FINAL

EXPANDED

PERFLUOROOCTANE SULFONATE (PFOS),

PERFLUOROOCTANOIC ACID (PFOA), AND

PERFLUOROBUTANE SULFONATE (PFBS)

SITE INSPECTION REPORT

FOR

EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA

Prepared for:

United States Air Force
Air Force Civil Engineer Center (AFCEC) CZOP
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July 2022

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Final
Expanded
Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS)
Site Inspection (SI) Report
for
Eielson Air Force Base and Moose Creek, Alaska

Prepared under:

U.S. Army Corps of Engineers
Alaska District
PO Box 6898
JBER, Alaska 99506-0898

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	microgram(s) per liter
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADEC Cleanup Levels	*Title 18 AAC Chapter 75, Oil and Other Hazardous Substances Pollution Control*
ADNR	Alaska Department of Natural Resources
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	aqueous film-forming foam
AGRA	AGRA Earth and Environmental, Inc.
B	The result is considered a high biased estimated value due to contamination present in associated blank
bgs	below ground surface
B.S.	Bachelor of Science
CDQR	Chemical Data Quality Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CPG	certified professional geologist
CSM	Conceptual Site Model
CWMA	Critical Water Management Area
DO	dissolved oxygen
DoD	Department of Defense
DQO	data quality objective
EA	EA Engineering, Science, and Technology, Inc., PBC
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
ERA	Ecological Risk Assessment
Eurofins	Eurofins Lancaster Laboratories
Expanded SI Report	*Expanded Perfluorooctane Sulfonate, Perfluorooctanoic Acid, and Perfluorobutane Sulfonate Site Inspection Report*
FCF	field change form
FNSB	Fairbanks North Star Borough
FFTA	former fire training area

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

FS	Feasibility Study
GAC	granular activated carbon
GeoTek Alaska	GeoTek Alaska, Inc., of Anchorage, Alaska
GIS	geographical information system
gpm	gallons per minute
GPS	global positioning system
HA	EPA lifetime Health Advisory
HDPE	high density polyethylene
HH	Human Health
HQ	hazard quotient
ID	identification
IDW	investigation-derived waste
IRP	Installation Restoration Program
J	Analyte was positively identified; the quantitation is estimated.
LC/MS/MS	liquid chromatography/tandem mass spectrometry
LF003	LF003 Containment Cell #1
LUC	Land Use Control
MED	Manual for Electronic Deliverables
mg/kg	milligram(s) per kilogram
M.S.	Master of Science
msl	mean sea level
mV	millivolts
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
No.	number
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric Turbidity Units
ORP	oxidation reduction potential
OSHA	Occupational Safety and Health Administration
PAL	project action level
PE	professional engineer
PFAA	perfluoroalkyl acids
PFAS	per- and polyfluoroalkyl substance
PFBS	perfluorobutane sulfonate

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

PFC	perfluorinated compound
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexane sulfonate
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOA+PFOS	aggregate of PFOA+PFOS
PFOS	perfluorooctane sulfonate
PFTA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnA	perfluoroundecanoic acid
PG	professional geologist
pH	potential hydrogen
PHA	provisional health advisories
PMP	Project Management Professional
PTW	principal threat waste
PVC	polyvinyl chloride
PWSID	Public Water System ID
QA	quality assurance
QC	quality control
QEP	Qualified Environmental Professional, defined in Title 18 AAC Chapter 75
QES	Qualified Environmental Sampler, defined in Title 18 AAC Chapter 75
QH	Analyte result is considered an estimated value with high bias due to a quality control failure
QL	Analyte result is considered an estimated value with low bias due to a quality control failure.
QN	Analyte result is considered an estimated value with uncertain bias due to a quality control failure
QSM	Quality Systems Manual
RI	Remedial Investigation
ROD	Record of Decision
ROE	right of entry
ROW	right of way
RSL	EPA Risk-Based Screening Levels
SI	Site Inspection
SP16 Sampler	GeoProbe® Screen Point 16 Sampler
Sundance-EA	Sundance-EA II LLC

LIST OF ACRONYMS AND ABBREVIATIONS (CONCLUDED)

UCMR	Unregulated Contaminant Monitoring Regulation
UECA	Uniform Environmental Covenants Act
USACE	U.S. Army Corps of Engineers
USACE-AK	U.S. Army Corps of Engineers – Alaska District
USAF	U.S. Air Force
USDOT	U.S. Department of Transportation
UST	underground storage tank
WRCC	Western Regional Climate Center
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers-Alaska District (USACE-AK), on behalf of the U.S. Air Force Civil Engineer Center (AFCEC), has contracted Sundance-EA II LLC (Sundance-EA) to prepare this Expanded Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS) Site Inspection (SI) Report (Expanded SI Report) for Eielson Air Force Base (AFB) and Moose Creek. This Expanded SI Report was prepared under Contract Number (No.) W911KB-17-D-0018, Task Order No. W911KB18F0173, the *Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Inspection at Eielson Air Force Base and Moose Creek Uniform Federal Policy-Quality Assurance Project Plan Work Plan*, dated September 2019 (Work Plan; U.S. Air Force [USAF], 2019a), and two separate Work Plan Addenda and field change forms (FCFs). The FCFs by phase of work are provided in Appendix A.

This Expanded SI Report describes the results of activities performed and recommends future activities at Eielson AFB and the adjacent community of Moose Creek. The goal of the Expanded SI was to further delineate known PFOS, PFOA, and PFBS groundwater contamination migrating off Eielson AFB to the community of Moose Creek, impacting the groundwater that the community of Moose Creek uses as its domestic water source. Investigated media included groundwater, soil, sediment, and surface water.

Per- and polyfluoroalkyl substance (PFAS) compounds or perfluorinated compounds (PFCs) are used in the formulation of aqueous film-forming foam (AFFF) that the USAF has historically used in polymers, waterproof coatings, aircraft hangar fire suppression systems, and fire training exercises to suppress aircraft and other vehicle fires. There is evidence that PFOS and PFOA are possible environmental contaminants resulting from AFFF releases. PFOS and PFOA are not Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) listed hazardous substances, but in some circumstances could be responded to as CERCLA pollutants or contaminants; therefore, the USAF is following the CERCLA process to address potential risks from exposure to these PFASs (USAF, 2016). In 2014, PFOS and PFOA contamination was identified in environmental media (e.g., groundwater and surface water) at Eielson AFB by the USAF. On 6 November 2016, Alaska Department of Environmental Conservation (ADEC) promulgated soil and groundwater cleanup levels for PFOS and PFOA. PFOS and PFOA are considered hazardous substances under state of Alaska regulations.

The purpose of this Expanded SI Report is to summarize the Expanded SI field activities, present analytical results, and provide recommendations for additional activities, if needed.

- **Groundwater and Surface Water Samples:** Project Action Levels (PALs) for PFOA and PFOS are based on the U.S. Environmental Protection Agency (EPA) lifetime Health Advisory (HA) of 0.070 micrograms per liter (µg/L) (70 parts per trillion) (EPA, 2016). If both PFOS and PFOA were present, the combined (aggregate, PFOA+PFOS) concentration was compared to the HA of 0.070 µg/L. The PAL for PFBS (target hazard quotient [HQ] of 0.1) is based upon the EPA Regional Screening Level (RSL) of 0.6 µg/L (EPA, 2020a). On and around Eielson AFB, the groundwater and surface water are generally in direct contact and are generally connected vertically and horizontally. Therefore, the groundwater and surface water are presented together.

- **Soil and Sediment Samples:** PALs for PFOA and PFOS (target HQ of 0.1) are calculated using the EPA RSL calculator on the EPA RSLs of 0.126 milligrams/kilogram (mg/kg) (EPA, 2020b). The PAL for PFBS (target HQ of 0.1) is based upon the EPA RSL of 1.9 mg/kg in residential soil (EPA, 2020a).

This Expanded SI Report addresses PFOS, PFOA, and PFBS contamination in groundwater, surface water, sediment, and soil on Eielson AFB and Moose Creek, Alaska. Project objectives were as follows.

1. To laterally and vertically delineate PFOS, PFOA, and PFBS contamination in groundwater on and around Eielson AFB and in the adjacent community of Moose Creek, focusing on areas that exceed the aggregate of PFOA and PFOS (PFOA+PFOS) EPA HA level (EPA, 2016).
2. To determine the concentrations PFOS, PFOA, and PFBS in surface water and sediment in surface water bodies at Eielson AFB and in one nearby surface water body (Bathing Beauty Lake) that is located off-Base that exceeds the PALs for groundwater and soil (Work Plan Addendum, USAF, 2020b; DoD, 2021).
3. To laterally and vertically delineate PFOS, PFOA, and PFBS concentrations in soil on Eielson AFB in the two areas at the Fire Station #1 (IRP Site SS306P) and the former fire training area (FFTA) by the current Entomology Building (Southern Burn Area, IRP Site FT092) with reported exceedances of the EPA RSLs for soil (Work Plan, USAF, 2019a; DoD, 2021). Initially, soil exceedances were also compared to the ADEC HH CLs for soil, but ADEC has subsequently deferred to the RSLs in lieu of HH CLs.

PFAS Analytical Results

Laboratory analysis identified multiple PFOS and PFOA+PFOS impacts exceeding PALs in groundwater samples and surface water samples that exceeded the PAL of 0.070 micrograms per liter (µg/L) (EPA, 2016). PFOA+PFOS results for existing, temporary, and new permanent shallow monitoring wells are shown on Figure 6-1. Laboratory analysis identified low concentrations of PFOA in both groundwater and surface water samples. Only one groundwater sample contained PFOA at a concentration exceeding the PAL of 0.070 µg/L (EPA, 2016). PFBS was detected in most groundwater and surface water samples submitted but all concentrations were well below the PFBS PAL of 0.6 µg/L.

Groundwater Receptors

Eielson AFB and Moose Creek are currently using either water from water treatment systems that remove PFOS, PFOA, and PFBS or water delivered to them. However, the groundwater ingestion pathway is considered complete for current and future commercial and industrial and residential land use scenarios due to potential treatment system failure. The pathway for dermal absorption of contaminants in groundwater is also considered complete, due to contact with groundwater used as tap water and potential contact with groundwater during subsurface construction. However, this pathway is considered insignificant because dermal absorption of PFOS, PFOA, and PFBS is slow.

Surface Water Receptors

The ingestion of surface water pathway is considered potentially complete for current and future commercial and industrial, and residential land use scenarios. The pathway for dermal absorption of contaminants in surface water is also considered complete; however, this pathway is considered insignificant because dermal absorption of PFOS, PFOA, and PFBS is slow.

Soil and Sediment Receptors

Because PFOS, PFOA, and PFBS are present in soil surface (0-2 feet below ground surface [bgs]) and subsurface soil (>2 feet bgs), the incidental soil ingestion pathway is considered potentially complete for both current and future users in commercial, industrial, and residential land use scenarios.

Direct contact with soil or sediment may occur; however, the associated exposure pathways are considered insignificant because dermal absorption of PFOS, PFOA, and PFBS is slow. Additionally, the results of the Expanded SI indicated that PFOS, PFOA, and PFBS concentrations in sediment from the 16 surface water bodies sampled were less than 1/100 of risk-based screening levels, which further indicates that the human health pathway by direct contact with sediment (which includes incidental ingestion as well as dermal absorption) is insignificant.

Conclusions/Recommendations

The objectives of the Expanded SI field activities included:

- Laterally and vertically delineate PFOS, PFOA, and PFBS contamination in groundwater on Eielson AFB and the adjacent community of Moose Creek,
- Laterally and vertically delineate PFOS, PFOA, and PFBS contamination in soil at Fire Station #1 (IRP Site SS306P),
- Laterally and vertically delineate PFOS, PFOA, and PFBS contamination the FFTAs by the current Entomology Building (Southern Burn Area, IRP Site FT092) on Eielson AFB, and
- Determine concentrations of PFOS, PFOA, and PFBS in surface water and sediment in surface water bodies on and around Eielson AFB.

PFOS, PFOA, and PFOA+PFOS concentrations in groundwater, surface water, and soil exceed PALs. PFBS concentrations in groundwater, surface water, and soil were well below the PALs. All sediment sample concentrations were below the PALs. Based on the data collected during this Expanded SI, it is recommended that Remedial Investigation (RI) activities be performed to further characterize PFOS and PFOA contamination in groundwater, surface water, and soil.

PFOS, PFOA, and PFOA+PFOS concentrations in groundwater, surface water, and soil media are considered to have potentially complete exposure pathways to human receptors for the current and future commercial/industrial land use scenarios. Fully delineating the extent of PFOS, PFOA, and PFOA+PFOS in relation to these media will be critical to understand risks to identified receptors at Eielson AFB and off-Base in the adjacent community of Moose Creek.

This Expanded SI Report provides support for the USAF Plan to conduct future RI activities that will further characterize PFOS, PFOA, and PFBS impacts. Per the Office of the Secretary of Defense Memo dated 6 July 2022, USAF will incorporate the 18 May 2022 RSLs as part of the RI

effort. Additionally, SI data will also be screened against the new RSLs. As part of the RI, a Human Health/Ecological Risk Assessment (HH/ERA) will be performed, and the CSM will be updated. A Feasibility Study/Proposed Plan will follow the RI to propose any changes needed to the established remedies at Eielson AFB to address PFOS, PFOA, and PFBS contamination. Any changes to the 2019 Interim Record of Decision (ROD) (USAF, 2019c) will be implemented during the next review process through a formal ROD amendment as appropriate.

Some specific recommendations for future investigations include:

- **Fire Station #1 (IRP Site SS306P) and FFTA soils:** Additional vertical soil delineation within identified contaminated areas is recommended by collecting soils at 1-to-2-foot intervals from the surface to below the groundwater interface. Due to the shallow groundwater, the subsurface samples collected were in the vadose zone directly above the groundwater interface at 6-8 feet bgs. Both soil investigation areas are within known areas of groundwater impacted with PFOS, PFOA, and PFBS. Depending on seasonal groundwater elevation fluctuations, the subsurface soil concentrations may be either contributing to or being impacted from the groundwater. As an example, Fire Station #1 had no detections of PFBS in the surface samples, but 11 of 13 subsurface samples had detections of PFBS.
- **Vertical Groundwater Delineation:** More detailed vertical delineation at multiple zones within the contaminant plume. It is recommended that a lateral series of temporary monitoring well samples are collected at 10 feet vertical intervals using direct push and SP-16 technology to better understand vertical contaminant transport after the groundwater flow is redirected to the west. Specifically:
    - Complete a transect from north-northeast to south-southwest within the Chena River Flood Control Project from MW33 to MW32 to further evaluate vertical distribution of contamination within and outside preferential pathways, as findings point to deep contamination in the area.
    - Complete a transect from north to south from Moose Creek Bluff to Piledriver Slough, to further evaluate vertical distribution of contamination within a narrowing within 1,000 feet of Moose Creek Bluff and Richardson Highway.

1 INTRODUCTION

The U.S. Army Corps of Engineers-Alaska District (USACE-AK), on behalf of the U.S. Air Force Civil Engineer Center (AFCEC), has contracted Sundance-EA II LLC (Sundance-EA) to prepare this Expanded Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS) Site Inspection (SI) Report (Expanded SI Report) for Eielson Air Force Base (AFB) and Moose Creek. This Expanded SI Report describes the results of activities performed and recommends future activities at Eielson AFB and the adjacent community of Moose Creek. The goal of the Expanded SI was to further delineate known PFOS, PFOA, and PFBS groundwater contamination migrating off Eielson AFB to the community of Moose Creek impacting the groundwater that the community of Moose Creek uses as its domestic water source. Investigated media included groundwater, soil, sediment, and surface water.

This Expanded SI Report was prepared under Contract Number (No.) W911KB-17-D-0018, Task Order No. W911KB18F0173, the *Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Inspection at Eielson Air Force Base and Moose Creek Uniform Federal Policy-Quality Assurance Project Plan Work Plan*, dated September 2019 (Work Plan; U.S. Air Force [USAF], 2019a), and the following three separate Work Plan Addenda and field change forms (FCFs).

1. *Existing Monitoring Well Sampling Work Plan Supplemental PFOA and PFOS Site Inspection at Eielson AFB, Alaska*, dated July 2019 (Existing Monitoring Well Sampling Work Plan Addendum; USAF, 2019b).
2. *Eielson Surface Water and Sediment Sampling Final Addendum to the Work Plan for Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Investigation, Eielson Air Force Base (AFB), Alaska*, dated April 2020 (Surface Water and Sediment Work Plan Addendum; USAF, 2020b).
3. *Birch Lake Surface Water, Sediment, and Soil Sampling, Final Addendum to the Work Plan for Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Investigation, Eielson Air Force Base (AFB), Alaska.* Dated 6 April 2020. The investigation at Birch Lake is discussed in a separate report.
4. FCFs used for documentation and approval of technical changes or additions to the Work Plan and Work Plan Addenda when revision or amendment of the document was not required (Appendix A).

1.1 BACKGROUND

Per- and polyfluoroalkyl substance (PFAS) compounds or perfluorinated compounds (PFCs) are used in the formulation of aqueous film-forming foam (AFFF) that the USAF has historically used in polymers, waterproof coatings, aircraft hangar fire suppression systems, and fire training exercises to suppress aircraft and other vehicle fires. There is evidence that PFOS, PFOA, and PFBS are possible environmental contaminants resulting from AFFF releases. PFOS and PFOA are not Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) listed hazardous substances, but in some circumstances could be responded to as CERCLA

pollutants or contaminants; therefore, the USAF is following the CERCLA process to address potential risks from exposure to these PFASs (USAF, 2016).

Several federal government documents confirm the initial use of AFFF by the Department of Defense (DoD) beginning in 1970.

- *Military Specification – Fire Extinguishing Agent, Aqueous Film Forming Foam (AFFF) Liquid Concentrate, Six Percent, for Fresh and Sea Water*. Issued on 21 November 1969 (U.S. Navy, 1969).
- General Accounting Office determination on sole source award protest to provide AFFF to the U.S. Navy in December 1969 (General Accounting Office, 1969).
- *History of U.S. Air Force Fire Protection Training at Chanute Air Force Base, 1964-1976*. (Coates, 1977).

Based on USAF performance testing results on AFFF, the Air Force Director of Civil Engineering, issued an authorization in 1970 for the USAF to procure AFFF. No usage within the USAF is documented or suspected prior to 1970.

In the 1970s, the USAF began using AFFF containing PFAS associated with historical activities at fire-training sites and other facilities at Eielson AFB (CH2MHill, 2018). Military and AFFF manufacturers removed PFOS and PFOA from AFFF in the early 2000s as part of a nationwide voluntary phaseout (U.S. Environmental Protection Agency [EPA], 2009a). Although PFOS and PFOA were never major constituents of AFFF, some of the compounds used in these formulations are thought to degrade to form PFOS and PFOA. The USAF continues to use these and older formulations (which are not banned by the EPA) that are in stock from their significant inventory (CH2MHill, 2018). PFOS and PFOA are banned substances under the Stockholm Convention (to which the United States is not a signatory). EPA has entered into agreements with manufacturers to phase out these chemicals in the United States (CH2MHill, 2018). PFBS is a shorter-chain PFAS used as a replacement for PFOS.

In 2014, PFOS and PFOA contamination was identified in environmental media (i.e., groundwater and surface water) at Eielson AFB by the USAF and is further discussed in Section 3. On 6 November 2016, ADEC promulgated soil and groundwater cleanup levels for PFOS and PFOA. PFOS and PFOA are considered hazardous substances under state of Alaska regulations.

1.2 PURPOSE AND OBJECTIVES

The purpose of this Expanded SI Report is to summarize the Expanded SI field activities, present analytical results, and provide recommendations for additional activities, if needed.

This Expanded SI Report addresses PFOS, PFOA, and PFBS contamination in groundwater, surface water, sediment, and soil on Eielson AFB and Moose Creek, Alaska. Project objectives were as follows.

1. To laterally and vertically delineate PFOS, PFOA, and PFBS contamination in groundwater on and around Eielson AFB and in the adjacent community of Moose Creek, focusing on areas that exceed the PALs as detailed in Section 1.3.
2. To determine the concentrations PFOS, PFOA, and PFBS in surface water and sediment in surface water bodies at Eielson AFB and in one nearby surface water body (Bathing Beauty

Lake) that is located off-Base that exceeds the PALs as detailed in Section 1.3 for surface water and soil (Work Plan Addendum, USAF, 2020b; DoD, 2021).

3. To laterally and vertically delineate PFOS, PFOA, and PFBS concentrations in soil on Eielson AFB in the two areas at the Fire Station #1 (IRP Site SS306P) and the former fire training areas (FFTAs) by the current Entomology Building (Southern Burn Area, IRP Site FT092) with reported exceedances of the Alaska Department of Environmental Conservation (ADEC) HH Cleanup Levels and EPA Regional Screening Levels (RSLs) for soil (Work Plan, USAF, 2019a; DoD, 2021).

1.3 REGULATORY SETTING

Samples were collected to identify the presence or absence of and to delineate PFOS, PFOA, and PFBS contamination in site groundwater, surface water, sediment, and soil. These samples were analyzed and compared to applicable screening levels to determine whether identified data gaps have been fully delineated or to identify new data gaps based on the Expanded SI field activities at Eielson AFB and the community of Moose Creek.

PFOS and PFOA are not CERCLA listed hazardous substances, but in some circumstances could be responded to as CERCLA pollutants or contaminants; therefore, the USAF is following the CERCLA process to address potential risks from exposure to these PFASs (USAF, 2016). On 6 November 2016, ADEC promulgated soil and groundwater cleanup levels for PFOS and PFOA. PFOS and PFOA are considered hazardous substances under state of Alaska regulations. The only PFAS compounds with state or federal screening criteria are PFOS, PFOA, and PFBS, as described below.

Groundwater, surface water, sediment, and soil sample results were analyzed for 14 PFAS compounds as presented in the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b); however, no applicable screening levels are available for these compounds, other than PFOS, PFOA, and PFBS. Results for the other PFAS compounds were not compared to applicable screening levels as they do not have established state or federal screening criteria. For the Expanded SI field activities, as agreed upon by all stakeholders, analytical results for PFOS, PFOA, and PFBS in groundwater, surface water, sediment, and soil samples were compared to the applicable screening levels designated as PALs. The National Contingency Plan (NCP), as stated in 40 CFR 300.420, assigns responsibility for an SI to the lead agency. The USAF, as the lead agency, selected the EPA RSLs as PALs for soil and sediment consistent with the 2021 Assistant Secretary of Defense Memorandum, Investigating Per- and Polyfluoroalkyl Substances within the DoD Cleanup Program (DoD, 2021). Applicable screening levels and groundwater, surface water, sediment, and surface soil PALs are provided in analytical result tables in Section 6.

- **Groundwater and Surface Water Samples:** PALs for PFOA and PFOS are based on the HA of 0.070 micrograms per liter (µg/L) (70 parts per trillion) (EPA, 2016). If both PFOS and PFOA were present, the combined (aggregate, PFOA+PFOS) concentration was compared to the HA of 0.070 µg/L. The PAL for PFBS (target hazard quotient [HQ] of 0.1) is based upon the EPA RSL of 0.6 µg/L (EPA, 2020a). On and around Eielson AFB, the groundwater and surface water are generally in direct contact and are generally connected vertically and horizontally. Therefore, the groundwater and surface water are presented together.

- **Soil and Sediment Samples:** PALs for PFOA and PFOS (target HQ of 0.1) of 0.126 milligrams/kilogram (mg/kg) are calculated using the EPA RSL calculator (EPA, 2020b). The PAL for PFBS (target HQ of 0.1) is based upon the EPA RSL of 1.9 mg/kg in residential soil (EPA, 2020a).

1.3.1 Moose Creek Interim Record of Decision

A 2019 Interim Record of Decision (ROD), currently in place for the community of Moose Creek, selected an interim remedy to provide potable water supplied by the city of North Pole Water Treatment Plant (WTP) to the community of Moose Creek and institute land use controls (LUCs) to prohibit the use of contaminated groundwater (USAF, 2019c). This interim remedy does not address the principal threat waste (PTW); the identification of PTW and approaches to address any identified PTW will be addressed in the Final ROD. A PTW is normally defined as material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater (USAF, 2019c).

Following are the major components of the selected remedy:

- A new water main is currently being constructed to connect the city of North Pole WTP to the community of Moose Creek. A local distribution system, holding tank, and circulation pumping station will be constructed to serve the community, and local connections will be made to affected properties in the community of Moose Creek.
- The new system will be maintained and operated by the North Pole Municipality, which will collect water use charges from property owners, and operate and maintain the system for the residents of Moose Creek.
- LUCs will be required to prohibit the use of contaminated groundwater. The LUCs will include a Critical Water Management Area (CWMA), which will be established to prevent the use of contaminated groundwater and prohibit the installation of new water wells within the CWMA.
- The Alaska Uniform Environmental Covenants Act (UECA) will require the recording of environmental covenants on all impacted real properties in accordance with Alaska statutory law. The USAF will negotiate agreements with impacted landowners to 1) decommission existing wells, 2) discontinue use of the property groundwater for any purpose, 3) provide access for USAF monitoring of groundwater and/or LUCs, and 4) place a covenant on the property to prohibit future well installation and contaminated-groundwater use.
- In addition, the previously installed water tanks, and granular activated carbon (GAC) systems will be removed, and tanker and bottled water delivery will stop.

1.3.2 Moose Creek Critical Water Management Area

As part of the 2019 Interim ROD (USAF, 2019c; Section 1.3.1), LUCs will be required to prohibit the use of contaminated groundwater. The LUCs will include a CWMA, which will be established to prevent the use of contaminated groundwater and prohibit the installation of new water wells within the CWMA. On 26 November 2019, the USAF requested that the Alaska Department of Natural Resources (ADNR) establish a CWMA for the water within Moose Creek, Alaska. The

USAF request for a CWMA was in response to known PFOS and PFOA contamination on Eielson AFB (ADNR, 2020). The CWMA order and decision was signed by the Commissioner of DNR on 24 May 2021. As of 31 June 2021, the CWMA was no longer appealable, and is considered in effect by DNR.

Portions of Expanded SI field activities completed for this Expanded SI Report were located within the Moose Creek CWMA managed by ADNR as shown on Figure 1-1.

1.4 REPORT ORGANIZATION

This Expanded SI Report is organized into the following sections and appendices:

Section 1.0: Introduction

Presents an introduction, purpose and objectives, regulatory setting, applicable state and federal screening levels and PALs, document organization, project key personnel, and analytical program.

Section 2.0: Site Setting

Presents a site description, including general background information and a brief site history; and site setting, including physical and environmental setting, and current and potential future land use.

Section 3.0: Previous Investigations

Presents a summary of previous investigations conducted within and adjacent to Eielson AFB and the community of Moose Creek, Alaska.

Section 4.0: Conceptual Site Model

Evaluates the primary release mechanisms, secondary contaminant migration, fate and transport considerations, and potential exposure pathways for human and ecological receptors that might be threatened by PFOA, PFOS, and PFBS in environmental media.

Section 5.0: Site Inspection Field Activities

Describes the premobilization activities, phased mobilization approach and site setup activities, Expanded SI field activities organized by phased approach, global positioning system (GPS) surveys, investigation-derived waste (IDW) management, site restoration, and deviations from the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b).

Section 6.0: Results

Presents the extent of PFOS, PFOA, and PFBS contamination by media type (e.g., groundwater, surface water, sediment, and soil), and a summary of the data review, validation, and usability assessment.

Section 7.0: Summary and Conclusions

Presents a summary of the extent of contamination by media types (e.g., groundwater, surface water, sediment, and soil), conclusions, data limitations, and recommendations for future work.

Section 8.0: References

Presents the works cited and referenced within this Expanded SI Report.

Appendix A: Field Change Forms by Phase of Work

Presents the field change forms by phase of work used for documentation and approval of technical changes or additions to the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b) when revision or amendment of the document was not required.

Appendix B: Site Conceptual Model

Presents the ADEC Human Health Conceptual Site Model (CSM) Scoping Form and Standardized Graphic (ADEC, 2017).

Appendix C: Site Inspection Photographs

Presents general site photographs for Expanded SI field activities, including drill rig and supporting equipment, well development, low-flow groundwater sampling, surface water, and sediment sampling.

Appendix D: Site Access

Presents the 811 One Calls, USAF Dig Permit site access forms, and Right of Way (ROW) agreements for Expanded SI field activities.

Appendix E: Field Daily Activity Logs, Tailgate Safety Meetings & Job Safety Analysis, and Field Logbooks

Presents Field Activity Logs, Tailgate Safety Meetings & Job Safety Analysis forms, and field notebooks, in chronological order for the Expanded SI field activities.

Appendix F: Field Measurement Data

Presents the calibration log sheets, well development records, groundwater sample collection logs, low-flow groundwater sampling and stabilization forms, surface water sampling forms, sediment sampling forms, and soil sampling forms.

Appendix G: Boring Logs and Monitoring Well Construction Details

Presents the boring logs and monitoring well construction details for permanent shallow and clustered monitoring wells.

Appendix H: Survey Report

Presents the document sample locations and features of interest in accordance with the USACE-AK Manual for Electronic Deliverable (MED) (USACE, 2017) for the survey results.

Appendix I: Investigation Derived Waste Management

Presents the IDW Management documentation, including the ADEC Transport, Treatment, & Disposal Approval Forms for Contaminated Media, and final signed disposal manifests.

Appendix J: Analytical Laboratory Reports

Presents complete laboratory analytical reports.

Appendix K: Chemical Data Quality Report

Presents the chemical data quality report (CDQR), including data quality assessment evaluation, ADEC laboratory data review and checklists.

Appendix L: Response to Comments

Presents the response to comments, to be determined.

1.5 PROJECT KEY PERSONNEL

This project was managed by Qualified Environmental Professionals (QEPs; as defined in 18 AAC 75.333) and all samples were collected by our team of Qualified Environmental Samplers (QES; as defined in 18 AAC 75.990 (100)) (AAC, 2021). All samples were collected following the procedures and methods outlined in the *Field Sampling Guidance* (ADEC, 2019b) and the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b) except as described in Section 5.7 Deviations. The project key personnel below provided and performed project oversight, technical support review, quality assurance (QA) and QC, and Expanded SI field activities:

- **Program Manager/Senior Project Manager:** John Consoletti, Professional Engineer (PE), Project Management Professional (PMP), is a program manager, senior project manager, and senior engineer with over 25 years of professional experience in program and project management, engineering, design, management of remedial actions, and site characterization.
- **Program Manager/Senior Project Manager:** Mark Wilkinson, Certificated Professional Geologist (CPG), is a program manager and senior project manager with a Bachelor of Science (B.S.) in Geology and a Master of Science (M.S.) in Management, and has over 20 years of professional experience performing and managing environmental projects.
- **Deputy Project Manager:** Sharon Richmond, is a project manager and senior scientist with an M.S. in Applied and Environmental Microbiology and a PhD in Biology and has over 27 years of professional experience performing and managing environmental projects.
- **QA/QC Manager:** Nicole Stoecklein, CPG, is a geologist with a B.S. in Geology and has over 15 years of professional experience performing and task managing environmental investigations and remediation as an Alaska QEP.
- **Project Chemist:** Brenda Nuding is an environmental professional with over 30 years of experience with environmental projects and a project chemist with over 12 years of experience with an environmental analytical laboratory.
- **Senior Technical Support and Site Health and Safety Officer:** Colleen Rust, CPG, Professional Geologist (PG), PMP, is a project manager and geologist with a B.S. in Geology and an M.S. in Hydrogeology with over 10 years of professional experience performing and managing environmental projects.

- **Field Team Lead:** George Garner, is a geologist with a B.S. in Geology with over 8 years of professional experience in environmental investigation and remediation and is an Alaska QEP. He holds the following certifications Alaska Certified Erosion and Sediment Control Lead, Occupational Safety and Health Administration (OSHA) 40-Hour Hazardous Waste Operations, and OSHA 30-Hour Construction Operations.
- **Field Team Lead:** Nicole Stoecklein, CPG, is a geologist with a B.S. Geology and has over 15 years of professional experience performing and task managing environmental investigations and remediation as an Alaska QEP.
- **Laboratory Project Manager:** Kay Hower (Eurofins Lancaster Laboratories [Eurofins]) is a laboratory project manager with over 20 years of professional experience managing contact between the project team and analytical laboratory.
- **Laboratory Quality Assurance Manager:** Dorothy Love (Eurofins) is the laboratory quality assurance manager with over 30 years of experience as an analytical chemist and responsible for planning, directing, and supervising the quality system for laboratory compliance with federal and state regulations at Eurofins.

The following firms were subcontracted to perform services for the Expanded SI field activities:

- GeoTek Alaska, Inc. of Anchorage, Alaska (GeoTek Alaska), provided drilling services.
- Eurofins Lancaster Laboratories provided analytical testing.
- Gumfory Underground was contracted to complete utility locates.
- 3-Tier Alaska Civil Engineering & Surveying provided the professional survey.
- US Ecology provided IDW management services and NRC Alaska transported IDW waste.

1.6 ANALYTICAL PROGRAM

Groundwater, surface water, sediment, and soil samples were submitted for analytical testing at Eurofins Laboratory office in Lancaster, Pennsylvania and SGS in Orlando, Florida. Eurofins and SGS are ADEC-approved laboratories accredited through the Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP). The analytical program was completed in accordance with the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b). The following analyses were selected to identify presence or absence of and delineate PFOS, PFOA, and PFBS contamination in groundwater, surface water, sediment, and soil.

Groundwater, surface water, soil, and sediment samples were submitted for analysis of the following constituents by isotope dilution liquid chromatography/tandem mass spectrometry [LC/MS/MS]) 537 Modified compliant with DoD quality systems manual (QSM) Version 5.1 Table B-15 (DoD, 2017):

- PFOS, PFOA, and PFBS,
- 11 additional compounds:
    - N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA),
    - N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA),

- perfluorodecanoic acid (PFDA),
- perfluorododecanoic acid (PFDoA),
- perfluoroheptanoic acid (PFHpA),
- perfluorohexane sulfonate (PFHxS),
- perfluorohexanoic acid (PFHxA),
- perfluorononanoic acid (PFNA),
- perfluorotetradecanoic acid (PFTA),
- perfluorotridecanoic acid (PFTrDA), and
- perfluoroundecanoic acid (PFUnA).

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2 SITE SETTING

Site setting information regarding previously conducted field activities at various sites at Eielson AFB and the adjacent community of Moose Creek has been detailed in numerous historical documents. This section briefly describes the general background information; a brief site history; site setting, including physical and environmental settings; and current and potential future land use at Eielson AFB and the adjacent community of Moose Creek.

2.1 SITE DESCRIPTION

Eielson AFB, Alaska, is located approximately 120 miles south of the Arctic Circle, 25 miles southeast of Fairbanks, 12 miles southeast of the city of North Pole, and 6 miles southeast of the community of Moose Creek and is a relatively undeveloped area as shown on Figure 2-1. A mixture of commercial, light industrial, residential, and recreational areas has been developed in a narrow corridor along the Richardson Highway between Eielson AFB and Fairbanks (CH2MHill, 2018). The main entrance to Eielson AFB is at about Milepost 341 of the Richardson Highway.

Eielson AFB encompasses 19,790 acres of the Fairbanks North Star Borough (FNSB). It is bordered on the southern, eastern, and western boundaries by undeveloped military reservation lands and on the northern boundary by the community of Moose Creek. Approximately 3,651 acres of Eielson AFB is improved or partially improved land. There are 16,139 acres of undeveloped land encompassing forests, wetlands, lakes, and ponds.

Established in 1944, Eielson AFB is an active military installation. The mission of Eielson AFB is to train and equip personnel for close air support of ground troops in an arctic environment. Eielson AFB operations include industrial areas, aircraft maintenance and operations, an active runway and associated facilities, administrative offices, and residential and recreational facilities. Eielson AFB provides housing for resident military personnel and their dependents, as well as employment and services for civilians from the surrounding area (AECOM, 2014).

2.2 CLIMATE

Eielson AFB is in the continental climatic zone, which covers the interior of Alaska. The climate in this zone is semi-arid and is characterized by great diurnal and annual temperature variations, low precipitation, and low humidity. Large annual variations in temperature and solar radiation occur because of the high latitude location. The average summer temperature is approximately 59 degrees Fahrenheit (°F) while the average winter temperature is -2 °F (USAF, 2017b). Snowfall predominantly occurs from October through April and averages 70.9 inches per year; the highest monthly averages occur in October, November, December, and January. The average annual precipitation for 1946 through 2011 is 12.86 inches (Western Regional Climate Center [WRCC], 2015). Table 2-1 presents the average maximum and minimum temperatures and average precipitation and snowfall by month and annually from 01 October 1946 through 30 June 2011 (WRCC, 2015).

2.3 TOPOGRAPHY

Eielson AFB is in the Tanana River Valley along the northern bank of the Tanana River on a low, relatively flat, floodplain terrace approximately 2 miles from the active river channel with

meandering streams and a complex network of shallow swales (CH2MHill, 2018). Approximately 89 percent of Eielson AFB is flat alluvial floodplain with elevations ranging from 520 to 556 feet above mean sea level (msl). The remaining 11 percent of the Eielson AFB is in the uplands along the eastern edge of the valley. Elevations in the main industrial area surrounding the flight line range from 548 to 556 feet above msl from Richardson Highway to the west to French Creek the east before the foothills. In the uplands at the northeast extent of the Eielson AFB includes Engineer Hill, which reaches 1,000 feet above msl. The highest elevation on Eielson AFB, Quarry Hill, is 1,125 feet msl, which is in the uplands at the southeastern corner of Eielson AFB (AECOM, 2014).

2.4 SOIL AND VEGETATION TYPES

Soils in the vicinity of Eielson AFB are mainly composed of a mixture of sands and sandy gravels with variable amounts of silt. The soils are highly variable over short distances due to the presence of relict meandering river and creek channels associated with the Tanana River.

Eielson AFB is characterized as lowland spruce and hardwood forest (USAF, 2017b). Dense and open stands of evergreen and deciduous trees include black and white spruce, birch, and aspen. Shrubs include willow, alder, dwarf birch, low-bush cranberry, and blueberry. Sedges and bog cranberry occur along small bogs and muskegs. Some riparian vegetation is present along the banks of the various creeks and sloughs draining the base.

2.5 ECOLOGICAL AND BIOLOGICAL RESOURCES

Wildlife species prevalent at Eielson AFB include moose, black bear, fox, owl, grouse, ptarmigan, duck, and geese. French Creek, Moose Creek, and Piledriver Slough support arctic grayling, salmon, and other fish (USAF, 2017b). No Threatened and Endangered Species identified by the U.S. Fish and Wildlife Service (USFWS) are known to live within the study area (USFWS, 2022).

2.6 GEOLOGY

Eielson AFB lies in the Tanana-Kuskokwim Lowlands physiographic province. The Tanana-Kuskokwim Lowlands are a broad depression bordering the Alaska Range to the south and the Yukon-Tanana Upland to the north. The Tanana-Kuskokwim Lowlands are generally characterized by glacial moraines, outwash plains, terraces, and floodplains formed by glaciers and streams flowing northward from the Alaska Range. During the Pleistocene, glaciers extended north from the Alaska Range to positions within about 80 miles of Fairbanks, and taller peaks of the uplands supported isolated alpine glaciers. However, most of the Tanana-Kuskokwim Lowlands, including Eielson AFB and the community of Moose Creek, have not been glaciated (R&M, 2017).

The geology of the Tanana River floodplain is generally characterized by a thick sequence of heterogenous mixture of coarse alluvial sands and gravels with interbedded silts and occasional peat or organics (AECOM, 2014). Where untouched by human activity, the upper 10-15 feet of basin fill is composed of a variable combination of well graded sand, gravel interbedded with poorly graded sand, and intervals of silt (USAF, 2017b). Bedrock at the margins of the floodplain is a metamorphic quartz-biotite schist known as Birch Creek Schist. The unconsolidated deposits of the Tanana Basin are limited to the floodplain and extend for a short distance up the hill slopes.

The Yukon-Tanana Uplands east of Eielson AFB are mantled with perennially frozen silt as shown on Figure 2-2 and Figure 2-3 (Ahtna, 2020; Figure 2-2; Geology Map Source, 2021).

Moose Creek Bluff is a prominent feature north of Eielson AFB next to the Richardson Highway and just upstream of Moose Creek Dam, as shown on Figure 2-2 and Figure 2-3 (Ahtna, 2020; Figure 2-2; Geology Map Source, 2021). The Moose Creek Bluff is an exposure of Birch Creek Schist that extends about 276 feet above the surrounding Tanana River floodplain. To the north of Moose Creek Bluff, bedrock was encountered in one boring at a depth of 616 feet (USACE, 2013). However, drilling, and other historical investigations have indicated that bedrock may exist up to 250 to 400 feet below much of the developed portion of Eielson AFB (AFCEC, 2015b). Review of historical documents also indicate that the bluff originally extended to the west of Richardson Highway, but the surface exposure was blasted away for the highway construction. The subsurface remains of this extension influence the shallow surface water flow in that area. Shallow bedrock has been observed on the east side of Eielson AFB. A conceptual east-west cross-section from the Groundwater Model Summary and Quality Report for the Yukon-Tanana Uplands to the Tanana River is shown on Figure 2-4 (Ahtna, 2020; Figure 2-3).

2.7 PERMAFROST

The Tanana River floodplain is underlain by numerous isolated masses of permafrost, which is defined as ground (e.g., rock, soil, or sediment) at a temperature below 0 degrees Celsius (°C) for two or more consecutive years. The presence of permafrost is a controlling factor in groundwater dynamics in the Tanana River floodplain (Ahtna, 2020). Both temperature of permafrost at depth just below the zone of seasonal variation, and air temperature are extremely variable in regions of discontinuous permafrost (R&M, 2017). Permafrost in the area is discontinuous and is generally absent on south-facing slopes and underneath large or warm surface water bodies. Permafrost can have a significant seasonal effect on the flow of groundwater and surface water between unconfined and confined conditions. Shallow permafrost, especially in low-lying areas, contributes to the formation of wetlands, which are prevalent on the landscape. Estimated permafrost boundaries (e.g., uncertain, shallow, frozen bedrock, deep, and very deep) are shown on Figure 2-1.

2.8 HYDROLOGY AND SURFACE WATER BODIES

Eielson AFB is bounded by the Tanana River to the west and the Yukon-Tanana Uplands to the east. The developed portion of the Base is bounded by French Creek to the east, Piledriver Slough to the west, and Moose Creek to the north. French Creek flows north-northwest along the eastern side of Eielson AFB, eventually flowing into Moose Creek. Although much of the immediate area of Eielson AFB has been built up with fill material, Eielson AFB is surrounded by large areas of forested wetland and numerous small lakes, ponds, creeks, and sloughs as illustrated on Figure 2-5. Eielson AFB is relatively flat, and stormwater drainage occurs as sheet flow across much of Eielson AFB. Sheet flow primarily collects in low areas or drains into Garrison Slough. Garrison Slough flows from south to north through the main area of Eielson AFB, east of the flight line, and drains into Moose Creek north of the Eielson AFB, which ultimately drains to the Tanana River. Piledriver Slough (previously known as Chena Slough; War Department, 1946) meanders along the western side of Eielson AFB eventually merging with Moose Creek to the northwest of Eielson AFB.

Note, on and around Eielson AFB, the groundwater and surface water are generally in direct contact and are generally connected vertically and horizontally. Therefore, the groundwater and surface water are presented together within this report.

The Tanana River is a large glacially fed river west of Eielson AFB with a mean annual flow of 41,800 cubic feet per second (cfs) (Bailey, 2005). The drainage area of Tanana River is approximately 44,300 square miles, with an extensive braided channel system (Kraemer and Brabets, 2012). The Chena River joins the Tanana River about 25 miles northwest of Eielson AFB. Severe flooding of the Chena River prompted the construction of the Moose Creek Dam in 1973. Moose Creek Dam was operational up until 1979 (USACE, 2017). While the Moose Creek Dam does not have a permanent reservoir, it can hold back and diverts water from the Chena River to the Tanana River as needed, preventing flood damage to downtown Fairbanks (AECOM, 2014).

Numerous small lakes, ponds, creeks, and sloughs are present within the Tanana River floodplain and specifically, within the footprint of Eielson AFB as illustrated on Figure 2-5. Piledriver Slough, west of the Eielson AFB runway, is groundwater fed south of Eielson AFB and discharges to the Tanana River near the Moose Creek Dam (Wuttig, 1997). Flows in Piledriver Slough have been measured between 50 and 75 cfs in the northern part (Wuttig, 1997) and between 2 and 8 cfs in the southern part (Tanana Valley Watershed Association, 2016). Garrison Slough runs through the developed portion of Eielson AFB and joins Moose Creek near the northwestern boundary of Eielson AFB. Garrison Slough receives water from the aquifer along most of its length as indicated by surface water levels (relative to groundwater elevations) and stable isotope data (EA Engineering, Science & Technology, Inc. [EA], 2008; and AFCEC, 2019). Moose Creek and French Creek originate to the east and southeast of Eielson AFB, respectively, in the Yukon-Tanana Uplands. French Creek joins Moose Creek at the northeast edge of Eielson AFB and together they discharge to Piledriver Slough northwest of Eielson AFB (Ahtna, 2020).

Within the local Tanana River floodplain, there are historical stream channels from the Pleistocene until the construction of the Chena River Flood Control Project in the 1970s as shown in photographs taken in and around Moose Creek Bluff, Moose Creek, and Chena Slough (currently called Piledriver Slough) (Figure 2-6, Figure 2-7, and Figure 2-8; War Department, 1946). Historical stream channels where the hydraulic conductivity is greater than surrounding sediments and generally consist of well graded sand, gravel interbedded with poorly graded sand, and intervals of silt (USAF, 2017b) may create preferential pathways for contamination transport. More recent historical stream channels can be identified in aerial photographs as oxbow lakes, low lying areas, and variation of land cover. Historical stream channels were estimated based on aerial photographs and the 1930s and 1940s historical photographs (War Department, 1946) and are shown on Figure 2-5.

2.9 HYDROGEOLOGY

Eielson AFB is underlain by unconsolidated sedimentary deposits that act as an unconfined aquifer overlying Birch Creek Schist at an approximate depth of 250 to 400 feet below ground surface (bgs) from the Tanana River to Garrison Slough and shallowing to near ground surface east of French Creek. The hydrogeologic properties of the Birch Creek Schist bedrock are unknown; however, it likely acts as an aquitard at depth. These unconsolidated deposits do not extend far up the foothill slopes. Groundwater flows down the foothill slopes within the Birch Creek Schist and within the overlying unconsolidated deposits of the Tanana Basin that make up the Tanana Basin

Aquifer. Alluvial fans within the unconsolidated deposits trend to fineness toward their distal ends. These alluvial fan deposits are typically much finer than the braided river deposits encountered at Eielson AFB, causing a boundary effect. However, the thickness of the alluvial fans is inconsistent, and at least a portion of the alluvial fans likely has pushed out over older braided river deposits. If this is the case, the groundwater flow direction in the deeper part of the unconfined aquifer (estimated greater than approximately 50 feet bgs) could be more westerly than the shallow flow direction that is in a north-northwest direction (AECOM, 2014).

The Tanana Basin Aquifer is composed of a heterogeneous mixture of gravelly sands and sandy gravels. Although the entire Tanana Basin Aquifer is generally very permeable, this vertical heterogeneity causes local changes in groundwater flow velocity. Groundwater depths range from the ground surface in wetland areas to 10 feet bgs in developed areas of Eielson AFB. Groundwater flow has a regional gradient of approximately 5 feet per mile flowing to the north-northwest as shown on Figure 2-5. The groundwater flow direction on Eielson AFB generally follows along the regional gradient in a north-northwesterly direction. However, with isolated masses of permafrost (e.g., uncertain, shallow, frozen bedrock, deep, and very deep), the Birch Creek Schist of the Yukon-Tanana Uplands to the east, and Moose Creek Bluff to the north of the community of Moose Creek, appear to redirect groundwater flow due west towards the Tanana River. Contaminants released in this environment tend to migrate comparatively slowly through the fill material near the ground surface and very rapidly in the Tanana Basin Aquifer sediments. Contaminant plume shapes are expected to be complex because of the vertical disparity in groundwater velocity encountered in braided river sediments, alluvial fans, and historical stream channels (AECOM, 2014). Although the isolated masses of permafrost, Birch Creek Schist, and Moose Creek Bluff have very low hydraulic conductivity, it is expected that fracture flow and preferential flow pathways likely occurs through these very low hydraulic conductivity features.

Recharge to the Tanana Basin Aquifer is from precipitation, snowmelt, and infiltration from rivers and surface water bodies. Historical water-level data indicate that recharge typically increases from late March to April through May to mid-June indicating recharge from snowmelt and from high water levels in the rivers and surface water bodies. Water-level declines begin in July or August. Analysis of river stage elevations compared with groundwater levels indicates that there is little separation between the two (less than 0.2 foot) although data are limited. Based on these data, the sloughs, and creeks at or near Eielson AFB are likely to be at the same elevation as the groundwater. Eielson AFB is also surrounded by wetland areas. On the eastern side of Eielson AFB, these wetlands likely recharge groundwater (CH2MHill, 2018). The largest recharge to the Tanana Basin Aquifer is from the Tanana River during periods of high flow. Another source of recharge to the Tanana Basin Aquifer is from groundwater flowing from the Birch Creek Schist down the hill slopes to the Tanana Basin valley and to the wetlands at the foot of the Yukon-Tanana Uplands.

The groundwater within the Tanana Basin Aquifer is a calcium bicarbonate or calcium magnesium bicarbonate type. The groundwater quality is suitable for most uses in many areas but is highly variable and locally contains high iron and manganese and may not be usable for drinking water without treatment. Eielson AFB uses the local Tanana Basin Aquifer for its drinking water and monitors groundwater quality in several locations as part of its Installation Restoration Program (IRP). Localized contamination of the aquifer has been identified in the industrial area of Eielson AFB (USAF, 2007).

The hydraulic gradient varies along the Eielson AFB flight line where a decline in hydraulic head of 4 feet has been observed over a 3,750-foot distance yielding a gradient of 0.0011. Using this gradient with a hydraulic conductivity of 240 feet per day (based on a transmissivity of 800,000 gallons per day per foot; Cederstrom, 1963), a 450-foot thickness, and a porosity of 0.3, groundwater would flow approximately 320 feet in 1 year. However, it is likely that the groundwater velocity is highly variable in braided river sediments, alluvial fans, and historical stream channels (AECOM, 2014) leading to preferential pathways with significant differences in flow velocities.

Regionally, water supply wells in the underlying Birch Creek Schist, which is an inferior water-bearing formation, seldom yield more than 10 gallons per minute (gpm). Of more significance in terms of well yield are the sediment-filled valleys along the mountain slopes (CH2MHill, 2018). These valleys are commonly underlain with sand and gravel, and wells drilled into these deposits may yield 100 gpm or more (Cederstrom, 1963). The sands and gravels underlying the Tanana River Valley (braided river deposits) that make up the Tanana Basin Aquifer provide large quantities of water (1,000 gpm or more) to wells. Well yields of up to 3,400 gpm with minimal drawdown have been reported. Recharge is predominantly from seepage into the aquifer from stream beds during periods of melt water rather than from precipitation. During these times, the river elevations are higher than the groundwater levels (CH2MHill, 2018).

2.10 EIELSON AFB HISTORICAL AND CURRENT POTABLE WATER USE

Eielson AFB uses the shallow unconfined aquifer for its drinking water. Eight drinking water wells are on Eielson AFB, and a ninth well provides drinking water strictly for the military working dogs as shown on Figure 2-1. Of the eight drinking water wells, five are primary water supply wells that provide Eielson AFB with drinking water, a sixth is a standby and backup well to the main drinking water system, and two (one at Hursey Gate and one at the Bear Lake Family Camp) supply single facilities. The drinking water wells that supply the primary drinking water distribution system range in depth from 89 to 160 feet bgs and have pumps set at between 42 and 106 feet bgs (although the depth of one pump is unknown) (CH2MHill, 2018). Each drinking water well can produce 1,000 gpm, except for one that can produce 2,500 gpm (Hollowell, 2015). The five primary Eielson AFB drinking water wells and standby and backup well are connected to the public water system for Eielson AFB, which is a community water system. The Eielson AFB Water Treatment Plant uses a combination of oxidation, filtration, disinfection, and activated carbon treatment before distribution (ADEC, 2021). The Alaska Public Water System identification (ID) (PWSID) for this system is 370625. The federal PWSID is AK2370625.

2.11 MOOSE CREEK HISTORICAL AND CURRENT POTABLE WATER USE

The 2013 Five-Year Review for Eielson AFB indicated that multiple private wells had been identified within 5 kilometers (3.1 miles) of Eielson AFB, primarily in the adjacent community of Moose Creek (USAF, 2014). Moose Creek is a community that stretches from approximately 1 to 3 miles downgradient of the northern end of Eielson AFB. The community relies on wells installed in the shallow aquifer for drinking water. During a time-critical removal action conducted in Moose Creek, 178 properties with drinking water wells were identified in the community (USACE, 2018). Drinking water wells in Moose Creek range from 12 to 60 feet bgs.

A 2019 Interim ROD, currently in place for the community of Moose Creek, selected an interim remedy to provide potable water supplied by the city of North Pole WTP to the community of

Moose Creek and institute LUCs to prohibit the use of contaminated groundwater and establish a CWMA as detailed in Section 1.3 (USAF, 2019c).

2.12 CURRENT AND FUTURE LAND USE

The current land use at Eielson AFB is an active USAF facility. As the lead entity, USAF has the authority to determine the future anticipated land use of the Eielson AFB. The USAF has determined that the most likely future land use of the Eielson AFB for the foreseeable future is as an active USAF facility.

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3 PREVIOUS INVESTIGATIONS

Site background information regarding previously conducted site investigations at various sites at Eielson AFB has been detailed in numerous historical documents. This section briefly summaries previously submitted historical analytical results and information relevant to this Expanded SI Report.

3.1 PFOS, PFOA, AND PFBS CONTAMINATION

PFOS, PFOA, and PFBS contamination associated with historical activities at fire-training sites and other facilities at Eielson AFB have been identified in multiple environmental media (e.g., groundwater, surface water, soil, and sediment) at Eielson AFB and the adjacent community of Moose Creek. The distribution of PFOS, PFOA, and/or PFBS has been presented in detail in numerous historical reports that document investigations completed since 2014 (AFCEC, 2015a; AFCEC, 2015b; AFCEC, 2015c; AFCEC, 2017a; AFCEC, 2017b; AFCEC, 2018; AFCEC, 2019; USAF, 2017a; USAF, 2020a; USAF, 2020b; USAF, 2020c; USACE, 2018; USACE, 2021). These investigations included surface water sampling, soil sampling, sediment sampling, private well sampling, and groundwater sampling from existing monitoring wells and temporary monitoring well points.

3.1.1 Eielson AFB PFOS and PFOA Contamination

In 2014, the USAF conducted sampling that indicated samples in groundwater and surface water exceeded the provisional health advisories (PHAs) of 0.2 µg/L for PFOS and 0.4 µg/L PFOA (EPA, 2009a; EPA, 2009b) in at four sites throughout the developed portions of Eielson AFB at (1) South Ramp Spray Area, 2) KC-135 Fire, 3) Former Ball Field Spray Area, and 4) Foamed Runway (AFCEC, 2015a).

In 2015, the USAF conducted sampling of Eielson AFB groundwater and surface water and found concentrations of PFOS that exceeded the EPA HA of 0.2 µg/L in Garrison Slough and in temporary well points installed near the Eielson AFB and Moose Creek boundary. PFOA was also detected, although concentrations were below the EPA HA of 0.4 µg/L at the same sampling locations (USAF, 2015; North Wind, 2018).

As a result, starting from March 2015 to 2020, quarterly groundwater sampling for PFOS and PFOA has been conducted on the eight drinking water wells on Eielson AFB, the wastewater treatment plant (WWTP) supply well, and the drinking water well for the military working dog kennel. Results indicate PFOA and PFOS concentrations exceeding the PAL in all locations before treatment. The maximum concentrations of PFOA and PFOS were 0.39 µg/L and 0.94 µg/L, respectively, with the highest concentrations at the dog kennel well. Initial tests using a portable GAC system to remove PFOA and PFOS from water from one drinking water well showed a reduction of over 90% for both PFOA and PFOS concentrations. In April 2016, two GAC vessels were installed at the water treatment plant, but the system was unable to remove PFOA and PFOS from the water to the EPA HA of 0.070 µg/L (USAF, 2017b). In December 2017, the water treatment system was upgraded to six GAC vessels and quarterly sampling shows that the WWTP is maintaining the PFOS and PFOA levels below the EPA HA (USAF, 2020c).

In 2015 and 2016, site inspections were completed for 15 additional AFFF areas, as well as groundwater sampling of monitoring wells installed at the Chena River Flood Control Project,

Northern Boundary, and Western Area monitoring wells, and surface water sampling at Garrison Slough (AFCEC 2017a; AFCEC, 2017b; AFCEC, 2018). PFOS and/or PFOA were detected in soil, surface water, and/or groundwater at all 15 AFFF areas investigated, confirming the presence of PFOS and/or PFOA at each of the 15 AFFF areas and establishing the need for further investigation. Groundwater concentrations of PFOS and PFOA exceeded the PAL at all 15 AFFF areas investigated on Eielson AFB.

In 2015 and 2016, a groundwater and surface water investigation took place along the northern (Transmitter Road) and western portions of Eielson AFB. Groundwater and surface water samples along Transmitter Road had elevated levels of PFOA+PFOS up to 2.43 µg/L at a temporary monitoring well location, TW-02 at 100 feet bgs.

Two areas where PFOS and PFOA soil contamination exceeding the ADEC HH Cleanup Level was identified but not fully delineated were 1) Fire Station #1 (IRP Site SS306P) and the 2) FFTAs by the current Entomology Building (Building 4335; Southern Burn Area, IRP Site FT092).

Fire Station #1 (IRP Site SS306P) PFOS and PFOA Contamination

Fire Station #1, as shown on Figure 3-1, was originally constructed in 1953 and underwent renovations beginning in 2014. Bulk storage and restocking of AFFF for emergency vehicles formerly occurred at Fire Station #1. Fire Station #1 formerly had a 2,000-gallon AFFF underground storage tank (UST) located along the northern side of the building that was closed in place in 1996. There is anecdotal evidence that the UST foamed over at some time in the past (AFCEC, 2015a). The former AFFF UST was leak-tested during closure and no leaks were detected. A leak was observed adjacent to the manhole riser at the top of the former AFFF UST during a head test. However, the former AFFF UST was not believed to have been leaking from the top of the UST (CH2MHill, 2018). During the 2014 renovation, bulk storage supply of AFFF concentrate was relocated to Hazardous Materials Storage (Building 3446) and a bench stock for resupplying emergency vehicles was housed at Fire Station 3 (Building 1300) (CH2MHill, 2018). No AFFF releases are known to have occurred at Fire Station #1 (Building 1206) prior to 2016 (AFCEC, 2015a). However, due to anecdotal evidence of the former AFFF UST foaming over and the history of restocking emergency vehicles with AFFF, releases may have occurred at this site.

On 18 October 2016, approximately 10 gallons of an AFFF/water mixture was released to pavement and soil on the airfield side of Fire Station #1 during routine testing of firefighting equipment (ADEC, 2019c; Spill #16309929202). During the 2016 SI for AFFF areas, the PFOS concentration in one soil boring sample at Fire Station #1 exceeded the EPA RSL and the ADEC HH CLs for soil as shown on Figure 3-1. The nearest drinking water supply well (Well E) is 1,670 feet upgradient (east-southeast) of this documented release location (CH2MHill, 2018).

FFTA PFOS and PFOA Contamination

The Southern Burn Area FFTA by the current Entomology Building (IRP Site FT092), as shown on Figure 3-2, were identified during the 1988 Remedial Investigation (RI) for a fuel-saturated area (USAF, 1989) and again during a 1997 utilidor investigation in the same area (AGRA Earth and Environmental, Inc. [AGRA], 1998). The 1989 RI-Feasibility Study (FS) of the fuel saturated area (USAF, 1989) indicates that the FFTAs were used from 1976 to 1981. Interviews indicated that fire training procedures included saturating the ground with water and applying jet propellant

(JP-4) to the wet ground. The method of extinguishing the flames was not specified, but AFFF may have been in use during the late 1970s at Eielson AFB (AGRA, 1998). Three FFTAs were identified during the 1997 utilidor investigation and interviews indicated two other locations north of Outer Loop Road that were used for fire training during the late 1970s. During the 2016 SI for AFFF Areas (CH2MHill, 2018), two soil borings samples at the FFTAs by the current Entomology Building contained PFOS exceeding the EPA RSL and the ADEC HH CL, as shown on Figure 3-2.

3.1.2 Moose Creek PFOS and PFOA Contamination

In 2015, groundwater analytical data indicated that both PFOS and PFOA had migrated off Eielson AFB and into the adjacent community of Moose Creek at concentrations exceeding PHAs of 0.2 µg/L for PFOS and 0.4 µg/L PFOA (AFCEC, 2015a). As a result, sampling of drinking water systems in the community of Moose Creek were initiated in May 2015 (AFCEC, 2015b).

In 2015 and 2016, a groundwater and surface water investigation took place in the community of Moose Creek and Chena River Flood Control Project. Within Moose Creek, all 174 private wells sampled had detections of PFOS and PFOA. PFOA exceeded the EPA HA of 0.07 µg/L in 51% of the groundwater samples and PFOS exceeded in 96% of the groundwater samples collected from the community of Moose Creek. For the Chena River Flood Control Project, three of the monitoring wells sampled contained PFOS and/or PFOA but were below cleanup levels (USAF, 2017a).

PFOS results and PFOA+PFOS results through December 2015 from a model are presented on Figure 3-3 and Figure 3-4, respectively (USAF, 2016). PFOS results and PFOA+PFOS results through November 2016 for soil, sediment, and sludge results are presented on Figure 3-5 (AFCEC, 2018; Figure 3-2). PFOS results and PFOA+PFOS results through November 2016 for groundwater and surface water are presented on Figure 3-6 (AFCEC, 2018; Figure 3-4).

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4 CONCEPTUAL SITE MODEL

The following section presents the results of the evaluation of potential sources, release mechanisms, fate and transport considerations, potential receptors (e.g., people, animals, and plants that might encounter PFOS, PFOA, and PFBS contamination in environmental media), exposure pathways, and land use considerations, and the updated CSM for PFOS, PFOA, and PFBS contamination at Eielson AFB and the adjacent community of Moose Creek. This updated CSM was evaluated in accordance with ADEC's Policy Guidance on Developing CSMs and ADEC Human Health Scoping Form (ADEC, 2017) and addressed under Title 18 AAC Chapter 75, Oil and Other Hazardous Substances Pollution Control (AAC, 2021).

This CSM utilizes the information presented in Section 2 along with the information presented in the following subsections. The extent of PFOS, PFOA, and PFBS contamination identified during the Expanded SI field activities are further discussed in Section 7. The CSM is provided in Appendix B. The ADEC Human Health Conceptual Site Model Scoping Form and Standardized Graphic (ADEC, 2017) are provided in Appendix B.

4.1 POTENTIAL SOURCES AND RELEASE MECHANISMS

The presence of PFOS, PFOA, and PFBS contamination in the environment at Eielson AFB resulted from USAF use of PFAS compounds in polymers and waterproofing coatings, and AFFF that was used in fire training exercises and firefighting beginning in 1970 (Schultz, et al. 2003; Place and Field, 2012) and further described in Section 1.1. Specific to DoD concerns, AFFF was used to extinguish petroleum fires and prevent ignition of petroleum releases that have occurred at military airstrips; petroleum, oil, and lubricant facilities; and fire-training sites. It is expected that the primary source of PFOS, PFOA, and PFBS at USAF facilities is from AFFF, although releases from other sources are possible and other sources remain potential sources of sample cross contamination (CH2MHill, 2018).

The majority of the PFAS in AFFF, including PFOS, PFOA, and PFBS, are surfactants (Place and Field, 2012; D'Agostino and Mabury, 2014; Backe, et al., 2013). Surfactants are compounds that accumulate at fluid interfaces because they contain both soluble (e.g., lyophilic, hydrophilic, and oleophilic in general fluids, water, and oil, respectively) and insoluble (e.g., lyophobic, hydrophobic, and oleophobic) groups on the same molecule (Kissa, 2001). PFOS, PFOA, and PFBS make excellent surfactants because the perfluorocarbon chains of these compounds are both hydrophobic and oleophobic, and more strongly so than the hydrocarbons chains present in other surfactants (Kissa, 2001). Surfactants can be anionic (such as carboxylic and sulfonic acids), cationic (such as amines and amides), and amphoteric (containing anions and cations such as betaines) or non-ionic (such as alcohols) (Kissa, 2001). The hydrophilic portion of the molecule makes surfactants more water soluble than would be expected for molecules of their size. The ionic surfactants act as ions in aqueous systems, with anions forming organic acids and cations forming organic bases. They are subject to all the interactions one would expect of ions in a groundwater system with migration and sorption strongly influenced by valence and the corresponding properties of the aquifer matrix. Because aquifer systems tend to be dominated by cation exchange capacity rather than anion exchange capacity, anionic surfactants tend to be more mobile in aquifer systems than the cationic or amphoteric surfactants (CH2MHill, 2018).

Studies have suggested that the active ingredients in AFFF tend to be the more complex PFAS, such as betaines and other amphoteric compounds. At least some of these compounds degrade by loss of functional groups (with preservation of the perfluorinated moieties) to simple, stable perfluoroalkyl acids (PFAAs) (Place and Field, 2012; McGuire et al., 2014), such as sulfonic acids (e.g., PFOS) and carboxylic acids (e.g., PFOA). It appears that the perfluorinated moieties are preserved in this process. The resulting compounds include PFOS, PFOA, and PFBS, which are resistant to degradation and therefore extremely persistent in the environment. PFOA and other carboxylic and sulfonic acids are commonly found in fire training areas (Backe et al., 2013) even though they are not commonly detected in AFFF formulations (D'Agostino and Mabury, 2014), suggesting that the source of these compounds is degradation of more complex compounds. In general, the larger, more complex compounds subject to degradation are known as precursor compounds. The resulting PFAAs appear to be terminal products thought not to be subject to further significant degradation, although it is difficult to evaluate the potential for long-term degradation of chemicals in the environment. In general, very few cases exist where the simple organic acids have been shown to degrade, even under controlled biodegradation or strongly oxidizing conditions. Because these compounds (the simple PFAAs) are stable and mobile, they tend to be detected much more frequently in the environment than other PFAS compounds and are more typically monitored (CH2MHill, 2018). For example, PFAAs have been detected in surface water and groundwater across the United States (Appleman, et al., 2014). EPA's Unregulated Contaminant Monitoring Regulation (UCMR) includes six PFAAs (sulfonic and carboxylic acids) because of their enhanced migration potential (EPA, 2014).

4.2 FATE AND TRANSPORT CONSIDERATIONS

PFAS compounds including PFOS, PFOA, and PFBS, are water soluble and non-volatile, and therefore readily migrate from soil to groundwater and can be easily transported long distances. PFAS compounds are also chemically and biologically stable in the environment and, as a result, are extremely persistent in the environment. Transport mechanisms of interest for this Expanded SI Report include dissolved-phase transport in the saturated zone, driven by groundwater flow within the aquifer, as well as dissolved-phase transport of PFAS in surface water. It is thought that PFAS accumulate in the environment in a manner like chlorinated solvents, as proposed in the 14-compartment model (Sale and Newell, 2011). PFAS are thought to occupy 10 of these discrete compartments in an aquifer system (Hatton and DiGuiseppi, 2015). These compartments include material stored in the vadose zone; in the dissolved phase, sorbed material, and product (as micelles) in the source zone of the saturated aquifer; and in the dissolved and sorbed phase outside the source zone. It is expected that PFAS would occur in both low- and high-conductivity materials. Unlike most other contaminants, PFAS have the potential to migrate as precursors and convert to target compounds. The vapor phase is thought not to be a significant compartment based on chemical characteristics, although there is little research on the topic. An additional transport mechanism is the fugitive dust from surface soil impacts.

Results of the Expanded SI for Eielson AFB and Moose Creek, further detailed in Section 6, indicate PFOS and PFOA above the PAL in groundwater and in the surface water of some surface water bodies. PFOS and PFOA exceeding soil screening levels were reported in soil samples from the targeted source areas at both Fire Station #1 and FFTAs by the current Entomology Building, but not in sediment from surface water bodies. Once PFAS compounds are in groundwater,

constituents migrate in the direction of groundwater flow, within preferential pathways such as historical stream channels, and may also discharge to surface water bodies by direct contact at the groundwater interface, overland flow, or groundwater seeps associated with the wetlands, lakes, and ponds. Results of the Expanded SI for Eielson AFB and Moose Creek, further detailed in Section 6, indicate similar concentrations of PFOS and PFOA in groundwater monitoring wells and in the surface water from nearby surface water bodies within the extent of the groundwater plume (e.g., Bear Lake, the northern portions of Moose Creek, Moose Lake, Piledriver Slough, and Spruce Lake); this provides evidence that transport of PFOS and PFOA between groundwater and surface water may be occurring. PFOS and PFOA compounds associated with soil particles may also be transported by overland transport, particularly within drainage features on Eielson AFB and the adjacent community of Moose Creek or through erosion of soils.

4.3 LAND USE CONSIDERATIONS

4.3.1 Eielson AFB

The USAF has determined that, for the foreseeable future, the most likely land use of the Eielson AFB is as an active USAF facility. The developed area of Eielson AFB is surrounded by large undeveloped areas of forested wetland and numerous small lakes, ponds, creeks, and sloughs. Surface water bodies at Eielson AFB include but are not limited to Grayling Lake, Shoe Lake, Moose Lake, Tar Kettle Lake, Bear Lake, Spruce Lake, Hidden Lake, Scout Lake, Mullins Pit, Moose Creek, French Creek, and Piledriver Slough.

4.3.2 Community of Moose Creek

Moose Creek is a community that stretches from approximately 1 to 3 miles downgradient of the northern end of Eielson AFB. The community previously relied on private wells installed from 12 to 60 feet bgs in the shallow aquifer for drinking water. A 2019 Interim ROD selected to implement an interim remedy to provide potable water to the community of Moose Creek supplied by the City of North Pole WTP (USAF, 2019c). Individual households have been manually supplied with North Pole WTP water until the permanent water supply line construction can be completed. As part of the Interim ROD, LUCs were established to prohibit the use of contaminated groundwater, including a CWMA to prevent the use of contaminated groundwater and prohibit the installation of new water wells within the CWMA.

Surface water bodies in the vicinity of Moose Creek include Bathing Beauty Lake.

4.4 POTENTIAL RECEPTORS AND EXPOSURE PATHWAYS

Potential receptors and exposure pathways were evaluated in accordance with ADEC's Policy Guidance on Developing CSMs (ADEC, 2017). Potential receptors at Eielson AFB and in Moose Creek, Alaska, include residents, commercial and industrial workers, construction workers, subsistence harvesters or consumers, farmers, site visitors, recreational users, and trespassers, as well as animals and plants that might encounter PFOS, PFOA, and PFBS contamination in environmental media. Exposure pathways were evaluated based on current and potential future land and natural resources (specifically groundwater uses) and whether they are incomplete or complete.

Complete exposure pathways for PFOS, PFOA, and PFBS in the vicinity of Eielson and the community of Moose Creek include ingestion of groundwater, surface water, and soil; ingestion of wild or farmed foods; and inhalation of fugitive dust by current and future users. While direct contact with sediment, surface water, soil, and groundwater containing PFOS, PFOA, and PFBS may occur, dermal absorption of PFAS, including PFOS, PFOA, and PFBS, is slow and does not result in significant exposure (Agency for Toxic Substances and Disease Registry, 2018). Therefore, dermal absorption and direct contact pathways are considered complete but insignificant. Human exposure via ingestion of PFOS, PFOA, and PFBS contaminated groundwater is expected to be the most significant exposure pathway because Eielson AFB and the community of Moose Creek use the local groundwater for drinking water and daily operations, although both are currently using either water from water treatment systems that effectively remove PFOS, PFOA, and PFBS or water delivered to them.

Exposure pathways associated with air PFOS, PFOA, and PFBS are considered incomplete for current commercial and industrial and future residential land use scenarios because these compounds are not volatile.

The ADEC Human Health Conceptual Site Model Scoping Form and Standardized Graphic (ADEC, 2017) are provided in Appendix B. Results of the exposure pathway evaluation are presented in more detail below.

4.4.1 Groundwater Pathways and Targets

Groundwater at Eielson AFB and Moose Creek is used as a drinking water source and comes from the Tanana Basin Aquifer, which is a heterogeneous mixture of gravelly sand and sandy gravels. Groundwater flow is generally to the north-northwest and groundwater depths range from the ground surface in wetland areas to 10 feet bgs in developed areas of Eielson AFB.

PFOS, PFOA, and PFBS have been detected in samples from drinking water wells located within 0.5 mile from documented AFFF areas on Eielson AFB and in drinking water systems in the community of Moose Creek and in private wells at 170 properties in the community of Moose Creek.

Eielson AFB and Moose Creek are currently being supplied water from water treatment systems that remove PFOS, PFOA, and PFBS or water delivered to them. Supplied treated water or treatment systems exist at most residences in Moose Creek, but some residents continue to use the groundwater with no treatment system. The groundwater ingestion pathway is considered complete for current and future commercial and industrial and residential land use scenarios due to potential treatment system failure.

The pathway for dermal absorption of contaminants in groundwater is also considered complete, due to contact with groundwater used as tap water and potential contact with groundwater during subsurface construction. However, as noted above, this pathway is considered insignificant because dermal absorption of PFOS, PFOA, and PFBS is slow.

4.4.2 Surface Water Pathways and Targets

The developed areas of Eielson AFB and Moose Creek are surrounded by large undeveloped areas of forested wetland and numerous small lakes, ponds, creeks, and sloughs. Eielson AFB is

relatively flat, and stormwater drainage occurs across much of Eielson AFB in drainages generally in a north-northwest direction as sheet flow.

PFOS, PFOA, and PFBS have been detected in surface water in both developed and undeveloped areas on Eielson AFB. Although surface water is not currently used as a drinking source, it is in some cases used for recreational purposes. Therefore, the ingestion of surface water pathway is considered potentially complete for current and future commercial and industrial, and residential land use scenarios.

The pathway for dermal absorption of contaminants in surface water is also considered complete; however, as noted above, this pathway is considered insignificant because dermal absorption of PFOS, PFOA, and PFBS is slow.

4.4.3 Soil and Sediment Pathways and Targets

Within the developed areas of Eielson AFB, PFOS, PFOA, and PFBS have been detected in surface and subsurface soil at multiple AFFF areas, including the two source areas investigated as part of this Expanded SI.

Because PFOS, PFOA, and PFBS are present in soil surface (0-2 feet bgs) and subsurface soil (>2 feet bgs), the incidental soil ingestion pathway is considered potentially complete for both current and future users in commercial, industrial, and residential land use scenarios. Inhalation of fugitive dust (e.g., generated by saltation of impacted surface soil) may also occur; therefore, this pathway is considered potentially complete for the current and future commercial and industrial land use scenarios.

Direct contact with soil or sediment may occur; however, as noted above, the associated exposure pathways are considered insignificant because dermal absorption of PFOS, PFOA, and PFBS is slow. Additionally, the results of the Expanded SI, further detailed in Section 6, indicated that PFOS, PFOA, and PFBS concentrations in sediment from the 16 surface water bodies sampled were less than 1/100 of risk-based screening levels, which further indicates that the human health pathway by direct contact with sediment (which includes incidental ingestion as well as dermal absorption) is insignificant.

However, five sediment samples exceeded the ADEC Method Two Clean-up levels for PFOS of 0.0030 mg/kg with concentrations ranging from 0.0033 to 0.0055 mg/kg. Additional consideration of ecological screening levels may be warranted in the RI.

4.4.4 Ecological Pathways and Targets

Eielson AFB is surrounded by large areas of forested wetland and surface water bodies that provide potential diverse ecological habitat. Wildlife living within or migrating through the impacted areas could potentially ingest water and/or sediment containing PFOS, PFOA, and PFBS. Plants could absorb PFOS, PFOA, and PFBS from impacted soil, surface water, and groundwater. Potentially complete exposure pathways for ecological receptors include human health pathway by direct contact and/or ingestion of soil and sediment and surface water, inhalation of dust, and ingestion of impacted plants and animal tissue.

While PFOS and PFOA contaminant concerns exclusive to ecological receptors are not currently part of the response actions, these may be considered in the future. For future evaluations, the data

indicates that given the available habitat and ecosystems, potential ecological exposure pathways would (at least) include:

- Potential direct exposure of aquatic resources (e.g., fish, benthic macroinvertebrates, and epibenthic organisms) to chemicals present in sediment,
- Potential direct exposure (e.g., incidental ingestion during foraging or burrowing activities) of wildlife to chemicals in surface soil and/or sediment, and
- Bioconcentration or bioaccumulation through ingestion of food items by avian wildlife (for example, piscivorous birds) and aquatic organisms (e.g., marine fish) using ponded and near shore lagoon or ocean areas.

5 SITE INSPECTION FIELD ACTIVITIES

This section describes the field activities for the Expanded SI performed under the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b).

Field activities under the Work Plan (USAF, 2019a) included:

- Installing initial and step-in and step-out temporary monitoring wells (55 locations),
- Advancing initial and step-in and step-out soil borings at Fire Station #1 and FFTAs by the current Entomology Building (26 locations),
- Installing permanent shallow monitoring wells (27 locations), and
- Installing permanent deep nested monitoring well clusters (2 locations).

Field activities under the Work Plan Addenda (USAF, 2019b and USAF, 2020b) included:

- Sampling existing monitoring wells (25 locations), and
- Co-locating surface water and sediment in surface water bodies (16 surface water and 13 sediment locations).

The approach to the field investigation included completing multiple iterative phases, including five mobilizations as part of this Expanded SI. After each mobilization, data and proposed next steps were presented to stakeholders (i.e., USACE Alaska-AK, USAF, ADEC, and EPA) for concurrence. The field activities are detailed below and presented in chronological order.

- **Phase I:** Sampling of existing groundwater monitoring wells on and around the perimeter of Eielson AFB, within the Chena River Flood Control Project, and in the adjacent community of Moose Creek to determine the lateral extent of contamination.
- **Phase II:**
    - Installing and sampling temporary monitoring wells around the perimeter of Eielson AFB, within the Chena River Flood Control Project, and at the adjacent community of Moose Creek to build upon the existing monitoring well data and determine placement of future permanent monitoring wells.
    - Installing deep nested monitoring well clusters within the interior of the known contamination to delineate the vertical extent of contamination.
    - Advancing and sampling soil borings around locations with known soil contamination at Fire Station #1 and FFTAs by the current Entomology Building.
- **Phase III:**
    - Installing additional step-in and step-out temporary monitoring wells based upon results from the initial phase of temporary monitoring wells to further delineate the lateral extent of contamination and determine the most beneficial locations for permanent shallow monitoring wells.

    - Advancing additional step-in and step-out soil borings based upon the initial phase of soil borings to further delineate the extent of contamination at Fire Station #1 and FFTAs by the current Entomology Building.

- **Phase IV:** Installing permanent shallow monitoring wells in locations to enable long-term groundwater monitoring of the entire contaminant plume. The objective for locating these permanent shallow monitoring wells was to establish a perimeter of permanent shallow monitoring wells with current concentrations between 10% and 100% of the PALs.
- **Phase V:** Sampling surface water and sediment in surface water bodies at Eielson AFB and in one nearby surface water body (Bathing Beauty Lake) that was located off-Base.

Field activities described above are general in nature, and specific approaches based on the data collected during each mobilization are further described below.

This section summarizes the following:

- Pre-mobilization activities
- Mobilization(s) and site setup activities
- Temporary monitoring well installation
- Permanent shallow monitoring well installation
- Permanent deep nested monitoring well cluster installation
- Development of newly installed monitoring wells
- Groundwater sampling
- Surface water and sediment sampling of surface water bodies
- Soil boring advancement and sampling
- Survey
- IDW management
- Site restoration
- Deviations from Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b).

Supporting field documentation and field data collected during the Expanded SI field activities for this Expanded SI Report are provided within the appendices in this Expanded SI Report and as listed in Section 1.4. Selected photographs of specific Expanded SI field processes are provided in Appendix C.

5.1 PREMOBILIZATION ACTIVITIES

Prior to mobilization of field teams and subcontractors, (e.g., drilling subcontractor-GeoTek, third party locates, survey, and IDW services) right-of-entry (ROE) and permits were approved by the appropriate personnel. Because the drilling locations are both on Eielson AFB and off-Base, permission was secured from the following entities, as shown on Figure 5-1.

- ADNR
- Alyeska Pipeline Service Company
- JJAL, Inc.
- Chena River Flood Control Project, USACE-AK

Utility locate requests were submitted to the local one-call utility notification center (Alaska 811), and utility clearance approvals were submitted and received by the appropriate USAF and contractor personnel. A private utility locate company, Gumfory Underground, completed locates of off-Base locations, including those along various pipelines (e.g., Alyeska Pipeline Service Company). A USAF Base Civil Engineering work clearance request (Form 103) and work authorization were confirmed with the appropriate USAF personnel for all locations on Eielson AFB. Drilling and utility locations were identified prior to ground disturbance and marked using paint, flags, or stakes, as appropriate to the surface material.

All site access permits, and documentation are provided in Appendix D.

5.2 PHASED MOBILIZATION APPROACH AND SITE SETUP ACTIVITIES

Personnel, equipment, and resources necessary to implement the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b) were mobilized to the site in multiple mobilization events from July 2019 through October 2020 in an iterative phased approach executed as part of this Expanded SI. Sundance-EA and subcontractor personnel obtained proper site access credentials to perform site work. During all mobilization and site work activities, precautions were implemented to create a safe working zone through use of cones, barricades, good housekeeping, and Sundance-EA supervision.

Field activity logs, Tailgate Safety Meetings & Job Safety Analysis forms, and field notebooks are provided in Appendix E in chronological order from July 2019 through October 2020.

5.3 EXPANDED SI FIELD ACTIVITIES

The following sections summarize the Expanded SI field activities performed by Sundance-EA from July 2019 through October 2020. Expanded SI field activities included groundwater sampling of existing monitoring wells; advancing of soil borings and sampling; installing, developing, and sampling temporary monitoring wells, permanent deep nested monitoring wells, and shallow permanent monitoring wells; and sampling surface water and sediment of surface water bodies. All Expanded SI field activities described in this section were performed within the criteria outlined in the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b), and any deviations are documented in Section 5.7 and summarized in Table 5-1 and the subsections below. Field measurement data, including calibration logs, monitoring well integrity checks lists, monitoring well development, and groundwater sampling forms, are provided in Appendix F.

5.3.1 Temporary Monitoring Well Installation

Temporary wells were installed to the groundwater table or to a maximum total depth of 25 feet bgs or refusal using the GeoProbe® direct-push technique by GeoTek Alaska, a State of Alaska registered drilling company. Temporary monitoring well construction details are provided in Table 5-3 and locations are shown on Figure 5-2. Each temporary well point was sampled using

the GeoProbe® Screen Point 16 Groundwater Sampler system (SP16 Sampler). The SP16 Sampler is a sealed, screen-type, groundwater sampling device consisting of a 0.010-inch-slotted polyvinylchloride (PVC) disposable screen installed in a 1.6 inch-outer diameter screen sheath (Geoprobe®, 2020). The SP16 Sampler was threaded on to a direct-push probe rod, then pushed by the drill rig to the desired depth. An extension rod was then inserted down the probe rod to push the expendable tip out of the end of the probe rod allowing the inner screen to slide out of the bottom of its sheath. The probe rod was then pulled up in the borehole, exposing up to 41 inches of screen from its sheath allowing groundwater to enter the sampling tool. Dedicated PFAS-free tubing (e.g., high density polyethylene [HDPE] or silicone) was lowered into the SP16 Sampler and then the temporary monitoring wells were purged and sampled by a QEP or QES using low flow sampling methods in accordance with the *Field Sampling Guidance* (ADEC, 2019b) and Work Plan (USAF, 2019a), as further described in Section 5.3.5. The probe rod and extension rod were decontaminated between temporary monitoring well installations and the single-use well screens and tubing were disposed of according to procedures outlined in the approved Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b).

5.3.2 Permanent Shallow Monitoring Well Installation

Installing and constructing permanent shallow monitoring wells were performed by GeoTek Alaska in accordance with the regulatory requirements of Title 18 AAC Chapter 75, Oil and Other Hazardous Substances Pollution Control (AAC, 2021), ADEC's Monitoring Well Guidance (ADEC, 2013) and Work Plan (USAF, 2019a). Newly installed permanent shallow monitoring well completion diagrams are provided in Appendix G, monitoring well construction details are provided in Table 5-2, and monitoring well locations are shown on Figure 5-2.

At the direction of the on-site geologist, the contracted driller installed a 2-inch diameter monitoring well with a 10-foot pre-packed screen section placed to intersect the groundwater surface. Direct push methods were used with a Geoprobe® 66DT drill rig pushing an outer casing of approximately 4-inches for the monitoring well to be constructed. Monitoring wells were constructed of 2-inch, Schedule 40 PVC, flush-thread-jointed casing with 0.010-inch slotted 10 feet screen. The blank casing was Schedule 40 flush-thread-jointed monitoring well casing. Where possible, well screens straddled the groundwater table with 3 feet of screen above and 7 feet below the observed groundwater table at time of drilling. The seal located immediately above the sand pack was hydrated bentonite pellet seal placed from the level of the filter sand to 2 feet above the filter sand. The remainder of the annulus seal was hydrated bentonite chips from the top of the bentonite seal to near ground surface. The bottom of each well was capped with a 2-inch diameter sediment trap or end cap to anchor the well.

When required, PFAS-free water was added to the borehole during monitoring well construction to counteract downhole pressure. Pioneer Wells provided the water that was free of PFAS and chlorine and not softened. Sampling and laboratory analysis were conducted prior to use to confirm the water was free of PFAS compounds as stated in Appendix H of the Work Plan (USAF, 2019a).

In general, monitoring well surface completions to protect the PVC casing included a steel monument as a protective outer casing. The stickup monument was constructed with an above ground, 6-inch steel pipe approximately 3 feet in length with a locking aluminum cover. These monuments were secured with a cement ring cast by a sonotube cement form. A gravel mantle was applied from the bentonite to the ground surface. Where appropriate, bollards were installed

around the monitoring well completions. Some monitoring wells were completed with a traffic-rated, flush mounted casing due to either a property owner's request or installation in areas of high traffic. The flush mounted, surface finishes included 6-inch-thick concrete pads that were a minimum of 4 feet × 4 feet with 3,000 pounds per square inch-rated concrete with a mat of number 3 reinforcement bar on 12-inch centers. Both stickup and flush mount monitoring wells were finished with sonotube formed cement anchors.

5.3.3 Permanent Deep Nested Monitoring Well Cluster Installation

Two sets of permanent, deep, nested monitoring well clusters were installed by GeoTek Alaska using both a hollow stem auger and a rotary wash method of drilling to achieve final depths. Both monitoring well clusters included four monitoring wells installed to total depths of approximately 60, 110, 160, and 210 feet bgs. Well cluster #1 included 19PS-MW01A to 63.33 feet bgs, 19PS-MW01B to 110.58 feet bgs, 20PS-MW01C to 160.50 feet bgs, and 20PS-MW01D to 209.53 feet bgs. Well cluster #2 included 19PS-MW02A to 62.00 feet bgs, 19PS-MW02B to 115.00 feet bgs, 20PS-MW02C to 161.24 feet bgs, and 20PS-MW02D to 210.00 feet bgs. Newly installed well cluster construction details are provided in Table 5-2 and locations are shown on Figure 5-2.

Individual monitoring wells within each nested well cluster were installed in separate borings placed as close together as possible. Because of known drilling issues within the upper lithology, a hollow stem auger was used to install a casing from surface to 100 feet bgs as stated in the Work Plan (USAF, 2019a) and rotary wash method of drilling was used to achieve final depths of 210 feet bgs. When total depth was achieved, well construction continued through the annular space of the override casing in both drilling methods. Monitoring wells were 2-inches in diameter and constructed of Schedule 40 PVC, flush-thread-jointed casing with 0.010-inch slotted 10 feet screen. Blank casing was Schedule 40 PVC flush-thread-jointed monitoring well casing. Monitoring well screens were placed in the bottom 10 feet of each monitoring well (from approximately 50 to 60 feet bgs, 100 to 110 feet bgs, 150 to 160 feet bgs, or 200 to 210 feet bgs, respectively). The filter sand pack was placed from the bottom of the monitoring well to 3 feet above the screened interval. The 2-foot seal located immediately above the sand pack was hydrated bentonite pellet seal placed above the filter sand. The remainder of the annulus seal was hydrated bentonite chips from the top of the bentonite seal to near ground surface. The bottom of each monitoring well was capped with a 4-inch diameter schedule 40 PVC sediment trap or end cap to anchor the monitoring well to prevent frost jacking. All permanent deep nested well clusters were completed with a stickup and protective bollards.

When required, PFAS-free water was added to the borehole during monitoring well construction to counteract downhole pressure. Pioneer Wells provided the PFAS-free water, which was also chlorine-free and not softened. PFAS testing was conducted prior to use to confirm the water was free of PFAS as stated in Appendix H of the Work Plan (USAF, 2019a).

5.3.4 Development of Newly Installed Monitoring Wells

Newly installed permanent monitoring wells were developed a minimum of 24 hours after the installation was complete to allow the grout seals to set. Well development was conducted in accordance with *ADEC Monitoring Well Guidance* (ADEC 2013) and the Work Plan (USAF, 2019a), using a combination of surge blocks and bailers or pumps. Alternate cycles of

surging and bailing and pumping were performed during development. A minimum of three and a maximum of ten well casing volumes plus the volume of fluids used during well construction were removed during development activities. Discharge watercolor, odor, equipment used, water quality parameters, and volume calculations were documented on the Well Development Record field forms provided in Appendix F.

Direct water quality parameters, including potential hydrogen (pH), specific conductance, oxidation reduction potential (ORP), dissolved oxygen (DO), and turbidity were monitored during development to determine if well stabilization was achieved. Turbidity was measured using a portable turbidity meter after each monitoring well volume was removed. Monitoring wells were considered developed when stabilization of parameters was achieved, and turbidity of the development water was less than 10 nephelometric turbidity units (NTU) for three to six consecutive readings. In instances where stabilization or turbidity of less than 10 NTU was unattainable, development was stopped when ten times the casing volume in the monitoring well had been purged.

Water quality parameters were collected using a multi-probe water quality meter. The water quality parameter field equipment, specifically the portable turbidity meter and multi-probe water quality meter, were calibrated and checked daily in accordance with the equipment manual specifications. Calibration logs are provided in Appendix F. The specific equipment used to develop, purge, sample, and collect water quality parameters for each monitoring well are listed for each.

5.3.5 Groundwater Sampling

Existing, temporary, and permanent monitoring wells were purged and sampled in a phased approach between July 2019 and October 2020 by a QEP or QES working under the direct supervision of a QEP using low-flow sampling methods in accordance with the *Field Sampling Guidance* (ADEC, 2019b) and Work Plan (USAF, 2019a). Existing, temporary, and permanent monitoring well locations are shown on Figure 5-2. Several of the existing monitoring wells were not sampled because they held pressure transducers containing Teflon or other PFAS-containing materials. Several other existing monitoring wells were not sampled because of access issues or simply not being able to find them, even when using a metal detector to search for flush mounted monitoring wells. Deviations are summarized in Section 5.7 and Table 5-1. Field measurement data, including calibration logs, monitoring well integrity checks lists, monitoring well development, and groundwater sampling forms, are provided in Appendix F.

The purpose of low-flow sampling methods was to minimize the mixing of the water column by purging water at a slow rate causing a minimal drawdown. This method ensures purged water is from the screened formation.

Before purging the wells, depth to water and total depth were gauged and documented on field forms. Existing, temporary, and permanent monitoring wells were purged at a maximum flow rate of 0.1 to 0.5 liters per minute until water quality parameters stabilized for three consecutive measurements. For shallow wells, a low-flow peristaltic pump with dedicated PFAS-free tubing (HDPE and silicone) was used to purge and sample the groundwater. For the permanent deep monitoring wells where use of a peristaltic pump was not feasible, a submersible pump was used. Groundwater quality parameters, including pH, specific conductance, ORP, DO, and turbidity,

were collected and documented on field forms. Monitoring well purging and low-flow groundwater sampling details were recorded and documented on field forms.

Water quality parameters were collected using a portable turbidity meter and a multi-parameter probe water quality meter. Water quality parameter field equipment was calibrated and/or checked daily in accordance with the equipment manual specifications. Groundwater samples were collected for laboratory analysis once groundwater quality parameters stabilized, as described below. Note: stabilization indicates that the groundwater collected is water from the formation instead of stagnant water in the monitoring well. Groundwater quality parameters were considered stable when three to six parameters are within the following stabilization criteria:

- Temperature: within ± 3 % (minimum of ± 0.2 degrees °C)
- pH: within ± 0.1 pH units
- Specific conductance: within ± 3%
- ORP: within ± 10 millivolts (mV)
- DO: within ± 10%
- Turbidity: less than 10 NTU, or within ± 10% if greater than 10 NTU.

If water quality parameters did not stabilize, the monitoring well was sampled once a minimum of three well casing volumes had been purged. During sampling, all monitoring wells were stabilized or purged until six wellbore volumes were removed. Only one monitoring well was purged dry during sampling, MW45.

Water levels were checked frequently to monitor potential drawdown during purging. The pump rate was adjusted to minimize drawdown in the monitoring well (<0.1 meter and stabilized water level). Purging was continued until either the previously identified water quality parameters met the criteria above for three to six successive readings, or for a minimum of three well volumes (as calculated based on the volume of water in the monitoring well and the monitoring well construction log). When the monitoring well was low yielding and was purged dry before stabilization, the monitoring well could recover until approximately 80% of the water had infiltrated into the monitoring well and then was immediately sampled.

Groundwater samples were collected directly into the appropriate laboratory-provided containers using the dedicated PFAS-free sample tubing labeled, placed in a cooler with PFAS-free gel ice and chilled. Groundwater sampling was conducted in accordance with the PFAS specific methods detailed in the Work Plan (USAF, 2019a). For example, no Teflon®-containing equipment was used for low-flow groundwater sampling. Groundwater samples were placed in a cooler with gel ice packs at 0°C – 6°C as soon as possible after collection and remained in the cooler until they were placed in a dedicated refrigerator. Groundwater samples remained in the dedicated refrigerator until packaged appropriately for shipping to the laboratory. Gel ice packs were frozen each day to enable storage of groundwater samples at 0°C – 6°C.

Groundwater samples were shipped to Eurofins in Lancaster, Pennsylvania, an ADEC-approved and DoD ELAP-accredited environmental laboratory. All groundwater samples from existing, temporary, and permanent monitoring wells were sampled for PFOS, PFOA, and PFBS and 11 other PFAS compounds by LC/MS/MS Method 537 Modified compliant with DoD QSM Version 5.1 Table B-15 as described in Section 1.6.

5.3.6 Surface Water Bodies Sampling

Co-located surface water and sediment samples were collected within 16 surface water bodies at the following locations at Eielson AFB and off-Base in accordance with the Work Plan Addendum (USAF, 2020b) as shown on Figure 5-3.

- Crescent Lakes (crescent-shaped lake formed by the historical stream channel)
- Bathing Beauty Lake
- Bear Lake
- French Creek
- Grayling Lake
- Hidden Lake
- Moose Creek
- Moose Creek Landing Pond
- Moose Lake
- Mullins Pit
- Piledriver Slough
- Scout Lake
- Shoe Lake
- Spruce Lake
- Tar Kettle Lake
- Z-Pit

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A minimum of one surface water and one sediment sample were collected from each lake, creek, pond, or slough. In some locations, surface water samples were collected at two depth intervals to assess the potential stratification of PFOS, PFOA, and PFBS contamination. To the extent practicable, surface water samples were collected without disturbing the sediment and then co-located sediment samples were also collected from approximately the top 1 foot of sediment.

5.3.7 Soil Boring Advancement and Sampling

Soil borings were advanced with Geoprobe® DT45 rods with an inner sample barrel and GeoProbe dual system with 3.25-inch-diameter drill rods to collect continuous soil cores in 2.1-inch-diameter liners. Soil core samples were continuously sampled from the ground surface to total depth using 5-foot-long Macro-Core® sample liners with acetate sleeves. Two soil samples were collected from each boring, one from 0 to 1-foot bgs and one directly above the groundwater interface at the time of drilling. Soil borings were advanced from the ground surface to the groundwater interface or to a maximum total depth of 15 feet bgs.

Soil samples were extracted from the MacroCore® using a dedicated stainless-steel spoon and transferred directly into the appropriate laboratory-provided containers, placed in a cooler with PFAS-free gel ice and chilled. Soil sampling was conducted in accordance with the PFAS specific methods detailed in the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b).

Soil samples were shipped to Eurofins in Lancaster, Pennsylvania, an ADEC-approved and DoD ELAP-accredited environmental laboratory. All soil samples were sampled for PFOS, PFOA, and PFBS and 11 other PFAS compounds by LC/MS/MS Method 537 Modified compliant with DoD QSM Version 5.1 Table B-15 as described in Section 1.6.

The soil borings at Fire Station #1 are shown on Figure 5-4. The soil borings at FFTAs by the current Entomology Building are shown on Figure 5-5.

5.4 SURVEY

Sampling locations, newly installed permanent monitoring wells, and features of interest were surveyed by field teams using GPS to provide spatial reference information for reporting,

integration into geographical information system (GIS) data, and to document sample locations and features of interest in accordance with the USACE-AK MED (USACE, 2017).

Field teams collected a horizontal and vertical position with a Trimble™ Geo7X™ handheld mapping-grade GPS for each temporary groundwater wells, surface water, sediment, and soil samples collected at Eielson AFB and the adjacent community of Moose Creek. Horizontal and vertical positions of various site features were documented with a GPS and used to georeference aerial photography.

In addition, a professional survey was conducted on 15 December 2020 of all permanent monitoring wells (e.g., deep clustered and shallow monitoring wells) by an Alaska State-licensed surveyor with 3-Tier Alaska Civil Engineering and Surveying from Fairbanks, Alaska (3-Tier Alaska). 3-Tier Alaska employed Topcon GPS receivers to locate all permanent monitoring wells and to verify and establish the horizontal and vertical control. A Leica DNA10 digital level was used to run all level loops and provide elevations for the permanent monitoring wells to meet the horizontal and vertical quality as specified for site inspections in the USACE-AK MED (USACE, 2017).

Monitoring well construction details including survey results for newly installed permanent monitoring wells are provided in Table 5-2 and temporary monitoring wells are provided in Table 5-3, and a detailed survey report is provided in Appendix H.

5.5 INVESTIGATION-DERIVED WASTE MANAGEMENT

All IDW generated during the Expanded SI field activities was labelled, numbered, tracked using a drum log, staged pending analytical analysis and characterization, transported, and properly disposed of according to Air Force Guidance (USAF, 2019d). Prior to transportation of IDW, waste manifests were generated in cooperation with the contracted US Ecology and NRC Alaska transportation and the disposal facility. Waste manifesting was conducted in accordance with the U.S. Department of Transportation (USDOT) Shipping Regulations (49 CFR 173-178). Field crews-maintained records and photographs of all IDW generated and associated transportation containers. The USAF approved and signed each manifest prior to shipment and disposal. Additionally, approval to transport from ADEC was required prior to transport. IDW management documentation and manifests are provided in Appendix I.

IDW requiring off-site disposal was disposed of as RCRA non-hazardous waste at US Ecology, Inc., in Grand View, Idaho (EPA ID 1100). IDW was transported by NRC Alaska (EPA ID 110003037035).

5.5.1 Water

IDW water (e.g., purge and development water) generated from each monitoring well on and off-Eielson AFB was containerized separately, labelled, numbered, transported, and staged on Eielson AFB at the USAF-approved LF003 Containment Cell #1 (LF003) pending analytical analysis and/or IDW characterization for each monitoring well location.

IDW water from monitoring wells at IRP sites where historical analytical results indicated the presence of other contaminants (such as metals) was assumed to be contaminated. This IDW was

kept separate from other Expanded SI generated IDW, transferred to LF003, and shipped by NRC Alaska to US Ecology Idaho, Inc., in Grand View, Idaho, for treatment and disposal.

IDW water from monitoring wells not within IRP sites was characterized for PFOS and PFOA using current Expanded SI groundwater analytical results. When these monitoring wells had PFOS and PFOA concentrations less than the ADEC Table C Groundwater Cleanup Levels, then the water IDW from these specific monitoring wells was discharged directly to the ground surface at the point of generation. A total of 15,058 gallons of IDW water below ADEC Table C Groundwater Cleanup Levels was discharged at the point of generation. The discharge was conducted in such a way as to minimize erosion, in an area capable of infiltration, and was conducted at a sufficient distance from surface water to prevent discharge to a surface water body. Note: IDW from off-Base monitoring wells that was staged at LF003 was returned to its off-Base point of generation for discharge as stated above.

Water IDW from monitoring wells with PFOS and PFOA concentrations exceeding ADEC Table C Groundwater Cleanup Levels were shipped to the permitted facility, US Ecology Idaho, Inc., for treatment and disposal. A total of 105 gallons of IDW liquids were shipped to the permitted facility. All IDW requiring off-Base disposal was staged at LF003 until it was analyzed, manifested, and shipped off-Base for disposal.

5.5.2 Soils

IDW soil generated during soil sampling at Fire Station #1 and FFTAs by the current Entomology Building was returned to the boring location where it was generated. Minimal soil IDW was generated during direct push boring due to using small diameter sampling sleeves, the lack of cuttings generated with direct push method, and the shallow depth to groundwater.

IDW soil cuttings generated during monitoring well installations on and off Eielson AFB were individually containerized, labelled, numbered, transported, and staged at the point of generation or on Eielson AFB at the USAF-approved LF003 Containment Cell #1 (LF003), pending analytical analysis and IDW characterization for each monitoring well location. A composite soil sample from soil cuttings from each monitoring well location was collected and analyzed for PFOS, PFOA, and PFBS. Soil samples were composited from the drum(s) generated for each monitoring well location, mixed with a disposable stainless-steel spoon in a disposable stainless-steel bowl, and placed in laboratory provided containers. If the concentrations were less than the EPA Risk Based Screening Levels, the soils were applied directly to the ground surface at the point of generation. If concentrations exceeded EPA Risk Based Screening Levels, soils were shipped off site for disposal at US Ecology Idaho, Inc., in Grand View, Idaho. No concentrations exceeded EPA Risk Based Screening Levels.

5.6 SITE RESTORATION

Following the Expanded SI field activities, site disturbance was restored as close to previous conditions as feasible.

5.7 DEVIATIONS

During the Expanded SI field activities, deviations were made from the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b). These deviations did not affect project data

quality objectives (DQOs) or final conclusions and recommendations. Deviations resulted from change in field conditions, field observations, or human error. The documented deviations from the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b) are summarized in the below sections and summarized in Table 5-1.

5.7.1 Temporary Monitoring Well Installation

Where the track mounted GeoProbe® rig could not access proposed temporary monitoring well locations whether due to either high water or steep slopes, the monitoring wells were installed manually using a stainless-steel drive-point piezometer to groundwater or refusal. Some temporary monitoring well locations had no viable groundwater due to the presence of shallow permafrost. The following temporary monitoring wells were not able to be sampled or installed during the Expanded SI field activities due to the deviations summarized in Table 5-1.

- **19PS-TW21 (10/18/2019)** – Proposed location was drilled but not sampled because it was dry hole (e.g., damp silty peat that produced no water).
- **20PS-TW42 (5/19/2020)** – Proposed location was inaccessible due to high water in Piledriver Slough.
- **20PS-TW43 (5/20/2020)** – Proposed location was unsampleable due to standing water throughout the immediate area.
- **20PS-TW44 (5/20/2020)** – Proposed location was unsampleable due to standing water throughout the immediate area.
- **20PS-TW45 (5/19/2020)** – Proposed location was inaccessible due to steepness of Moose Creek Bluff.
- **20PS-TW54 (5/19/2020)** – Proposed location was inaccessible due to high water in Piledriver Slough.

The 2019 temporary monitoring wells, 19PS-TW01 through 19PS-TW35, were installed to a depth of 25 feet or refusal (19PS-TW20) and sampled at the terminal depth rather than at the groundwater interface. There is a potential for a low bias for these results. During sampling, all temporary monitoring wells were stabilized or purged until six wellbore volumes were removed. Only one temporary monitoring well was purged dry during sampling, 20PS-TW45.

5.7.2 Permanent Shallow Monitoring Well Installation

Where groundwater was less than 5 feet bgs, the monitoring well design was modified to include a minimum of 2 feet of a hydrated bentonite seal in accordance with, and exceedance of, the *Monitoring Well Guidance* (ADEC, 2013). Hydrated bentonite was placed on the surface on top of a minimum of 1-foot of 10/20 mesh sand above the top of the screen.

The surface finishes for the flush mount monitoring wells were not completed during the 2020 field season due to 1 foot of snow and frozen ground during the mobilization to complete the monitoring wells. Excavating depressions in the ground to pour the planned 4 feet x 4 feet x 6-inch cement pads would have required specialized equipment to cut through and remove the frozen ground; therefore, it was decided to abandon this plan and leave the monitoring wells as constructed with surface completions identical to the stick-up monitoring wells.

The following permanent shallow monitoring wells were not installed or placed at the proposed locations during the Expanded SI field activities due to the deviations summarized in Table 5-1.

- **20PS-MW21 (9/25/2020)** – Installation of permanent monitoring well, 20PS-MW21, could not be completed due to access issues for the track-mounted rig. Proposed location was replaced with a surface water sample, CS-03.
- **20PS-MW03, MW13, MW14, MW15, MW17, MW18, MW19, MW22, MW24, MW25 (9/13-23/2020)** – Final permanent shallow monitoring well locations were altered at time of drilling.
- **20PS-MW16 (9/24/2020)** – The USACE-AK Chena River Flood Control Project requested that monitoring well 20PS MW16 be flush mounted, and the monitoring well was set right at the ground surface. Upon returning to monitoring well 20PS-MW16 after waiting at least 24-hours before development, the surface water in the marshy area had deepened and the capped top of the monitoring well was below water. A temporary coffer dam was constructed, and the cap was removed for monitoring well inspection. The groundwater was found to have artesian conditions with water flowing out of the top of the casing. Attempts were made to pump down the water level, but artesian conditions returned within seconds of turning off the pump. Development and sampling were attempted again on October 30, 2020, but the well was frozen. Due to these circumstances, the monitoring well 20PS MW16 was not able to be developed or sampled and remains with a plastic cap pending lower surface water levels.
- **20PS-MW26, MW28, MW31, MW32, and MW33** – The permanent shallow monitoring wells were installed at the wrong depth and/or incorrect location and were decommissioned in June 2021 (There are no entries in Table 5-1 for these wells, as they were decommissioned). These wells were replaced with subsequent wells as follows:
    - MW-13 replaced MW-26
    - MW-18 replaced MW-31
    - MW-23 replaced MW-33
    - MW-15 replaced MW-28
    - MW-19 replaced MW-32

5.7.3 Groundwater Sampling

The following monitoring wells were not sampled during the Expanded SI field activities due to the deviations summarized in Table 5-1.

Existing Monitoring Wells

- MW-1 (7/16/2019)
- 51MB2B (7/16/2019)
- MW-BKG-05 (7/16/2019)
- 51MB4 (7/16/2019)
- USAP-2 (5/12/2020)
- MW-4 (replaced by MW-2) (9/19/2020)
- AP-6417 (10/28/2020)
- 49M01B (10/28/2020)
- 20M14B (10/28/2020).

Temporary Monitoring Wells

- 19PS-TW21 (dry) (10/18/2019)
- 20PS-TW42 (5/19/2020)
- 20PS-TW43 (5/20/2020)
- 20PS-TW44 (5/20/2020)
- 20PS-TW45 (5/19/2020)
- 20PS-TW54 (5/19/2020).

Newly Installed Permanent Shallow Monitoring Wells

- 20PS-MW16 (9/24 & 10/30/2020)
- 20PS-MW21 (9/25/2020).

During sampling, all monitoring wells were stabilized or purged until six wellbore volumes were removed.

5.7.4 Surface Water Bodies Sampling

The proposed location for 20PS-MW21 was not accessible for a drill rig. Surface water sample, CS-03, was substituted to provide data at this location and CS-03 replaced permanent shallow monitoring well 20PS-MW21. Surface water sample CS-03 is near MW-19 and replaced permanent shallow monitoring well 20PS-MW21.

A stainless-steel clam gun was used to core sediment samples, as the Tenite tubes could not penetrate the thick vegetation and packed sediment encountered at most of the surface water bodies. An equipment blank was taken from stainless-steel clam gun each day it was used for the collection of sediment samples.

The following surface water body sediment samples were not collected during the Expanded SI field activities due to the deviations summarized in Table 5-1.

- 20PS-SP01 (6/4/2020)
- 20PS-ZP01 (6/4/2020).

The following surface water body sediment samples were collected outside of the proposed acceptable distance from their proposed location during the Expanded SI field activities due to the deviations summarized in Table 5-1.

- 20PS-MLP01 (6/6/2020)
- 20PS-PS02 (6/8/2020)
- 20PS-PS01 (6/9/2020)

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6 RESULTS

The following sections describe the analytical results by media of the field activities performed for this Expanded SI. Investigated media included groundwater, soil, sediment, and surface water. Samples were collected as described in Section 5 to determine if PFOS, PFOA, and PFBS were present at concentrations exceeding PALs, as described in Section 1.3.

Figure 6-1 shows the lateral extent of PFOA+PFOS concentrations exceeding the PAL in shallow groundwater samples from previous investigations and the Expanded SI field activities from existing, temporary, and permanent monitoring wells. Figure 6-1 will be referenced in the following sections. Note: historical PFOA+PFOS groundwater concentrations from 51MB2B and AP-6147 (existing monitoring wells), and TW-01, TW-02, TW-03, TW-04, TW-05, and TW-06 (temporary monitoring wells) and surface water samples from the south loop runway were added to Figure 6-1 to be better refine the lateral extent of PFOA+PFOS concentrations in shallow groundwater and surface water samples (USAF, 2017a; USAF, 2020d; USACE, 2018). PFBS is not shown on Figure 6-1 since it was below the PAL in all sample locations.

Analytical laboratory reports are provided in Appendix J. The Chemical Data Quality Report (CDQR) and ADEC data verification QC checklists are provided in Appendix K.

6.1 EIELSON AFB AND MOOSE CREEK GROUNDWATER SUMMARY

The project objectives of this Expanded SI for groundwater were to laterally and vertically delineate PFOS, PFOA, and PFBS groundwater contamination above PALs on and around Eielson AFB and in the adjacent community of Moose Creek.

6.1.1 Existing Monitoring Wells

Groundwater samples were collected at locations on and around Eielson AFB and the Moose Creek community including six co-located nested monitoring well clusters with both a shallow and a deep sample and two monitoring wells (USAP-1 and DSAP-8S) that were sampled twice (USAP-1 in both 2019 and 2020, and DSAP-8S twice in 2020). The six co-located nested monitoring well clusters were HCMW01, HCMW02, HCMW03, HCMW04, HCMW05, and DSAP-8. The 15 feet bgs well and the 75 feet bgs monitoring well were sampled from the HCMW series and both shallow (16.5 feet bgs) and deep (61 feet bgs) monitoring wells were sampled in well DSAP-8. Thirty-three primary groundwater samples and ten field duplicate groundwater samples were collected from existing wells at 26 locations as shown on Figure 6-1. A summary of analytical results and exceedances for groundwater samples from existing monitoring wells are provided in Table 6-1.

- PFOS was detected in groundwater samples from 23 of the 26 locations. The PFOS concentration detections ranged from 0.00046 (the analyte was positively identified; the quantitation is estimated [J]) to 0.16 µg/L with the highest concentration in a groundwater sample from MW-2 on Eielson AFB. Five locations had groundwater samples that exceeded the PFOS PAL of 0.070 µg/L including the deep (75 feet bgs) sample from HCMW-02. Only one existing well location, HCMW-02 (15 feet bgs), had a groundwater concentration between ½ PAL and the PAL.

- PFOA was detected in groundwater samples from 20 of the 26 locations. The PFOA concentration detections ranged from 0.00068 (J) to 0.043 µg/L with the highest concentration in a groundwater sample from MW-2 on Eielson AFB. No groundwater samples exceeded the PFOA PAL of 0.070 µg/L. Two locations, AP-6078 and MW-2, had groundwater concentrations between ½ PAL and the PAL.
- PFOA+PFOS was detected in groundwater samples from 22 of the 26 locations. The PFOA+PFOS concentration detections ranged from 0.00046 (J) to 0.20 µg/L with the highest concentration in a groundwater sample from MW-2 on Eielson AFB. Five locations had groundwater samples that exceeded the PFOA+PFOS PAL of 0.070 µg/L, including the shallow (15 feet bgs) and deep (75 feet bgs) samples from HCMW-02. Only the 2020 groundwater sample from USAP-1 had a concentration between ½ PAL and the PAL. The 2019 sample result from USAP-1 had a nearly identical value of 0.034 µg/L
- PFBS was detected in groundwater samples from 22 of the 26 locations. The PFBS concentration detections ranged from 0.00050 (J, analyte result is considered an estimated value biased uncertain due to a quality control failure [QN]) to 0.018 µg/L with the highest concentration in a groundwater sample from MW-2 on Eielson AFB. No groundwater samples had concentrations that exceeded ½ PAL or the PFBS PAL of 0.6 µg/L.

6.1.2 Temporary Monitoring Wells

As described in Section 5, 34 initial and 21 step-out temporary monitoring wells were installed and sampled in an iterative phased approach to further delineate PFOS, PFOA, and PFBS contaminant concentrations and to determine the locations of permanent monitoring wells to create a long-term monitoring well network on and around Eielson AFB and the community of Moose Creek. Fifty-five primary groundwater samples and ten field duplicate groundwater samples were collected from temporary monitoring wells. A summary of analytical results and exceedances for groundwater samples from temporary monitoring wells are provided in Table 6-2.

- PFOS was detected in groundwater samples from 51 of the 55 locations. The PFOS concentration detections ranged from 0.00049 (J) to 0.39 (analyte result is considered an estimated value biased low due to a quality control failure [QL]) µg/L with the highest concentration in a groundwater sample from 19PS-TW01, northwest of the community of Moose Creek, Alaska. The location of temporary monitoring well TW01, and all other temporary monitoring wells, can be seen in Figure 6-1. Six locations had groundwater samples that exceeded the PFOS PAL of 0.070 µg/L. Groundwater samples from eight locations (TW16, TW17, TW25, TW28, TW30, TW33, TW34, and TW55) had concentrations between ½ PAL and the PAL including the field duplicate from 19PS-TW33 at 0.035 µg/L while the primary groundwater sample was detected at a concentration of 0.033 µg/L.
- PFOA was detected in groundwater samples from 45 of the 55 locations. The PFOA concentration detections ranged from 0.00046 (J) to 0.11 µg/L with the highest concentration in a groundwater sample from 19PS-TW24 north of Eielson AFB near JJ&L, Inc. Only one location had a groundwater sample that exceeded the PFOA PAL of 0.070 µg/L. Groundwater samples from three locations (TW01, TW22, and TW23) had concentrations between ½ PAL and the PAL.

- PFOA+PFOS was detected in groundwater samples from 52 of the 55 locations. The PFOA+PFOS concentration detections ranged from 0.00049 (J) to 0.43 (QL) µg/L with the highest concentration in a groundwater sample from 19PS-TW01 on northwestern end of community of Moose Creek. Eight locations had groundwater samples that exceeded the PFOA+PFOS PAL of 0.070 µg/L, including the duplicate sample of 20PS-TW55 (0.071 µg/L), but not exceeding in the primary groundwater sample of 20PS-TW55 (0.066 µg/L). Groundwater samples from 11 locations had a concentration between ½ PAL and the PAL, including the primary groundwater sample of 20PS-TW55 at 0.066 µg/L while the field duplicate was detected at 0.071 µg/L.
- PFBS was detected in groundwater samples from 39 of the 55 locations. The PFBS concentration detections ranged from 0.00050 (J, QN) to 0.14 (QN, analyte result is considered an estimated value biased high due to a quality control failure [QH]) µg/L with the highest concentration in a groundwater sample from 20PS-TW37 on Eielson AFB south of the runway. No groundwater samples had concentrations that exceeded ½ PAL or the PFBS PAL of 0.6 µg/L.

6.1.3 Permanent Shallow Monitoring Wells

Thirty-two permanent shallow monitoring wells were installed and were generally screened across the groundwater interface. Thirty-one primary groundwater samples and nine field duplicate groundwater samples were collected at the newly installed permanent shallow monitoring wells on and around Eielson AFB and the community of Moose Creek. No groundwater sample was collected from monitoring well 20PS-MW16 as detailed in Section 5.7.2. A summary of analytical results and exceedances for groundwater samples from newly installed permanent shallow monitoring wells are provided in Table 6-3.

- PFOS was detected in groundwater samples from 30 of the 31 locations. The PFOS concentration detections ranged from 0.00050 (J, the result is considered a high biased estimated value due to contamination present in associated blank [B]) to 0.068 µg/L with the highest concentration in a groundwater sample from 20PS-MW08 west of Richardson Highway in the northwesternmost portion of Eielson AFB. No groundwater samples exceeded the PFOS PAL of 0.070 µg/L. Eleven locations had groundwater samples with concentrations between ½ PAL and the PAL, including the duplicate sample of MW01 (0.035 µg/L), but the primary groundwater sample of MW01 (0.034 µg/L) did not exceed ½ PAL.
- PFOA was detected in groundwater samples from 30 of the 31 locations. The PFOA concentration detections ranged from 0.0015 (J) to 0.028 µg/L with the highest concentration in a groundwater sample from 20PS-MW06 on Eielson AFB at the north end of the runway. No groundwater samples exceeded ½ PAL (0.035 µg/L).
- PFOA+PFOS was detected in groundwater samples from 30 of the 31 locations. The PFOA+PFOS concentration detections ranged from 0.0020 (J, B) to 0.089 µg/L with the highest concentration in a groundwater sample from 20PS-MW27 west of Richardson Highway off Eielson AFB at the southern end of Moose Creek Landing Pond. Groundwater samples from three locations exceeded the PFOA+PFOS PAL of 0.070 µg/L. Nine locations had groundwater samples with concentrations between ½ PAL and the PAL.

- PFBS was detected in groundwater samples from all 31 locations, including the duplicate sample of MW04 (0.00049 µg/L [J, QN]), but not in the primary groundwater sample of MW04. The PFBS concentration detections ranged from 0.00049 (J, QN) to 0.0074 µg/L (QN) with the highest concentration in a groundwater sample from 20PS-MW01 east of Cathers Lake and Moose Creek in the northernmost portion of Eielson AFB. No groundwater samples exceeded ½ PAL or the PFBS PAL of 0.6 µg/L.

6.1.4 Permanent Deep Nested Clustered Monitoring Wells

Two sets of four permanent deep nested monitoring well clusters were installed, to total depths of approximately 60, 110, 160, and 210 feet bgs and labeled A, B, C, and D, respectively. The four shallow monitoring wells (60 feet bgs and 110 feet bgs) were sampled in both 2019 and 2020. Twelve primary groundwater samples and nine field duplicates were collected off Eielson AFB to vertically delineate PFOS, PFOA, and PFBS contaminant concentrations. A summary of analytical results and exceedances for groundwater samples from newly installed deep nested clustered are provided in Table 6-3 and are shown on Figure 6-1.

- PFOS was detected in groundwater samples from three of the eight monitoring wells (MW01A, MW02A, and MW02B) at the two well cluster locations. The PFOS concentration detections ranged from 0.0022 to 0.026 µg/L with the highest concentration in a 2020 groundwater sample from MW02A at 60 feet bgs west of Moose Creek Landing Pond off Eielson AFB. No groundwater samples exceeded ½ the PAL of 0.070 µg/L and there were no detections in any of the C (160 feet bgs) or D (210 feet bgs) deep monitoring wells.
- PFOA was detected in groundwater samples from three of the eight monitoring wells (MW01A, MW02A, and MW02B) sampled at the two well cluster locations. The PFOA concentration detections ranged from 0.0021 to 0.017 µg/L with the highest concentration in a 2020 groundwater sample from MW02A at 60 feet bgs west of Moose Creek Landing Pond off Eielson AFB. No groundwater samples exceeded ½ PAL of 0.070 µg/L and there were no detections in any of the C (160 feet bgs) or D (210 feet bgs) deep monitoring wells.
- PFOA+PFOS was detected in groundwater samples from three of the eight monitoring wells sampled at the two well cluster locations. The PFOA+PFOS concentration detections ranged from 0.0043 to 0.043 µg/L with the highest concentration in a 2020 groundwater sample from MW02A at 60 feet bgs west of Moose Creek Landing Pond off Eielson AFB. Only the primary groundwater sample collected from MW02A in 2020 exceeded ½ PAL of 0.070 µg/L and there were no detections in any of the C (160 feet bgs) or D (210 feet bgs) deep monitoring wells.
- PFBS was detected in groundwater samples from three of the eight monitoring wells sampled at the two well cluster locations. The PFBS concentration detections ranged from 0.0006 (J) to 0.0041 µg/L (QN, QH) with the highest concentration in a 2020 groundwater sample from MW02A at 60 feet bgs west of Moose Creek Landing Pond off Eielson AFB. No groundwater samples exceeded ½ PAL or the PFBS PAL of 0.6 µg/L.

6.2 EIELSON AFB SURFACE WATER BODIES SUMMARY

The project objectives of this Expanded SI for surface water were to determine the concentrations of PFOS, PFOA, and PFBS in surface water above PALs in surface water bodies on and around Eielson AFB. Surface water samples were collected within the following surface water bodies at Eielson AFB and off-Base.

- Crescent Lakes (crescent-shaped lake formed by the historical stream channel)
- Bathing Beauty Lake
- Bear Lake
- French Creek
- Grayling Lake
- Hidden Lake
- Moose Creek
- Moose Creek Landing Pond
- Moose Lake
- Mullins Pit
- Piledriver Slough
- Scout Lake
- Shoe Lake
- Spruce Lake
- Tar Kettle Lake
- Z-Pit

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Surface water samples were co-located with sediment samples except for Spruce Lake, Z Pit, and Crescent Lakes. Deviations are summarized in Table 5-1. A minimum of one surface water sample was collected from each lake, creek, pond, or slough; however, in some cases surface water samples were collected at two depth intervals to assess the potential stratification of PFOS, PFOA, and PFBS contamination. Surface water samples were collected without disturbing the sediment to the extent practicable.

46 primary surface water samples were collected along with 10 field duplicates. A summary of analytical results and exceedances for surface water samples are provided in Table 6-4. Surface water sampling locations at Eielson AFB and off-Base are shown on Figure 5-3. Surface water sample exceedances are illustrated on figures for Bear Lake (Figure 6-2), Moose Creek and Piledriver Slough (Figure 6-3), Moose Creek Landing Pond (Figure 6-4), Moose Lake (Figure 6-5), and Spruce Lake (Figure 6-6).

6.2.1 Crescent Lakes

The Crescent Lakes (crescent-shaped lake formed by the historical stream channel) were formed when Chena Slough was cut off from the source by railroad, road, and flood control efforts including Chena River Flood Control. Three primary surface water samples and two field duplicate surface water samples were collected in the Crescent Lakes to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS, PFOA, PFOA+PFOS, and PFBS were detected in all surface water samples with no exceedance of the respective PALs.

6.2.2 Bathing Beauty Lake

Bathing Beauty Lake is situated between Piledriver Slough and the Richardson highway across from the community of Moose Creek. Three primary surface water samples were collected in Bathing Beauty Lake to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS, PFOA, PFOA+PFOS, and PFBS were detected in all surface water samples with no exceedance of the respective PALs.

6.2.3 Bear Lake

Bear Lake is located along Arctic Avenue on Eielson AFB. Three primary surface water samples and one field duplicate surface water sample were collected in Bear Lake to further evaluate PFOS, PFOA, and PFBS contaminant concentrations. Surface water sample exceedances for Bear Lake are shown on Figure 6-2.

- PFOS, PFOA, PFOA+PFOS, and PFBS were detected in all surface water samples.
- The PFOS concentration detections ranged from 0.042 (QL) to 0.053 (QL) µg/L with the highest concentration in surface water sample 20PS-BR02-SW-5. All surface water samples collected at Bear Lake had PFOS concentrations between ½ PAL and the PAL.
- The PFOA+PFOS concentration detections ranged from 0.059 (QL) to 0.070 (QL) µg/L with the highest concentration in surface water sample 20PS-BR02-SW-5. One surface water sample, 20PS-BR02-SW-5, exceeded the PFOA+PFOS PAL of 0.070 µg/L.

6.2.4 French Creek

French Creek is located on the eastern edge of Eielson AFB. Three primary surface water samples and one field duplicate surface water sample were collected in French Creek to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS, PFOA, PFOA+PFOS, and PFBS were detected in all surface water samples with no exceedance of the respective PALs.

6.2.5 Grayling Lake

Grayling Lake is located within Eielson AFB on the west side of the Richardson Highway. Three primary surface water samples and one field duplicate surface water sample were collected in Grayling Lake to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS, PFOA, PFOA+PFOS, and PFBS were not detected in any of the surface water samples collected.

6.2.6 Hidden Lake

Hidden Lake is located within Eielson AFB on the west side of the Richardson Highway. Three primary surface water samples were collected in Hidden Lake to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS, PFOA, and PFOA+PFOS were detected in all surface water samples with no exceedance of the respective PALs.
- PFBS was not detected in any of the surface water samples collected.

6.2.7 Moose Creek

Moose Creek runs along the northern side of the town of Moose Creek and cuts west to the Tanana River near the Chena River Flood Control Project. Two primary surface water samples were collected in Moose Creek to further evaluate PFOS, PFOA, and PFBS contaminant concentrations. Surface water sample exceedances for Moose Creek are shown on Figure 6-3.

- PFOS, PFOA, PFOA+PFOS, and PFBS were detected in all surface water samples.
- Surface water sample 20PS-MC01-SW-1 had a PFOS concentration of 0.065 µg/L below the PAL of 0.070 µg/L but exceeding ½ PAL.
- Surface water sample 20PS-MC01-SW-1 had a PFOA+PFOS concentration of 0.094 µg/L that exceeds the PAL of 0.070 µg/L.

6.2.8 Moose Creek Landing Pond

Moose Creek Landing Pond is located on Moose Creek near its confluence with the Tanana River. Four primary surface water samples were collected in Moose Creek Landing Pond to further evaluate PFOS, PFOA, and PFBS contaminant concentrations. Surface water sample results for Moose Creek Landing Pond are shown on Figure 6-4.

- PFOS, PFOA, PFOA+PFOS, and PFBS were detected in all surface water samples with no exceedance of the respective PALs.
- The PFOS concentration detections ranged from 0.040 to 0.044 µg/L with the highest concentration in surface water sample 20PS-MLP02-SW-5. All surface water samples collected at Moose Creek Landing Pond had concentrations between ½ PAL and the PAL.
- The PFOA+PFOS concentration detections ranged from 0.059 to 0.064 µg/L with the highest concentration in surface water sample 20PS-MLP02-SW-5. All surface water samples collected at Moose Creek Landing Pond had concentrations between ½ PAL and the PAL.

6.2.9 Moose Lake

Moose Lake is located on the east edge of Eielson AFB. Three primary surface water samples were collected in Moose Lake to further evaluate PFOS, PFOA, and PFBS contaminant concentrations. Surface water sample exceedances for Moose Lake are shown on Figure 6-5.

- PFOS, PFOA, PFOA+PFOS, and PFBS were detected in all surface water samples.
- The PFOS concentration detections ranged from 0.12 (QL, B) to 0.15 (QL) µg/L with the highest concentration in surface water sample 20PS-ML01-SW-1. All primary surface water samples exceeded the PFOS PAL of 0.070 µg/L. PFOS results for all primary surface water samples were qualified as detailed in Table 6-4.
- The PFOA+PFOS concentration detections ranged from 0.14 (QL, B) to 0.17 (QL, B) µg/L with the highest concentration in surface water sample 20PS-ML01-SW-1. All primary surface water samples exceeded the PFOA+PFOS PAL of 0.070 µg/L.

6.2.10 Mullins Pit

Mullins Pit is located on the south end of Eielson AFB. Two primary surface water samples and one field duplicate surface water sample were collected in Mullins Pit to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS, PFOA, and PFOA+PFOS were detected in all surface water samples with no exceedance of the respective PALs.
- PFBS was not detected in any of the surface water samples collected.

6.2.11 Piledriver Slough

Piledriver Slough runs along the Richardson Highway on its east side. Three primary surface water samples and two field duplicate surface water samples were collected in Piledriver Slough to further evaluate PFOS, PFOA, and PFBS contaminant concentrations. Surface water sample exceedances for Piledriver Slough are shown on Figure 6-3.

- PFOA was detected in two of the three primary samples with no exceedance of the PFOA PAL of 0.070 µg/L.
- The PFOS concentration detections ranged from 0.00052 (J) to 0.076 µg/L with the highest concentration in surface water sample 20PS-PS01-SW-1. Surface water sample 20PS-PS01-SW-1 and its field duplicate, 20PS-PS99-SW-0609, had concentrations that exceeded the PFOS PAL of 0.070 µg/L.
- The PFOA+PFOS concentration detections ranged from 0.00052 (J) to 0.11 µg/L with the highest concentration in surface water sample 20PS-PS01-SW-1. Surface water sample 20PS-PS01-SW-1 and its field duplicate, 20PS-PS99-SW-0609, had concentrations that exceeded the PFOA+PFOS PAL of 0.070 µg/L.
- PFBS was detected in one of the three primary samples with no exceedance of the PFBS PAL of 0.6 µg/L.

6.2.12 Scout Lake

Scout Lake is located on Eielson AFB west of the Richardson Highway. Three primary surface water samples were collected in Scout Lake to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS, PFOA, PFOA+PFOS, and PFBS were not detected in any of the surface water samples collected.

6.2.13 Shoe Lake

Shoe Lake is located on Eielson AFB west of the Richardson Highway. Three primary surface water samples were collected in Shoe Lake to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOA and PFBS were not detected in any of the surface water samples collected.

- PFOS was detected in surface water sample 20PS-SH02-SW-4 with a concentration of 0.00041 (J) below the PFOS PAL of 0.070 µg/L.
- PFOA+PFOS was detected in surface water sample 20PS-SH02-SW-4 with a concentration of 0.00041 (J) below the PFOA+PFOS PAL of 0.070 µg/L.

6.2.14 Spruce Lake

Spruce Lake is located on the east side of Eielson AFB. Three primary surface water samples were collected in Spruce Lake to further evaluate PFOS, PFOA, and PFBS contaminant concentrations. Surface water sample exceedances for Spruce Lake are shown on Figure 6-6.

- PFOS, PFOA, PFOA+PFOS, and PFBS were detected in all surface water samples.
- The PFOS concentration detections ranged from 0.31 (QL) to 0.50 (QL) µg/L with the highest concentration in surface water sample 20PS-SP02-SW-1. All primary surface water samples exceeded the PFOS PAL of 0.070 µg/L.
- The PFOA+PFOS concentration detections ranged from 0.34 (QL) to 0.53 (QL) µg/L with the highest concentration in surface water sample 20PS-SP02-SW-1. All primary surface water samples exceeded the PFOA+PFOS PAL of 0.070 µg/L.

6.2.15 Tar Kettle Lake

Tar Kettle Lake is located on Eielson AFB west of the Richardson Highway. Three primary surface water samples and one field duplicate surface water sample were collected in Tar Kettle Lake to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS, PFOA, PFOA+PFOS, and PFBS were not detected in any surface water samples collected.

6.2.16 Z-Pit

Z-Pit is located within the Chena River Flood Control Project on the east side of the Richardson Highway. Two primary surface water samples and one field duplicate sample were collected in Z-Pit to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS, PFOA, PFOA+PFOS, and PFBS were detected in all surface water samples with no exceedance of the respective PALs.

6.3 SURFACE WATER BODY SEDIMENT SUMMARY

The project objectives of this Expanded SI for sediment were to determine the concentrations of PFOS, PFOA, and PFBS in sediment above PALs in surface water bodies on and around Eielson AFB. Sediment samples were collected within the following surface water bodies at Eielson AFB and off-Base.

- Bathing Beauty Lake
- Bear Lake
- French Creek
- Grayling Lake
- Hidden Lake
- Moose Creek
- Moose Creek Landing Pond
- Moose Lake
- Mullins Pit

- Piledriver Slough
- Scout Lake
- Shoe Lake
- Tar Kettle Lake

Sediment samples were co-located with surface water samples except for Spruce Lake, Z Pit, and Crescent Lakes. Sediment samples were collected from the uppermost sediment of the lake or river bottom.

No sediment samples were collected at the Spruce Lake and Z Pit locations due to impenetrable vegetation on the floor of the surface water bodies. Several methods were employed to attempt to break through the vegetation for sediment collection (e.g., stainless steel shovel, Tenite tubes, clam gun, and the Ponar); however, none were successful, and no sediment samples were collected from these surface water bodies. Deviations are summarized in Table 5-1.

As stated in the FCF dated 24 September 2020 (Appendix A), no co-located sediment samples were required at the Crescent Lakes locations since only a surface water sample was collected to replace inaccessible monitoring well locations.

A summary of analytical results for sediment samples is provided in Table 6-5. Co-located surface water and sediment sampling locations at Eielson AFB and off-Base are shown on Figure 5-3.

Twenty primary sediment samples and seven field duplicate sediment samples were collected in 13 surface water bodies at Eielson AFB and off-Base to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOA was not detected in any sediment samples collected, except for a detection in the one sediment sample 20PS-MLP01-SD-0 at a concentration of 0.00032 (QL, J) within Moose Creek and below the PFOA PAL of 0.126 mg/kg.
- PFOS was detected in 13 of the 27 sediment samples. The PFOS concentrations ranged from 0.00036 (QL, J) to 0.0055 (QL) mg/kg with the highest concentration in sediment sample 20PS-MC01-SD-0 within Moose Creek. PFOS results for 17 sediment samples were qualified as stated in Table 6-5. None of the sediment samples exceeded the PFOS PAL of 0.126 mg/kg. However, five sediment samples exceed the ADEC Method Two Clean-up levels for PFOS of 0.0030 mg/kg with concentrations ranging from 0.0033 to 0.0055 mg/kg (see Table 6-5). Additional consideration of ecological screening levels may be warranted in the RI.
- PFBS was not detected in any of the sediment samples.

6.4 SOIL SUMMARY

The project objectives of this Expanded SI for soil were to laterally and vertically delineate PFOS, PFOA, and PFBS soil concentrations on Eielson AFB at two areas 1) Fire Station #1 and 2) the Southern Burn Area FFTA by the current Entomology Building above PALs.

6.4.1 Fire Station #1 (IRP Site SS306P)

Thirteen soil borings, SB02 to SB14, were advanced each with two soil samples collected: one surface soil sample from 0 to 1 feet bgs and one subsurface/deep soil sample from right above the groundwater interface. Saturated soil was encountered in most soil borings, at depths ranging from 6 to 8 feet bgs.

A summary of analytical results and exceedances for surface and subsurface soils samples at Fire Station #1 are provided in Table 6-6. Surface soil analytical exceedances at Fire Station #1 are shown on Figure 6-7. Subsurface soil analytical exceedances at Fire Station #1 are shown on Figure 6-8.

Twenty-six primary soil samples and two field duplicate soil samples were collected in the vicinity of Fire Station #1 to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS was detected in all 26 primary soil samples. Twelve surface soil samples and twelve deep soil samples had detections that exceeded the PFOS PAL of 0.126 mg/kg. The highest PFOS concentration detected was 8.9 (QH) mg/kg in the surface sample 20PS-FST1-SB13-1.
- PFOA was detected in 25 of the 26 primary soil samples. Two deep soil samples, 20PS-FST1-SB13-7.5 and 20PS-FST1-SB14-8, had detections that exceeded the PFOA PAL of 0.126 mg/kg.
- PFBS was not detected in any of the surface soil samples, but it was detected in 11 of the 13 deep soil samples. None of the surface or deep soil samples exceeded the PFBS PAL of 1.9 mg/kg. The highest PFBS concentration detected was 0.0091 mg/kg in two deep soil samples, 20PS-FST1-SB13-7.5 and 20PS-FST1-SB14-8.

Surface soil contamination remains unbounded to the south and southeast of 20PS-FST1-SB13 and to the north and northeast of 20PS-FST1-SB12. Subsurface soil contamination remains unbounded to the south and southeast of 20PS-FST1-SB13-1.

6.4.2 Southern Burn Area FFTA by the current Entomology Building (IRP Site FT092)

Thirteen soil borings, SB04 to SB16, were advanced each with two soil samples collected: one surface soil sample from 0 to 1 feet bgs and one subsurface/deep soil sample from right above the groundwater interface. Saturated soil was encountered in most soil borings, at depths ranging from 6 to 8.5 feet bgs.

A summary of analytical results and exceedances for surface and subsurface soils samples at FFTA are provided in Table 6-7. Surface soil analytical exceedances at the FFTA are shown on Figure 6-9. Subsurface soil analytical exceedances at the FFTAs are shown on Figure 6-10.

Twenty-six primary soil samples and four field duplicate soil samples were collected in the vicinity of FFTA near the Entomology Building to further evaluate PFOS, PFOA, and PFBS contaminant concentrations.

- PFOS was detected in all 26 primary soil samples. Seven surface soil samples and seven deep soil samples had detections that exceeded the PFOS PAL of 0.126 mg/kg. The highest PFOS concentration detected was 16 (QN) mg/kg in the duplicate surface sample at 20PS-FFTA-ENT-SB11-1.
- PFOA was detected in 23 of the 26 primary soil samples with all three non-detects in shallow samples from 0 to 1 feet bgs. Four deep soil samples and one surface soil sample had detections that exceeded the PFOA PAL of 0.126 mg/kg.

- PFBS was detected in 2 of the 13 surface soil samples and in 5 of the 13 deep soil samples. None of the surface or deep soil samples exceeded the PFBS PAL of 1.9 mg/kg. The highest PFBS concentration detected was 0.029 mg/kg in the deep soil sample 20PS-FFTA-ENT-SB11-7.5.

Surface soil contamination remains unbounded to the north and west of 20PS-FFTA-ENT-SB11 and 20PS-FFTA-ENT-SB12-1. Additionally, surface contamination likely extends below the existing soil stockpiles within the possible release area identified in Figures 6-9 and 6-10. Subsurface soil contamination remains unbounded to the south and west of boring locations 20PS-FFTA-ENT-SB15 and 20PS-FFTA-ENT-SB16.

6.5 DATA REVIEW, VALIDATION, AND USABILITY ASSESSMENT

The results of data verification and validation process indicate that the data generated from the samples collected during the Expanded SI field activities are of sufficient quality and quantity necessary for accomplishing project objectives. Sample results accurately indicate the presence and/or absence of target analyte contaminations at sampled locations. Samples were collected and analyzed as specified in the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b), except as noted in Section 5.7. Sample results are representative of site conditions at the time of collection in 2019 and 2020. Results obtained are comparable to industry standards in that collection and analytical techniques followed approved, documented procedures (except in the CDQR provided in Appendix K). Results are reported in industry standard units. Although trip, field, and equipment blank contamination occurred, the concentrations were at trace concentration and representative of normal laboratory or field procedures. The data are complete, and the results are usable for project objectives. The overall completeness of the data indicates that the quality of the analytical program and the laboratory and field procedures were sufficient to meet the DQOs.

The overall quality of the data was acceptable. No results were rejected, and the project completeness goal was met. Acceptable data are associated with QC data that meet QC criteria, or with QC samples that did not meet QC criteria but DQOs were not affected. Estimated results are considered inaccurate due to a bias created by matrix interference or QC acceptance criteria, which were not met. The requirements of the Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b) and the DoD QSM (DoD, 2017) were used to evaluate the acceptability of the data.

Analytical laboratory reports are provided in Appendix J. Data validation reports, including data quality assessment reports, data validation reports, and ADEC data verification QC checklists are provided in Appendix K.

7 SUMMARY AND CONCLUSIONS

In 2016, EPA established HAs for PFOS and PFOA for drinking water. PALs for PFOA and PFOS in groundwater and surface water are based on the PAL of 0.070 µg/L (70 parts per trillion) (EPA, 2016). If both PFOS and PFOA were present in groundwater and surface water, the combined (aggregate, PFOA+PFOS) concentration was compared to the PAL of 0.070 µg/L. The PAL for PFBS (target HQ of 0.1) in groundwater and surface water is based upon the EPA RSL of 0.6 µg/L (EPA, 2020a).

PALs for PFOA and PFOS (target HQ of 0.1) in soil and sediment are based on the EPA RSL of 0.126 mg/kg (EPA, 2020b). The PAL for PFBS (target HQ of 0.1) in soil and sediment is based upon the EPA RSL of 1.9 mg/kg in residential soil (EPA, 2020a).

During the Expanded SI field activities, environmental samples (i.e., groundwater, surface water, sediment, and soil) were collected on and around Eielson AFB and the community of Moose Creek. Project objectives were 1) to laterally and vertically delineate PFOS, PFOA, and PFBS contamination in groundwater, 2) to determine the concentrations PFOS, PFOA, and PFBS in surface water and sediment in surface water bodies on Eielson AFB and off-Base, and 3) to laterally and vertically delineate PFOS, PFOA, and PFBS concentrations in soil at the Fire Station #1 and the FFTAs by the current Entomology Building.

The following section presents the extent of contamination and conclusions and recommendations of the Expanded SI field activities and provides recommendations for possible future actions.

7.1 EXTENT OF CONTAMINATION

7.1.1 Groundwater

On and around Eielson AFB, the groundwater and surface water are generally in direct contact and are generally connected vertically and horizontally.

Laboratory analysis identified PFOS, PFOA, and PFOA+PFOS impacts exceeding PALs in groundwater samples that exceeded the PFOS, PFOA, and PFOA+PFOS PAL of 0.070 µg/L (EPA, 2016). PFOA+PFOS results from existing, temporary, and permanent deep and shallow monitoring wells are shown on Figure 6-1.

The highest concentrations of PFOS were in groundwater samples occurred in temporary monitoring well, 19PS-TW01 (0.39 QL µg/L), to the northwest of the community of Moose Creek exceeding the PFOS PAL of 0.070 µg/L (EPA, 2016).

The highest concentrations of PFOA were detected in a groundwater sample from temporary monitoring well, 19PS-TW24 (0.11 µg/L), on the northeastern end of the community of Moose Creek exceeding the PFOA PAL of 0.070 µg/L (EPA, 2016).

The highest concentrations of PFOA+PFOS in groundwater samples occurred in temporary monitoring well, 19PS-TW01 (0.43 QL µg/L) to the northwest of the community of Moose Creek exceeding the PFOA+PFOS PAL of 0.070 µg/L (EPA, 2016).

PFBS was detected in most groundwater samples submitted but all concentrations were well below the PFBS PAL of 0.6 µg/L. In addition, all PFBS detections were below 0.025 µg/L except in a groundwater sample from temporary monitoring well 20PS-TW37 on Eielson AFB south of the

runway with a concentration of 0.14 (QN, QH) µg/L. For reference, the PFOA+PFOS to PFBS ratio for all other monitoring wells sampled was about 15:1. The PFOA+PFOS to PFBS ratio in this well was 1:14, indicating an atypical contaminant compound distribution.

All groundwater exceedances of PALs are summarized in Table 7-1, Table 7-2, and Table 7-3. Table 7-1 shows exceedances in existing monitoring wells. Table 7-2 shows exceedances in temporary monitoring wells. Table 7-3 shows exceedances in newly installed permanent shallow and deep monitoring wells.

Lateral Extent

On and around Eielson AFB, the groundwater and surface water are generally in direct contact or are heavily influenced by the other; therefore, the lateral extent of the groundwater and surface water are both discussed. The estimated lateral extent of PFOA+PFOS results for groundwater and surface water from existing, temporary, permanent shallow monitoring wells, and surface water samples through October 2020 are shown on Figure 6-1. The figure illustrates the estimated PFOA+PFOS plume contours, delineating areas with concentrations in the following ranges:

- ≥ PAL (exceeding the EPA HA of 0.070 µg/L)
- ≥ 50% PAL and < PAL
- ≥ 10% of PAL and < 50% PAL; and
- < 10% of PAL including non-detections.

The groundwater flow direction on Eielson AFB generally follows the regional gradient. However, contaminants released in this environment tend to migrate comparatively slowly through the fill material near the ground surface and very rapidly in the Tanana Basin Aquifer sediments. Contaminant plume shapes are expected to be complex because of the vertical disparity in groundwater velocity encountered in braided river sediments, alluvial fans, and historical stream channels (AECOM, 2014).

In general, the estimated lateral extent of the PFOA+PFOS contaminant plume, as shown on Figure 6-1, is elongate and follows the regional north-northwest groundwater flow direction through the length of Eielson AFB, originating at the runways on the southern edge. The estimated lateral extent of the PFOA+PFOS contaminant plume at a local level is likely affected by the complex heterogeneous nature of the Tanana River floodplain deposits, the prominent Moose Creek Bluff feature (e.g., hydrogeologic boundary), historical stream channels, and numerous isolated masses of discontinuous permafrost. The lateral extent is generally constrained to the west by Piledriver Slough adjacent to Richardson Highway, and to the east by French Creek and numerous isolated masses of discontinuous permafrost. However, as the contaminant plume leaves Eielson AFB to the north and approaches the community of Moose Creek, the numerous isolated masses of permafrost, the Birch Creek Schist of the Yukon-Tanana Uplands to the east, and Moose Creek Bluff to the north of the community of Moose Creek redirect groundwater flow due west towards the Tanana River. The contaminant plume narrows dramatically (approximately less than 1,000 feet across) as it flows past Moose Creek Bluff (e.g., hydrogeologic boundary). As the contaminant plume passes west of Moose Creek Bluff, it appears to fan out, and may be preferentially following historical and current stream channels across the USACE-AK Chena River Flood Control Project area and due west toward the Tanana River. The northwesternmost

reach of the ≥ 10% of PAL portion of the contaminant plume seems to terminate as it approaches the Tanana River and along the Moose Creek Dam. Although the numerous isolated masses of discontinuous permafrost and Birch Creek Schist have very low hydraulic conductivity, it is expected that fracture flow through the Birch Creek Schist and preferential flow channels through the permafrost to the north may exist due to the tremendous hydraulic pressure created by redirecting the flow of a portion of the Tanana Basin Aquifer. There are several groundwater sample locations with concentrations ≥ 10% of PAL northwest and north of Moose Creek Bluff that may be the result of this fracture or preferential flow through the Moose Creek Bluff and permafrost.

As limited by the scope of this Expanded SI, the estimated horizontal extent of the PFOA+PFOS contaminant plume is bounded by a combination of groundwater sample results and natural boundaries as detailed in the following examples and exceptions.

- Northern and eastern edges of the central contaminant plume are bound by permafrost and the Birch Creek Schist as the Tanana Basin Aquifer thins approaching the foothills. Several attempts to retrieve groundwater samples to the east were unsuccessful due to dry monitoring wells in the permafrost. Stakeholder scoping decisions were made that no further delineation was necessary.
- The southern edge and area west of the main Eielson AFB are well defined with a series of monitoring wells < 10% of the PAL.
- The northwestern edge along the Chena River Flood Control levee has a line of low detections that bound the contaminant plume in that direction including the north side of Moose Creek Bluff.
- The westernmost portion (west of the town of Moose Creek) of the contaminant plume as it approaches the Tanana River via Piledriver Slough, and the Chena River Flood Control area is relatively undefined as the area is marshy or inaccessible during the summer months. However, it is likely the westward migration of the contaminant plume is dependent on the local and seasonal Tanana River hydrological influence on the regional groundwater gradient.

Vertical Extent

Vertical extent of PFOS, PFOA, and PFBS contamination in the deep cluster monitoring wells and surface water samples in surface water bodies were investigated to determine if there was a potential for stratification. The surface water bodies were generally too shallow to allow for much differentiation of contaminant stratification, and no clear stratification pattern was observed in the results for the surface water samples collected.

The permanent deep nested clustered monitoring wells showed a clear stratification in the vertical migration of contaminants. The permanent deep nested monitoring wells were located west of Moose Creek Bluff in line with the contamination plume as it narrows and is redirected westward as it passes Moose Creek Bluff. The vertical differentiations and conclusions of vertical delineation may not apply to the main body of the contamination plume on Eielson AFB. There were no detections in the C (160 feet bgs) and D (210 feet bgs) monitoring wells. The highest concentrations were from groundwater samples from the A (60 feet bgs) monitoring wells with the

groundwater samples from the B (110 feet bgs) being an order of magnitude less than for the A (60 feet bgs) monitoring wells groundwater samples. (Note: the new nested clustered monitoring wells are not included in Table 7-3 because no sample results from these monitoring wells exceeded the PALs. Table 6-3 includes the nested clustered wells.

Also, two temporary monitoring wells were located near both Cluster #1 and #2. At cluster #1, the groundwater sample from 20PS-TW51 had a detection of PFOA+PFOS of 0.013 µg/L, like the A (60 feet bgs) sample detection of 0.017 µg/L. At cluster #2, the groundwater sample from 19PS-TW16 collected at approximately 24 feet bgs had a detection of PFOA+PFOS of 0.072 µg/L, which is consistent with the stratigraphic differences illustrated by the A (60 feet bgs) and B (110 feet bgs) sample detections of 0.043 µg/L and 0.0043 µg/L. However, this trend seems to be reversed at the HCMW02 well cluster. The groundwater sample HCMW02-15 collected at approximately 15 feet bgs had a detection of PFOA+PFOS of 0.087 µg/L while the groundwater sample HCMW02-75 had a detection of PFOA+PFOS of 0.15 µg/L and was collected at approximately 75 feet bgs.

In addition, two permanent shallow monitoring wells, 20PS-MW14 and 20PS-MW27, at the southern end of Moose Creek Landing Pond were placed within 20 feet of each other and screened from 3 to 13 feet bgs and 10 to 20 feet bgs, respectively. The groundwater sample from 20PS-MW14 had a detection of PFOA+PFOS of 0.028 µg/L and the groundwater sample from 20PS-MW27 had a detection of PFOA+PFOS of 0.089 µg/L, a significant and inexplicable vertical variance considering the lateral proximity of the two wells. No soil boring logs were taken during these installations, so further investigation may be warranted.

7.1.2 Surface Water

On and around Eielson AFB, the groundwater and surface water are generally in direct contact and are generally connected vertically and horizontally.

Laboratory analysis identified impacts exceeding PALs in surface water samples that exceeded the PFOS and PFOA+PFOS PAL of 0.070 µg/L (EPA, 2016). PFOS, PFOA, and PFBS results from surface water samples are detailed in Table 6-4 and shown on Figures 6-2, 6-3, 6-4, 6-5, and 6-6.

PFOS and PFOA+PFOS concentrations exceeding the PALs were found in surface water samples from Bear Lake (Figure 6-2), Moose Creek (Figure 6-3), Moose Lake (Figure 6-5), Piledriver Slough (Figure 6-3), and Spruce Lake (Figure 6-6). Moose Creek Landing (Figure 6-4) had samples with PFOS and PFOA+PFOS concentrations exceeding ½ of the PALs.

All surface water exceedances of PALs are summarized in Table 7-4.

Surface water bodies to the south and west of Eielson AFB have not been significantly impacted by PFOS, PFOA, and PFOA+PFOS. Multiple surface water bodies to the east, north, and northeast of Eielson AFB and the community of Moose Creek have been impacted through contact with impacted groundwater or overland flow.

7.1.3 Sediment

Laboratory analysis identified low concentrations of PFOS and PFOA in sediment samples well below the PAL of 0.126 mg/kg (EPA, 2020b). PFBS was not detected in any sediment samples, including from off-base Bathing Beauty Lake. Co-located surface water and sediment sampling

locations on Eielson AFB and off-Base are shown on Figure 5-3. No obvious trends in concentration were observed with horizontal distribution of sediment samples.

7.1.4 Soil

Laboratory analysis identified both PFOS and PFOA impacts that exceeded PALs in surface (0 to 2 feet bgs) and subsurface (>2 feet bgs) soil samples in the two areas 1) Fire Station #1 and 2) the FFTAs by the current Entomology Building. The limited scope of this Expanded SI was to further investigate the PFOS and PFOA contamination in soil in the vicinity of the two buildings. The investigation further assessed the vertical and lateral extents of contamination but did not fully delineate either dimension. The assessment of the extents of contamination of PFOS and PFOA in soil is further described below.

Fire Station #1 (IRP Site SS306P)

Laboratory analysis identified PFOS in 4 of 13 surface (0-2 feet bgs) and 3 of 13 subsurface (> 2 feet bgs) soil samples that exceeded the PAL of 0.126 mg/kg. Laboratory analysis identified low concentrations of PFOA and PFBS in soil samples at Fire Station #1 below the PAL of 1.26 mg/kg and 1.9 mg/kg in residential soil, respectively (EPA, 2020a; EPA, 2020b). Surface soil detection levels do not align with subsurface detection levels. Fire Station #1 sample exceedances are shown in Table 7-5. Surface soil analytical results at Fire Station #1 are shown on Figure 6-7. Subsurface soil analytical results at Fire Station #1 are shown on Figure 6-8.

Southern Burn Area FFTA by the current Entomology Building (IRP Site FT092)

Laboratory analysis identified PFOS in 3 of 13 surface soil (0-2 feet bgs) and 4 of 13 subsurface soil (> 2 feet bgs) samples exceeded the PAL of 0.126 mg/kg. Laboratory analysis detected PFOA and PFBS in soil samples at the FFTA below the PAL of 1.26 mg/kg and PAL of 1.9 mg/kg, respectively (EPA, 2020a; EPA, 2020b). Surface soil detection levels do not align with subsurface detection levels. Surface soil analytical results at the FFTA are shown on Figure 6-9, subsurface soil analytical sample results at the FFTA are shown in Table 7-6, and exceedances at the FFTA are shown on Figure 6-10.

7.2 CONCLUSIONS AND RECOMMENDATIONS

The objectives of the Expanded SI field activities were to laterally and vertically delineate PFOS, PFOA, and PFBS contamination in groundwater on Eielson AFB and the adjacent community of Moose Creek and in soil at Fire Station #1 (IRP Site SS306P) and the Southern Burn Area FFTA by the current Entomology Building (Southern Burn Area, IRP Site FT092) on Eielson AFB, and to determine concentrations of PFOS, PFOA, and PFBS in surface water and sediment in surface water bodies on and around Eielson AFB.

PFOS, PFOA, and PFOA+PFOS concentrations in groundwater, surface water, and soil exceeded PALs. PFBS concentrations in groundwater, surface water, and soil were well below the PALs and is therefore not recommend as a primary contaminant for the RI activities; however, PFBS should continue to be evaluated as part of the analytical suite to account for cumulative risks. All sediment sample concentrations were below the PALs. Based on the data collected during this Expanded SI, it is recommended that RI activities be performed to further characterize PFOS and PFOA contamination in groundwater, surface water, and soil. Further, based on the data from this

investigation, it is recommended that the determination of horizontal vertical extent of sediment is eliminated for future PFOS, PFOA, and PFBS investigations; however, further assessment to support risk assessments maybe necessary.

PFOS, PFOA, and PFOA+PFOS concentrations in groundwater, surface water, and soil media are considered to have potentially complete exposure pathways to human receptors for the current and future commercial/industrial land use scenarios. Fully delineating the extent of PFOS, PFOA, and PFOA+PFOS in relation to these media will be critical to understand risks to identified receptors at Eielson AFB and off-Base in the adjacent community of Moose Creek.

This Expanded SI Report provides support for the USAF Plan to conduct future RI activities that will further characterize PFOS and PFOA impacts. As part of the RI, a Human Health/Ecological Risk Assessment (HH/ERA) will be performed, and the CSM will be updated. An FS/Proposed Plan will follow the RI to propose any changes needed to the established remedies at Eielson AFB to address PFOS, PFOA, and PFBS contamination. Any changes to the 2019 Interim ROD (USAF, 2019c) will be implemented during the next review process through a formal ROD amendment as appropriate.

Some specific recommendations for future investigations include:

- **Fire Station #1 (IRP Site SS306P) and FFTA soils:** Additional vertical soil delineation within identified contaminated areas is recommended by collecting soils at 1-to-2-foot intervals from the surface to below the groundwater interface. Due to the shallow groundwater, the subsurface samples collected were in the vadose zone directly above the groundwater interface at 6-8 feet bgs. Both soil investigation areas are within known areas of groundwater impacted with PFOS, PFOA, and PFBS. Depending on seasonal groundwater elevation fluctuations, the subsurface soil concentrations may be either contributing to or being impacted from the groundwater. As an example, Fire Station #1 had no detections of PFBS in the surface samples, but 11 of 13 subsurface samples had detections of PFBS.
- **Vertical Groundwater Delineation:** More detailed vertical delineation at multiple zones within the contaminant plume. It is recommended that a lateral series of temporary monitoring well samples are collected at 10 feet vertical intervals using direct push and SP-16 technology to better understand vertical contaminant transport after the groundwater flow is redirected to the west. Specifically:
    - Complete a transect from north-northeast to south-southwest within the Chena River Flood Control Project from MW33 to MW32 to further evaluate vertical distribution of contamination within and outside preferential pathways, as findings point to deep contamination in the area.
    - Complete a transect from north to south from Moose Creek Bluff to Piledriver Slough, to further evaluate vertical distribution of contamination within a narrowing within 1,000 feet of Moose Creek Bluff and Richardson Highway.

7.3 LIMITATIONS

Limitations associated with the results of this Expanded SI Report include the following:

- **Monitoring Well Network:** The Expanded SI monitoring well network locations were influenced by and determined based on the complex heterogeneous nature of the Tanana River floodplain deposits, the prominent Moose Creek Bluff feature, historical stream channels, and by numerous isolated masses of permafrost. Based on these complexities there may be preferential pathways for PFOS, PFOA, and PFBS contamination transport not captured by the Expanded SI monitoring well network, as limited by the scope of this Expanded SI, as further described in Section 1.2.
- **Soil Borings at Fire Station #1 (IRP Site SS306P) and FFTA by the current Entomology Building (Southern Burn Area, IRP Site FT092):** The extent of PFOS and PFOA contamination was not fully delineated laterally or vertically from completed soil borings at Fire Station #1 and FFTA by the current Entomology Building, as limited by the number of sample locations within the scope of this Expanded SI, as further described in Section 6.4. Additionally, PFAS contaminated soil stockpiles are currently located at the FFTA by the former Entomology Building. The soil stockpiles partially overlay the extent of existing soil contamination and have the potential to be a source of surface soil contamination.
- **Comparability of 2019 and 2020 Temporary Monitoring Wells Samples:** It should be noted that the 2019 temporary monitoring well samples were collected at the bottom of the 25 feet bgs soil boring whereas the 2020 temporary monitoring well samples were collected at the groundwater interface, or in wetland areas, from the ground surface to 10 feet bgs.
- **Location of Permanent Deep Nested Monitoring Wells:** The permanent deep nested monitoring wells were located west of Moose Creek Bluff in line with the contamination plume as it narrows and is redirected westward as it passes Moose Creek Bluff. The vertical differentiations and conclusions of vertical delineation may not apply to the main body of the contamination plume on Eielson AFB.

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75.325 Cumulative Risk Guidance

75.333 Qualified environmental professionals and qualified samplers

75.341 Table B1, Method 2, Soil Cleanup Levels Table, Human Health, under 40-inch zone.

75.341 Table B1, Method 2, Soil Cleanup Levels Table, Migration to groundwater

75.345 Table C, Groundwater and Surface Water Cleanup Levels

75.990 (100) Qualified Persons

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

FIGURES

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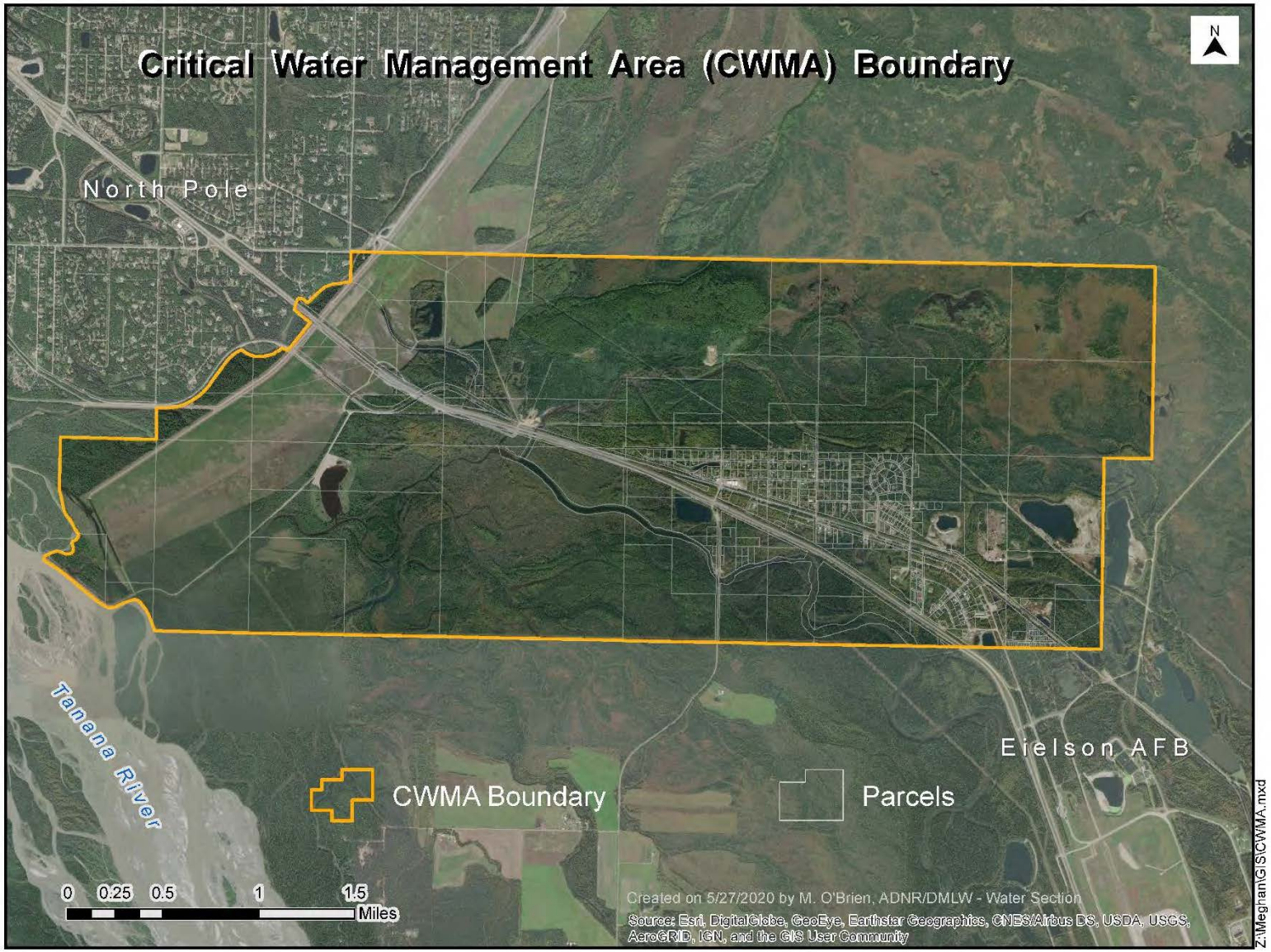
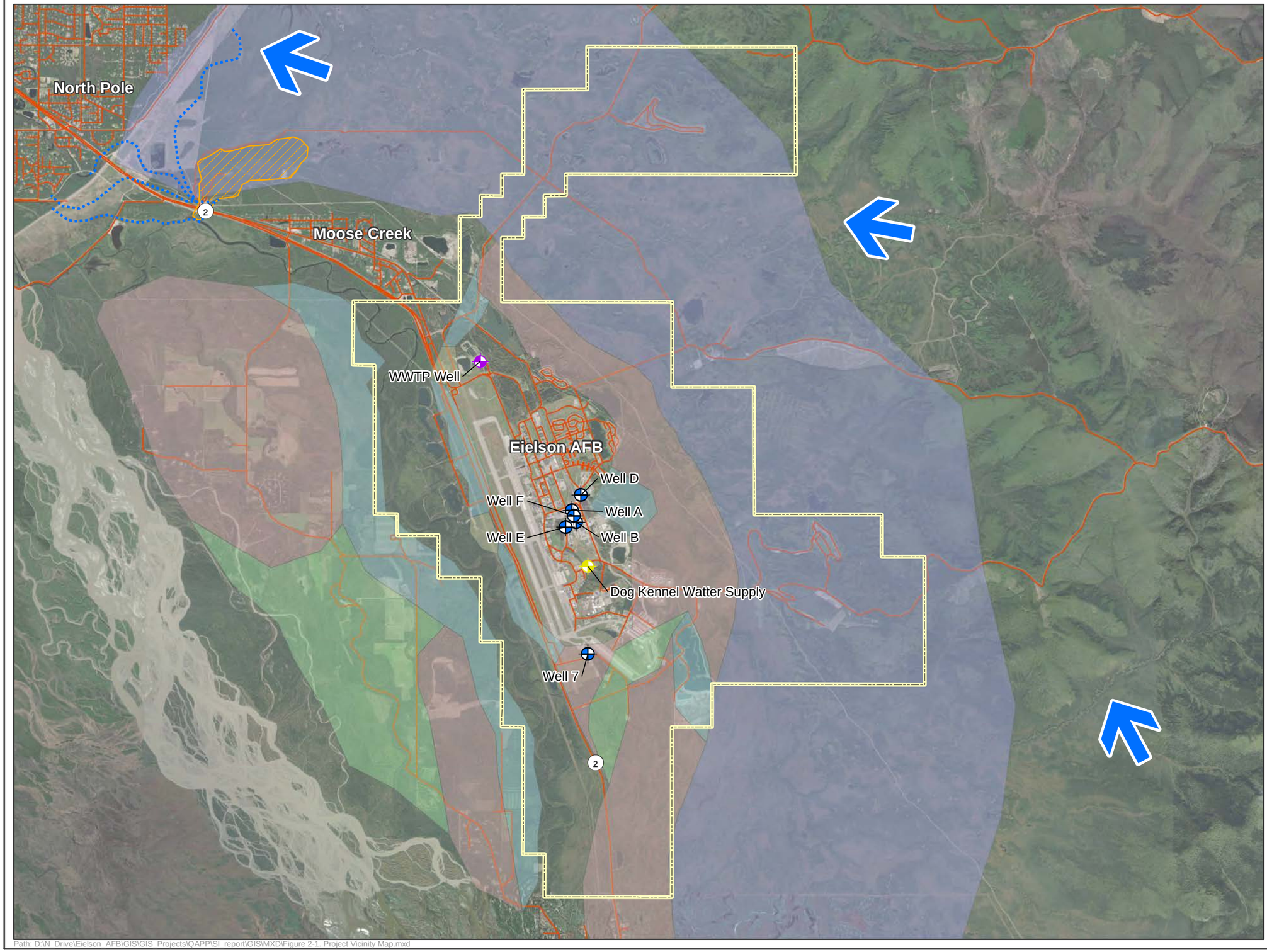
Figure 1-1. Critical Water Management Area – Moose Creek Vicinity Map (ADNR, 2020)
Note: Figure is unaltered from the original source reference.





Legend

- Eielson AFB Installation Boundary
- Historic Creek Bed
- Moose Creek Bluff
- Drinking Water Well
- Dog Kennel Water Supply
- WWTP Well Location

Estimated Permafrost Delineation

- Uncertain
- Shallow
- Frozen Bedrock
- Deep
- Very Deep
- Road

Regional Groundwater Flow

AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctanoic sulfonate

0 0.5 1 2
Miles

Imagery: Esri, 2016

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Project Vicinity Map

Figure 2-1

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 2-1. Project Vicinity Map.mxd

Figure 2-2. Geological Map (Ahtna, 2020)
Note: Figure is unaltered from the original source reference.

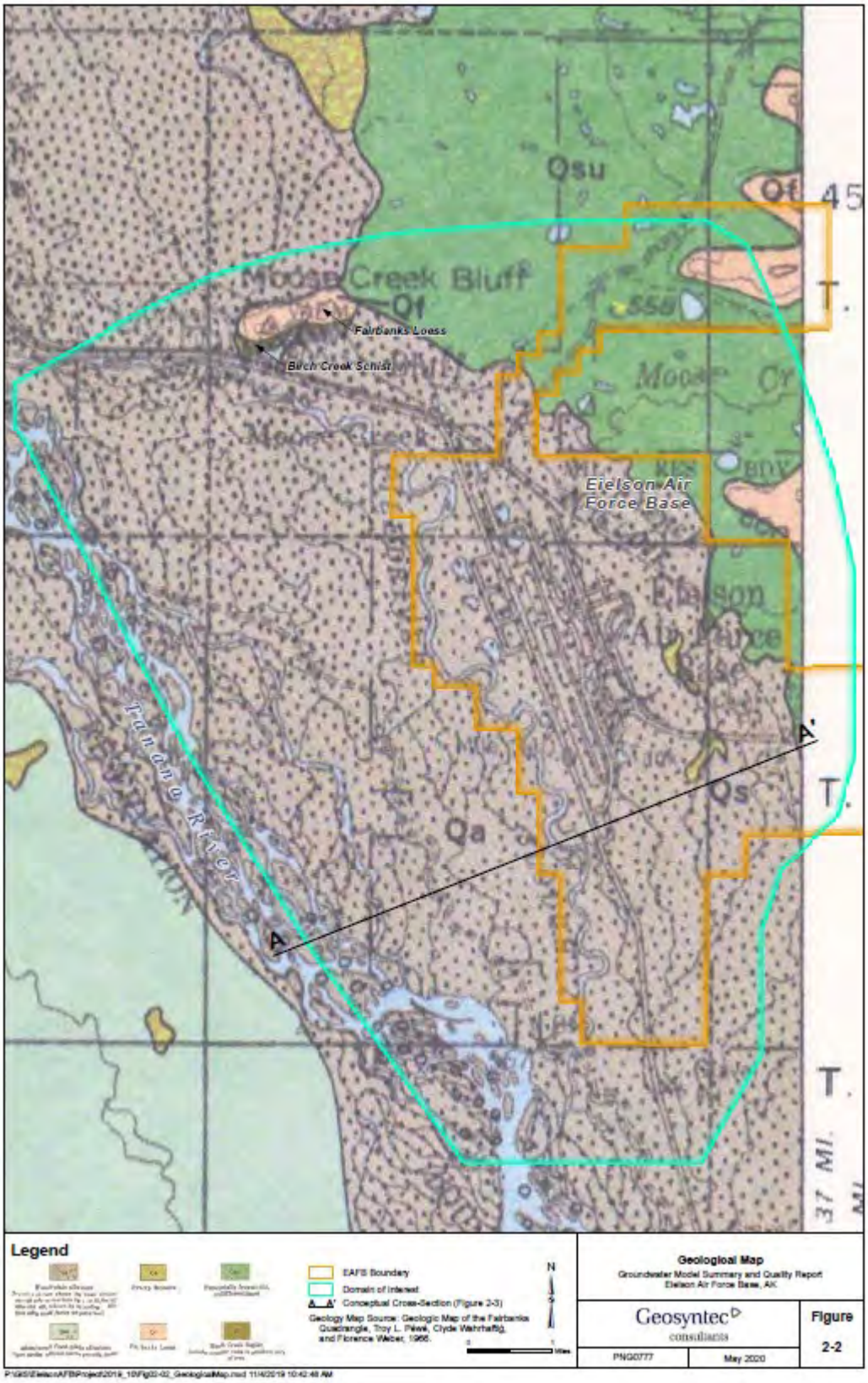


Figure 2-3. Geological Map – Explanation of Deposits (Geology Map Source; 2021)
Note: Figure is unaltered from the original source reference.

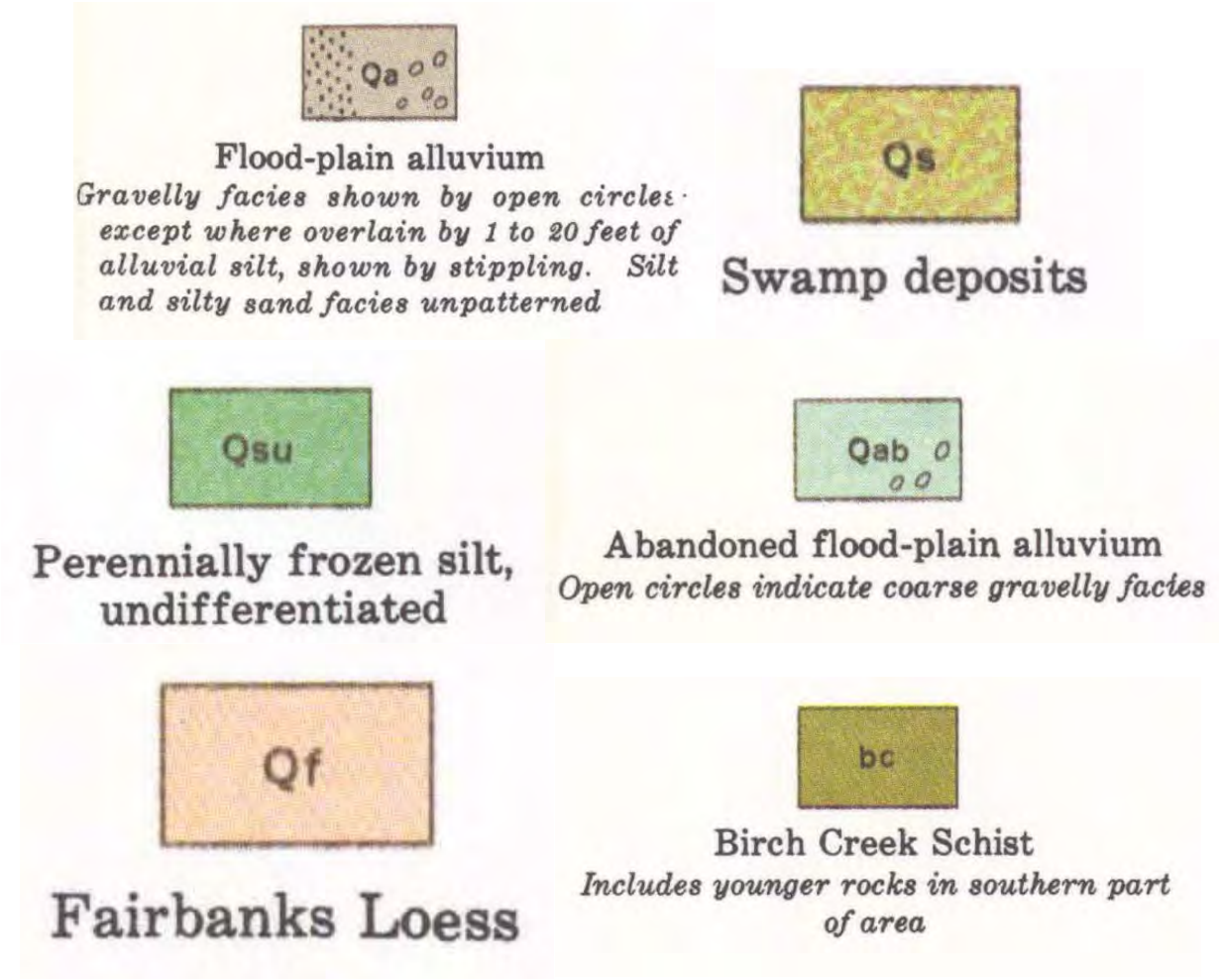
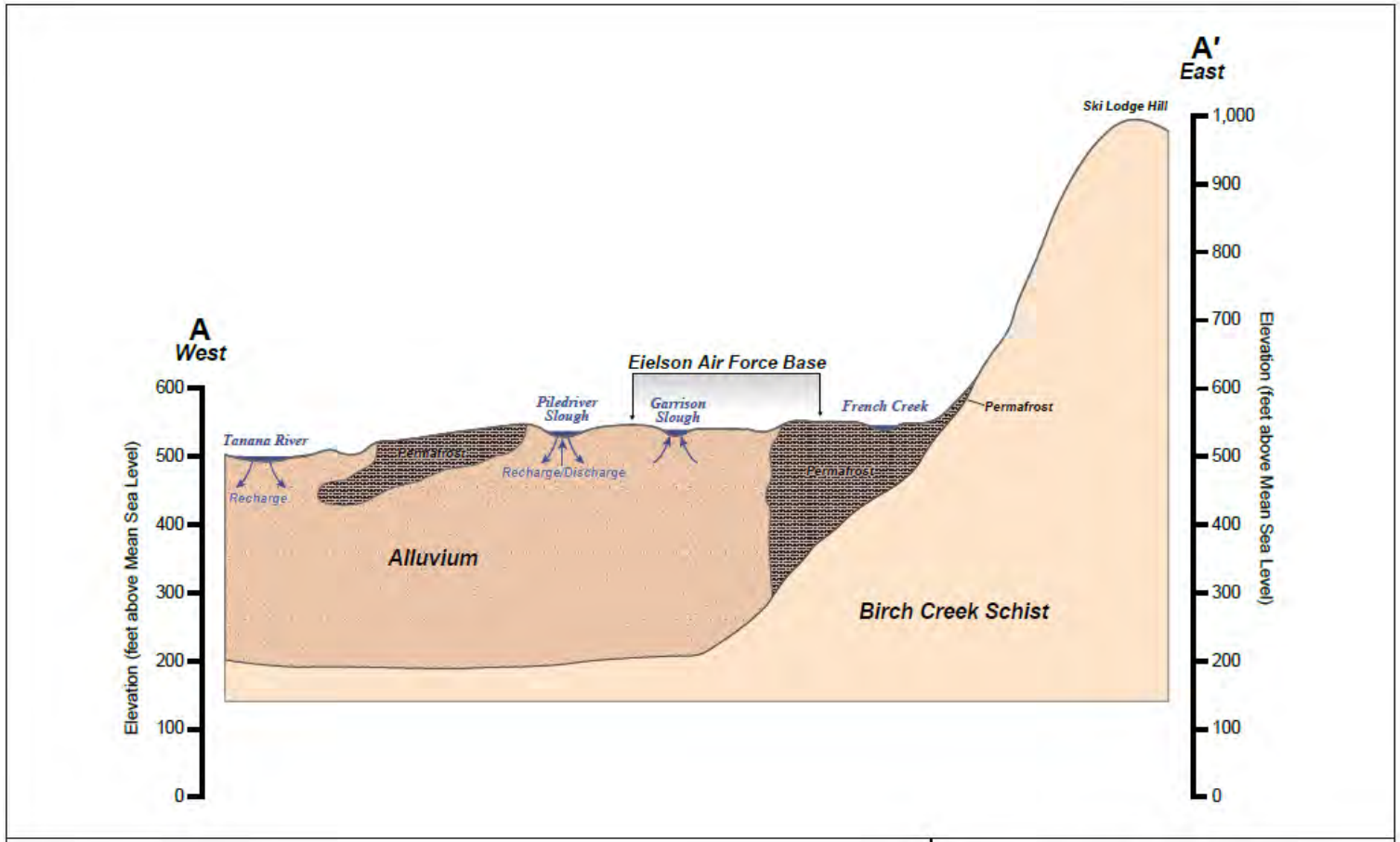
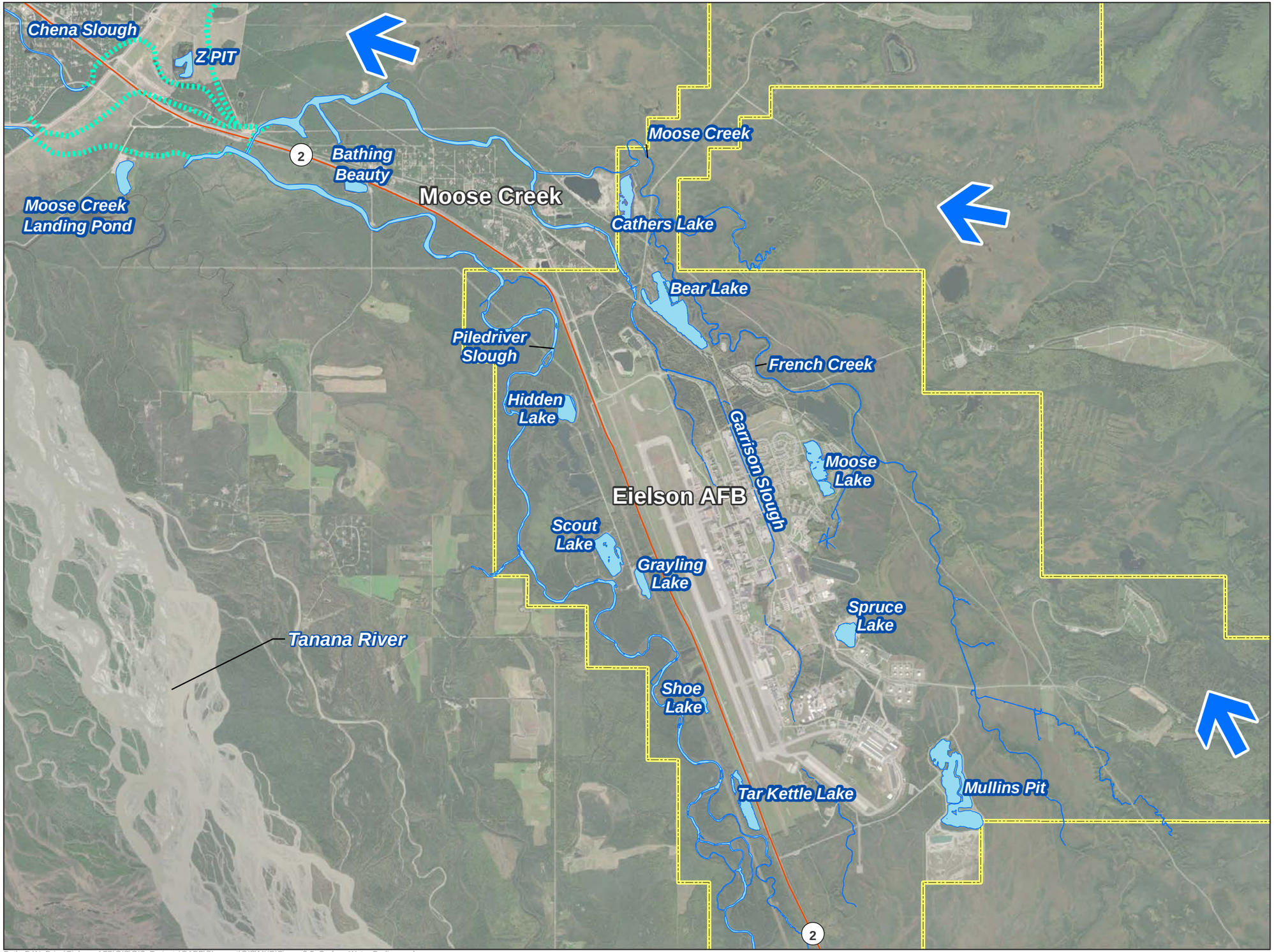
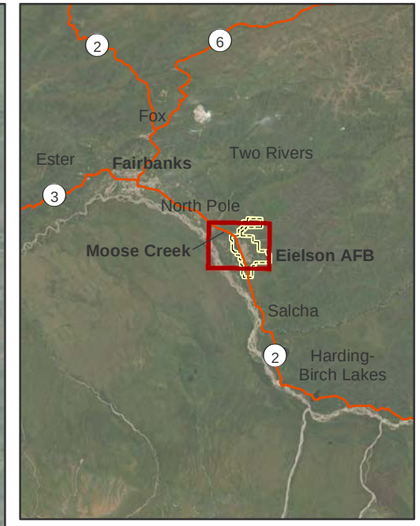


Figure 2-4. Conceptual Cross-Section (Ahtna, 2020; Figure 2-3)
Note: Figure is unaltered from the original source reference.







Legend

- Eielson AFB Installation Boundary
- Road
- Historic Creek Channels
- Waterbody
- Regional Groundwater Flow

AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate

0 0.25 0.5 1
Miles

Imagery: Esri, 2015

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Surface Water Bodies

Figure 2-5

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 2-5. Surface Water Bodies.mxd

Figure 2-6. Chena Slough with Moose Creek and Moose Creek Bluff in Background (War Department, 1946; Plate No. 2)
Note: Figure is unaltered from the original source reference.

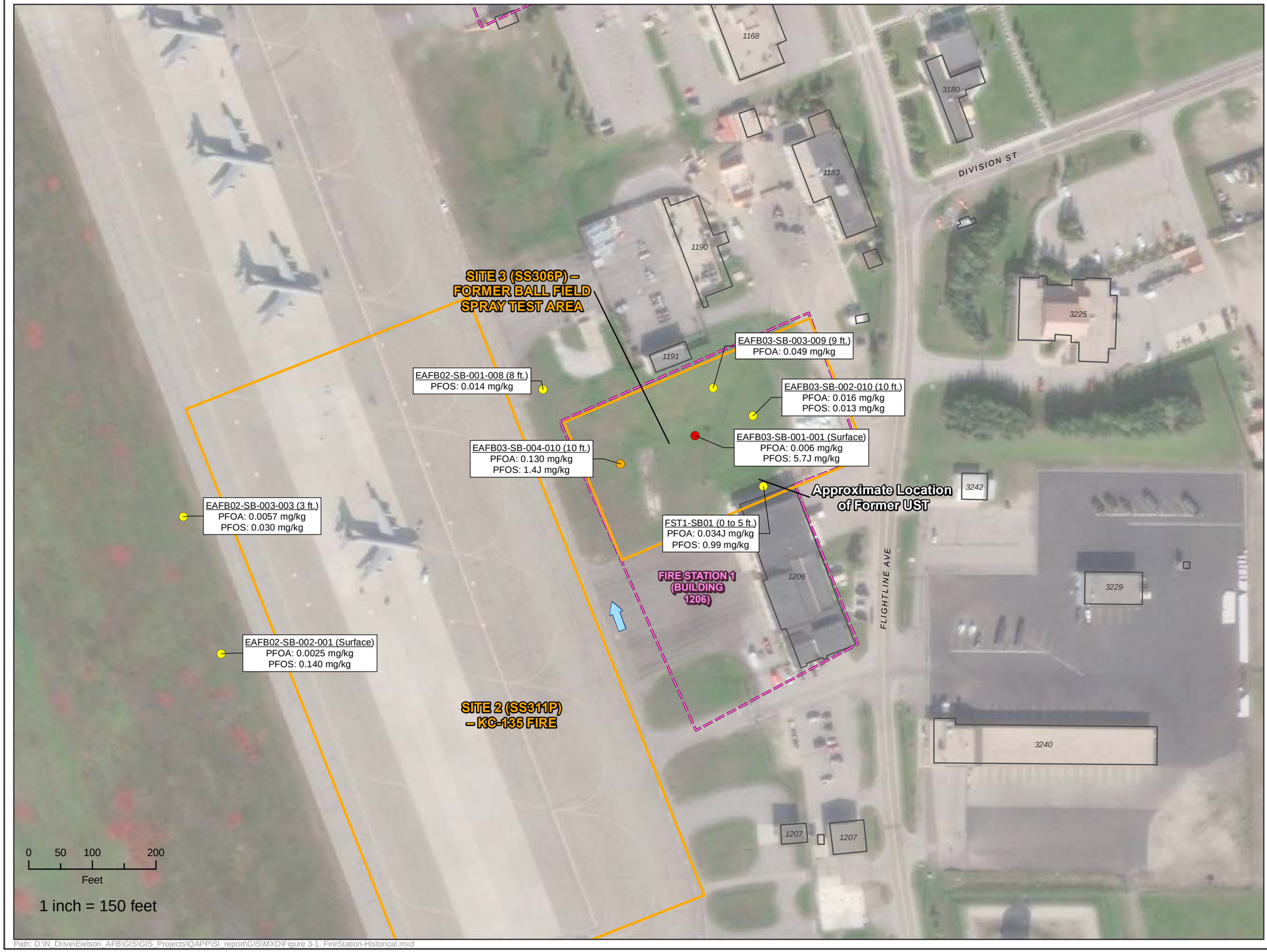
PLATE NO. 2.
CHENA SLOUGH WITH MOOSE CREEK AND MOOSE CREEK BUTTE IN BACKGROUND, LOOKING EAST, 14 MAY 1937.

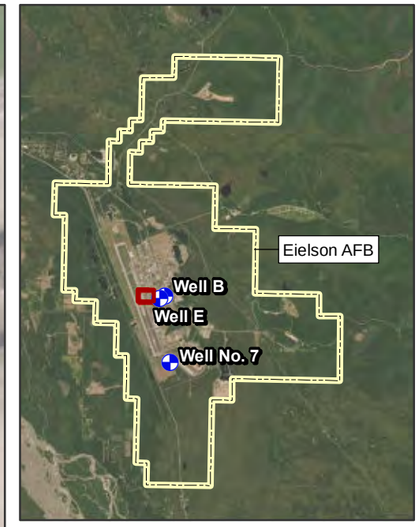
Figure 2-7. Dike at Moose Creek and Moose Creek Bluff in Background (War Department, 1946; Plate No. 7)
Note: Figure is unaltered from the original source reference.

PLATE NO. 7.
DIKE AT MOOSE CREEK, LOOKING EAST, 23 JUNE 1941.

Figure 2-8. Moose Creek Bluff in Foreground with Richardson Highway in Background (War Department, 1946; Plate No. 10)
Note: Figure is unaltered from the original source reference.

PLATE NO. 10.
RELOCATED RICHARDSON HIGHWAY ENROUTE TO VALDEZ, LOOKING EAST FROM MOOSE CREEK BUTTE, 13 JUNE 1944. FLOOD STAGE HAS RECEDED 1 FOOT.





Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Validated PFAS Source Area
- Approximate Groundwater Flow
- Water Supply Well

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above EPA RBSL and Below ADEC HH Cleanup Levels (1.26 mg/kg and 1.6 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA - US Environmental Protection Agency
ft. - Feet
HH - Human health
J - Analyte identified, quantitation estimated
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk based screening level

ISM samples were collected between 0 and 5 feet bgs.

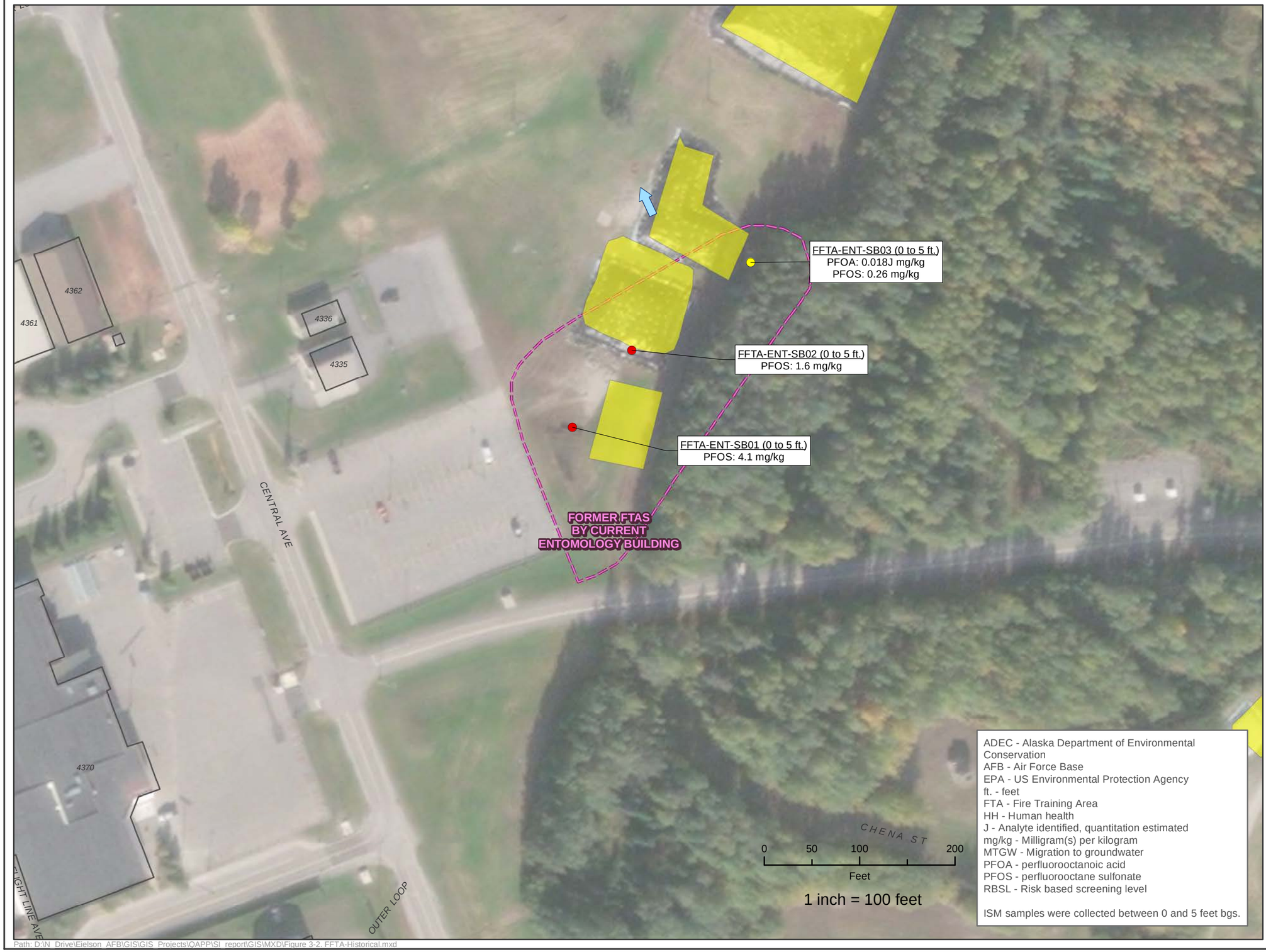
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Fire Station 1 (Building 1206)-Historical Data

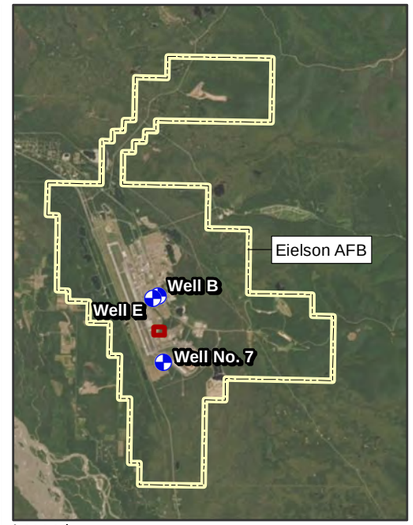
Figure 3-1

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 3-1. FireStation-Historical.mxd



ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA - US Environmental Protection Agency
ft. - feet
FTA - Fire Training Area
HH - Human health
J - Analyte identified, quantitation estimated
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk based screening level

ISM samples were collected between 0 and 5 feet bgs.



Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Existing Soil Stockpiles
- Approximate Groundwater Flow
- Water Supply Well

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

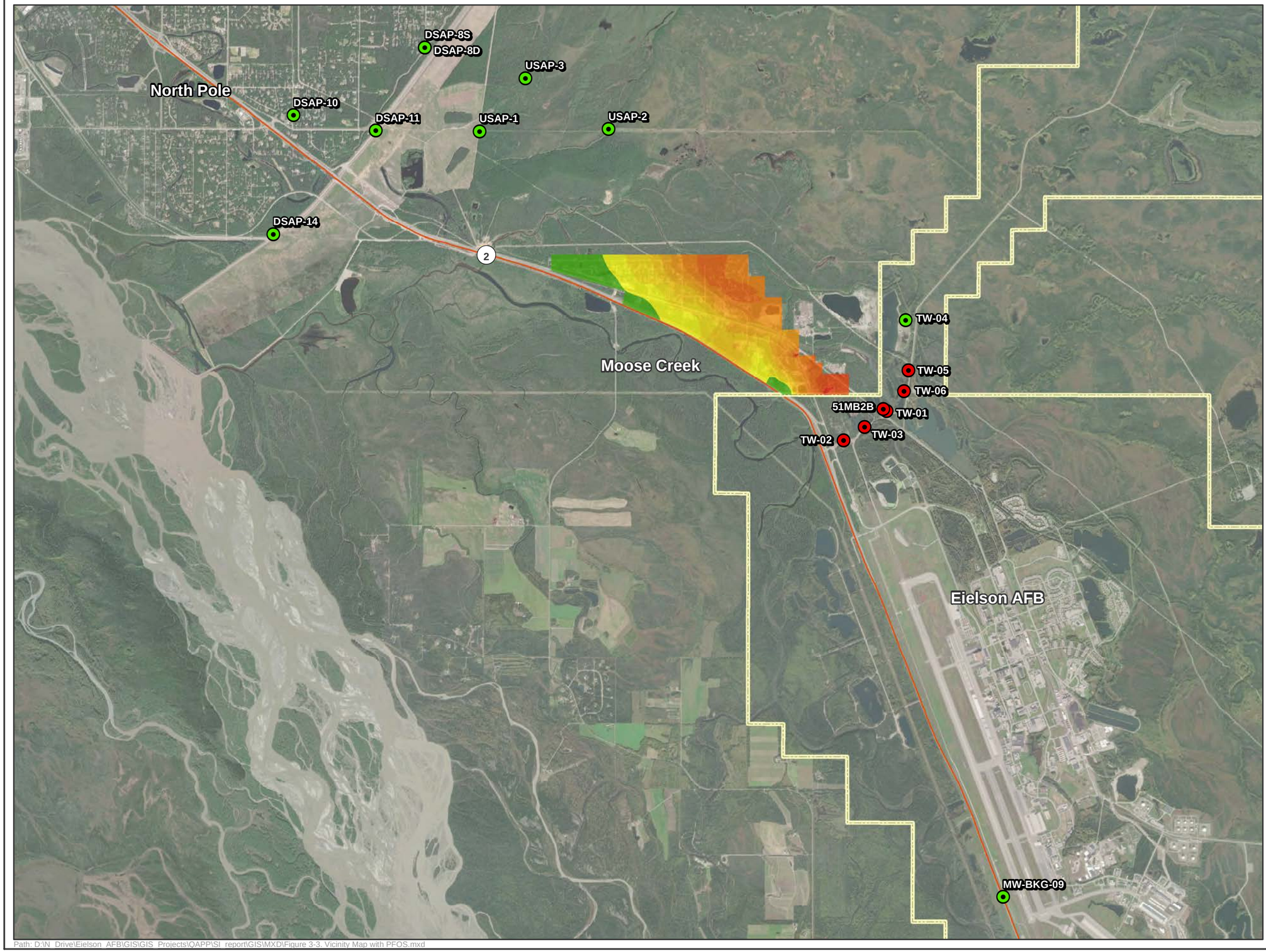
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

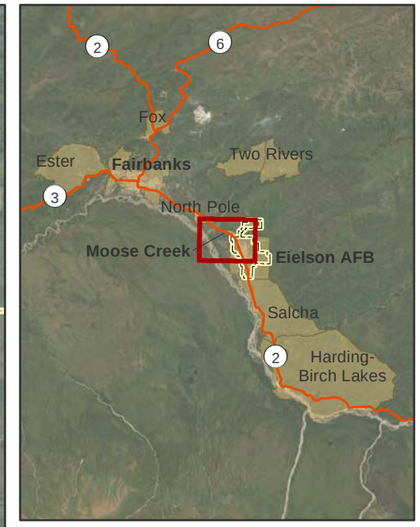
Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Former Fire Training Area Near Entomology Building-Historical Data

Figure 3-2

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 3-2. FFTA-Historical.mxd





Legend

- Eielson AFB Installation Boundary
- Road
- Sample Location with result above 0.07 µg/L
- Sample Location with result below 0.07 µg/L

PFOS Concentrations (µg/L)

- 0-0.2
- 0.2-0.4
- 0.4-0.6
- 0.6-0.8
- 0.8-1.0
- 1.0-1.2
- 1.2-1.4
- 1.4-1.6
- 1.6-1.8
- 1.8-2.0

AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
µg/L - Micrograms per liter

0 0.5 1
Miles

Data: EA, 2016; Jacobs, 2015; PACAF, 2018
Imagery: Esri, 2015

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Site Vicinity Map with PFOS Results through December 2015

Figure 3-3

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 3-3. Vicinity Map with PFOS.mxd

North Pole

DSAP-8S 10/23/2015
PFOS ND
PFOA ND
PFOS+PFOA ND

DSAP-8D 11/4/2016
PFOS 0.0089
PFOA 0.0039
PFOS+PFOA 0.0128

USAP-1 10/23/2015
PFOS **0.0257 J**
PFOA 0.00739 J
PFOS+PFOA 0.0331

USAP-3 10/23/2015
PFOS ND
PFOA ND
PFOS+PFOA ND

DSAP-10 11/3/2016
PFOS 0.005
PFOA 0.0033
PFOS+PFOA 0.0083

USAP-2 10/23/2015
PFOS ND
PFOA ND
PFOS+PFOA ND

DSAP-11 11/3/2016
PFOS 0.0075
PFOA 0.0053
PFOS+PFOA 0.0128

TW-04 4/29/2015
PFOS ND
PFOA ND
PFOS+PFOA ND

DSAP-14 11/2/2016
PFOS 0.013
PFOA 0.0045
PFOS+PFOA 0.0175

Moose Creek

TW-05 4/27/2015
PFOS **0.11**
PFOA **0.038**
PFOS+PFOA **0.144**

TW-06 10/23/2015
PFOS **0.11**
PFOA **0.034**
PFOS+PFOA **0.144**

TW-01 4/22/2015
PFOS **0.41**
PFOA **0.099**
PFOS+PFOA **0.509**

51MB2B 11/2/2016
PFOS **0.3**
PFOA **0.18**
PFOS+PFOA **0.48**

Eielson AFB

GS-MW02 2018
PFOS **0.256**
PFOA ND
PFOS+PFOA **0.256**

TW-02 4/23/2015
PFOS **2.3**
PFOA **0.13**
PFOS+PFOA **2.43**

44MW13 2018
PFOS **1.1**
PFOA **0.15**
PFOS+PFOA **1.25**

ANGH-MW02 2018
PFOS **5**
PFOA **0.71**
PFOS+PFOA **5.71**

TW-03 4/25/2015
PFOS **1.6 JTE**
PFOA **0.14 JTE**
PFOS+PFOA **1.74**

ANGH-KC135-MW01 2018
PFOS **9.7**
PFOA **3.7**
PFOS+PFOA **13.4**

SITE 4 (SS312P) – FOAMED RUNWAY

ANGH-MW01 2018
PFOS **2.8**
PFOA **0.42**
PFOS+PFOA **3.22**

FST-MW01 2018
PFOS **16**
PFOA **1.5**
PFOS+PFOA **17.5**

FFTA-ANTF-MW02 2018
PFOS **0.80 J**
PFOA **1.0**
PFOS+PFOA **1.8 J**

SITE 3 (SS306P) – FORMER BALL FIELD SPRAY TEST AREA

SITE 2 (SS311P) – KC-135 FIRE

FFTA-ENT-MW01 2018
PFOS **330 J**
PFOA **4.2**
PFOS+PFOA **334.2**

HANG-MW01 2018
PFOS **81 J**
PFOA **0.89**
PFOS+PFOA **81.9**

MW-BKG-09 10/24/2015
PFOS ND
PFOA 0.00337 J
PFOS+PFOA 0.00337

HANG-MW02 2018
PFOS **0.47**
PFOA **0.2**
PFOS+PFOA **0.67**

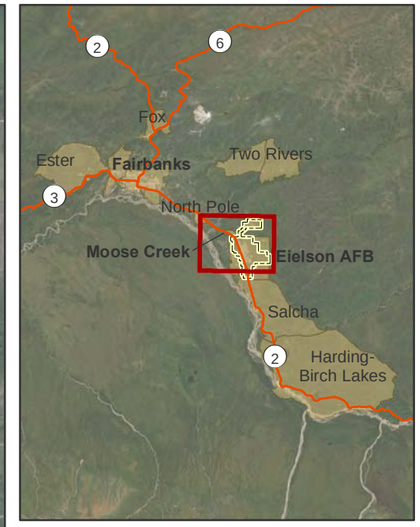
MW-BKG-09 11/4/2016
PFOS 0.007
PFOA 0.00337
PFOS+PFOA 0.0107

SITE 1 (SS310P) – SOUTH RAMP SPRAY TEST AREA

13-1 2018
PFOS **0.38**
PFOA **0.15**
PFOS+PFOA **0.53**

1. All results in micrograms per liter (µg/L).
2. Bold data exceeds the current EPA HA of 0.07 µg/L or the previous EPA HA of 0.02 µg/L. The HA limit was increased on 16 May 2016.
3. PFBS concentrations are not shown due to levels below EPA RSLs.
4. Red data exceeds the ADEC Groundwater cleanup level of 0.4 µg/L (ADEC 2018).

ADEC- Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA- U.S. Environmental Protection Agency
HA- Health Advisory
PFAS- per- and polyfluoroalkyl substances
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate



Legend

- Monitoring Well
- Eielson AFB Installation Boundary
- Validated Source Areas
- Road

PFOA + PFOS Concentrations (ug/L)

- < 0.07
- 0.07-0.2
- 0.2-0.4
- 0.4-0.6
- 0.6-0.8
- 0.8-1.0
- 1.0-1.2
- 1.2-1.4
- 1.4-1.6
- 1.6-1.8
- 1.8-2.0
- > 2.0

0 0.5 1 2
Miles

Imagery: Esri, 2015; Jacobs 2015; EA 2016

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Site Vicinity Map with PFOS and PFOA Results through December 2015

Figure 3-4

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 3-4. PFOS+PFOA (updated).mxd

Figure 3-5. Overall PFOA and PFOS Soil, Sediment, and Sludge Results (AFCEC, 2018; Figure 3-2)

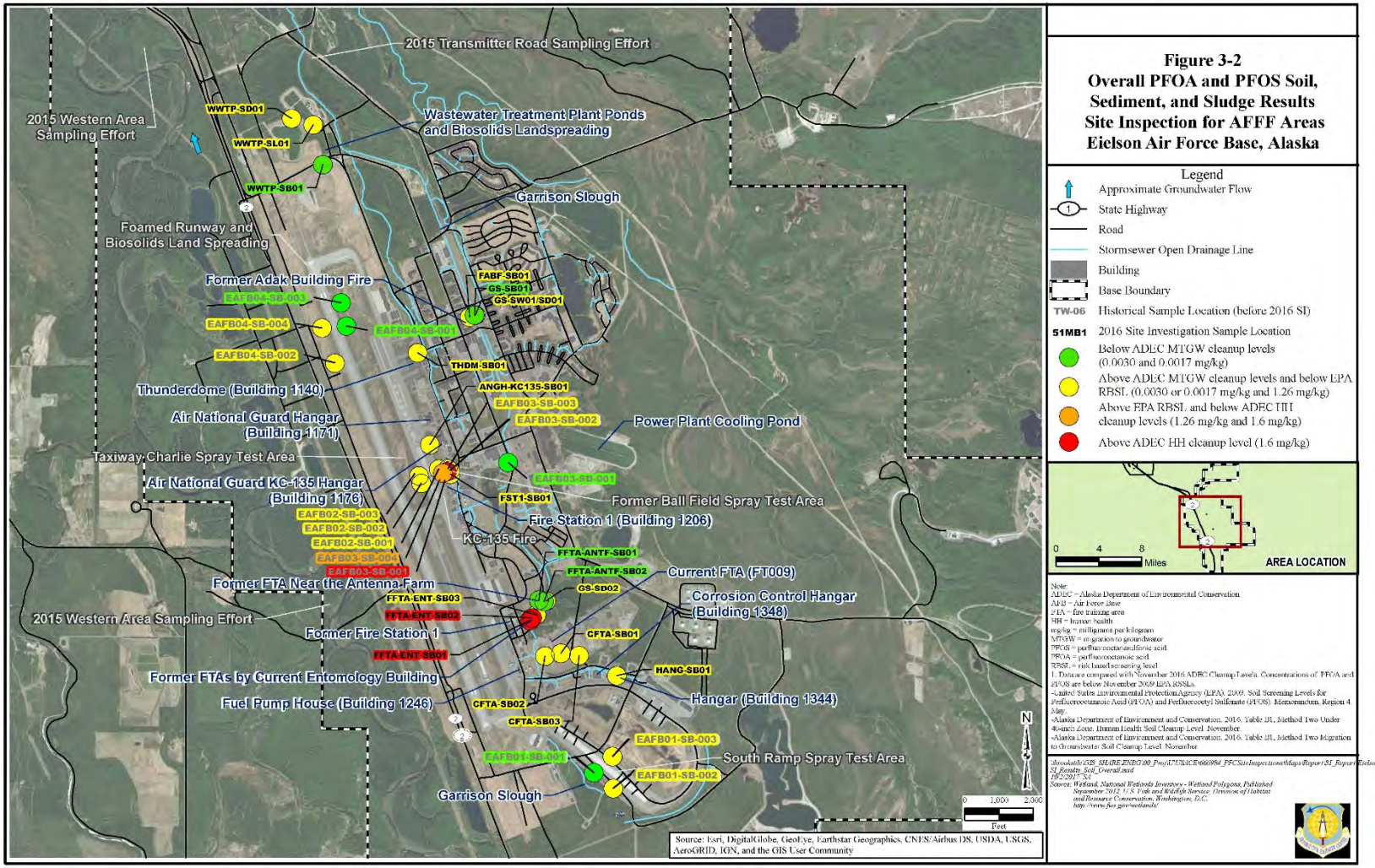


Figure 3-6. Overall PFOA and PFOS Groundwater and Surface Water Results (AFCEC, 2018; Figure 3-4)

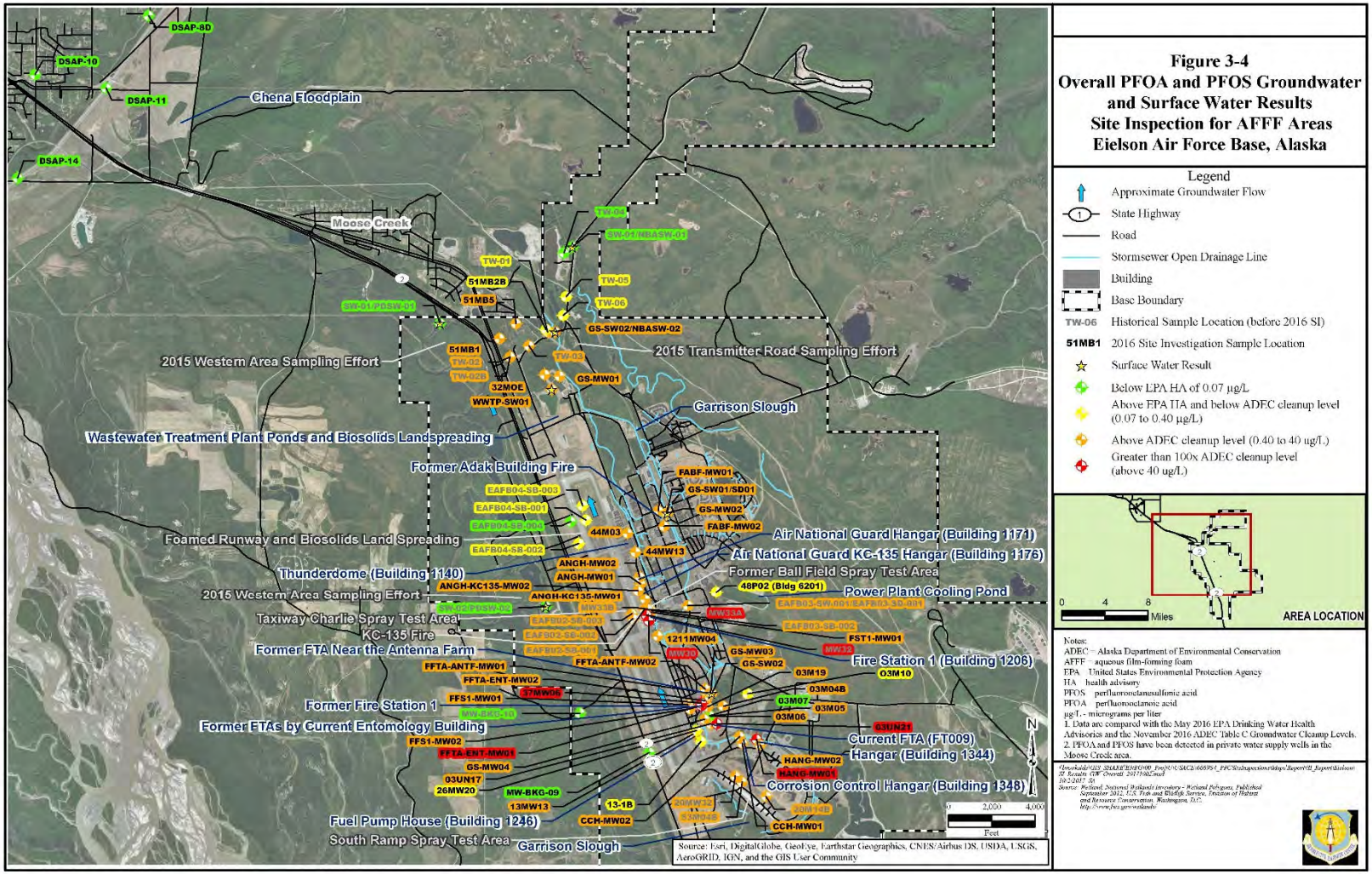
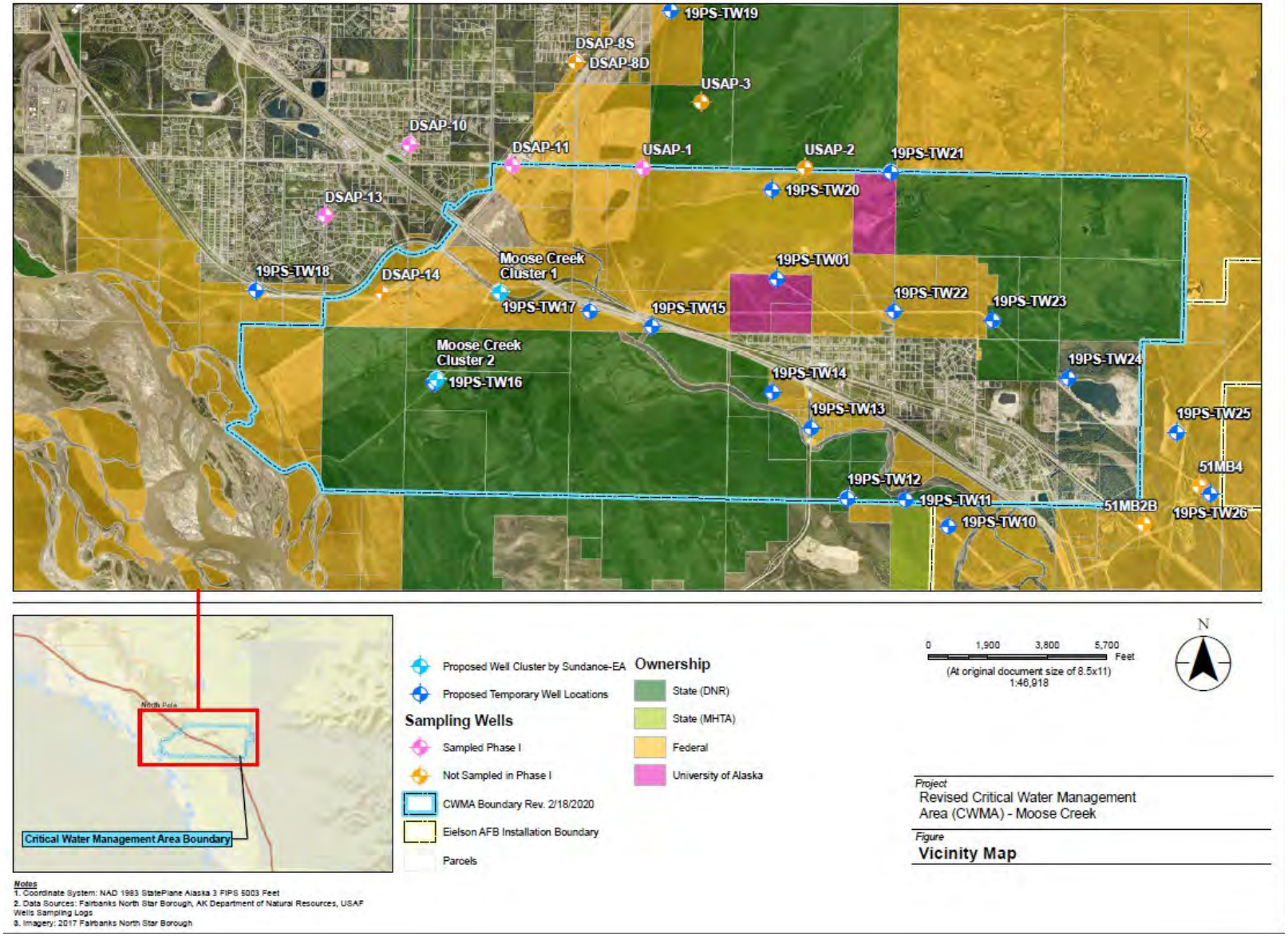
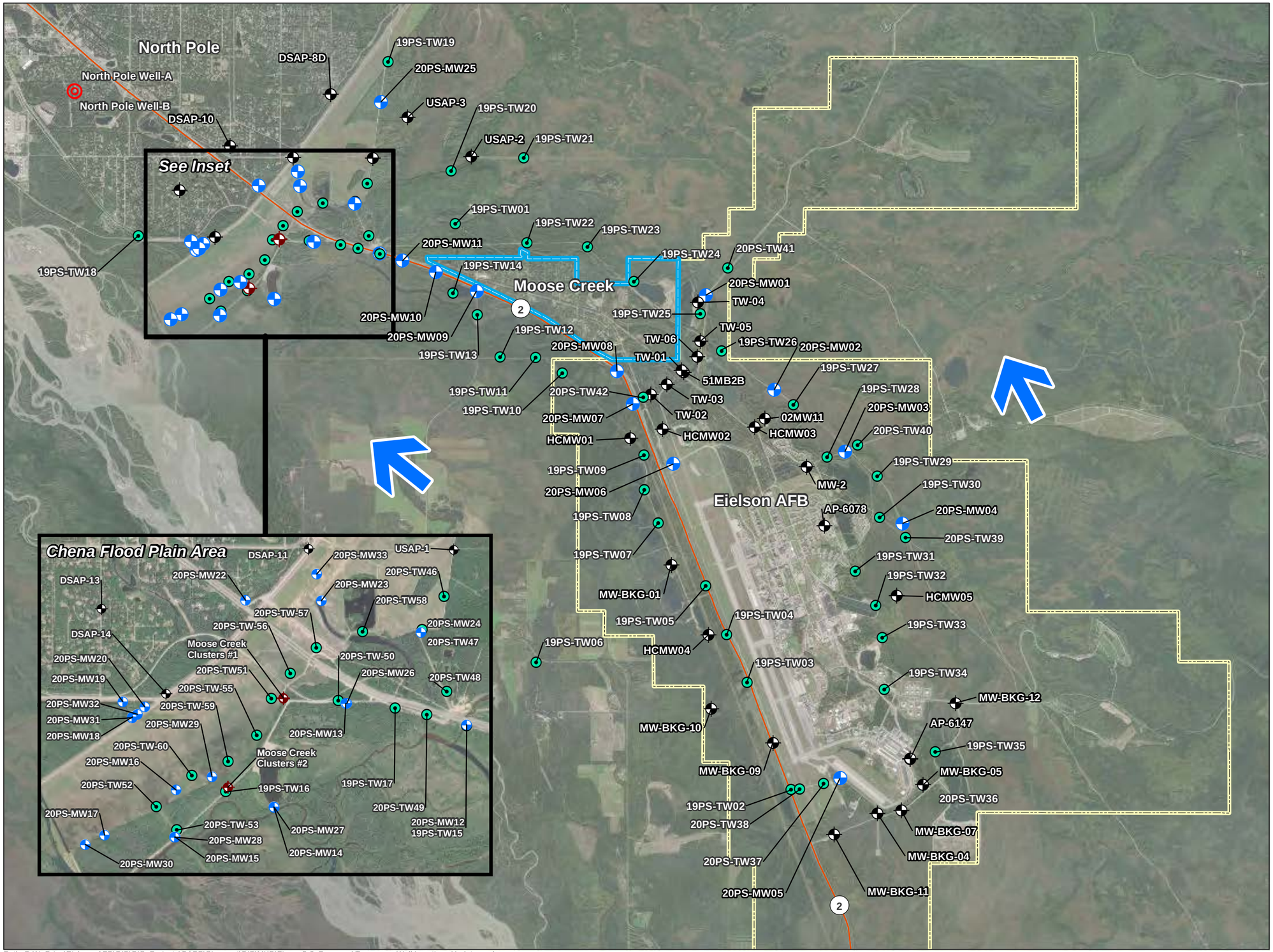


Figure 5-1. Ownership Boundaries within the Critical Water Management Area (CWMA) – Moose Creek
Note: Figure is unaltered from the original source reference.





Legend

- Eielson AFB Installation Boundary
- Moose Creek Private Property
- Roads

Sampling Locations

- Existing Monitoring Well
- Installed Monitoring Well
- Clustered Well
- Temporary Monitoring Well
- Municipal Drinking Water Well, North Pole
- Regional Groundwater Flow

AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
PFBS - perfluorobutane sulfonate

0 0.5 1 2
Miles

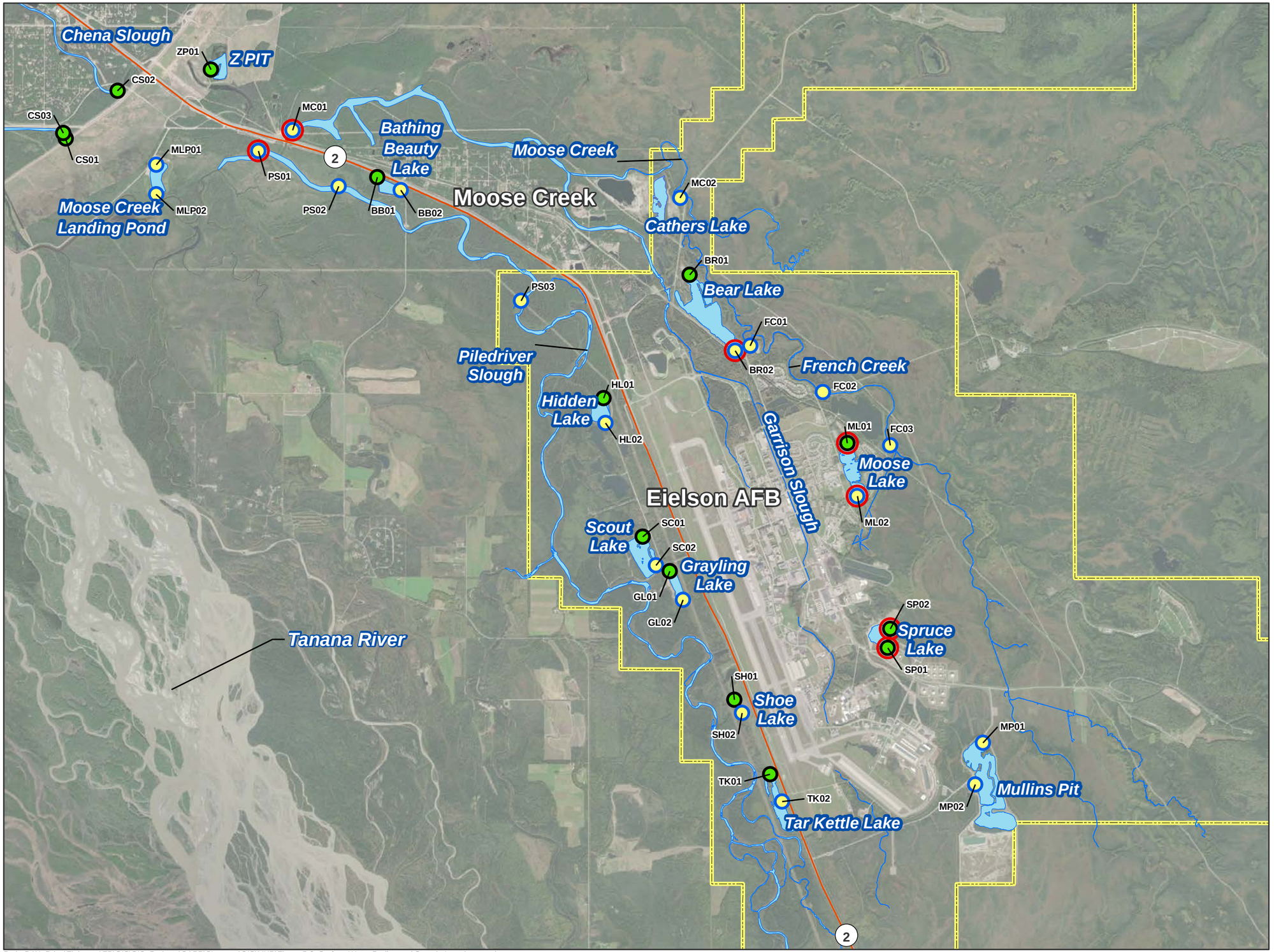
Imagery: Esri, 2016

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Well Locations at Eielson Air Force Base and Moose Creek

Figure 5-2

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 5-2. Proposed Temporary Well Locations Update.mxd



Legend

- Eielson AFB Installation Boundary
- Waterbody
- Road
- Location Exceeding LHA

Sample Locations

- Surface Water Sample Location
- Surface Water and Sediment Sample Location

AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
PFBS - perfluorobutane sulfonate

0 0.25 0.5 1
Miles

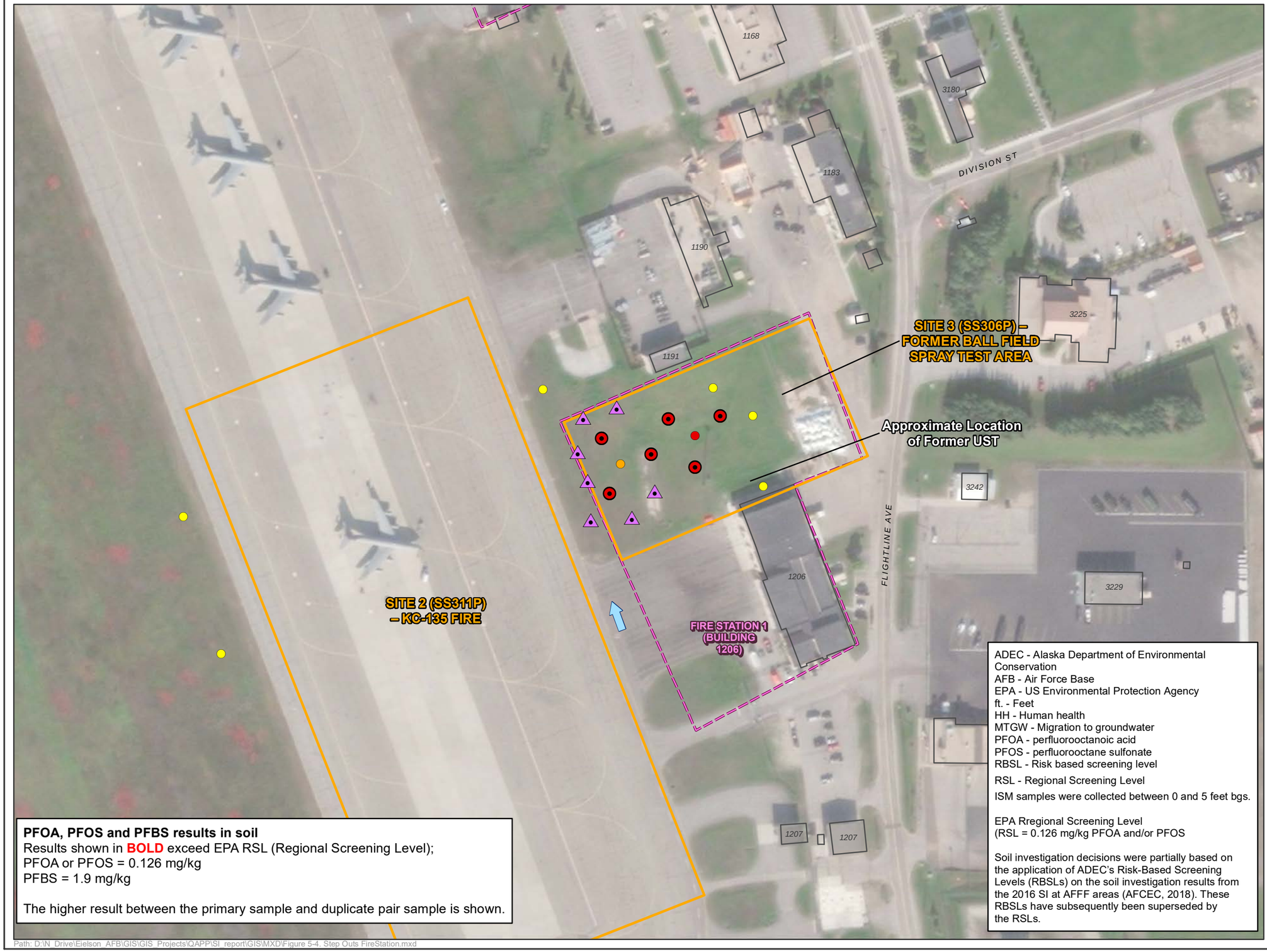
Imagery: Esri, 2015

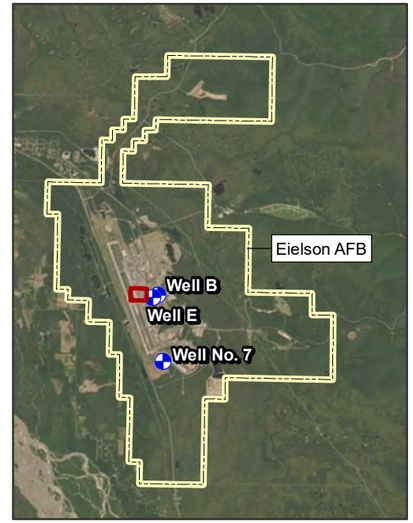
Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Surface Water Bodies both on Eielson AFB and Off-Base and Co-Located Surface Water and Sediment Samples

Figure 5-3

Path: D:\N Drive\Eielson AFB\GIS\GIS Projects\QAPP\SI report\GIS\MXD\Figure 5-3. Surface Water Bodies and Sample Locations.mxd





Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Validated PFAS Source Area
- Approximate Groundwater Flow
- Water Supply Well
- 2020 Soil Boring Location

2019 Sub Surface Soil Boring Sample Results

- PFOA and/or PFOS <EPA RSL
- PFOA and/or PFOS ≥ EPA RSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above EPA RBSL and Below ADEC HH Cleanup Levels (1.26 mg/kg and 1.6 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

0 50 100 200
Feet

1 inch = 150 feet

PFOA, PFOS and PFBS results in soil
Results shown in **BOLD** exceed EPA RSL (Regional Screening Level);
PFOA or PFOS = 0.126 mg/kg
PFBS = 1.9 mg/kg

The higher result between the primary sample and duplicate pair sample is shown.

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA - US Environmental Protection Agency
ft. - Feet
HH - Human health
MTGW - Migration to groundwater
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk based screening level
RSL - Regional Screening Level
ISM samples were collected between 0 and 5 feet bgs.

EPA Rregional Screening Level
(RSL = 0.126 mg/kg PFOA and/or PFOS

Soil investigation decisions were partially based on the application of ADEC's Risk-Based Screening Levels (RBSLs) on the soil investigation results from the 2016 SI at AFFF areas (AFCEC, 2018). These RBSLs have subsequently been superseded by the RSLs.

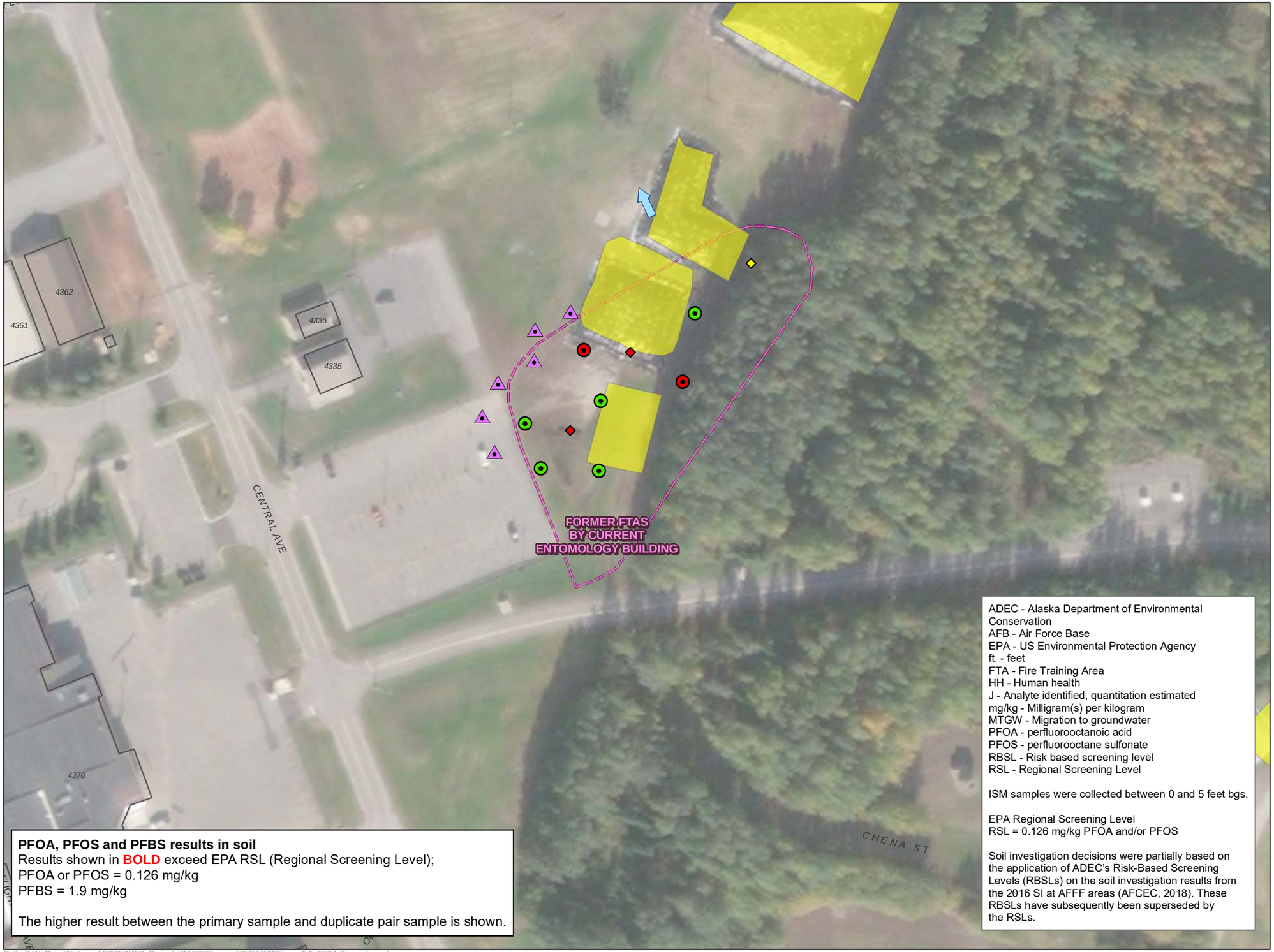
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Soil Boring Locations
Fire Station 1 (Building 1206)

Figure 5-4

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 5-4. Step Outs FireStation.mxd



PFOA, PFOS and PFBS results in soil
Results shown in **BOLD** exceed EPA RSL (Regional Screening Level);
PFOA or PFOS = 0.126 mg/kg
PFBS = 1.9 mg/kg

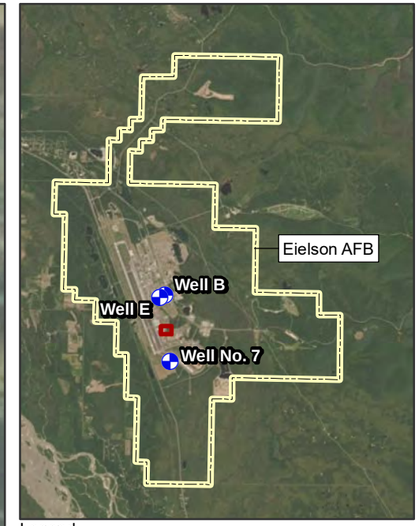
The higher result between the primary sample and duplicate pair sample is shown.

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA - US Environmental Protection Agency
ft. - feet
FTA - Fire Training Area
HH - Human health
J - Analyte identified, quantitation estimated
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk based screening level
RSL - Regional Screening Level

ISM samples were collected between 0 and 5 feet bgs.

EPA Regional Screening Level
RSL = 0.126 mg/kg PFOA and/or PFOS

Soil investigation decisions were partially based on the application of ADEC's Risk-Based Screening Levels (RBSLs) on the soil investigation results from the 2016 SI at AFFF areas (AFCEC, 2018). These RBSLs have subsequently been superseded by the RSLs.



Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Existing Soil Stockpiles
- Approximate Groundwater Flow
- Water Supply Well
- 2020 Soil Boring Location

2019 Sub Surface Soil Boring Location

- PFOA and/or PFOS <EPA RSL
- PFOA and/or PFOS ≥ EPA RSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

0 50 100 200
Feet

1 inch = 100 feet

Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Soil Boring Locations at Former Fire Training Area Near Entomology Building

Figure 5-5

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 5-5. FFTA Stepouts.mxd

PFOA AND PFOS GROUNDWATER RESULTS
Eielson AFB Site Inspection 2020
PFOA + PFOS ≥ EPA HA
PFOA + PFOS ≥ 50% EPA HA and < EPA HA
PFOA + PFOS ≥ 10% of EPA HA and < 50% EPA HA
PFOA + PFOS ≥ ND and < 10% of EPA HA

EPA Health Advisory (HA) = 0.07 µg/L

Moose Creek Dam
Moose Creek
Eielson AFB
Polaris Lake
ADEC File #107.38.146
Moose Creek Cluster #1
Moose Creek Cluster #2

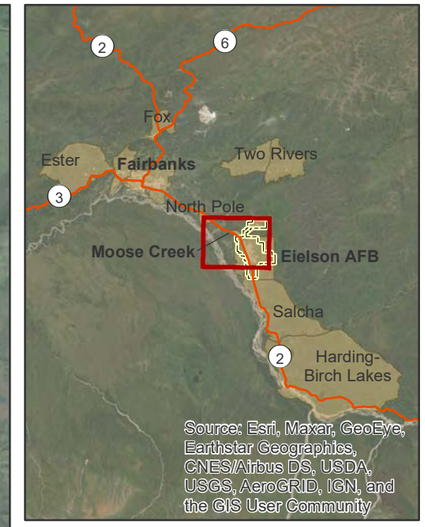
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Regional Groundwater Flow

Acronyms:
AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate

0 0.25 0.5 1
Miles

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Eielson AFB Installation Boundary
- Moose Creek Private Property
- Historic Creek Bed
- Moose Creek Bluff
- Critical Water Management Area

Estimated Permafrost Boundaries
- Uncertain
- Shallow
- Frozen Bedrock
- Deep
- Very Deep
- Clustered Well Location

PFOS + PFOA Contour from GW results
- 0.07 µg/L or 70 ppt (EPA HA)
- 0.07 µg/L, Inferred
- 0.035 µg/L
- 0.035 µg/L, Inferred
- 0.007 µg/L
- 0.007 µg/L, Inferred

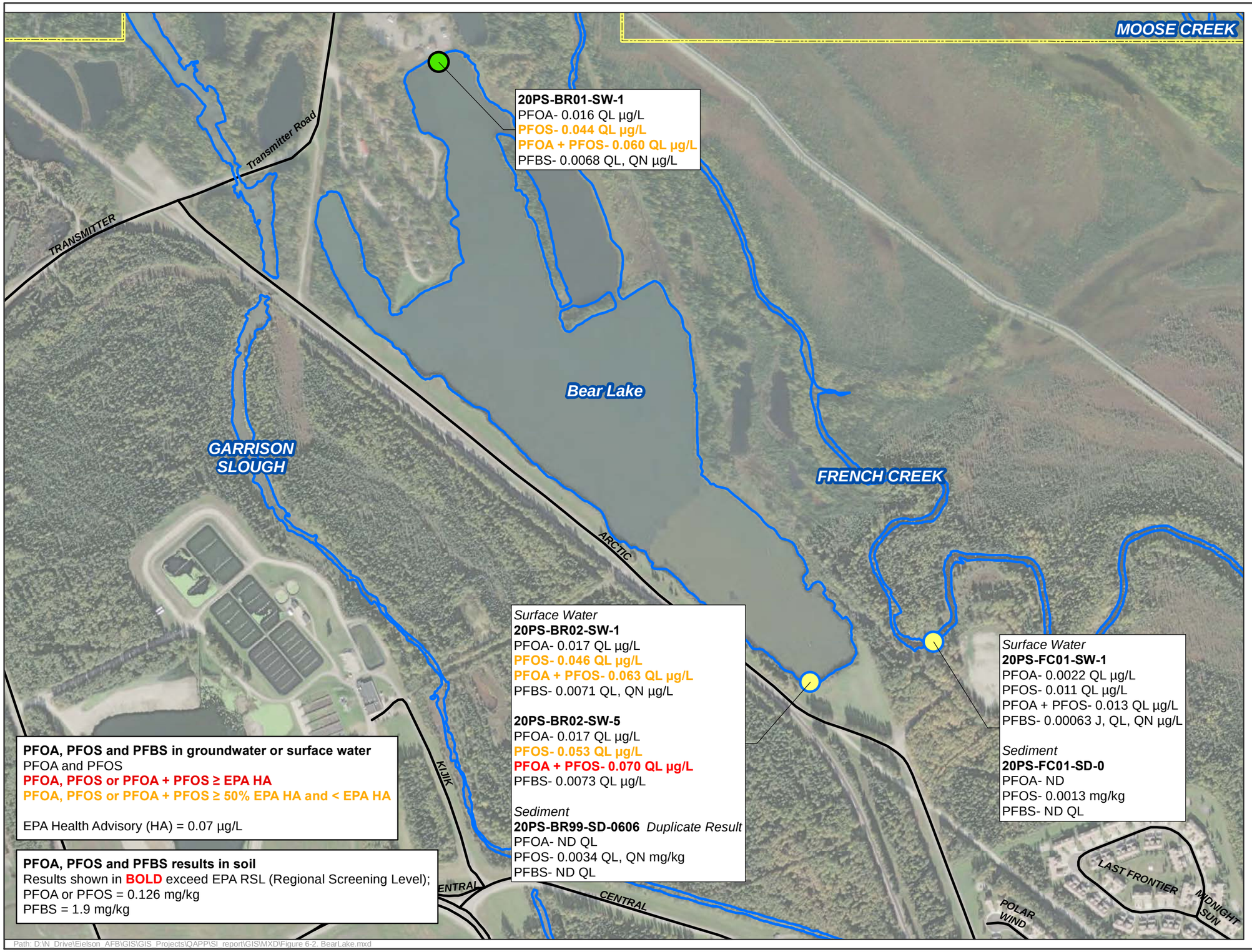
Location Results
- PFOA + PFOS ≥ EPA HA
- PFOA + PFOS ≥ 50% EPA LHA and < EPA HA
- PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA HA
- PFOA + PFOS = ND and < 10% of EPA HA
- Not Sampled due to Permafrost

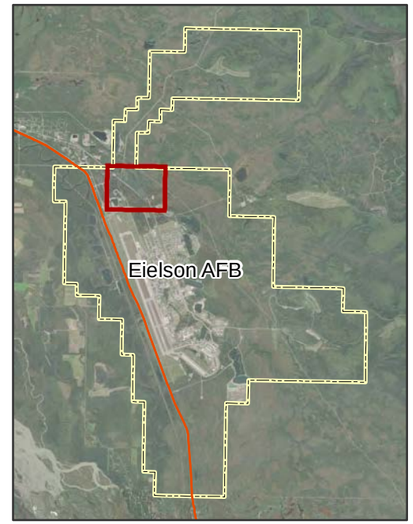
Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Site Vicinity Map with PFOA + PFOS Results through October 2020

Figure 6-1

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-1. Eielson_PFOAPFOS Plume_GW(updated).mxd





Legend

- Eielson AFB Installation Boundary
- Waterbody
- Road

Sampling Locations

- Surface Water
- Surface Water and Sediment

Acronyms and Notes:
µg/L - micrograms per kilogram
mg/kg - milligrams per kilogram
J - The analyte was positively identified; the quantitation is estimated.
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ND - nondetectable
AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctanoic sulfonate
PFBS - perfluorobutane sulfonate
SW - Surface Water
SD - Sediment

0 125 250 500
Feet

Imagery: Esri, 2015

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Surface Water and Sediment
Results- Bear Lake

Figure 6-2

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-2. BearLake.mxd

Surface Water
20PS-MC01-SW-1
PFOA- 0.029 µg/L
PFOS- 0.065 µg/L
PFOA + PFOS- 0.094 µg/L
PFBS- 0.0055 QL µg/L

Sediment
20PS-MC01-SD-0
PFOA- ND QL
PFOS- 0.00055 QL mg/kg
PFBS- ND QL

Surface Water
20PS-MC02-SW-1
PFOA- 0.0019 µg/L
PFOS- 0.011 µg/L
PFOA + PFOS- 0.0129 µg/L
PFBS- 0.00058 J, QN µg/L

Sediment
20PS-MC02-SD-0
PFOA- ND QL
PFOS- 0.00042 QL, J mg/kg
PFBS- ND QL

Surface Water
20PS-PS01-SW-1
PFOA- 0.029 µg/L
PFOS- 0.076 µg/L
PFOA + PFOS- 0.11 µg/L
PFBS- 0.0054 µg/L

Sediment
20PS-PS01-SD-0
PFOA- ND
PFOS- ND
PFBS- ND

Surface Water
20PS-PS02-SW-1
PFOA- 0.00066 J µg/L
PFOS- 0.0020 µg/L
PFOA + PFOS- 0.0027 J µg/L
PFBS- ND

Sediment
20PS-PS02-SD-0
PFOA- ND
PFOS- ND
PFBS- ND

Surface Water
20PS-PS99-SW-0608 *Duplicate Result*
PFOA- ND
PFOS- 0.00078 J µg/L
PFOA + PFOS- 0.00078 J µg/L
PFBS- ND

Sediment
20PS-PS03-SD-0
PFOA- ND
PFOS- ND
PFBS- ND

Bathing Beauty Lake

Moose Creek

Piledriver Slough

Cathers Lake

PFOA, PFOS and PFBS in groundwater or surface water
PFOA and PFOS
PFOA, PFOS or PFOA + PFOS ≥ EPA HA
PFOA, PFOS or PFOA + PFOS ≥ 50% EPA HA and < EPA HA

EPA Health Advisory (HA) = 0.07 µg/L

PFOA, PFOS and PFBS results in soil
Results shown in **BOLD** exceed EPA RSL (RegionalScreening Levels);
PFOA or PFOS = 0.126 mg/kg
PFBS = 1.9 mg/kg

The higher result between the primary sample and duplicate pair sample is shown.

Legend
- Eielson AFB Installation
- Road
- Waterbody

Sample Locations
- Surface Water and Sediment

Acronyms and Notes:
µg/L - micrograms per kilogram
mg/kg - milligrams per kilogram
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AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctanoic sulfonate
PFBS - perfluorobutane sulfonate
SW - Surface Water
SD - Sediment

0 0.125 0.25 0.5
Miles

Imagery: Esri, 2015

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Surface Water and Sediment Sampling Results- Moose Creek and Piledriver Slough

Figure 6-3

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-3. Surface Water Bodies and Sample Locations.mxd

RICHARDSON
New Richardson

PILEDRIVER SLOUGH

MOOSE CREEK LANDING POND

Surface Water
20PS-MLP01-SW-1
PFOA-0.019 µg/L
PFOS- 0.041 µg/L
PFOA + PFOS- 0.060 µg/L
PFBS- 0.0035 µg/L

20PS-MLP01-SW-5
PFOA- 0.019 µg/L
PFOS- 0.040 µg/L
PFOA + PFOS- 0.059 µg/L
PFBS- 0.0036 µg/L

Sediment
20PS-MLP01-SD-0
PFOA- 0.00032 QL, J mg/kg
PFOS- 0.0036 QL mg/kg
PFBS- ND QL

Surface Water
20PS-MLP02-SW-1
PFOA- 0.020 µg/L
PFOS- 0.040 µg/L
PFOA + PFOS- 0.060 µg/L
PFBS- 0.0035 µg/L

20PS-MLP02-SW-5
PFOA- 0.020 µg/L
PFOS- 0.044 µg/L
PFOA + PFOS- 0.064 µg/L
PFBS- 0.0036 µg/L

Sediment
20PS-MLP02-SD-0
PFOA- ND QL
PFOS- 0.0018 QL mg/kg
PFBS- ND QL

PFOA, PFOS and PFBS in groundwater or surface water
PFOA and PFOS
PFOA, PFOS or PFOA + PFOS ≥ EPA HA
PFOA, PFOS or PFOA + PFOS ≥ 50% EPA HA and < EPA HA

EPA Health Advisory (HA) = 0.07 µg/L

PFOA, PFOS and PFBS results in soil
Results shown in **BOLD** exceed EPA RSL (Regional Screening Levels);
PFOA or PFOS = 0.126 mg/kg
PFBS = 1.9 mg/kg

Legend

- Eielson AFB Installation Boundary
- Waterbody
- Road

Sample Locations

- Surface Water and Sediment

Acronyms and Notes:
µg/L - micrograms per kilogram
mg/kg - milligrams per kilogram
J - The analyte was positively identified; the quantitation is estimated.
QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.
ND - nondetectable
AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctanoic sulfonate
PFBS - perfluorobutane sulfonate
SW - Surface Water
SD - Sediment

0 125 250 500
Feet

Imagery: Esri, 2019

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Surface Water and Sediment
Results- Moose Creek Landing Pond

Figure 6-4

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-4. Moose Creek Landing.mxd

Surface Water
20PS-ML01-SW-1
PFOA- 0.022 QL, B µg/L
PFOS- 0.15 QL µg/L
PFOA + PFOS- 0.17 QL, B µg/L
PFBS- 0.0095 QN, QL, B µg/L

Surface Water
20PS-FC03-SW-1
PFOA- 0.0028 QL µg/L
PFOS- 0.018 QL µg/L
PFOA + PFOS- 0.021 QL µg/L
PFBS- 0.00095 J, QL, QN µg/L

Sediment
20PS-FC03-SD-0
PFOA- ND QL
PFOS- 0.0011 QL,J mg/kg
PFBS- ND QL

Surface Water
20PS-ML02-SW-1
PFOA- 0.022 QL, B µg/L
PFOS- 0.12 QL, B µg/L
PFOA + PFOS- 0.14 QL, B µg/L
PFBS- 0.0092 QN, QL, B µg/L

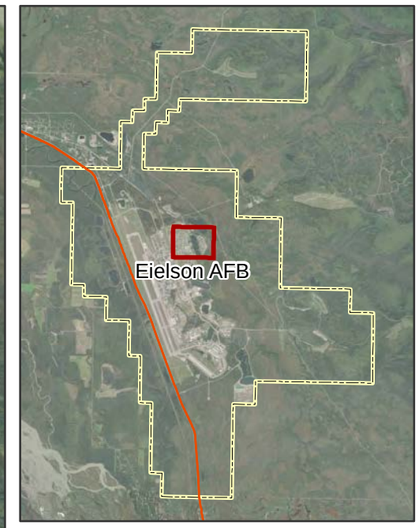
20PS-ML02-SW-5
PFOA- 0.023 QL, B µg/L
PFOS- 0.13 QL, B µg/L
PFOA + PFOS- 0.15 QL,B µg/L
PFBS- 0.0096 QN, QL, B µg/L

Sediment
20PS-ML02-SD-0
PFOA- ND QL
PFOS- 0.0018 QL mg/kg
PFBS- ND QL

PFOA, PFOS and PFBS in groundwater or surface water
PFOA and PFOS
PFOA, PFOS or PFOA + PFOS ≥ EPA HA
PFOA, PFOS or PFOA + PFOS ≥ 50% EPA HA and < EPA HA

EPA Health Advisory (HA) = 0.07 µg/L

PFOA, PFOS and PFBS results in soil
Results shown in **BOLD** exceed EPA RSL (Regional Screening Levels);
PFOA or PFOS = 0.126 mg/kg
PFBS = 1.9 mg/kg



Legend
- Eielson AFB Installation Boundary
- Waterbody
- Road

Sampling Locations
- Surface Water
- Surface Water and Sediment

Acronyms and Notes:
µg/L - micrograms per kilogram
mg/kg - milligrams per kilogram
J - The analyte was positively identified; the quantitation is estimated.
QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.
ND - nondetectable
AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctanoic sulfonate
PFBS - perfluorobutane sulfonate
SW - Surface Water
SD - Sediment

0 125 250 500
Feet

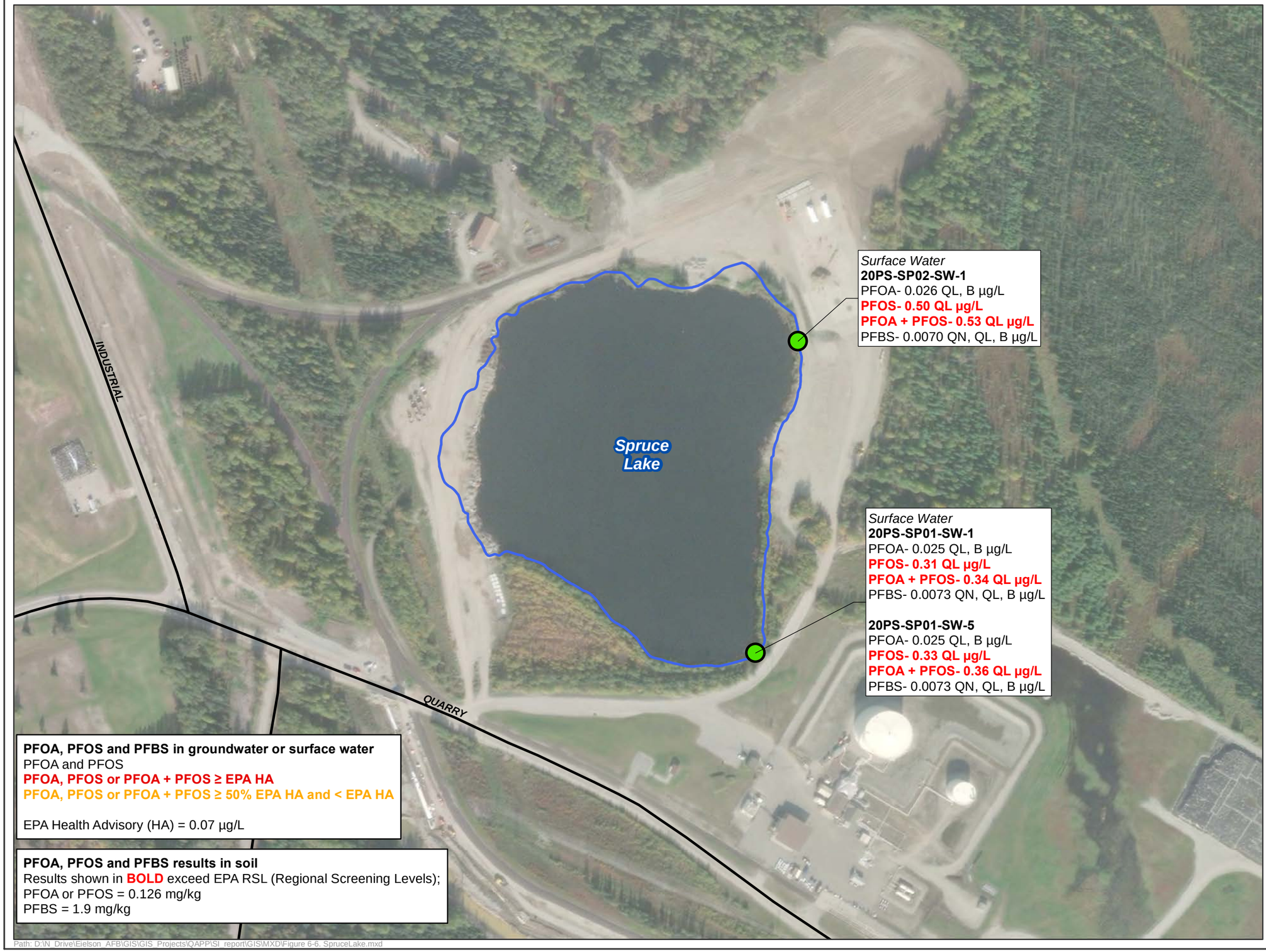
Imagery: Esri, 2015

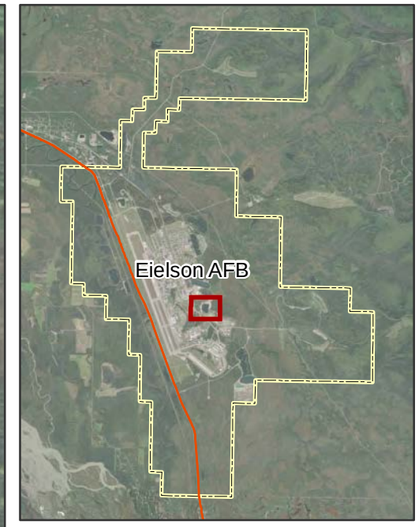
Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Surface Water and Sediment
Results- Moose Lake

Figure 6-5

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-5. MooseLake.mxd





Legend

- Eielson AFB Installation Boundary
- Waterbody
- Road

Sampling Locations

- Surface Water

Acronyms and Notes:
µg/L - micrograms per kilogram
mg/kg - milligrams per kilogram
J - The analyte was positively identified; the quantitation is estimated.
QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.
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AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctanoic sulfonate
PFBS - perfluorobutane sulfonate
SW - Surface Water
SD - Sediment

0 125 250 500
Feet

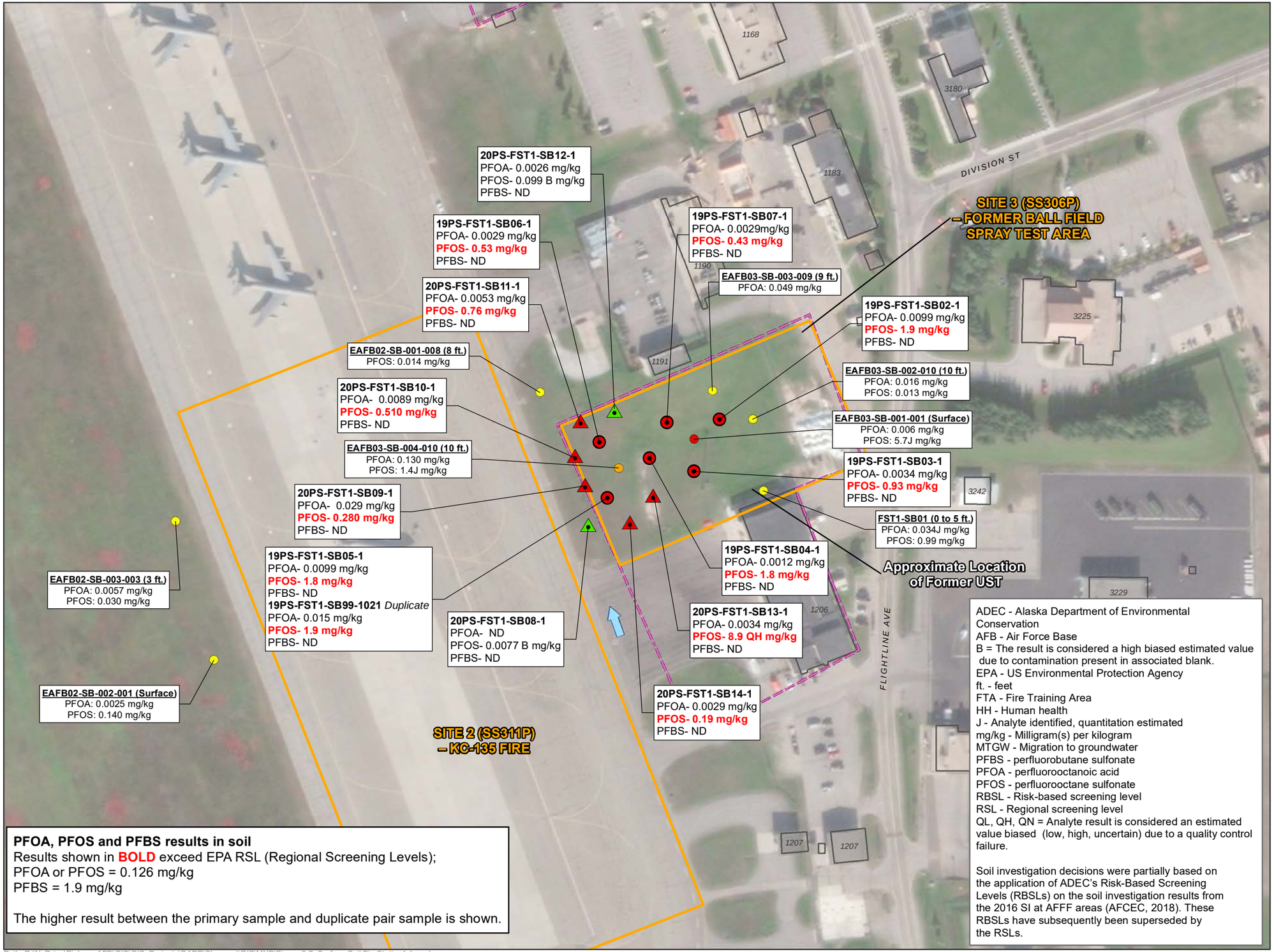
Imagery: Esri, 2015

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Surface Water and Sediment Sampling Locations- Spruce Lake

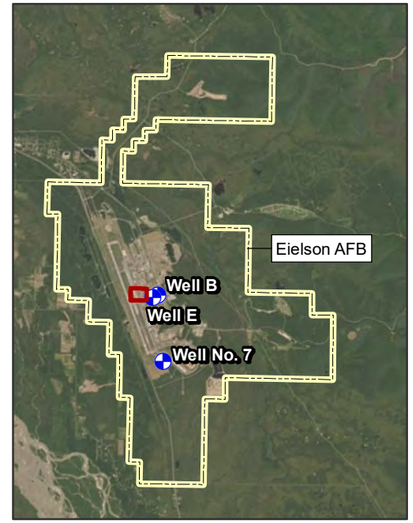
Figure 6-6

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-6. SpruceLake.mxd



PFOA, PFOS and PFBS results in soil
Results shown in **BOLD** exceed EPA RSL (Regional Screening Levels);
PFOA or PFOS = 0.126 mg/kg
PFBS = 1.9 mg/kg

The higher result between the primary sample and duplicate pair sample is shown.



Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Validated PFAS Source Area
- Approximate Groundwater Flow
- Water Supply Well

2020 Soil Boring Sample Results

- PFOA and/or PFOS <EPA RSL
- PFOA and/or PFOS ≥ EPA RSL

2019 Soil Boring Sample Results

- PFOA and/or PFOS ≥ EPA RSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above EPA RBSL and Below ADEC HH Cleanup Levels (1.26 mg/kg and 1.6 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
B = The result is considered a high biased estimated value due to contamination present in associated blank.
EPA - US Environmental Protection Agency
ft. - feet
FTA - Fire Training Area
HH - Human health
J - Analyte identified, quantitation estimated
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFBS - perfluorobutane sulfonate
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk-based screening level
RSL - Regional screening level
QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Soil investigation decisions were partially based on the application of ADEC's Risk-Based Screening Levels (RBSLs) on the soil investigation results from the 2016 SI at AFFF areas (AFCEC, 2018). These RBSLs have subsequently been superseded by the RSLs.

0 50 100 200
Feet

Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Surface Soil Results-
Fire Station 1 (Building 1206)

Figure 6-7

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-7_Surface Soil FireStation1 1.mxd

SITE 3 (SS306P) – FORMER BALL FIELD SPRAY TEST AREA

20PS-FST1-SB12 (8 ft.)
PFOA- 0.0077 mg/kg
PFOS- 1.70 mg/kg
PFBS- 0.00049 J mg/kg

19PS-FST1-SB07 (8 ft.)
PFOA- 0.084 mg/kg
PFOS- 0.67 mg/kg
PFBS- 0.0032 mg/kg

20PS-FST1-SB11 (6 ft.)
PFOA- 0.11 mg/kg
PFOS- 0.27 mg/kg
PFBS- 0.0026 mg/kg

EAFB03-SB-001-001 (Surface)
PFOA: 0.006 mg/kg
PFOS: 5.7J mg/kg

EAFB02-SB-001-008 (8 ft.)
PFOS: 0.014 mg/kg

EAFB03-SB-003-009 (9 ft.)
PFOA: 0.049 mg/kg

19PS-FST1-SB06 (7 ft.)
PFOA- 0.061 mg/kg
PFOS- 1.3 QL mg/kg
PFBS- 0.00044 J mg/kg

19PS-FST1-SB02 (7 ft.)
PFOA- 0.081 mg/kg
PFOS- 0.66 mg/kg
PFBS- 0.0032 mg/kg

20PS-FST1-SB10 (6 ft.)
PFOA- 0.0076 mg/kg
PFOS- 0.050 B mg/kg
PFBS- ND

EAFB03-SB-002-010 (10 ft.)
PFOA: 0.016 mg/kg
PFOS: 0.013 mg/kg

19PS-FST1-SB03 (6 ft.)
PFOA- 0.039 mg/kg
PFOS- 0.57 mg/kg
PFBS- 0.00059 J mg/kg

EAFB03-SB-004-010 (10 ft.)
PFOA: 0.130 mg/kg
PFOS: 1.4J mg/kg

FST1-SB01 (0 to 5 ft.)
PFOA: 0.034J mg/kg
PFOS: 0.99 mg/kg

20PS-FST1-SB09 (7.5 ft.)
PFOA- 0.018 mg/kg
PFOS- 0.11 B, QN mg/kg
PFBS- 0.00045 J mg/kg

20PS-FST1-SB99-0603 (7.5 ft.) *Duplicate*
PFOA- 0.012 mg/kg
PFOS- 0.20 QN mg/kg
PFBS- 0.00058 J mg/kg

19PS-FST1-SB04 (8 ft.)
PFOA- 0.10 mg/kg
PFOS- 0.98 mg/kg
PFBS- 0.00081 J mg/kg

EAFB03-SB-003-003 (3 ft.)
PFOA: 0.0057 mg/kg
PFOS: 0.030 mg/kg

20PS-FST1-SB08 (7.5 ft.)
PFOA- 0.0023 mg/kg
PFOS- 0.17 mg/kg
PFBS- ND

20PS-FST1-SB13 (7.5 ft.)
PFOA- 2.0 mg/kg
PFOS- 2.3 mg/kg
PFBS- 0.0091 mg/kg

Approximate Location of Former UST

SITE 2 (SS311P) – KC-135 FIRE

19PS-FST1-SB05 (8 ft.)
PFOA- 0.065 QH mg/kg
PFOS- 0.84 mg/kg
PFBS- 0.0035 mg/kg

20PS-FST1-SB14 (8 ft.)
PFOA- 0.30 mg/kg
PFOS- 0.87 mg/kg
PFBS- 0.0091 mg/kg

EAFB02-SB-002-001 (Surface)
PFOA: 0.0025 mg/kg
PFOS: 0.140 mg/kg

1168 3180 1183 1190 1191 3225 3242 3229 1206 1207 1207

DIVISION ST

FLIGHTLINE AVE

PFOA, PFOS and PFBS results in soil
Results shown in **BOLD** exceed EPA RSL (Regional Screening Level);
PFOA or PFOS = 0.126 mg/kg
PFBS = 1.9 mg/kg

The higher result between the primary sample and duplicate pair sample is shown.

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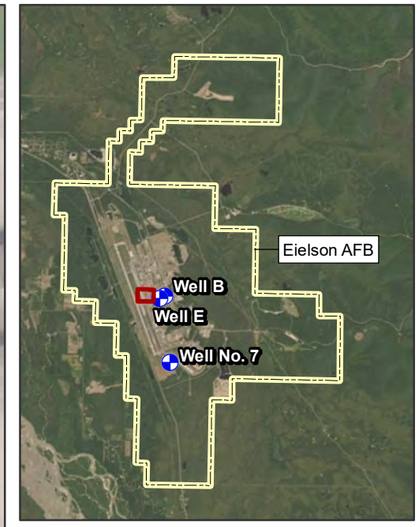
QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Soil investigation decisions were partially based on the application of ADEC's Risk-Based Screening Levels (RBSLs) on the soil investigation results from the 2016 SI at AFFF areas (AFCEC, 2018). These RBSLs have subsequently been superseded by the RSLs.



Legend
- Eielson AFB Installation Boundary
- Area of Possible Release
- Validated PFAS Source Area
- Approximate Groundwater Flow
- Water Supply Well

2020 Soil Boring Sample Results
- PFOA and/or PFOS <EPA RSL
- PFOA and/or PFOS ≥ EPA RSL

2019 Soil Boring Sample Results
- PFOA and/or PFOS ≥ EPA RSL

Former Soil Boring Locations
- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above EPA RBSL and Below ADEC HH Cleanup Levels (1.26 mg/kg and 1.6 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

0 50 100 200
Feet

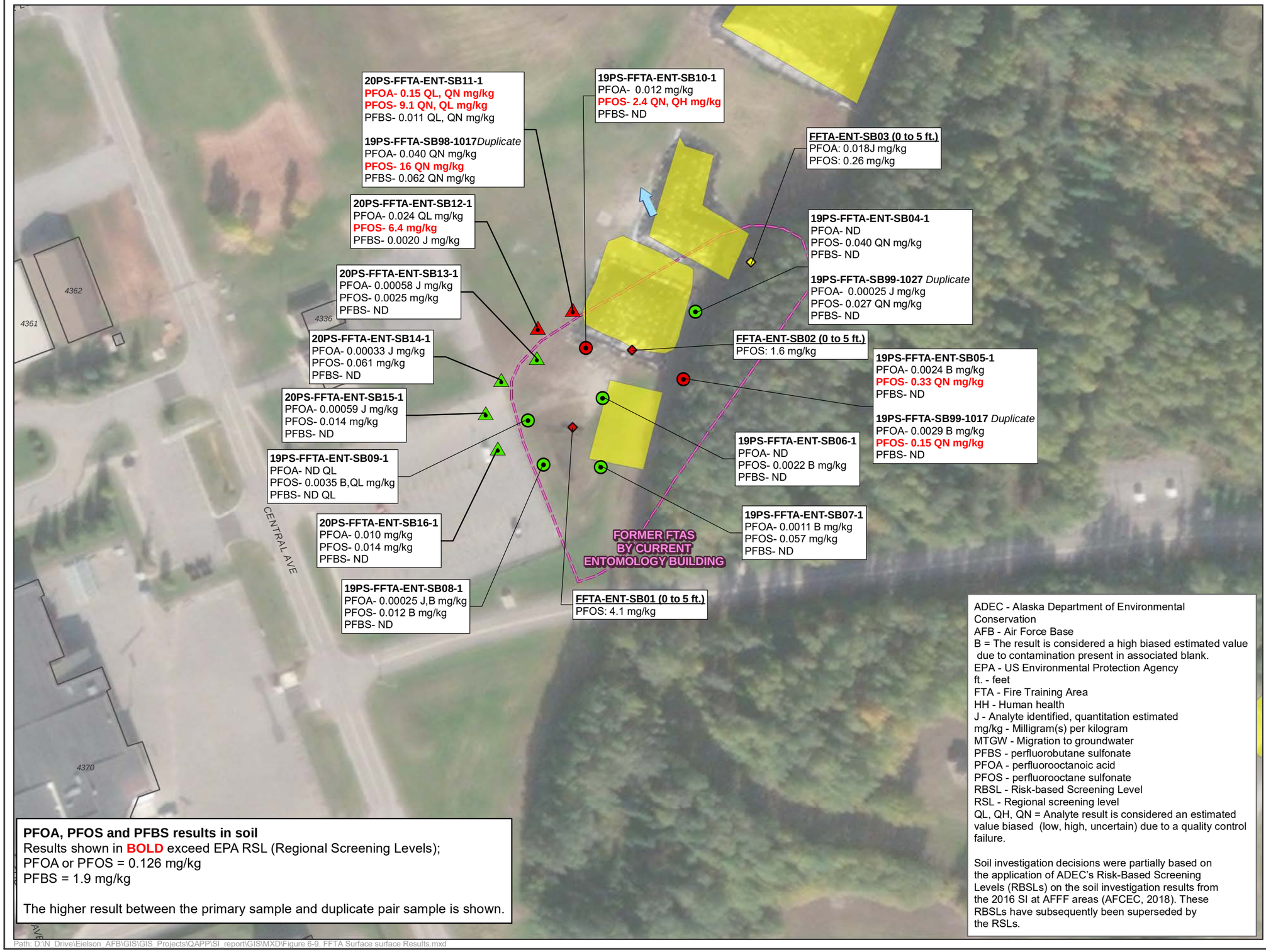
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Subsurface Soil Results-
Fire Station 1 (Building 1206)

Figure 6-8

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-8. Sub-Surface Soil FireStation1 1.mxd



PFOA, PFOS and PFBS results in soil
Results shown in **BOLD** exceed EPA RSL (Regional Screening Levels);
PFOA or PFOS = 0.126 mg/kg
PFBS = 1.9 mg/kg

The higher result between the primary sample and duplicate pair sample is shown.

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
B = The result is considered a high biased estimated value due to contamination present in associated blank.
EPA - US Environmental Protection Agency
ft. - feet
FTA - Fire Training Area
HH - Human health
J - Analyte identified, quantitation estimated
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFBS - perfluorobutane sulfonate
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk-based Screening Level
RSL - Regional screening level
QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Soil investigation decisions were partially based on the application of ADEC's Risk-Based Screening Levels (RBSLs) on the soil investigation results from the 2016 SI at AFFF areas (AFCEC, 2018). These RBSLs have subsequently been superseded by the RSLs.

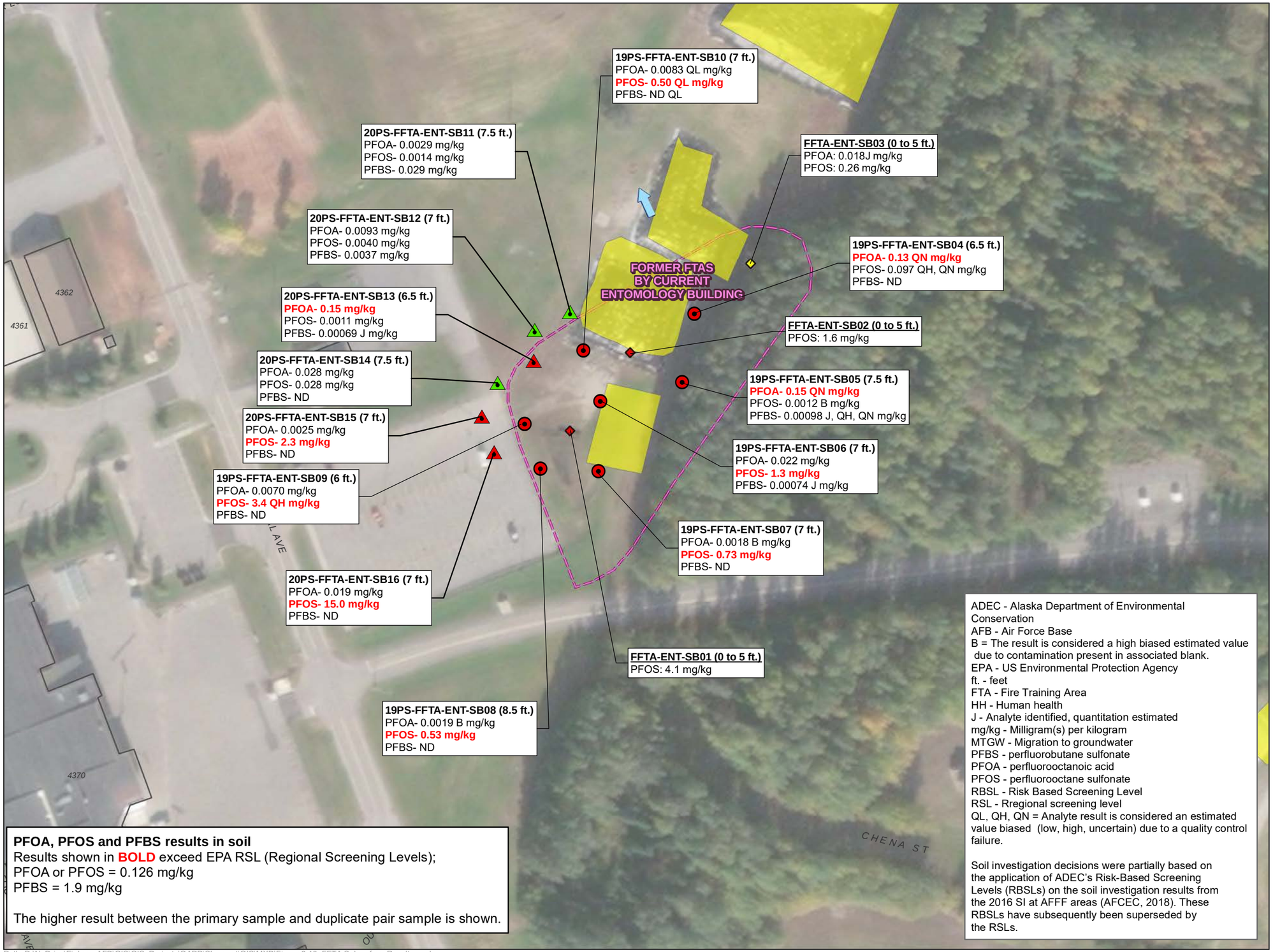
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

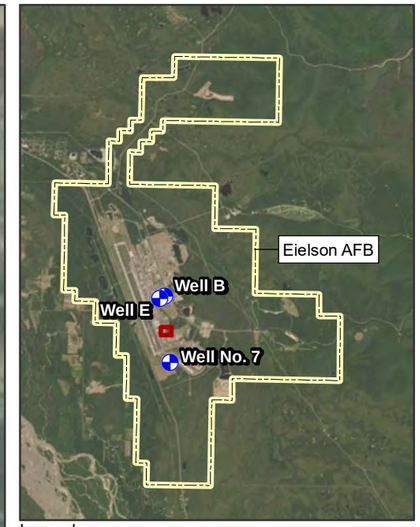
Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Surface Soil Results - Former Fire Training Area Near Entomology Building

Figure 6-9

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-9. FFTA Surface surface Results.mxd





Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Existing Soil Stockpiles
- Approximate Groundwater Flow
- Water Supply Well

2020 Soil Boring Location

- PFOA and/or PFOS <EPA RSL
- PFOA and/or PFOS ≥ EPA RSL

2019 Soil Boring Location

- PFOA and/or PFOS ≥ EPA RSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
B = The result is considered a high biased estimated value due to contamination present in associated blank.
EPA - US Environmental Protection Agency
ft. - feet
FTA - Fire Training Area
HH - Human health
J - Analyte identified, quantitation estimated
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFBS - perfluorobutane sulfonate
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk Based Screening Level
RSL - Rregional screening level
QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Soil investigation decisions were partially based on the application of ADEC's Risk-Based Screening Levels (RBSLs) on the soil investigation results from the 2016 SI at AFFF areas (AFCEC, 2018). These RBSLs have subsequently been superseded by the RSLs.

0 50 100 200
Feet

Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

Eielson AFB
Expanded Site Inspection
Eielson AFB and Moose Creek, Alaska

Subsurface Soil Reslts- Former Fire Training Area Near Entomology Building

Figure 6-10

Path: D:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\SI_report\GIS\MXD\Figure 6-10. FFTA Subsurface Results.mxd

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

TABLES

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Table 2-1. Average Temperatures and Precipitation at Eielson AFB by Month

	Annual Average	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Max Temp (°F)	36.00	-1.7	7.4	23.8	41.9	59.0	69.2	70.8	65.7	54.4	32.0	10.2	-0.1
Avg. Min Temp (°F)	16.80	-17.8	-13.3	-2.5	20.1	37.3	48.4	51.3	46.3	35.1	16.9	-5.1	-15.3
Avg. Precipitation (inches)	12.86	0.6	0.5	0.5	0.4	0.8	1.8	2.5	2.3	1.4	0.9	0.7	0.7
Avg. Snowfall (inches)	70.90	11.2	8.3	7.0	3.9	1.0	0.0	0.0	0.0	1.9	12.0	13.7	11.9

Notes:
Source: WRCC https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak2707
Period of Record: 10/01/1946 to 06/30/2011
Abbreviations and Acronyms:

°F	degrees Fahrenheit
Avg.	average
Temp	temperature

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Table 5-1. Deviations

Date	Phase	General Topic	Deviation
July 2019	**I**	**Field Blanks**	Although the 2019 QAPP (USAF, 2019) indicated that two field blanks would be collected each day, USACE provided subsequent input that this procedure was not necessary. After July 2019, field blanks were collected only once per day, and collection times alternated between AM and PM each day of sampling. This sampling protocol is a deviation from the 2019 QAPP (USAF, 2019); however, it does not impact quality or usability of data. Field blank deviations are further described in Appendix K, Section 6.1.
July 2019	**I**	**Trip Blanks**	Although the project planning document (USAF, 2019) indicated that trip blanks would be shipped with samples, subsequent input from the USACE indicates that trip blanks were not necessary for samples for non-volatile. With concurrence from the USACE, trip blanks were eliminated from the sampling protocol after July 2019. This deviation from the 2019 QAPP does not impact quality or usability of data. Trip blank results were ND. Trip blank deviations are further described in Appendix K, Section 6.2.
7/16/2019	**I**	**Existing Monitoring Wells** **MW-1** **51MB2B** **MW-BKG-05** **51MB4**	MW-1 and 51MB2B contained a transducer that was made with Teflon; therefore, existing monitoring wells MW-1 and 51MB2B were not sampled.
			MW-BKG-05 had a broken seal, which allowed seal material (bentonite) to penetrate the riser/casing; therefore, existing monitoring well MW-BKG-05 was not sampled.
			51MB4 was frost jacked high out of the ground. Additionally, it is located within/behind a gate that field staff were not able to gain access to; therefore, existing monitoring well 51MB4 was not sampled.
7/18/2019	**I**	**Existing Monitoring Wells** **USAP-1** **DSAP-8D**	USAP-1 was purged with a monsoon pump and sampled by hand pumping due to issues with the monsoon pump. USAP-1 was sampled.
			DSAP-8D could not be accessed. USACE did not have the right key to unlock the well and well was too sturdy to cut with hand tools. DSAP-8D was not sampled until USACE provided access in 2020.
10/17/2019	**I**	**Field Duplicates**	A field duplicate was collected every day of groundwater sampling, except for 17 October 2019; this is an identified deviation from the 2019 QAPP. Primary groundwater samples 19PS-TW16-1017 and 19PS-TW19-1017 sampled on 17 October 2019 do not have a daily associated project field duplicate sample. Sample results are not qualified based on lack of daily field duplicate and data quality and usability are not affected. Field duplicate deviations are further described in Appendix K, Section 6.4.
10/18/2019	**II**	**19PS-TW21**	19PS-TW21 was drilled but not sampled because the proposed location was a dry hole. The lithology was silty peat and the drill rod pushed to depth without a hammer. The boring ended in permafrost (frozen from 23-25 ft bgs). There was surface water below a layer of frozen soil/surface ice, but not enough to sample at depth. The soils were moist but not permeable enough to produce water for sampling. The team tried two pumps and lifted the screen up to 16 ft bgs and 10 ft bgs to attempt to get water in the screen with no results. Team reviewed findings from the remaining Fall 2019 temporary monitoring wells and attempted to close the potential data gap with a Spring 2020 step-out temporary monitoring well. However, proposed temporary well locations, 20PS-TW43 and 20PS-TW44, encountered frozen soils (permafrost zones) between Moose Creek and 19PS-TW21. Based on these wells and the permafrost model available for the area, it is assumed that shallow groundwater does not flow toward 19PS-TW21 due to the extent of permafrost.
10/22/2019	**II**	**19PS-MW02A**	Material downhole sluffed into void during the well construction/auger removal process of clustered monitoring well 19PS-MW02A. Therefore, the total depth is 59 ft bgs instead of the proposed 60 ft bgs. Additional monitoring wells proposed for installation were over drilled a few more feet to help mitigate the deviation of material sluffing downhole during well construction to accomplish the proposed total depth.
10/24/2019	**II**	**19PS-MW02A**	During the development of clustered monitoring well 19PS-MW02A some issues occurred. The team had fluctuations in voltage/power with the rental equipment, which in turn affected the pump/flow. The lowest turbidity achieved was 62 NTU. The team rented a new set of pumping instrumentation and continued developing clustered monitoring well 19PS-MW02A.
11/25/2019	**II**	**COC**	Three sample coolers were shipped with only one Sample Receipt covering the contents of all three coolers (COC-11, COC-12, COC-13). However, all coolers were received within temperature range and in good condition. Therefore, there was no impact to the sample data quality.
2019	**II**	**Temporary Monitoring Wells**	The 2019 temporary monitoring wells, 19PS-TW01 through 19PS-TW35, were installed to a depth of 25 ft or refusal (19PS-TW20) and sampled at the terminal depth rather than at the groundwater interface. There is a potential for a low bias for these results.

Date	Phase	General Topic	Deviation
		19PS-TW01 to 19PS-TW35	
5/12/2020	**II**	**USAP-2**	While driving to access existing monitoring well USAP-2, the team encountered deep water/marsh. The team managed to turn around and get out of the area before getting the truck stuck. Therefore, existing monitoring well USAP-2 was not sampled due to accessibility issues.
5/16/2020	**II**	**20PS-MW02C**	Clustered monitoring well 20PS-MW02C was set at 161 ft bgs rather than the proposed 160 ft bgs.
5/19/2020	**III**	**Temporary Monitoring Wells** **20PS-TW42** **20PS-TW45** **20PS-TW54**	The proposed location for temporary monitoring well 20PS-TW42 was inaccessible due to high water. Piledriver Slough was too deep to cross from either the north or south. The location was moved, and the new location was approved in a field change form on 28 May 2020.
			The proposed location for temporary monitoring well 20PS-TW45 was inaccessible by drill rig due to the steepness of Moose Creek Bluff. The nearest accessible location was too high in elevation to reach any impacted groundwater (50+ vertical feet above Moose Creek). Sampling was attempted using a hand-driven piezometer. The necessary sample volume was unable to be collected and the location was abandoned.
			The proposed location for temporary monitoring well 20PS-TW54 was inaccessible due to high water. Piledriver Slough was too high to cross from the north and sloughs from the south are also impassable.
5/20/2020	**III**	**Temporary Monitoring Wells** **20PS-TW43** **20PS-TW44**	The proposed locations for temporary monitoring wells 20PS-TW43 and 20PS-TW44 were inaccessible by drill rig due to high water. The access trail and proposed locations were currently under 6-inches to 2 ft of standing water. Sampling was attempted using a hand-driven piezometer. Frozen soils were encountered within 2 ft of the surface and the holes/locations were abandoned.
5/31/2020	**III**	**Temporary Monitoring Wells** **20PS-TW45**	During sampling, all temporary monitoring wells were stabilized or purged until six wellbore volumes were removed. Only one temporary monitoring well was purged dry during sampling, 20PS-TW45.
6/4/2020	**V**	**20PS-ML02 (SW)**	The second surface water sample at 20PS-ML02 was collected at 3 ft. The 20PS-ML02 location did not go any deeper within sample location than 4 ft. This is a deviation from the Work Plan on Page 8, which states, “At locations where collection of two samples is planned, one sample will be collected from just below the water surface and the other will be collected at approximately 5 ft depth in the water column.” The field team did not utilize a non-motorized boat to collect surface water samples in a deeper location because the pond did not get deeper than that within 100 ft.
6/4/2020	**V**	**20PS-SP01 (SED)**	Several attempts were made to collect sediment sample 20PS-SP01; however, the location had willows lining the entire shoreline, making any sediment sample collection impossible due to heavy root cover and other log debris. Sediment sample was not collected.
6/6/2020	**V**	**20PS-ZP01 (SED)**	The team attempted to collect sediment sample 20PS-ZP01; however, the pond floor was covered in impenetrable vegetation. Sediment sample was not collected.
6/6/2020	**V**	**20PS-ZP01 (SW)**	A second surface water sample at 20PS-ZP01 was collected at 3 ft. 20PS-ZP01 location did not go any deeper within sample location than 4 ft. This is a deviation from the Work Plan on Page 8, which states, “At locations where collection of two samples is planned, one sample will be collected from just below the water surface and the other will be collected at approximately 5 ft depth in the water column.” The field team did not utilize a non-motorized boat to collect surface water samples in a deeper location because the pond did not get deeper than that within 100 ft.
6/6/2020	**V**	**20PS-MLP01 (SED)**	Sediment sample collection with an auger and Ponar were unsuccessful as sediment sample locations was only gravel with minimal sand. Only viable sediment to be collected was approximately 3 ft from shoreline where sand has settled between two boulders, so sediment sample was collected here.
6/7/2020	**V**	**20PS-SH02 (SW)**	Depth to bottom at surface water sample 20PS-SH02 location was about 4 ft. One surface water sample was collected at just below the water surface and at approximately 4 ft versus the proposed 5 ft depth in the water column. The field team did not utilize a non-motorized boat to collect the surface water samples in a deeper location because the field team could not bring a non-motorized boat on site.
6/8/2020	**V**	**20PS-PS02 (SW/SED)**	The field team had to walk in on the opposite side of the slough for accessibility. The slough was approximately 80 ft across (width) and too deep to cross safely to access the proposed sample GPS point. The surface water and sediment sample, 20PS-PS02 was collected 88 meters from the proposed location.

Date	Phase	General Topic	Deviation
6/9/2020	**V**	**20PS-PS01 (SW/SED)**	The closest accessible surface water and sediment sampling location was 93 meters from the proposed location. The field team collected a sample located on the other side of slough (Northwest side – closer to highway). The team could not access the proposed sample point due to deeper water and dangerous stream bed conditions.
6/10/2020	**V**	**20PS-SC02 (SW)**	Depth to bottom at surface water sample 20PS-SC02 location was about 4 ft. One surface water sample was collected at just below the water surface and at approximately 4 ft versus the proposed 5 ft depth in the water column. The field team did not utilize a non-motorized boat to collect the surface water samples in a deeper location because the field team could not bring a non-motorized boat on site.
6/10/2020	**V**	**Sediment Sampling**	The team used a stainless-steel clam gun rather than Tenite tubes for a coring device for sediment samples. The Tenite tubes could not penetrate the thick vegetation and packed sediment encountered at most of the water bodies. An equipment blank was taken off the "auger" each day it was used for collection of sediment samples. This is a deviation of the Work Plan on Page 8 under "Sediment Sampling Activities," although the Decontamination Section does say that equipment blanks would be collected on any reusable equipment.
9/13/2020	**IV**	**20PS-MW22**	20PS-MW22 was installed 160 ft from the planned location to better capture the subsurface flow from historical creek channels.
9/14/2020	**IV**	**20PS-MW24**	20PS-MW24 was installed 79 ft from the planned location to allow the well to remain a stick-up by placing it on the edge of the mowed floodplain corridor. The installed location also allowed the monitoring well to not be directly adjacent to a USACE service road at the Chena River Lakes Flood Control Project.
9/14/2020	**IV**	**20PS-MW25**	20PS-MW25 was installed 116 ft from the planned location to avoid conflict with ongoing USACE maintenance activities on the day of installation at the Chena River Lakes Flood Control Project.
9/19/2020	**IV**	**Existing Monitoring Wells** **MW-4, MW-2**	The team was unable to locate the existing monitoring well MW-4 after 30 minutes of searching, including looking for flush mounts with a metal detector. The GPS coordinates did not match up with the existing monitoring well position. The adjacent existing monitoring well MW-2 was sampled instead.
9/19/2020	**IV**	**20PS-MW18**	20PS-MW18 was installed 96 ft from the planned location to allow the monitoring well to remain a stick-up by placing it on the edge of the mowed floodplain corridor. The installed location also maximizes conductivity with historical creek channels.
9/19/2020	**IV**	**20PS-MW19**	20PS-MW19 was installed 342 ft from the planned location due to rig access issues with the steep embankments around the Chena River Lakes Flood Control Project.
9/20/2020	**IV**	**20PS-MW03**	20PS-MW03 was installed 40 ft from the planned location to clear existing utility lines.
9/20/2020	**IV**	**Flush Mount Wells**	Flush mount wells were not finished with 4 ft x 4 ft x 6-inch cement pad due to GeoTek not having the correct equipment to construct them at the time of drilling. Flush mount wells were finished the same as stick-ups with Sonotube formed cement anchors. Upon a subsequent mobilization, the ground was frozen and covered in 1 foot of snow. Excavating depressions in the ground to pour the planned 4 ft x 4 ft x 6-inch cement pads would have required specialized equipment to cut through and remove the frozen ground. It was decided to abandon this plan and leave the monitoring wells as constructed with surface completions identical to the stick-up wells for the 2020 winter. Monitoring well completions were completed in Spring 2021.
9/21/2020	**IV**	**20PS-MW14**	20PS-MW14 was installed 190 ft from the planned location because of rig access issues and to provide better conductivity with Moose Creek.
9/23/2020	**IV**	**20PS-MW13**	20PS-MW13 was installed 217 ft from the planned location to avoid the railroad service corridor.
9/23/2020	**IV**	**20PS-MW15**	20PS-MW15 was installed 199 ft from the planned location due to rig access issues.
9/23/2020	**IV**	**20PS-MW17**	20PS-MW17 was installed 44 ft from the planned location to allow the monitoring well to remain a stickup by placing it on the edge of the mowed Chena River Lakes Flood Control Project.
9/24/2020	**IV**	**20PS-MW16**	The team attempted to develop newly installed permanent shallow monitoring well 20PS-MW16, but the height of the water table was higher than the top of casing. The monitoring well was unable to be drawn down significantly with the monsoon pump at its highest setting. 20PS-MW16 was not developed or sampled.
9/25/2020	**IV**	**20PS-MW21** **CS-03**	Permanent shallow monitoring well 20PS-MW21 was replaced with a surface water sample, CS-03 (see field change form).

Date	Phase	General Topic	Deviation
10/28/2020	**IV**	**Existing Monitoring Wells** **AP-6417** **49M01B** **20M14B**	The team was unable to sample the existing monitoring well AP-6417 because it was located behind a fence with no known access.
			The team was unable to sample the existing monitoring well 49M01B because they were unable to locate it, despite looking for it for 30 minutes with a metal detector. The GPS coordinates did not match up with the existing monitoring well position.
			The team was unable to sample the existing monitoring well 20M14B because the USAF escort did not have the privileges required to gain access to that area of the flight line.
10/30/2020	**IV**	**20PS-MW16**	20PS-MW16 was successfully installed; however, the sampling team revisited 20PS-MW16 but were unable to access it with their vehicle and the monitoring well was frozen when the team arrived on foot. 20PS-MW16 was not sampled.

Notes:

Appendix A presents the field change forms used for documentation and approval of technical changes or additions to the Work Plan and Addenda (USAF, 2019b; USAF, 2019c; and USAF, 2020a) when revision or amendment of the document was not required.

Acronyms:

bgs below ground surface
COC chain of custody
ft feet
GPS global positioning system
NTU nephelometric turbidity units
USACE U.S. Army Corps of Engineers

Table 5-2. Monitoring Well Construction Details

Location ID	Date Installed	Easting[a]	Northing[a]	Ground Elevation (FAMSL)[b]	TOC Elevation (FAMSL)[b]	Well Depth (feet bgs)	Depth to Water ATD (feet bgs)	Boring Diameter (in)	Casing Diameter (in)	Casing Type	Well Type	Screened Interval (feet bgs)	Sample Depth (feet btoc)	Screen Slot Size (in)	Sample Target
Deep Clustered Wells Monitoring Wells															
19PS-MW01A	10/26/19	487703.261	7177465.413	506.29	508.80	63.33	5.06	8.00	2.00	PVC	Stick-Up	51.31-61.31	57	0.010	50-60 ft
19PS-MW01B	10/27/19	487703.958	7177471.420	506.20	509.20	110.58	4.85	8.00	2.00	PVC	Stick-Up	99.92-109.58	108	0.010	100-110 ft
20PS-MW01C	05/29/20	487704.137	7177474.325	506.67	509.50	160.50	3.19	3.75	2.00	PVC	Stick-Up	150.3-160.3	155.3	0.010	150-160 ft
20PS-MW01D	05/22/20	487703.556	7177468.345	506.51	508.95	209.53	3.24	3.75	2.00	PVC	Stick-Up	199-209	204	0.010	200-210 ft
19PS-MW02A	10/22/19	487216.291	7176688.653	509.65	511.86	62.00	6.33	8.00	2.00	PVC	Stick-Up	49-59	51	0.010	50-60 ft
19PS-MW02B	10/23/19	487221.339	7176691.080	509.74	512.38	115.00	6.35	8.00	2.00	PVC	Stick-Up	101.8-111.8	108.5	0.010	100-110 ft
20PS-MW02C	05/16/20	487222.494	7176691.614	509.49	512.43	161.24	4.47	3.75	2.00	PVC	Stick-Up	151-161	156	0.010	150-160 ft
20PS-MW02D	05/17/20	487219.028	7176689.902	509.89	512.15	210.00	4.43	3.75	2.00	PVC	Stick-Up	199.8-209.8	206.8	0.010	200-210 ft
Shallow Monitoring Wells															
20PS-MW01	09/20/20	494517.138	7176581.112	525.28	528.31	13.00	5.50	6.25	2.00	PVC	Stick-Up	3-13	12.0	0.010	Shallow Aquifer (Upper 10 feet)
20PS-MW02	10/27/20	495610.731	7175064.120	529.84	532.84	12.80	5.36	4.50	2.00	PVC	Stick-Up	2.8-12.8	7.0	0.010	Shallow Aquifer (Upper 5 feet)
20PS-MW03	09/20/20	496739.466	7174076.359	534.09	536.61	13.00	2.00	6.25	2.00	PVC	Stick-Up	3-13	11.0	0.010	Shallow Aquifer (Upper 5 feet)
20PS-MW04	10/29/20	497661.391	7172932.371	538.19	541.34	13.00	7.92	4.50	2.00	PVC	Stick-Up	3-13	10.4	0.010	Shallow Aquifer (Upper 5 feet)
20PS-MW05	10/02/20	496664.214	7168854.655	551.15	554.11	13.00	8.53	4.50	2.00	PVC	Stick-Up	3-13	12.37	0.010	Shallow Aquifer (Upper 5 feet)
20PS-MW06	10/28/20	494001.302	7173880.735	533.20	532.81	15.50	6.77	4.50	2.00	PVC	Flush Mount	5.5-15.5	11.03	0.010	Shallow Aquifer (Upper 5 feet)
20PS-MW07	09/18/20	493352.164	7174837.889	529.70	532.72	14.00	7.20	6.25	2.00	PVC	Stick-Up	4-14	13.0	0.010	Shallow Aquifer (Upper 10 feet)
20PS-MW08	09/18/20	493100.981	7175365.406	526.69	529.63	13.00	6.00	6.25	2.00	PVC	Stick-Up	3-13	11.5	0.010	Shallow Aquifer (Upper 10 feet)
20PS-MW09	09/18/20	490855.088	7176639.655	522.58	525.37	16.50	9.50	6.25	2.00	PVC	Stick-Up	6.5-16.5	15.0	0.010	Shallow Aquifer (Upper 10 feet)
20PS-MW10	09/18/20	490203.009	7176948.625	519.01	521.62	13.40	6.20	6.25	2.00	PVC	Stick-Up	3-13	12.0	0.010	Shallow Aquifer (Upper 10 feet)
20PS-MW11	09/16/20	489673.368	7177127.788	515.59	518.66	11.83	3.89	6.25	2.00	PVC	Stick-Up	1.5-11.5	10.5	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW12	09/16/20	489308.677	7177237.566	516.24	519.17	13.40	5.42	6.25	2.00	PVC	Stick-Up	3-13	12.0	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW13	09/23/20	488247.719	7177423.927	513.59	516.43	15.00	8.40	6.25	2.00	PVC	Stick-Up	5-15	14.0	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW14	09/21/20	487621.596	7176517.027	511.79	514.65	13.00	2.60	6.25	2.00	PVC	Stick-Up	3-13	11.0	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW15	09/23/20	486757.777	7176252.153	517.30	520.38	15.00	9.00	6.25	2.00	PVC	Stick-Up	5-15	14.0	0.010	Shallow Aquifer (upper 5 feet)
20PS-MW16	09/23/20	486764.171	7176663.601	507.22	506.71	13.00	0.00	6.25	2.00	PVC	Flush Mount	3-13	NA	0.010	Not sampled
20PS-MW17	09/23/20	486138.819	7176270.343	507.95	510.84	13.00	0.50	6.25	2.00	PVC	Stick-Up	3-13	11.5	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW18	09/19/20	486381.682	7177303.180	508.98	511.78	14.00	8.33	6.25	2.00	PVC	Stick-Up	4-14	13.00	0.010	Shallow Aquifer (upper 5 feet)
20PS-MW19	09/19/20	486298.504	7177438.570	507.33	510.21	13.00	7.00	6.25	2.00	PVC	Stick-Up	3-13	12.00	0.010	Shallow Aquifer (upper 5 feet)
20PS-MW20	09/19/20	486490.384	7177393.776	509.23	512.33	13.00	7.50	6.25	2.00	PVC	Stick-Up	3-13	12.5	0.010	Shallow Aquifer (upper 5 feet)
20PS-MW22	09/14/20	487374.239	7178324.143	502.66	505.70	20.00	4.73	6.25	2.00	PVC	Stick-Up	10-20	19.00	0.010	Shallow Aquifer (upper 20 feet)
20PS-MW23	09/19/20	488036.391	7178321.010	502.97	502.70	13.00	1.50	6.25	2.00	PVC	Flush Mount	3-13	8.00	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW24	09/14/20	488908.570	7178045.163	511.43	514.40	24.00	8.63	6.25	2.00	PVC	Stick-Up	4.5-14.5	14.5	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW25	09/14/20	489329.811	7179667.000	504.04	506.86	20.91	8.70	6.25	2.00	PVC	Stick-Up	4-14	13.00	0.010	Shallow Aquifer (upper 5 feet)
20PS-MW26	09/11/20	488258.605	7177423.693	513.62	516.58	21.19	8.49	6.25	2.00	PVC	Stick-Up	11.19-21.19	17.00	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW27	09/10/20	487623.321	7176512.106	511.72	514.67	20.80	2.94	6.25	2.00	PVC	Stick-Up	10.8-20.8	15.0	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW28	09/10/20	486751.795	7176252.400	517.25	520.08	20.50	8.76	6.25	2.00	PVC	Stick-Up	10.5-20.5	18.5	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW29	09/09/20	487078.246	7176784.518	507.49	506.99	17.00	0.00	6.25	2.00	PVC	Flush Mount	7-17	12.00	0.010	Shallow Aquifer (upper 20 feet)
20PS-MW30	09/10/20	485968.943	7176189.208	507.62	510.89	20.00	3.71	6.25	2.00	PVC	Stick-Up	10-20	19.00	0.010	Shallow Aquifer (upper 20 feet)
20PS-MW31	09/13/20	486380.143	7177296.544	510.61	510.25	20.33	8.63	6.25	2.00	PVC	Flush Mount	10-20	17.00	0.010	Shallow Aquifer (upper 10 feet)
20PS-MW32	09/13/20	486425.726	7177328.451	505.33	505.10	20.30	2.70	6.25	2.00	PVC	Flush Mount	10-20	18.00	0.010	Shallow Aquifer (upper 20 feet)
20PS-MW33	09/15/20	487997.012	7178554.178	512.26	511.66	19.50	10.83	6.25	2.00	PVC	Flush Mount	9.5-19.5	14.0	0.010	Shallow Aquifer (upper 5 feet)

Notes:

a Coordinate System: WGS 84 UTM Zone 6 North, in Meters.
b Vertical Coordinate System: NAVD88.

Abbreviations and Acronyms:

ATD	at time of drilling	ID	Identification
bgs	below ground surface	in	inches
btoc	below top of casing	PVC	polyvinyl chloride
FAMSL	feet above mean sea level	TOC	top of casing

Highlighted monitoring wells have been remove due to installation at incorrect depth or location.

Table 5-3. Temporary Monitoring Well Construction Details

Location ID	Date Installed	Easting[a]	Northing[a]	Ground Elevation (FAMSL)[b]	TOC Elevation (FAMSL)[b]	Well Depth (feet bgs)	Depth to Water ATD (feet bgs)	Boring Diameter (in)	Casing Diameter (in)	Casing Type	Screened Interval (feet bgs)	Sample Depth (feet btoc)	Screen Slot Size (in)	Sample Target
Phase II Temporary Monitoring Wells														
TW01	10/19/19	7177713.015	490517.640	165.883	NA	25.00	7.16	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW02	10/15/19	7168669.340	495879.937	181.48	NA	25.00	14.61	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 10 feet)
TW03	10/15/19	7170384.809	495176.320	176.57	NA	25.00	13.50	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW04	10/15/19	7171145.683	494851.498	178.72	NA	25.00	12.47	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW05	10/15/19	7171930.138	494521.130	175.34	NA	25.00	12.93	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW06	10/16/19	7170706.130	491810.512	175.96	NA	25.00	10.03	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW07	10/15/19	7172928.263	493757.165	174.05	NA	25.00	11.00	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW08	10/15/19	7173469.180	493535.809	174.19	NA	25.00	10.75	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW09	10/16/19	7174019.066	493530.707	173.29	NA	25.00	10.23	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW10	10/18/19	7175331.358	492228.278	170.29	NA	25.00	7.41	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW11	10/18/19	7175580.878	491802.328	168.36	NA	25.00	5.66	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW12	10/18/19	7175584.212	491237.026	165.36	NA	25.00	8.53	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW13	10/16/19	7176263.819	490873.050	171.23	NA	25.00	8.26	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW14	10/16/19	7176604.114	490483.294	169.87	NA	25.00	9.34	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW15	10/16/19	7177237.566	489308.677	157.35	NA	25.00	8.47	1.5	0.625	PVC	21.24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW16	10/17/19	7176647.566	487200.353	168.53	NA	25.00	10.15	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW17	10/16/19	7177383.502	488683.170	165.77	NA	25.00	15.16	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 10 feet)
TW18	10/16/19	7177523.559	485447.740		NA	25.00	9.15	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW19	10/17/19	7180304.457	489443.172	162.53	NA	25.00	15.58	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 10 feet)
TW20	10/18/19	7178560.844	490449.855	161.68	NA	16.00	2.76	1.5	0.625	PVC	12.5-16	15.0	0.010	Shallow aquifer (upper 20 feet)
TW21	**Not Sampled**													
TW22	10/19/19	7177415.363	491662.715	167.79	NA	25.00	8.69	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW23	10/19/19	7177342.554	492626.903	169.58	NA	25.00	9.09	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW24	10/19/19	7176789.810	493368.495	170.76	NA	25.00	15.26	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 10 feet)
TW25	10/19/19	7176279.303	494432.806	171.43	NA	25.00	5.41	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW26	10/19/19	7175684.678	494770.094	171.58	NA	25.00	9.75	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW27	10/19/19	7174828.980	495918.824	171.09	NA	25.00	5.88	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW28	10/19/19	7173986.774	496457.860	172.67	NA	25.00	7.35	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW29	10/19/19	7173678.146	497259.466	173.20	NA	25.00	6.53	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW30	10/19/19	7173021.050	497294.667	174.51	NA	25.00	6.68	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW31	10/20/19	7172163.267	496905.116	175.80	NA	25.00	10.72	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW32	10/20/19	7171615.022	497237.343	176.71	NA	25.00	7.48	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW33	10/20/19	7171102.355	497337.173	177.68	NA	25.00	7.30	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW34	10/20/19	7170275.747	497368.729	177.47	NA	25.00	6.28	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
TW35	10/20/19	7169275.958	498187.556	181.13	NA	25.00	8.78	1.5	0.625	PVC	21-24.3	24.0	0.010	Shallow aquifer (upper 20 feet)
Phase III Temporary Monitoring Wells														
TW36	06/27/20	7168739.102	497987.649	179.52	NA	17.50	6.10	1.5	0.625	PVC	17.5-13.8	15.0	0.010	Shallow aquifer (upper 10 feet)
TW37	05/27/20	7168768.174	496403.935	180.11	NA	17.70	8.30	1.5	0.625	PVC	17.7-14	16.0	0.010	Shallow aquifer (upper 10 feet)
TW38	05/29/20	7168680.745	496020.855	179.83	NA	17.70	12.00	1.5	0.625	PVC	17.7-14	16.0	0.010	Shallow aquifer (upper 5 feet)
TW39	05/29/20	7172699.951	497709.133	174.32	NA	17.60	8.20	1.5	0.625	PVC	17.6-13.9	15.6	0.010	Shallow aquifer (upper 10 feet)
TW40	05/29/20	7174180.040	496943.835	171.14	NA	12.50	4.20	1.5	0.625	PVC	12.5-8.9	11.0	0.010	Shallow aquifer (upper 10 feet)
TW41	05/28/20	7177008.312	494873.501	171.72	NA	17.70	14.10	1.5	0.625	PVC	17.7-14	16.0	0.010	Shallow aquifer (upper 5 feet)
TW42	06/27/20	7174949.482	493548.668	161.04	NA	17.50	9.05	1.5	0.625	PVC	17.5-13.8	15.5	0.010	Shallow aquifer (upper 10 feet)
TW43	**Not Sampled**													
TW44	**Not Sampled**													

Table 5-3. Temporary Monitoring Well Construction Details

Location ID	Date Installed	Easting[a]	Northing[a]	Ground Elevation (FAMSL)[b]	TOC Elevation (FAMSL)[b]	Well Depth (feet bgs)	Depth to Water ATD (feet bgs)	Boring Diameter (in)	Casing Diameter (in)	Casing Type	Screened Interval (feet bgs)	Sample Depth (feet btoc)	Screen Slot Size (in)	Sample Target
TW45	**Not Sampled**													
TW46	05/26/20	7178355.541	489113.023	165.45	NA	25.00	15.80	1.5	0.625	PVC	22.3-25	23.0	0.010	Shallow aquifer (upper 10 feet)
TW47	05/26/20	7178068.136	488920.212	166.01	NA	18.75	9.30	1.5	0.625	PVC	15-18.7	15.0	0.010	Shallow aquifer (upper 10 feet)
TW48	05/26/20	7177525.037	489134.293	167.12	NA	19.00	7.90	1.5	0.625	PVC	15.3-19	17.0	0.010	Shallow aquifer (upper 10 feet)
TW49	05/26/20	7177320.246	488960.363	170.63	NA	15.00	10.40	1.5	0.625	PVC	12.3-15	13.5	0.010	Shallow aquifer (upper 5 feet)
TW50	05/27/20	7177445.581	488184.131	172.09	NA	15.00	10.00	1.5	0.625	PVC	12.3-15	13.0	0.010	Shallow aquifer (upper 5 feet)
TW51	05/27/20	7177462.035	487600.120	163.99	NA	12.80	2.80	1.5	0.625	PVC	9-12.8	11.0	0.010	Shallow aquifer (upper 10 feet)
TW52	05/28/20	7176515.706	486591.522	166.58	NA	12.80	5.30	1.5	0.625	PVC	9.1-12.8	11.0	0.010	Shallow aquifer (upper 10 feet)
TW53	05/27/20	7176314.046	486772.951	164.59	NA	7.50	2.00	1.5	0.625	PVC	3.9-7.5	5.5	0.010	Shallow aquifer (upper 10 feet)
TW54	**Not Sampled**													
TW55	05/28/20	7177140.721	487472.988	164.38	NA	12.70	5.10	1.5	0.625	PVC	9-12.7	10.0	0.010	Shallow aquifer (upper 5 feet)
TW56	05/27/20	7177682.713	487767.261	163.94	NA	12.20	9.20	1.5	0.625	PVC	8.5-12.2	11.0	0.010	Shallow aquifer (upper 5 feet)
TW57	05/27/20	7177910.347	487991.287	164.12	NA	8.00	4.00	1.5	0.625	PVC	4.3-8	6.0	0.010	Shallow aquifer (upper 5 feet)
TW58	05/26/20	7178048.898	488398.489	165.02	NA	12.00	5.70	1.5	0.625	PVC	8.3-12	10.5	0.010	Shallow aquifer (upper 5 feet)
TW59	05/28/20	7176910.747	487222.307	166.14	NA	12.90	5.40	1.5	0.625	PVC	9.2-12.9	11.0	0.010	Shallow aquifer (upper 10 feet)
TW60	05/28/20	7176790.054	486903.018	165.94	NA	12.70	5.10	1.5	0.625	PVC	9-12.7	11.0	0.010	Shallow aquifer (upper 10 feet)

Notes:

a Coordinate System: WGS 84 UTM Zone 6 North, in Meters.
b Vertical Coordinate System: NAVD88.

Abbreviations and Acronyms:

ATD	at time of drilling	ID	Identification
bgs	below ground surface	in	inches
btoc	below top of casing	PVC	polyvinyl chloride
FAMSL	feet above mean sea level	TOC	top of casing

Table 6-1: Summary of Analytical Results for Groundwater - Existing Monitoring Wells

Field Sample ID	Well ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		EPA SLs	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Existing Wells										
19PS-AP-6078-0530	AP-6078	30-May-2019	**0.038** [0.0012]		**0.15** [0.0012]		**0.19** [0.0024]		0.017 [0.0011]	QN
19PS-MW99-0530	AP-6078 (field duplicate)	30-May-2019	**0.037** [0.0011]		**0.15** [0.0011]		**0.19** [0.0022]		0.016 [0.0010]	QN
20PS-DSAP-8D-0912	DSAP-8D	12-Sep-2020	0.0042 [0.00088]		0.0073 [0.00088]		0.012 [0.0018]		0.0018 [0.00088]	
20-DSAP-8S-0416	DSAP-8S	16-Apr-2020	0.00083 [0.00095]	J	0.0018 [0.00095]	J	0.0026 [0.0019]	J	0.00089 [0.00095]	J
20PS-DSAP-8S-0911	DSAP-8S	11-Sep-2020	0.0013 [0.00088]	J	0.0018 [0.00088]		0.0031 [0.0018]	J	0.00090 [0.00088]	J
19-DSAP-10-0718	DSAP-10	18-Jul-2019	0.0022 [0.00088]		0.0032 [0.00088]	B	0.0054 [0.0018]		0.0035 [0.00088]	
19-DSAP-11-0718	DSAP-11	18-Jul-2019	0.0030 [0.00087]		0.0053 [0.00087]	B	0.0083 [0.0017]		0.0013 [0.00087]	J
19-DSAP-13-0718	DSAP-13	18-Jul-2019	0.0016 [0.00088]	J	0.0024 [0.00088]	B	0.0040 [0.0018]		0.0019 [0.00088]	
20-DSAP-14-0416	DSAP-14	16-Apr-2020	0.0038 [0.00094]		0.010 [0.00094]		0.014 [0.0019]		0.0011 [0.00094]	J
20PS-MW99-0416	DSAP-14 (field duplicate)	16-Apr-2020	0.0034 [0.00084]		0.0085 [0.00084]		0.012 [0.0017]		0.00092 [0.00084]	J
20PS-HCMW01-15-0918	HCMW01-15	18-Sep-2020	0.0020 [0.00090]	J	0.0018 [0.00090]		0.0038 [0.0018]		0.0011 [0.00090]	J,QN
20PS-HCMW01-75-0918	HCMW01-75	18-Sep-2020	0.0073 [0.00088]	J	0.0046 [0.00088]		0.012 [0.0018]		0.0019 [0.00088]	QN,QH
20PS-HCMW02-15-0918	HCMW02-15	18-Sep-2020	0.030 [0.00087]		**0.057** [0.00087]		**0.087** [0.0017]		0.0061 [0.00087]	QN,QH
20PS-HCMW02-75-0918	HCMW02-75	18-Sep-2020	0.025 [0.00087]		**0.12** [0.00087]		**0.15** [0.0017]		0.0047 [0.00087]	QN
20PS-HCMW03-15-0919	HCMW03-15	19-Sep-2020	0.030 [0.00087]		**0.070** [0.00087]		**0.10** [0.0017]		0.011 [0.00087]	QN,QH
20PS-HCMW03-75-0919	HCMW03-75	19-Sep-2020	0.0015 [0.00087]		0.0053 [0.00087]		0.0068 [0.0017]		0.0075 [0.00087]	QN,QH
20PS-HCMW04-15-0918	HCMW04-15	18-Sep-2020	ND [0.00086]		ND [0.00086]		ND [0.0017]		0.0012 [0.00086]	J,QN
20PS-MW93-0918	HCMW04-15 (field duplicate)	18-Sep-2020	ND [0.00087]		ND [0.00087]		ND [0.0018]		0.0012 [0.00087]	J,QN
20PS-HCMW04-75-0918	HCMW04-75	18-Sep-2020	ND [0.00088]		ND [0.00088]		ND [0.0018]		ND [0.00088]	
20PS-HCMW05-15-0919	HCMW05-15	19-Sep-2020	0.0024 [0.00089]		0.0031 [0.00089]		0.0055 [0.0018]		0.00050 [0.00089]	J,QN
20PS-HCMW05-75-0919	HCMW05-75	19-Sep-2020	0.0049 [0.00088]		0.0050 [0.00088]		0.0099 [0.0018]		0.0024 [0.00088]	QN,QH
20PS-MW92-0919	HCMW05-75 (field duplicate)	19-Sep-2020	0.0048 [0.00089]		0.0047 [0.00089]		0.0095 [0.0018]		0.0024 [0.00089]	QN
19-MW-BKG-01-0716	MW-BKG-01	16-Jul-2019	ND [0.00085]		0.00046 [0.00085]	J	0.00046 [0.0017]	J	ND [0.00085]	
19-MW-BKG-04-0716	MW-BKG-04	16-Jul-2019	0.0022 [0.00090]		0.0013 [0.00090]	J	0.0035 [0.0018]	J	0.0016 [0.00090]	J, QN
19PS-MW99-0716	MW-BKG-04 (field duplicate)	16-Jul-2019	0.0026 [0.00088]	J,QN	0.0018 [0.00088]	QH	0.0044 [0.0018]	J,QN,QH	0.0016 [0.00088]	J
19-MW-BKG-07-0716	MW-BKG-07	16-Jul-2019	0.00068 [0.00088]	J	0.00073 [0.00088]	J	0.0014 [0.0018]	J	0.00095 [0.00088]	J,QN
19-MW-BKG-09-0717	MW-BKG-09	17-Jul-2019	0.0030 [0.00095]	J	0.011 [0.00095]		0.014 [0.0019]	J	0.0013 [0.00095]	J
19-MW-BKG-10-0717	MW-BKG-10	17-Jul-2019	ND [0.00089]		ND [0.00089]		ND [0.0018]		ND [0.00089]	
19-PS-MW99-0717	MW-BKG-10 (field duplicate)	17-Jul-2019	ND [0.00089]		ND [0.00089]		ND [0.0018]		ND [0.00089]	
19-MW-BKG-11-0716	MW-BKG-11	16-Jul-2019	0.0021 [0.00093]	J	0.0013 [0.00093]	J	0.0034 [0.0018]	J	0.0029 [0.00093]	QN,QH
19-MW-BKG-12-0716	MW-BKG-12	16-Jul-2019	0.0038 [0.00094]		0.018 [0.00094]		0.022 [0.0018]		0.0011 [0.00094]	J
19-02MW11-0717	02MW11	17-Jul-2019	0.025 [0.00092]		**0.083** [0.00092]		**0.11** [0.0018]		0.012 [0.00092]	
20PS-MW-2-0924	MW-2	24-Sep-2020	**0.043** [0.00087]		**0.16** [0.00087]		**0.20** [0.0017]		0.018 [0.00087]	
19-NorthPoleWellA-0717	North Pole Well-A	17-Jul-2019	ND [0.0013]		0.0014 [0.0012]	J	0.0014 [0.0025]	J	ND [0.0011]	
19-NorthPoleWellB-0717	North Pole Well-B	17-Jul-2019	ND [0.0013]		0.00093 [0.0013]		0.00093 [0.0026]		ND [0.0012]	
19-USAP-1-0718	USAP-1	18-Jul-2019	0.0092 [0.00089]		0.025 [0.00089]	B	0.034 [0.0018]		0.0044 [0.00089]	
19PS-MW99-0718	USAP-1 (field duplicate)	18-Jul-2019	0.0090 [0.00091]	J	0.025 [0.00091]	B	0.034 [0.0018]	J,B	0.0044 [0.00091]	
20-USAP-2-0608	USAP-2	8-Jun-2020	ND [0.00087]		ND [0.00087]		ND [0.0017]		ND [0.00087]	
20PS-MW99-0608	USAP-2 (field duplicate)	8-Jun-2020	0.0011 [0.00087]	J	ND [0.00087]		0.0011 [0.0017]	J	0.0010 [0.00087]	J,QN
20-USAP-3-0512	USAP-3	12-May-2020	0.0018 [0.00087]	J	0.0039 [0.00087]	J	0.0057 [0.0017]	J	0.00093 [0.00087]	J,QN
20PS-MW99-0512	USAP-3 (field duplicate)	12-May-2020	0.0018 [0.00091]	J	0.0031 [0.00091]		0.0049 [0.0018]		0.00091 [0.00091]	J
20PS-USAP-1-0912	USAP -1	12-Sep-2020	0.010 [0.00088]		0.027 [0.00088]		**0.037** [0.0018]		0.0052 [0.00088]	QN
20PS-MW98-0912	USAP -1 (field duplicate)	12-Sep-2020	0.011 [0.00087]		0.029 [0.00087]		**0.040** [0.0017]		0.0053 [0.00087]	

Table 6-1: Summary of Analytical Results for Groundwater - Existing Monitoring Wells

Notes:

Results shown in bold and highlighted red exceed EPA lifetime Health Advisory (HA) level.

Results shown in bold and highlighted blue are between ½ HA and the HA.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the health advisory Level (0.070 µg/L).

2. EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

EPA = U.S. Environmental Protection Agency	PFOA = perfluorooctanoic acid	SLs = Screening Levels
ND = nondetectable	PFOS = perfluorooctane sulfonate	µg/L = microgram(s) per liter
PFBS = perfluorobutane sulfonate	Q = qualifier	

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 6-2: Summary of Analytical Results for Groundwater - Temporary Monitoring Wells

Field Sample ID	Well ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		Screening Levels	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Temporary Wells										
19PS-TW01-1019	TW01	19-Oct-2019	**0.036** [0.00093]		**0.39** [0.0093]	QL	**0.43** [0.010]	QL	0.015 [0.00093]	
19PS-TW02-1015	TW02	15-Oct-2019	ND [0.00094]		0.00049 [0.00094]	J	0.00049 [0.0019]	J	0.00050 [0.00094]	J,QN
19PS-TW03-1015	TW03	15-Oct-2019	0.00064 [0.00095]	J	0.0014 [0.00095]	J	0.0020 [0.0019]	J	0.00051 [0.00095]	J,QN
19PS-TW99-1015	TW03 (field duplicate)	15-Oct-2019	0.00058 [0.00090]	J	0.0014 [0.00090]	J	0.0020 [0.0018]	J	0.00047 [0.00090]	J,QN
19PS-TW04-1015	TW04	15-Oct-2019	0.0018 [0.00095]	J	0.0018 [0.00095]	J	0.0036 [0.0019]	J	0.00055 [0.00095]	J,QN
19PS-TW05-1015	TW05	15-Oct-2019	0.0016 [0.00092]	J	0.0014 [0.00092]	J	0.0030 [0.0018]	J	0.00060 [0.00092]	J
19PS-TW06-1016	TW06	16-Oct-2019	ND [0.00096]		ND [0.00096]		ND [0.0019]		ND [0.00096]	
19PS-TW07-1015	TW07	15-Oct-2019	0.00057 [0.00094]	J	0.00071 [0.00094]	J	0.0013 [0.0019]	J	ND [0.00094]	
19PS-TW08-1015	TW08	15-Oct-2019	ND [0.00091]		0.00055 [0.00091]	J	0.00055 [0.0018]	J	ND [0.00091]	
19PS-TW09-1016	TW09	16-Oct-2019	0.0045 [0.00093]		0.0043 [0.00093]	J	0.0088 [0.0019]	J	0.0012 [0.00093]	J
19PS-TW10-1018	TW10	18-Oct-2019	ND [0.00091]		0.0010 [0.00091]	J	0.0010 [0.0018]	J	ND [0.00091]	
19PS-TW11-1018	TW11	18-Oct-2019	ND [0.00098]		0.00073 [0.00098]	J	0.00073 [0.0020]	J	ND [0.00098]	
19PS-TW12-1018	TW12	18-Oct-2019	ND [0.00094]		0.00081 [0.00094]	J	0.00081 [0.0019]	J	ND [0.00094]	
19PS-TW13-1016	TW13	16-Oct-2019	0.00065 [0.00095]	J	0.0044 [0.00095]		0.0051 [0.0019]	J	ND [0.00095]	
19PS-TW98-1016	TW13 (field duplicate)	16-Oct-2019	ND [0.00095]		ND [0.00095]		ND [0.0019]		ND [0.00095]	
19PS-TW14-1016	TW14	16-Oct-2019	0.0022 [0.00093]		0.0099 [0.00093]		0.012 [0.0019]		0.0015 [0.00093]	J
19PS-TW15-1016	TW15	16-Oct-2019	0.0068 [0.00097]		0.018 [0.00097]	J	0.025 [0.0019]	J	0.0045 [0.00097]	
19PS-TW16-1017	TW16	17-Oct-2019	0.018 [0.00095]		**0.054** [0.00095]		**0.072** [0.0019]		0.0029 [0.00095]	
19PS-TW17-1016	TW17	16-Oct-2019	0.0069 [0.00093]		**0.047** [0.00093]		**0.054** [0.0019]		0.0015 [0.00093]	J
19PS-TW18-1016	TW18	16-Oct-2019	0.0013 [0.00093]	J	0.0031 [0.00093]		0.0044 [0.0019]	J	ND [0.00093]	
19PS-TW19-1017	TW19	17-Oct-2019	0.0030 [0.00092]		0.0049 [0.00092]	B	0.0079 [0.0018]	B	0.0015 [0.00092]	J
19PS-TW20-1018	TW20	18-Oct-2019	ND [0.00092]		ND [0.00092]		ND [0.0018]		ND [0.00092]	
19PS-TW99-1018	TW20 (field duplicate)	18-Oct-2019	ND [0.00096]		ND [0.00096]		ND [0.0019]		ND [0.00096]	
19PS-TW22-1019	TW22	19-Oct-2019	**0.053** [0.00090]		**0.36** [0.0090]	QL	**0.41** [0.0099]	QL	0.017 [0.00090]	
19PS-TW23-1019	TW23	19-Oct-2019	**0.058** [0.0012]	QL,QN	**0.34** [0.012]	QL,QN	**0.40** [0.013]	QL,QN	0.015 [0.0012]	QL,QN
19PS-TW99-1019	TW23 (field duplicate)	19-Oct-2019	**0.045** [0.00093]		**0.25** [0.0093]	QL,QN	**0.30** [0.010]	QL,QN	0.011 [0.00093]	QN
19PS-TW24-1019	TW24	19-Oct-2019	**0.11** [0.0012]		**0.26** [0.012]	QL	**0.37** [0.013]	QL	0.024 [0.0012]	
19PS-TW25-1019	TW25	19-Oct-2019	0.016 [0.00089]		**0.042** [0.00089]	QL	**0.058** [0.0018]	QL	0.0055 [0.00089]	QN
19PS-TW26-1019	TW26	19-Oct-2019	0.013 [0.00093]		0.029 [0.00093]	QL	**0.042** [0.0019]	QL	0.0043 [0.00093]	
19PS-TW27-1019	TW27	19-Oct-2019	0.00094 [0.00092]	J	0.00080 [0.00092]	J,QL	0.0017 [0.0018]	J,QL	ND [0.00092]	
19PS-TW28-1019	TW28	19-Oct-2019	0.0096 [0.00092]		**0.042** [0.00092]	QL	**0.052** [0.0018]	QL	0.0049 [0.00092]	
19PS-TW29-1019	TW29	19-Oct-2019	0.00098 [0.00090]	J	ND [0.00090]	QL	0.00098 [0.0018]	J,QL	ND [0.00090]	
19PS-TW30-1019	TW30	19-Oct-2019	0.0096 [0.0013]	J	**0.040** [0.0013]	QL	**0.050** [0.0026]	J,QL	0.0049 [0.0013]	QN,QH
19PS-TW31-1020	TW31	20-Oct-2019	0.031 [0.00094]		**0.30** [0.0094]	QL	**0.33** [0.01034]	QL	0.013 [0.00094]	
19PS-TW32-1020	TW32	20-Oct-2019	0.0014 [0.00091]	J	0.013 [0.00091]	QL	0.014 [0.00018]	J,QL	ND [0.00091]	
19PS-TW33-1020	TW33	20-Oct-2019	0.0035 [0.00093]		0.033 [0.00093]	QL	**0.037** [0.0019]	QL	0.00099 [0.00093]	J
19PS-TW99-1020	TW33 (field duplicate)	20-Oct-2019	0.0032 [0.00093]		**0.035** [0.00093]	QL	**0.038** [0.0019]	QL	0.0010 [0.00093]	J
19PS-TW34-1020	TW34	20-Oct-2019	0.0071 [0.00090]		**0.060** [0.00090]	QL	**0.067** [0.0018]	QL	0.0027 [0.00090]	

Table 6-2: Summary of Analytical Results for Groundwater - Temporary Monitoring Wells

Field Sample ID	Well ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		Screening Levels	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Temporary Wells (continued)										
19PS-TW35-1020	TW35	20-Oct-2019	0.00046 [0.00090]	J	0.0014 [0.00090]	J,B,QL	0.0019 [0.0018]	J,B,QL	ND [0.00090]	
20PS-TW36-0627	TW36	27-Jun-2020	0.0022 [0.00093]		0.0036 [0.00093]		0.0058 [0.0019]		0.00073 [0.00093]	J
20PS-TW99-0627	TW36 (field duplicate)	27-Jun-2020	0.0018 [0.00093]	J	0.0039 [0.00093]		0.0057 [0.0019]		0.00064 [0.00093]	J
20PS-TW37-0529	TW37	29-May-2020	0.0079 [0.00097]		0.0017 [0.00097]	J	0.0096 [0.0019]	J	0.14 [0.00097]	QN,QH
20PS-TW99-0529	TW37 (field duplicate)	29-May-2020	0.0075 [0.00099]	J	0.0018 [0.00099]	J	0.0093 [0.0020]	J	0.14 [0.00099]	QH
20PS-TW38-0529	TW38	29-May-2020	ND [0.00095]		0.00056 [0.00095]	J	0.00056 [0.0019]	J	ND [0.00095]	
20PS-TW39-0529	TW39	29-May-2020	0.0029 [0.00098]	J	0.0017 [0.00098]	J	0.0046 [0.0020]	J	0.0017 [0.00098]	J,QN
20PS-TW40-0529	TW40	29-May-2020	ND [0.00097]		0.00054 [0.00097]	J	0.00054 [0.0019]	J	ND [0.00097]	
20PS-TW41-0528	TW41	28-May-2020	ND [0.00099]		ND [0.00099]		ND [0.0020]		ND [0.00099]	
20PS-TW42-0627	TW42	27-Jun-2020	0.030 [0.00091]		**0.21** [0.00091]		**0.24** [0.0018]		0.0068 [0.00091]	
20PS-TW46-0526	TW46	26-May-2020	0.0049 [0.00094]	B	0.031 [0.00094]	B	**0.036** [0.0019]	B	0.0017 [0.00094]	J, B
20PS-TW99-0526	TW46 (field duplicate)	26-May-2020	0.0053 [0.00099]	B	0.033 [0.00099]	B	**0.038** [0.0020]	B	0.0017 [0.00099]	J, B
20PS-TW47-0526	TW47	26-May-2020	0.0062 [0.00097]	B	0.019 [0.00097]	B	0.025 [0.0019]	B	0.0033 [0.00097]	B
20PS-TW48-0526	TW48	26-May-2020	0.012 [0.00098]	B	0.034 [0.00098]	B,J	**0.046** [0.0020]	B,J	0.0050 [0.00098]	B
20PS-TW49-0526	TW49	26-May-2020	0.014 [0.00099]	B	0.021 [0.00099]	B,J	**0.035** [0.0020]	B,J	0.0019 [0.00099]	J,B
20PS-TW50-0527	TW50	27-May-2020	0.012 [0.00098]	B,J	0.014 [0.00098]	B	0.026 [0.0020]	B,J	0.0039 [0.00098]	
20PS-TW99-0527	TW50 (field duplicate)	27-May-2020	0.012 [0.00097]	J	0.012 [0.00097]	B,J	0.024 [0.0019]	B,J	0.0036 [0.00097]	
20PS-TW51-0527	TW51	27-May-2020	0.0090 [0.0010]	B,J	0.0039 [0.0010]	B	0.013 [0.0020]	B,J	0.0025 [0.0010]	
20PS-TW52-0528	TW52	28-May-2020	0.0066 [0.00097]		0.0073 [0.00097]		0.014 [0.0019]		0.0017 [0.00097]	J
20PS-TW53-0527	TW53	27-May-2020	0.0040 [0.00096]	B	0.0098 [0.00096]	B	0.014 [0.0019]	B	0.0013 [0.00096]	J
20PS-TW55-0528	TW55	28-May-2020	0.020 [0.00098]		**0.046** [0.00098]		**0.066** [0.0020]		0.0036 [0.00098]	
20PS-TW99-0528	TW55 (field duplicate)	28-May-2020	0.020 [0.00099]		**0.051** [0.00099]		**0.071** [0.0020]		0.0039 [0.00099]	
20PS-TW56-0527	TW56	27-May-2020	0.0045 [0.0010]	B,J	0.0051 [0.0010]	B,J	0.0096 [0.0020]	B,J	0.0014 [0.0010]	J
20PS-TW57-0527	TW57	27-May-2020	0.013 [0.00095]	B	0.0059 [0.00095]	B,J	0.019 [0.0019]	B	0.0024 [0.00095]	
20PS-TW58-0526	TW58	26-May-2020	0.0075 [0.0010]	B	0.027 [0.0010]	B	0.035 [0.0020]	B	0.0024 [0.0010]	B
20PS-TW59-0528	TW59	28-May-2020	0.0066 [0.00097]		0.016 [0.00097]		0.023 [0.0019]		0.0020 [0.00097]	
20PS-TW60-0528	TW60	28-May-2020	0.0048 [0.00098]		0.014 [0.00098]		0.019 [0.0019]		0.0013 [0.00098]	J

Notes:

Results shown in bold and highlighted red exceed EPA lifetime Health Advisory (HA) level.

Results shown in bold and highlighted blue are between ½ HA and the HA.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the health advisory Level (0.070 µg/L).

2. EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
ND = nondetectable
PFBS = perfluorobutane sulfonate
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 6-3: Summary of Analytical Results for Groundwater - New Monitoring Wells

Field Sample ID	Well ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		Screening Levels	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Deep Cluster Wells										
19PS-MW01A-1029	MW01A	29-Oct-2019	ND [0.0077]		0.015 [0.0077]		0.015 [0.015]		ND [0.0077]	
19PS-MW99-1029	MW01A (field duplicate)	29-Oct-2019	ND [0.0077]		0.013 [0.0077]		0.013 [0.015]		ND [0.0077]	
20PS-MW01A-0913	MW01A	13-Sep-2020	0.0036 [0.00090]		0.013 [0.00090]		0.017 [0.0018]		0.0010 [0.00090]	J
20PS-MW96-0913	MW01A (field duplicate)	13-Sep-2020	0.0034 [0.00089]		0.013 [0.00089]		0.016 [0.0018]		0.0011 [0.00089]	J
19PS-MW01B-1030	MW01B	30-Oct-2019	ND [0.0077]		ND [0.0077]		ND [0.015]		ND [0.0077]	
19PS-MW99-1030	MW01B (field duplicate)	30-Oct-2019	ND [0.0077]		ND [0.0077]		ND [0.015]		ND [0.0077]	
20PS-MW01B-0913	MW01B	13-Sep-2020	ND [0.00086]		ND [0.00086]		ND [0.0017]		ND [0.00086]	
20PS-MW01C-0531	MW01C	31-May-2020	ND [0.00092]		ND [0.00092]		ND [0.0018]		ND [0.00092]	
20PS-MW01D-0531	MW01D	31-May-2020	ND [0.00091]		ND [0.00091]		ND [0.0018]		ND [0.00091]	
20PS-MW99-0531	MW01D (field duplicate)	31-May-2020	ND [0.00089]		ND [0.00089]		ND [0.0018]		ND [0.00089]	
19PS-MW02A-1026	MW02A	26-Oct-2019	0.011 [0.0077]		0.015 [0.0077]		0.026 [0.015]		0.0026 [0.0077]	J
19PS-MW99-1026	MW02A (field duplicate)	26-Oct-2019	0.011 [0.0077]		0.015 [0.0077]		0.025 [0.015]		0.0026 [0.0077]	J
20PS-MW02A-0911	MW02A	11-Sep-2020	0.017 [0.00090]		0.026 [0.00090]		**0.043** [0.0018]		0.0041 [0.00090]	QN,QH
20PS-MW99-0911	MW02A (field duplicate)	11-Sep-2020	0.013 [0.00090]		0.021 [0.00090]		0.034 [0.0018]		0.0033 [0.00090]	QN,QH
19PS-MW02B-1027	MW02B	27-Oct-2019	ND [0.0077]		ND [0.0077]		ND [0.015]		ND [0.0077]	
19PS-MW99-1027	MW02B (field duplicate)	27-Oct-2019	ND [0.0077]		ND [0.0077]		ND [0.015]		ND [0.0077]	
20PS-MW02B-0911	MW02B	11-Sep-2020	0.0021 [0.00089]		0.0022 [0.00089]		0.0043 [0.0018]		0.00064 [0.00089]	J
20PS-MW02C-0521	MW02C	21-May-2020	ND [0.00087]		ND [0.00087]		ND [0.0017]		ND [0.00087]	
20PS-MW99-0521	MW02C (field duplicate)	21-May-2020	ND [0.00088]		ND [0.00088]		ND [0.0018]		ND [0.00088]	
20PS-MW02D-0524	MW02D	24-May-2020	ND [0.00087]		ND [0.00087]		ND [0.0017]		ND [0.00087]	
20PS-MW99-0524	MW02D (field duplicate)	24-May-2020	ND [0.00088]		ND [0.00088]		ND [0.0018]		ND [0.00088]	
New Wells										
20PS-MW01-0924	MW01	24-Sep-2020	0.023 [0.00087]		0.034 [0.00087]		**0.057** [0.0017]		0.0074 [0.00087]	QN
20PS-MW88-0924	MW01 (field duplicate)	24-Sep-2020	0.023 [0.00088]		**0.035** [0.00088]		**0.058** [0.0018]		0.0074 [0.00088]	QN
20PS-MW02-1029	MW02	29-Oct-2020	0.0035 [0.00097]		0.0061 [0.00097]		0.0096 [0.0019]		0.00069 [0.00097]	J,QN
20PS-MW03-0924	MW03	24-Sep-2020	0.0020 [0.00088]		0.0066 [0.00088]		0.0086 [0.0018]		0.00092 [0.00088]	J,QN
20PS-MW04-1031	MW04	31-Oct-2020	0.0015 [0.00096]	J	0.00050 [0.00096]	J,B	0.0020 [0.0019]	J,B	ND [0.00096]	
20PS-MW99-1031	MW04 (field duplicate)	31-Oct-2020	0.0016 [0.00092]	J	0.00066 [0.00092]	J,B	0.0023 [0.0018]	J,B	0.00049 [0.00092]	J,QN
20PS-MW05-1030	MW05	30-Oct-2020	0.0094 [0.00094]	QN	**0.049** [0.00094]	QN,B	**0.058** [0.0019]	QN,B	0.0020 [0.00094]	QH
20PS-MW99-1030	MW05 (field duplicate)	30-Oct-2020	0.0069 [0.00099]	QN	0.033 [0.00099]	QN,B	**0.040** [0.0020]	QN,B	0.0017 [0.00099]	QH,QN
20PS-MW06-1029	MW06	29-Oct-2020	0.028 [0.00087]		**0.055** [0.00087]		**0.083** [0.0017]		0.0046 [0.00087]	
20PS-MW99-1029	MW06 (field duplicate)	29-Oct-2020	0.026 [0.00096]		**0.055** [0.00096]		**0.081** [0.0019]		0.0041 [0.00096]	
20PS-MW07-0921	MW07	21-Sep-2020	0.019 [0.00087]		**0.036** [0.00087]		**0.055** [0.0017]		0.0049 [0.00087]	
20PS-MW90-0921	MW07 (field duplicate)	21-Sep-2020	0.019 [0.00089]		**0.036** [0.00089]		**0.055** [0.0018]		0.0048 [0.00089]	
20PS-MW08-0921	MW08	21-Sep-2020	0.010 [0.00086]		**0.068** [0.00086]		**0.078** [0.0017]		0.0030 [0.00086]	QN,QH
20PS-MW09-0921	MW09	21-Sep-2020	0.0075 [0.00087]		0.020 [0.00087]		0.028 [0.0017]		0.0045 [0.00087]	
20PS-MW10-0921	MW10	21-Sep-2020	ND [0.00085]		ND [0.00085]		ND [0.0017]		0.0021 [0.00085]	
20PS-MW11-0923	MW11	23-Sep-2020	0.0027 [0.00082]		0.0051 [0.00082]		0.0078 [0.0016]		0.0016 [0.00082]	
20PS-MW12-0923	MW12	23-Sep-2020	0.0053 [0.00087]		0.015 [0.00087]	J	0.020 [0.0017]	J	0.0043 [0.00087]	

Table 6-3: Summary of Analytical Results for Groundwater - New Monitoring Wells

Field Sample ID	Well ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		Screening Levels	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
New Wells (continued)										
20PS-MW89-0923	MW12 (field duplicate)	23-Sep-2020	0.0053 [0.00087]		0.015 [0.00087]	J	0.020 [0.0017]	J	0.0045 [0.00087]	
20PS-MW13-0925	MW13	25-Sep-2020	0.018 [0.00088]		**0.038** [0.00088]		**0.056** [0.0018]		0.0043 [0.00088]	
20PS-MW14-0923	MW14	23-Sep-2020	0.015 [0.00087]		0.013 [0.00087]		0.028 [0.0017]		0.0033 [0.00087]	QN,QH
20PS-MW15-0925	MW15	25-Sep-2020	0.015 [0.00087]		**0.045** [0.00087]		**0.060** [0.0017]		0.0035 [0.00087]	QN
20PS-MW17-0925	MW17	25-Sep-2020	0.0028 [0.00088]		0.0087 [0.00088]		0.012 [0.0018]		0.0015 [0.00088]	J
20PS-MW87-0925	MW17 (field duplicate)	25-Sep-2020	0.0028 [0.00087]		0.0093 [0.00087]		0.012 [0.0017]		0.0015 [0.00087]	J
20PS-MW18-0923	MW18	23-Sep-2020	0.0015 [0.00089]	J	0.0035 [0.00089]		0.0050 [0.0018]	J	0.00066 [0.00089]	J,QN
20PS-MW19-0923	MW19	23-Sep-2020	0.0027 [0.00092]		0.0041 [0.00092]		0.0068 [0.0018]		0.0014 [0.00092]	J,QN
20PS-MW20-0923	MW20	23-Sep-2020	0.013 [0.00087]		0.0049 [0.00087]		0.018 [0.0017]		0.0025 [0.00087]	
20PS-MW22-0917	MW22	17-Sep-2020	0.0048 [0.00091]		0.0049 [0.00091]		0.0097 [0.0018]		0.0015 [0.00091]	J,QN
20PS-MW23-0924	MW23	24-Sep-2020	0.0038 [0.00088]		0.011 [0.00088]		0.015 [0.0018]		0.0019 [0.00088]	
20PS-MW24-0917	MW24	17-Sep-2020	0.015 [0.00091]		**0.047** [0.00091]		**0.062** [0.0018]		0.0047 [0.0018]	QN
20PS-MW25-0917	MW25	17-Sep-2020	0.0031 [0.00089]		0.0041 [0.00089]		0.0072 [0.0018]		0.0012 [0.00089]	J,QN
20PS-MW26-0914	MW26	14-Sep-2020	0.013 [0.00091]		**0.040** [0.00091]		**0.053** [0.0018]		0.0038 [0.00091]	QN,QH
20PS-MW27-0914	MW27	14-Sep-2020	0.024 [0.00092]		**0.065** [0.00092]		**0.089** [0.0018]		0.0043 [0.00092]	QN,QH
20PS-MW28-0914	MW28	14-Sep-2020	0.016 [0.00090]		**0.046** [0.00090]		**0.062** [0.0018]		0.0032 [0.00090]	QN,QH
20PS-MW29-0913	MW29	13-Sep-2020	0.015 [0.00087]		0.034 [0.00087]		**0.049** [0.0017]		0.0036 [0.00087]	QH
20PS-MW30-0914	MW30	14-Sep-2020	0.010 [0.00091]		0.016 [0.00091]		0.026 [0.0018]		0.0030 [0.00091]	QH
20PS-MW95-0914	MW30 (field duplicate)	14-Sep-2020	0.011 [0.00090]		0.016 [0.00090]		0.027 [0.0018]		0.0028 [0.00090]	
20PS-MW31-0917	MW31	17-Sep-2020	0.0023 [0.00091]		0.0049 [0.00091]		0.0072 [0.0018]		0.00092 [0.00091]	J,QN
20PS-MW94-0917	MW31 (field duplicate)	17-Sep-2020	0.0026 [0.00089]		0.0055 [0.00089]		0.0081 [0.0018]		0.0010 [0.00089]	J,QN
20PS-MW32-0917	MW32	17-Sep-2020	0.0033 [0.00091]		0.0067 [0.00091]		0.010 [0.0018]		0.0012 [0.00091]	J
20PS-MW33-0917	MW33	17-Sep-2020	0.0089 [0.00092]	J	0.0064 [0.00092]		0.015 [0.0018]		0.0022 [0.00092]	

Notes:

Results shown in bold and highlighted red exceed EPA lifetime Health Advisory (HA) level.

Results shown in bold and highlighted blue are between ½ HA and the HA.

Results are reported with the limit of detection (LOD) in brackets [ ].

Permanent monitoring wells are shown on Figure 6-1.

Screening levels are based on the following:

1. EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the health advisory Level (0.070 µg/L).
2. EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater.

Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
ND = nondetectable
PFBS = perfluorobutane sulfonate
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 6-4: Summary of Analytical Results for Surface Water

Field Sample ID	Location ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		EPA SLs	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Crescent Lake Surface Water										
20PS-CS-01-0912	CS01	12-Sep-2020	0.0032 [0.00081]		0.0063 [0.00081]		0.0095 [0.0016]		0.0011 [0.00081]	J
20PS-MW97-0912	CS01 (field duplicate)	12-Sep-2020	0.0030 [0.00081]		0.0061 [0.00081]		0.0091 [0.0016]		0.0010 [0.00081]	J,QN
20PS-CS-02-0912	CS02	12-Sep-2020	0.012 [0.00080]		0.016 [0.00080]		0.028 [0.0016]		0.0030 [0.00080]	QN
20PS-CS-03-0912	CS03	19-Sep-2020	0.0032 [0.00081]		0.0062 [0.00081]		0.0094 [0.0016]		0.00096 [0.00081]	J
20PS-MW91-0919	CS03 (field duplicate)	19-Sep-2020	0.0030 [0.00080]		0.0060 [0.00080]		0.0090 [0.0016]		0.00087 [0.00080]	J,QN
Bathing Beauty Lake Surface Water										
20PS-BB01-SW-1	BB01	9-Jun-2020	0.0038 [0.00083]		0.017 [0.00083]	J	0.021 [0.0017]		0.0024 [0.00083]	
20PS-BB02-SW-1	BB02	9-Jun-2020	0.0038 [0.00081]		0.022 [0.00081]		0.026 [0.0016]		0.0025 [0.00081]	
20PS-BB02-SW-5	BB02	9-Jun-2020	0.0035 [0.00092]		0.019 [0.00092]		0.023 [0.0018]		0.0024 [0.00092]	
Bear Lake Surface Water										
20PS-BR01-SW-1	BR01	6-Jun-2020	0.016 [0.0010]	QL	**0.044** [0.0010]	QL	**0.060** [0.0020]	QL	0.0068 [0.0010]	QL,QN
20PS-BR02-SW-1	BR02	6-Jun-2020	0.017 [0.00088]	QL	**0.046** [0.00088]	QL	**0.063** [0.0018]	QL	0.0071 [0.00088]	QL,QN
20PS-BR99-SW-0606	BR02 (field duplicate)	6-Jun-2020	0.017 [0.00089]	QL	**0.042** [0.00089]	QL	**0.059** [0.0018]	QL	0.0069 [0.00089]	QL
20PS-BR02-SW-5	BR02	6-Jun-2020	0.017 [0.00086]	QL	**0.053** [0.00086]	QL	**0.070** [0.0017]	QL	0.0073 [0.00086]	QL
French Creek Surface Water										
20PS-FC01-SW-1	FC01	4-Jun-2020	0.0022 [0.00085]	QL	0.011 [0.00085]	QL	0.013 [0.0017]	QL	0.00063 [0.00085]	J,QL,QN
20PS-FC02-SW-1	FC02	4-Jun-2020	ND [0.00098]	QL,H	0.015 [0.00098]	QL,H	0.015 [0.00098]	QL,H	0.0087 [0.00098]	J,QL,H
20PS-FC99-SW-0604	FC02 (field duplicate)	4-Jun-2020	0.0058 [0.00090]	QL,H	0.019 [0.00090]	QL,H	0.025 [0.0018]	QL,H	0.0011 [0.00090]	QL,H
20PS-FC03-SW-1	FC03	4-Jun-2020	0.0028 [0.00081]	QL	0.018 [0.00081]	QL	0.021 [0.0016]	QL	0.00095 [0.00081]	J,QL,QN
Grayling Lake Surface Water										
20PS-GL01-SW-1	GL01	10-Jun-2020	ND [0.00091]		ND [0.00091]		ND [0.0018]		ND [0.00091]	
20PS-GL02-SW-1	GL02	10-Jun-2020	ND [0.00087]		ND [0.00087]		ND [0.0017]		ND [0.00087]	
20PS-GL99-SW-0610	GL02-SW-1(field duplicate)	10-Jun-2020	ND [0.00092]		ND [0.00092]		ND [0.0018]		ND [0.00092]	
20PS-GL02-SW-5	GL02	10-Jun-2020	ND [0.00091]		ND [0.00091]		ND [0.0018]		ND [0.00091]	
Hidden Lake Surface Water										
20PS-HL01-SW-1	HL01	9-Jun-2020	0.00051 [0.00088]	J	0.00089 [0.00088]	J	0.0014 [0.0018]	J	ND [0.00088]	
20PS-HL02-SW-1	HL02	9-Jun-2020	0.00055 [0.00088]	J	0.00097 [0.00088]	J	0.0015 [0.0018]	J	ND [0.00088]	
20PS-HL02-SW-5	HL02	9-Jun-2020	0.00056 [0.00089]	J	0.00099 [0.00089]	J	0.0016 [0.0018]	J	ND [0.00089]	
Moose Creek Surface Water										
20PS-MC01-SW-1	MC01	6-Jun-2020	0.029 [0.00085]		**0.065** [0.00085]		**0.094** [0.0017]		0.0055 [0.00085]	
20PS-MC02-SW-1	MC02	6-Jun-2020	0.0019 [0.00084]		0.011 [0.00084]		0.013 [0.0017]		0.00058 [0.00084]	J,QN
Moose Creek Landing Surface Water										
20PS-MLP01-SW-1	MLP01	6-Jun-2020	0.019 [0.00091]		**0.041** [0.00091]		**0.060** [0.0018]		0.0035 [0.00091]	
20PS-MLP01-SW-5	MLP01	6-Jun-2020	0.019 [0.00094]		**0.040** [0.00094]		**0.059** [0.0019]		0.0036 [0.00094]	
20PS-MLP02-SW-1	MLP02	6-Jun-2020	0.020 [0.00084]		**0.040** [0.00084]		**0.060** [0.0017]		0.0035 [0.00084]	
20PS-MLP02-SW-5	MLP02	6-Jun-2020	0.020 [0.00090]		**0.044** [0.00090]		**0.064** [0.0019]		0.0036 [0.00090]	
Moose Lake Surface Water										
20PS-ML01-SW-1	ML01	3-Jun-2020	0.022 [0.00095]	QL,B	**0.15** [0.00095]	QL	**0.17** [0.0019]	QL,B	0.0095 [0.00095]	QN,QL,B
20PS-ML02-SW-1	ML02	3-Jun-2020	0.022 [0.00095]	QL,B	**0.12** [0.00095]	QL,B	**0.14** [0.0019]	QL,B	0.0092 [0.00095]	QN,QL,B
20PS-ML02-SW-5	ML02	3-Jun-2020	0.023 [0.00093]	QL,B	**0.13** [0.00093]	QL,B	**0.15** [0.0018]	QL,B	0.0096 [0.00093]	QN,QL,B

Table 6-4: Summary of Analytical Results for Surface Water

Field Sample ID	Location ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		EPA SLs	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Mullins Pit Surface Water										
20PS-MP01-SW-1	MP01	3-Jun-2020	0.00047 [0.00093]	J,QL,B	0.00066 [0.00093]	J,QL,B	0.00066 [0.0018]	J,QL,B	ND [0.00093]	QL
20PS-MP99-SW-0603	MP01 (field duplicate)	3-Jun-2020	0.00048 [0.00092]	J,QL,B	0.00062 [0.00092]	J,QL,B	0.0011 [0.0018]	J,QL,B	ND [0.00092]	QL
20PS-MP02-SW-2	ML02	3-Jun-2020	ND [0.00092]	QL	0.00055 [0.00092]	J,QL,B	0.00055 [0.0018]	J,QL,B	ND [0.00092]	QL
Piledriver Slough Surface Water										
20PS-PS01-SW-1	PS01	9-Jun-2020	0.029 [0.00091]		**0.076** [0.00091]		**0.11** [0.0018]		0.0054 [0.00091]	
20PS-PS99-SW-0609	PS01 (field duplicate)	9-Jun-2020	0.030 [0.00089]		**0.072** [0.00089]		**0.10** [0.0018]		0.0055 [0.00089]	
20PS-PS02-SW-1	PL02	8-Jun-2020	0.00066 [0.00085]	J	0.0020 [0.00085]		0.0027 [0.0017]	J	ND [0.00085]	
20PS-PS03-SW-1	PL03	8-Jun-2020	ND [0.00083]		0.00052 [0.00083]	J	0.00052 [0.0017]	J	ND [0.00083]	
20PS-PS99-SW-0608	PS03 (field duplicate)	8-Jun-2020	ND [0.00084]		0.00078 [0.00084]	J	0.00078 [0.0017]	J	ND [0.00084]	
Scout Lake Surface Water										
20PS-SC01-SW-1	SC01	10-Jun-2020	ND [0.00089]		ND [0.00089]		ND [0.0019]		ND [0.00089]	
20PS-SC02-SW-1	SC02	10-Jun-2020	ND [0.00088]		ND [0.00088]		ND [0.0019]		ND [0.00088]	
20PS-SC02-SW-4	SC02	10-Jun-2020	ND [0.00084]		ND [0.00084]		ND [0.0017]		ND [0.00084]	
Shoe Lake Surface Water										
20PS-SH01-SW-1	SH01	7-Jun-2020	ND [0.00080]		ND [0.00080]		ND [0.0016]		ND [0.00080]	
20PS-SH02-SW-1	SH02	7-Jun-2020	ND [0.00078]		ND [0.00078]		ND [0.0016]		ND [0.00078]	
20PS-SH02-SW-4	SH02	7-Jun-2020	ND [0.00079]		0.00041 [0.00079]	J	0.00041 [0.0016]	J	ND [0.00079]	
Spruce Lake Surface Water										
20PS-SP01-SW-1	SP01	3-Jun-2020	0.025 [0.00097]	QL,B	**0.31** [0.00097]	QL	**0.34** [0.0019]	QL	0.0073 [0.00097]	QN,QL,B
20PS-SP01-SW-5	SP01	3-Jun-2020	0.025 [0.00092]	QL,B	**0.33** [0.00092]	QL	**0.36** [0.0018]	QL	0.0073 [0.00092]	QN,QL,B
20PS-SP02-SW-1	SP02	3-Jun-2020	0.026 [0.00097]	QL,B	**0.50** [0.00097]	QL	**0.53** [0.0019]	QL	0.0070 [0.00097]	QN,QL,B
Tar Kettle Lake Surface Water										
20PS-TK01-SW-1	TK01	7-Jun-2020	ND [0.00081]		ND [0.00081]		ND [0.0016]		ND [0.00081]	
20PS-TK99-SW-0607	TK01 (field duplicate)	7-Jun-2020	ND [0.00079]		ND [0.00079]		ND [0.0016]		ND [0.00079]	
20PS-TK02-SW-1	TK02	7-Jun-2020	ND [0.00099]		ND [0.00099]		ND [0.0020]		ND [0.00099]	
20PS-TK02-SW-5	TK02	7-Jun-2020	ND [0.00099]		ND [0.00099]		ND [0.0020]		ND [0.00099]	
Z Pit Surface Water										
20PS-ZP01-SW-1	ZP01	6-Jun-2020	0.0021 [0.00095]		0.0036 [0.00095]		0.0057 [0.0019]		0.00050 [0.00095]	J
20PS-ZP99-SW-0606	ZP01 (field duplicate)	6-Jun-2020	0.0021 [0.00090]		0.0036 [0.00090]		0.0057 [0.0018]		0.00066 [0.00090]	J,QN
20PS-ZP01-SW-3	ZP01	6-Jun-2020	0.0021 [0.00085]		0.0038 [0.00085]		0.0059 [0.0017]		0.00070 [0.00085]	

Notes:

Results shown in bold and highlighted red exceed EPA lifetime Health Advisory (HA) level.

Results shown in bold and highlighted blue are between ½ HA and the HA.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the health advisory Level (0.070 µg/L).

2. EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC - Alaska Department of Environmental Conservation
EPA = U.S. Environmental Protection Agency
HH = Human Health
ND = nondetectable
PFBS = perfluorobutane sulfonate
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SLs = Screening Levels
Q = qualifier
µg/L = microgram(s) per liter

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 6-5: Summary of Analytical Results for Sediment

Field Sample ID	Location ID	Sample Depth (feet)	Sample Collection Date	PFOA Results (mg/kg)	Q	PFOS Results (mg/kg)	Q	PFBS Results (mg/kg)	Q
			Screening Levels	0.126 mg/kg [1]		0.126 mg/kg [1]		1.9 mg/kg [1]	
Bathing Beauty Lake Sediment Samples									
20PS-BB02-SD-0	BB02	0	9-Jun-2020	ND [0.00042]		ND [0.00042]		ND [0.0017]	
Bear Lake Sediment Samples									
20PS-BR02-SD-0	BR02	0	6-Jun-2020	ND [0.00049]	QL	0.0015 [0.00049]	QL,QN	ND [0.0020]	QL
20PS-BR99-SD-0606	BR02 (field duplicate)	0	6-Jun-2020	ND [0.00088]	QL	0.0034 [0.00088]	QL,QN	ND [0.0035]	QL
French Creek Sediment Samples									
20PS-FC01-SD-0	FC01	0	4-Jun-2020	ND [0.00089]	QL	0.0013 [0.00089]	QL	ND [0.0036]	QL
20PS-FC02-SD-0	FC02	0	4-Jun-2020	ND [0.00065]	QL	0.0014 [0.00065]	QL	ND [0.0026]	QL
20PS-FC03-SD-0	FC03	0	4-Jun-2020	ND [0.00081]	QL	0.0011 [0.00081]	QL,J	ND [0.0032]	QL
Grayling Lake Sediment Samples									
20PS-GL02-SD-0	GL02	0	10-Jun-2020	ND [0.00049]		ND [0.00049]		ND [0.0020]	
20PS-GL99-SD-0610	GL02 (field duplicate)	0	10-Jun-2020	ND [0.00046]		ND [0.00046]		ND [0.0019]	
Hidden Lake Sediment Samples									
20PS-HL02-SD-0	HL02	0	9-Jun-2020	ND [0.00048]		ND [0.00048]		ND [0.0019]	
Moose Creek Sediment Samples									
20PS-MC01-SD-0	MC01	0	6-Jun-2020	ND [0.00076]	QL	0.0055 [0.00076]	QL	ND [0.0030]	QL
20PS-MC99-SD-0606	MC01 (field duplicate)	0	6-Jun-2020	ND [0.00071]	QL	0.0043 [0.00071]	QL	ND [0.0028]	QL
20PS-MC02-SD-0	MC02	0	6-Jun-2020	ND [0.00076]	QL	0.00042 [0.00076]	QL,J	ND [0.0030]	QL
Moose Creek Landing Sediment Samples									
20PS-MLP01-SD-0	MLP01	0	6-Jun-2020	0.00032 [0.00050]	QL,J	0.0036 [0.00050]	QL	ND [0.0020]	QL
20PS-MLP02-SD-0	MLP02	0	6-Jun-2020	ND [0.00061]	QL	0.0018 [0.00061]	QL	ND [0.0025]	QL
Moose Lake Sediment Samples									
20PS-ML02-SD-0	ML02	0	4-Jun-2020	ND [0.00065]	QL	0.0033 [0.00065]	QL	ND [0.0026]	QL
Mullins Pit Sediment Samples									
20PS-MP01-SD-0	MP01	0	4-Jun-2020	ND [0.00067]	QL	ND [0.00067]	QL	ND [0.0027]	QL
20PS-MP02-SD-0	MP02	0	4-Jun-2020	ND [0.00048]	QL	ND [0.00048]	QL	ND [0.0019]	QL
20PS-MP99-SD-0604	MP02 (field duplicate)	0	4-Jun-2020	ND [0.00047]	QL	ND [0.00047]	QL	ND [0.0019]	QL

Table 6-5: Summary of Analytical Results for Sediment

Field Sample ID	Location ID	Sample Depth (feet)	Sample Collection Date	PFOA Results (mg/kg)	Q	PFOS Results (mg/kg)	Q	PFBS Results (mg/kg)	Q
			Screening Levels	0.126 mg/kg [1]		0.126 mg/kg [1]		1.9 mg/kg [1]	
Piledriver Slough Sediment Samples									
20PS-PS01-SD-0	PS01	0	9-Jun-2020	ND [0.00056]		ND [0.00056]		ND [0.0022]	
20PS-PS99-SD-0609	PS01 (field duplicate)	0	9-Jun-2020	ND [0.00080]		0.0039 [0.00080]		ND [0.0032]	
20PS-PS02-SD-0	PS02	0	8-Jun-2020	ND [0.0026]		ND [0.0026]		ND [0.010]	
20PS-PS03-SD-0	PS03	0	8-Jun-2020	ND [0.00051]		ND [0.00051]		ND [0.0020]	
20PS-PS99-SD-0608	PS03 (field duplicate)	0	8-Jun-2020	ND [0.00056]		ND [0.00056]		ND [0.0022]	
Scout Lake Sediment Samples									
20PS-SC02-SD-0	SC02	0	10-Jun-2020	ND [0.00039]		ND [0.00039]		ND [0.0016]	
Shoe Lake Sediment Samples									
20PS-SH02-SD-0	SH02	0	7-Jun-2020	ND [0.00055]	QL	0.00036 [0.00055]	QL, J	ND [0.0022]	QL
20PS-SH99-SD-0607	SH02 (field duplicate)	0	7-Jun-2020	ND [0.00054]	QL	ND [0.00054]	QL	ND [0.0022]	QL
Tar Kettle Lake Sediment Samples									
20PS-TK02-SD-0	TK02	0	7-Jun-2020	ND [0.00053]	QL	ND [0.00053]	QL	ND [0.0021]	QL

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry Number

EPA = U.S. Environmental Protection Agency

mg/kg = milligrams per kilogram

ND = nondetectable

PFBS = perfluorobutane sulfonate

PFOA = perfluorooctanoic acid

PFOS = perfluorooctane sulfonate

Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 6-6: Summary of Analytical Results for Soil - Fire Station #1

Field Sample ID	Location ID	Sample Depth (feet)	Sample Collection Date	PFOA Results (mg/kg)	Q	PFOS Results (mg/kg)	Q	PFBS Results (mg/kg)	Q
			Screening Levels	0.126 mg/kg [1]		0.126 mg/kg [1]		1.9 mg/kg [1]	
Former Fire Station 1 Soil Boring Samples									
19PS-FST1-SB02-1	SB02	1	21-Oct-2019	0.0099 [0.00044]		**1.9** [0.044]		ND [0.0018]	
19PS-FST1-SB02-7	SB02	7	21-Oct-2019	0.081 [0.0049]		**0.66** [0.0049]		0.0032 [0.0020]	
19PS-FST1-SB03-1	SB03	1	21-Oct-2019	0.0034 [0.00041]		**0.93** [0.0041]		ND [0.0016]	
19PS-FST1-SB03-6	SB03	6	21-Oct-2019	0.039 [0.00049]		**0.57** [0.0049]		0.00059 [0.002]	J
19PS-FST1-SB04-1	SB04	1	21-Oct-2019	0.0012 [0.00045]		**1.8** [0.045]		ND [0.0018]	
19PS-FST1-SB04-8	SB04	8	21-Oct-2019	0.10 [0.00050]		**0.98** [0.0050]		0.00081 [0.0020]	J
19PS-FST1-SB05-1	SB05	1	21-Oct-2019	0.0099 [0.00043]		**1.8** [0.043]		ND [0.0017]	
19PS-FST1-SB99-1021	SB05-1 (field duplicate)	1	21-Oct-2019	0.015 [0.00044]		**1.9** [0.044]		ND [0.0018]	
19PS-FST1-SB05-8	SB05	8	21-Oct-2019	0.065 [0.0041]	QH	**0.84** [0.0041]		0.0035 [0.0016]	
19PS-FST1-SB06-1	SB06	1	21-Oct-2019	0.0029 [0.00042]		**0.53** [0.0042]		ND [0.0017]	
19PS-FST1-SB06-7	SB06	7	21-Oct-2019	0.061 [0.00042]		**1.3** [0.042]	QL,H	0.00044 [0.0017]	J
19PS-FST1-SB07-1	SB07	1	21-Oct-2019	0.0029 [0.00046]		**0.43** [0.0046]		ND [0.0018]	
19PS-FST1-SB07-8	SB07	8	21-Oct-2019	0.084 [0.00049]		**0.67** [0.0049]		0.0032 [0.0020]	
20PS-FST1-SB08-1	SB08	1	3-Jun-2020	ND [0.00039]		0.0077 [0.00039]	B	ND [0.0015]	
20PS-FST1-SB08-7.5	SB08	7.5	3-Jun-2020	0.0023 [0.00055]		**0.17** [0.0055]		ND [0.0022]	
20PS-FST1-SB09-1	SB09	1	3-Jun-2020	0.0029 [0.00040]		**0.28** [0.0040]		ND [0.0016]	
20PS-FST1-SB09-7.5	SB09	7.5	3-Jun-2020	0.018 [0.00041]		0.11 [0.0041]	B,QN	0.00045 [0.0016]	J
20PS-FST1-SB99-0603	SB09-7.5 (field duplicate)	7.5	3-Jun-2020	0.012 [0.00044]		**0.20** [0.0044]	QN	0.00058 [0.0018]	J
20PS-FST1-SB10-1	SB10	1	3-Jun-2020	0.0089 [0.00046]		**0.51** [0.0046]		ND [0.0018]	
20PS-FST1-SB10-6	SB10	6	3-Jun-2020	0.0076 [0.00039]		0.050 [0.00039]	B	ND [0.0016]	
20PS-FST1-SB11-1	SB11	1	3-Jun-2020	0.0053 [0.00043]		**0.76** [0.043]		ND [0.0017]	
20PS-FST1-SB11-6	SB11	6	3-Jun-2020	0.11 [0.0043]		**0.27** [0.043]		0.0026 [0.0017]	
20PS-FST1-SB12-1	SB12	1	3-Jun-2020	0.0026 [0.00041]		0.099 [0.0041]	B	ND [0.0016]	
20PS-FST1-SB12-8	SB12	8	3-Jun-2020	0.0077 [0.00038]		**1.7** [0.038]		0.00049 [0.0015]	J
20PS-FST1-SB13-1	SB13	1	3-Jun-2020	0.0034 [0.00042]		**8.9** [0.042]	QH	ND [0.0017]	
20PS-FST1-SB13-7.5	SB13	7.5	3-Jun-2020	**2.0** [0.040]		**2.3** [0.040]		0.0091 [0.0016]	
20PS-FST1-SB14-1	SB14	1	3-Jun-2020	0.0029 [0.00041]		**0.19** [0.0041]		ND [0.0016]	
20PS-FST1-SB14-8	SB14	8	3-Jun-2020	**0.30** [0.0040]		**0.87** [0.0040]		0.0091 [0.0016]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:
1. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry Number

EPA = U.S. Environmental Protection Agency

mg/kg = milligrams per kilogram

ND = nondetectable

PFBS = perfluorobutane sulfonate

PFOA = perfluorooctanoic acid

PFOS = perfluorooctane sulfonate

Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 6-7: Summary Analytical Results for Soil - FFTAs

Field Sample ID	Location ID	Sample Depth (feet)	Sample Collection Date	PFOA Results (mg/kg)	Q	PFOS Results (mg/kg)	Q	PFBS Results (mg/kg)	Q
			Screening Levels	0.126 mg/kg [1]		0.126 mg/kg [1]		1.9 mg/kg [2]	
Former Fire Training Area Soil Boring Samples									
19PS-FFTA-ENT-SB04-1	SB04	1	27-Oct-2019	ND [0.00043]		0.0040 [0.00043]	QN	ND [0.0017]	
19PS-FFTA-SB99-1027	SB04-1 (field duplicate)	1	27-Oct-2019	0.00025 [0.00041]	J	0.027 [0.00041]	QN	ND [0.0017]	
19PS-FFTA-ENT-SB04-6.5	SB04	6.5	27-Oct-2019	**0.13** [0.0044]	QN	0.097 [0.0044]	QH, QN	ND [0.0018]	
19PS-FFTA-ENT-SB05-1	SB05	1	17-Oct-2019	0.0024 [0.00043]	B	**0.33** [0.0043]	QN	ND [0.0017]	
19PS-FFTA-SB99-1017	SB05-1 (field duplicate)	1	17-Oct-2019	0.0029 [0.00046]	B	**0.15** [0.0046]	QN	ND [0.0018]	
19PS-FFTA-ENT-SB05-7.5	SB05	7.5	17-Oct-2019	**0.15** [0.048]	QN	0.0012 [0.00048]	B	0.00098 [0.0019]	J,QH,QN
19PS-FFTA-ENT-SB06-1	SB06	1	17-Oct-2019	ND [0.00041]		0.0022 [0.00041]	B	ND [0.0017]	
19PS-FFTA-ENT-SB06-7	SB06	7	17-Oct-2019	0.022 [0.00051]		**1.3** [0.051]		0.00074 [0.0020]	J
19PS-FFTA-ENT-SB07-1	SB07	1	17-Oct-2019	0.0011 [0.00040]	B	0.057 [0.00040]		ND [0.0016]	
19PS-FFTA-ENT-SB07-7	SB07	7	17-Oct-2019	0.0018 [0.00045]	B	**0.73** [0.0045]		ND [0.0018]	
19PS-FFTA-ENT-SB08-1	SB08	1	17-Oct-2019	0.00025 [0.00046]	J, B	0.012 [0.00046]	B	ND [0.0018]	
19PS-FFTA-ENT-SB08-8.5	SB08	8.5	17-Oct-2019	0.0019 [0.00040]	B	**0.53** [0.040]		ND [0.0016]	
19PS-FFTA-ENT-SB09-1	SB09	1	17-Oct-2019	ND [0.00046]	QL	0.0035 [0.00046]	B, QL	ND [0.0018]	QL
19PS-FFTA-ENT-SB09-6	SB09	6	17-Oct-2019	0.0070 [0.00041]		**3.4** [0.041]	QH	ND [0.0016]	
19PS-FFTA-ENT-SB10-1	SB10	1	17-Oct-2019	0.012 [0.00043]		**2.4** [0.043]	QN,QH	ND [0.0017]	
19PS-FFTA-SB98-1017	SB10-1 (field duplicate)	1	17-Oct-2019	0.015 [0.00053]		**1.4** [0.053]	QN	ND [0.0021]	
19PS-FFTA-ENT-SB10-7	SB10	7	17-Oct-2019	0.0083 [0.00044]	QL	**0.50** [0.0044]	QL	ND [0.0018]	QL
20PS-FFTA-ENT-SB11-1	SB11	1	30-May-2020	**0.15** [0.0048]	QL,QN	**9.1** [0.048]	QL,QN	0.011 [0.0019]	QL,QN
20PS-FFTA-SB99-0530	SB11-1 (field duplicate)	1	30-May-2020	0.040 [0.00047]	QN	**16** [0.047]	QN	0.0062 [0.0019]	QN
20PS-FFTA-ENT-SB11-7.5	SB11	7.5	30-May-2020	0.0029 [0.00049]		0.0014 [0.00049]		0.029 [0.0020]	
20PS-FFTA-ENT-SB12-1	SB12	1	30-May-2020	0.024 [0.00050]	QL	**6.4** [0.050]		0.0020 [0.0020]	J
20PS-FFTA-ENT-SB12-7	SB12	7	30-May-2020	0.0093 [0.00038]		0.0040 [0.00038]		0.0037 [0.0015]	
20PS-FFTA-ENT-SB13-1	SB13	1	30-May-2020	0.00058 [0.00047]	J	0.0025 [0.00047]		ND [0.0019]	
20PS-FFTA-ENT-SB13-6.5	SB13	6.5	30-May-2020	**0.15** [0.0048]		0.0011 [0.00048]		0.00069 [0.0019]	J
20PS-FFTA-ENT-SB14-1	SB14	1	30-May-2020	0.00033 [0.00043]	J	0.061 [0.00043]		ND [0.0017]	
20PS-FFTA-ENT-SB14-7.5	SB14	7.5	30-May-2020	0.028 [0.00053]		0.028 [0.00053]		ND [0.0021]	
20PS-FFTA-ENT-SB15-1	SB15	1	30-May-2020	0.00059 [0.00040]	J	0.014 [0.00040]		ND [0.0016]	
20PS-FFTA-ENT-SB15-7	SB15	7	30-May-2020	0.0025 [0.00046]		**2.3** [0.046]		ND [0.0019]	
20PS-FFTA-ENT-SB16-1	SB16	1	30-May-2020	0.010 [0.00040]		0.014 [0.00040]		ND [0.0016]	
20PS-FFTA-ENT-SB16-7	SB16	7	30-May-2020	0.019 [0.00048]		**15** [0.048]		ND [0.0019]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry Number

EPA = U.S. Environmental Protection Agency

mg/kg = milligrams per kilogram

ND = nondetectable

PFBS = perfluorobutane sulfonate

PFOA = perfluorooctanoic acid

PFOS = perfluorooctane sulfonate

Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 7-1: Analytical Exceedances for Groundwater Samples in Existing Monitoring Wells

Field Sample ID	Well ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		Screening Levels	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Existing Wells										
19PS-AP-6078-0530	AP-6078	30-May-2019	**0.038** [0.0012]		**0.15** [0.0012]		**0.19** [0.0024]		0.017 [0.0011]	QL
19PS-MW99-0530	AP-6078 (field duplicate)	30-May-2019	**0.037** [0.0011]		**0.15** [0.0011]		**0.19** [0.0022]		0.016 [0.0010]	QL
20PS-HCMW02-15-0918	HCMW02-15	18-Sep-2020	0.030 [0.00087]		**0.057** [0.00087]		**0.087** [0.0017]		0.0061 [0.00087]	QN,QH
20PS-HCMW02-75-0918	HCMW02-75	18-Sep-2020	0.025 [0.00087]		**0.12** [0.00087]		**0.15** [0.0017]		0.0047 [0.00087]	QN
20PS-HCMW03-15-0919	HCMW03-15	19-Sep-2020	0.030 [0.00087]		**0.070** [0.00087]		**0.10** [0.0017]		0.011 [0.00087]	QN,QH
19-02MW11-0717	02MW11	17-Jul-2019	0.025 [0.00092]		**0.083** [0.00092]		**0.11** [0.0018]		0.012 [0.00092]	
20PS-MW-2-0924	MW-2	24-Sep-2020	**0.043** [0.00087]		**0.16** [0.00087]		**0.20** [0.0017]		0.018 [0.00087]	
20PS-USAP-1-0912	USAP -1	12-Sep-2020	0.010 [0.00088]		0.027 [0.00088]		**0.037** [0.0018]		0.0052 [0.00088]	QN
20PS-MW98-0912	USAP -1 (field duplicate)	12-Sep-2020	0.011 [0.00087]		0.029 [0.00087]		**0.040** [0.0017]		0.0053 [0.00087]	

Notes:

Results shown in bold and highlighted red exceed EPA lifetime Health Advisory (HA) level.

Results shown in bold and highlighted blue are between ½ HA and the HA.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the health advisory Level (0.070 µg/L).
2. EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater.

Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
ND = nondetectable
PFBS = perfluorobutane sulfonate
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 7-2: Analytical Exceedances for Groundwater Samples - Temporary Monitoring Wells

Field Sample ID	Well ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		Screening Levels	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Temporary Wells										
19PS-TW01-1019	TW01	19-Oct-2019	**0.036** [0.00093]		**0.39** [0.0093]	QL	**0.43** [0.010]	QL	0.015 [0.00093]	
19PS-TW16-1017	TW16	17-Oct-2019	0.018 [0.00095]		**0.054** [0.00095]		**0.072** [0.0019]		0.0029 [0.00095]	
19PS-TW22-1019	TW22	19-Oct-2019	**0.053** [0.00090]		**0.36** [0.0090]	QL	**0.41** [0.0099]	QL	0.017 [0.00090]	
19PS-TW23-1019	TW23	19-Oct-2019	**0.058** [0.0012]	QL,QN	**0.34** [0.012]	QL,QN	**0.40** [0.013]	QL,QN	0.015 [0.0012]	QL,QN
19PS-TW99-1019	TW23 (field duplicate)	19-Oct-2019	**0.045** [0.00093]		**0.25** [0.0093]	QL,QN	**0.30** [0.010]	QL,QN	0.011 [0.00093]	QN
19PS-TW24-1019	TW24	19-Oct-2019	**0.11** [0.0012]		**0.26** [0.012]	QL	**0.37** [0.013]	QL	0.024 [0.0012]	
19PS-TW31-1020	TW31	20-Oct-2019	0.031 [0.00094]		**0.30** [0.0094]	QL	**0.33** [0.01034]	QL	0.013 [0.00094]	
20PS-TW42-0627	TW42	27-Jun-2020	0.030 [0.00091]		**0.21** [0.00091]		**0.24** [0.0018]		0.0068 [0.00091]	
20PS-TW99-0528	TW55 (field duplicate)	28-May-2020	0.020 [0.00099]		**0.051** [0.00099]		**0.071** [0.0020]		0.0039 [0.00099]	

Notes:

Results shown in bold and highlighted red exceed EPA lifetime Health Advisory (HA) level.

Results shown in bold and highlighted blue are between ½ HA and the HA.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the health advisory Level (0.070 µg/L).
2. EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
ND = nondetectable
PFBS = perfluorobutane sulfonate
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 7-3: Analytical Exceedances for Groundwater Samples - New Monitoring Wells

Field Sample ID	Well ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		Screening Levels	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Deep Cluster Wells										
20PS-MW02A-0911	MW02A	11-Sep-2020	0.017 [0.00090]		0.026 [0.00090]		**0.043** [0.0018]		0.0041 [0.00090]	QN,QH
New Wells										
20PS-MW01-0924	MW01	24-Sep-2020	0.023 [0.00087]		0.034 [0.00087]		**0.057** [0.0017]		0.0074 [0.00087]	QN
20PS-MW88-0924	MW01 (field duplicate)	24-Sep-2020	0.023 [0.00088]		**0.035** [0.00088]		**0.058** [0.0018]		0.0074 [0.00088]	QN
20PS-MW05-1030	MW05	30-Oct-2020	0.0094 [0.00094]	QN	**0.049** [0.00094]	QN,B	**0.0584** [0.0019]	QN,B	0.0020 [0.00094]	QH
20PS-MW99-1030	MW05 (field duplicate)	30-Oct-2020	0.0069 [0.00099]	QN	0.033 [0.00099]	QN,B	**0.0399** [0.0020]	QN,B	0.0017 [0.00099]	QH,QN
20PS-MW06-1029	MW06	29-Oct-2020	0.028 [0.00087]		**0.055** [0.00087]		**0.083** [0.0017]		0.0046 [0.00087]	
20PS-MW99-1029	MW06 (field duplicate)	29-Oct-2020	0.026 [0.00096]		**0.055** [0.00096]		**0.081** [0.0019]		0.0041 [0.00096]	
20PS-MW07-0921	MW07	21-Sep-2020	0.019 [0.00087]		**0.036** [0.00087]		**0.055** [0.0017]		0.0049 [0.00087]	
20PS-MW90-0921	MW07 (field duplicate)	21-Sep-2020	0.019 [0.00089]		**0.036** [0.00089]		**0.055** [0.0018]		0.0048 [0.00089]	
20PS-MW08-0921	MW08	21-Sep-2020	0.010 [0.00086]		**0.068** [0.00086]		**0.078** [0.0017]		0.0030 [0.00086]	QN,QH
20PS-MW13-0925	MW13	25-Sep-2020	0.018 [0.00088]		**0.038** [0.00088]		**0.056** [0.0018]		0.0043 [0.00088]	
20PS-MW15-0925	MW15	25-Sep-2020	0.015 [0.00087]		**0.045** [0.00087]		**0.060** [0.0017]		0.0035 [0.00087]	QN
20PS-MW24-0917	MW24	17-Sep-2020	0.015 [0.00091]		**0.047** [0.00091]		**0.062** [0.0018]		0.0047 [0.0018]	QN
20PS-MW26-0914	MW26	14-Sep-2020	0.013 [0.00091]		**0.040** [0.00091]		**0.053** [0.0018]		0.0038 [0.00091]	QN,QH
20PS-MW27-0914	MW27	14-Sep-2020	0.024 [0.00092]		**0.065** [0.00092]		**0.089** [0.0018]		0.0043 [0.00092]	QN,QH
20PS-MW28-0914	MW28	14-Sep-2020	0.016 [0.00090]		**0.046** [0.00090]		**0.062** [0.0018]		0.0032 [0.00090]	QN,QH
20PS-MW29-0913	MW29	13-Sep-2020	0.015 [0.00087]		0.034 [0.00087]		**0.049** [0.0017]		0.0036 [0.00087]	QH

Notes:

Results shown in bold and highlighted red exceed EPA lifetime Health Advisory (HA) level.

Results shown in bold and highlighted blue are between ½ HA and the HA.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the health advisory Level (0.070 µg/L).

2. EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
ND = nondetectable
PFBS = perfluorobutane sulfonate
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 7-4: Analytical Exceedances for Surface Water Samples

Field Sample ID	Well ID	Sample Collection Date	PFOA Results (µg/L)	Q	PFOS Results (µg/L)	Q	Aggregate PFOA/PFOS Results (µg/L)	Q	PFBS Results (µg/L)	Q
		Screening Levels	0.070 µg/L [1]		0.070 µg/L [1]		0.070 µg/L [1]		0.60 µg/L [2]	
Bear Lake Surface Water										
20PS-BR01-SW-1	BR01	6-Jun-2020	0.016 [0.0010]	QL	**0.044** [0.0010]	QL	**0.060** [0.0020]	QL	0.0068 [0.0010]	QL,QN
20PS-BR02-SW-1	BR02	6-Jun-2020	0.017 [0.00088]	QL	**0.046** [0.00088]	QL	**0.063** [0.0018]	QL	0.0071 [0.00088]	QL,QN
20PS-BR99-SW-0606	BR02 (field duplicate)	6-Jun-2020	0.017 [0.00089]	QL	**0.042** [0.00089]	QL	**0.059** [0.0018]	QL	0.0069 [0.00089]	QL
20PS-BR02-SW-5	BR02	6-Jun-2020	0.017 [0.00086]	QL	**0.053** [0.00086]	QL	**0.070** [0.0017]	QL	0.0073 [0.00086]	QL
Moose Creek Surface Water										
20PS-MC01-SW-1	MC01	6-Jun-2020	0.029 [0.00085]		**0.065** [0.00085]		**0.094** [0.0017]		0.0055 [0.00085]	
20PS-MC02-SW-1	MC02	6-Jun-2020	0.0019 [0.00084]		0.011 [0.00084]		0.0129 [0.0017]		0.00058 [0.00084]	J,QN
Moose Creek Landing Surface Water										
20PS-MLP01-SW-1	MLP01	6-Jun-2020	0.019 [0.00091]		**0.041** [0.00091]		**0.060** [0.0018]		0.0035 [0.00091]	
20PS-MLP01-SW-5	MLP01	6-Jun-2020	0.019 [0.00094]		**0.040** [0.00094]		**0.059** [0.0019]		0.0036 [0.00094]	
20PS-MLP02-SW-1	MLP02	6-Jun-2020	0.020 [0.00084]		**0.040** [0.00084]		**0.060** [0.0017]		0.0035 [0.00084]	
20PS-MLP02-SW-5	MLP02	6-Jun-2020	0.020 [0.00090]		**0.044** [0.00090]		**0.064** [0.0019]		0.0036 [0.00090]	
Moose Lake Surface Water										
20PS-ML01-SW-1	ML01	3-Jun-2020	0.022 [0.00095]	QL,B	**0.15** [0.00095]	QL	**0.17** [0.0019]	QL,B	0.0095 [0.00095]	QN,QL,B
20PS-ML02-SW-1	ML02	3-Jun-2020	0.022 [0.00095]	QL,B	**0.12** [0.00095]	QL,B	**0.14** [0.0019]	QL,B	0.0092 [0.00095]	QN,QL,B
20PS-ML02-SW-5	ML02	3-Jun-2020	0.023 [0.00093]	QL,B	**0.13** [0.00093]	QL,B	**0.15** [0.0018]	QL,B	0.0096 [0.00093]	QN,QL,B
Piledriver Slough Surface Water										
20PS-PS01-SW-1	PS01	9-Jun-2020	0.029 [0.00091]		**0.076** [0.00091]		**0.11** [0.0018]		0.0054 [0.00091]	
20PS-PS99-SW-0609	PS01 (field duplicate)	9-Jun-2020	0.030 [0.00089]		**0.072** [0.00089]		**0.10** [0.0018]		0.0055 [0.00089]	
Spruce Lake Surface Water										
20PS-SP01-SW-1	SP01	3-Jun-2020	0.025 [0.00097]	QL,B	**0.31** [0.00097]	QL	**0.34** [0.0019]	QL	0.0073 [0.00097]	QN,QL,B
20PS-SP01-SW-5	SP01	3-Jun-2020	0.025 [0.00092]	QL,B	**0.33** [0.00092]	QL	**0.36** [0.0018]	QL	0.0073 [0.00092]	QN,QL,B
20PS-SP02-SW-1	SP02	3-Jun-2020	0.026 [0.00097]	QL,B	**0.50** [0.00097]	QL	**0.53** [0.0019]	QL	0.0070 [0.00097]	QN,QL,B

Notes:

Results shown in bold and highlighted red exceed EPA lifetime Health Advisory (HA) level.

Results shown in bold and highlighted blue are between ½ HA and the HA.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the health advisory Level (0.070 µg/L).

2. EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
ND = nondetectable
PFBS = perfluorobutane sulfonate
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 7-5: Analytical Exceedances for Soil Samples - Fire Station #1

Field Sample ID	Location ID	Sample Depth (feet)	Sample Collection Date	PFOA Results (mg/kg)	Q	PFOS Results (mg/kg)	Q	PFBS Results (mg/kg)	Q
			Screening Levels	0.126 mg/kg [1]		0.126 mg/kg [1]		1.9 mg/kg [1]	
Former Fire Station 1 Soil Boring Samples									
19PS-FST1-SB02-1	SB02	1	21-Oct-2019	0.0099 [0.00044]		**1.9** [0.044]		ND [0.0018]	
19PS-FST1-SB04-1	SB04	1	21-Oct-2019	0.0012 [0.00045]		**1.8** [0.045]		ND [0.0018]	
19PS-FST1-SB05-1	SB05	1	21-Oct-2019	0.0099 [0.00043]	QN	**1.8** [0.043]	QN	ND [0.0017]	
19PS-FST1-SB99-1021	SB05-1 (field duplicate)	1	21-Oct-2019	0.0015 [0.00044]		**1.9** [0.044]		ND [0.0018]	
19PS-FST1-SB06-7	SB06	7	21-Oct-2019	0.061 [0.00042]		**1.3** [0.042]	QL,H	0.00044 [0.0017]	J
20PS-FST1-SB12-8	SB12	8	3-Jun-2020	0.0077 [0.00038]		**1.7** [0.038]		0.00049 [0.0015]	J
20PS-FST1-SB13-1	SB13	1	3-Jun-2020	0.0034 [0.00042]		**8.9** [0.042]		ND [0.0017]	
20PS-FST1-SB13-7.5	SB13	7.5	3-Jun-2020	**2.0** [0.040]		**2.3** [0.040]		0.0091 [0.0016]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry Number

EPA = U.S. Environmental Protection Agency

mg/kg = milligrams per kilogram

ND = nondetectable

PFBS = perfluorobutane sulfonate

PFOA = perfluorooctanoic acid

PFOS = perfluorooctane sulfonate

Q = qualifier

RSL = Regional Screening levels

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table 7-6: Analytical Exceedances for Soil Samples - FFTA

Field Sample ID	Location ID	Sample Depth (feet)	Sample Collection Date	PFOA Results (mg/kg)	Q	PFOS Results (mg/kg)	Q	PFBS Results (mg/kg)	Q
			Screening Levels	0.126 mg/kg [1]		0.126 mg/kg [1]		1.9 mg/kg [2]	
Former Fire Training Area Soil Boring Samples									
19PS-FFTA-ENT-SB06-7	SB06	7	17-Oct-2019	0.022 [0.00051]		**1.3** [0.051]		0.00074 [0.0020]	J
19PS-FFTA-ENT-SB09-6	SB09	6	17-Oct-2019	0.0070 [0.00041]		**3.4** [0.041]		ND [0.0016]	
19PS-FFTA-ENT-SB10-1	SB10	1	17-Oct-2019	0.012 [0.00043]		**2.4** [0.043]	QN	ND [0.0017]	
19PS-FFTA-SB98-1017	SB10-1 (field duplicate)	1	17-Oct-2019	0.015 [0.00053]		**1.4** [0.053]	QN	ND [0.0021]	
20PS-FFTA-ENT-SB11-1	SB11	1	30-May-2020	0.15 [0.0048]	QL,QN	**9.1** [0.048]	QL,QN	0.011 [0.0019]	QL,QN
20PS-FFTA-SB99-0530	SB11-1 (field duplicate)	1	30-May-2020	0.040 [0.00047]	QN	**16** [0.047]	QN	0.0062 [0.0019]	QN
20PS-FFTA-ENT-SB12-1	SB12	1	30-May-2020	0.024 [0.00050]	QL	**6.4** [0.050]		0.0020 [0.0020]	J
20PS-FFTA-ENT-SB15-7	SB15	7	30-May-2020	0.0025 [0.00046]		**2.3** [0.046]		ND [0.0019]	
20PS-FFTA-ENT-SB16-7	SB16	7	30-May-2020	0.019 [0.00048]		**15** [0.048]		ND [0.0019]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results are reported with the limit of detection (LOD) in brackets [ ].

Screening levels are based on the following:

1. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry Number

EPA = U.S. Environmental Protection Agency

mg/kg = milligrams per kilogram

ND = nondetectable

PFBS = perfluorobutane sulfonate

PFOA = perfluorooctanoic acid

PFOS = perfluorooctane sulfonate

Q = qualifier

RSL = Regional Screening levels

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL, QH, QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDICES

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX A – FIELD CHANGE FORMS BY PHASE OF WORK

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Appendix A Table of Contents

Date **Field Change Form (FCF) Title by Phase of Work**

2019a, USAF. *Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection at Eielson Air Force Base and Moose Creek Uniform Federal Policy-Quality Assurance Project Plan Work Plan*. Dated September 2019 (Work Plan; USAF, 2019c).

2019b, USAF. *Existing Monitoring Well Sampling Work Plan Supplemental PFOA and PFOS Site Inspection at Eielson AFB, Alaska*. Dated July 2019 (Existing Monitoring Well Sampling Work Plan Addendum; USAF, 2019b).

2020a, USAF. *Eielson Surface Water and Sediment Sampling Final Addendum to the Work Plan for Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Investigation, Eielson Air Force Base (AFB), Alaska,* dated April 2020 (Surface Water and Sediment Work Plan Addendum; USAF; 2020a).

Phase I - Sampling of Existing Monitoring Wells

Phase I had no FCFs to document technical changes or additions to the Work Plan and Work Plan Addendum.

Phase II - Temporary Monitoring Wells, Clustered Monitoring Wells, and Soil Borings

24 March 2020 **Phase II –** New Standard Operating Procedure for Rotary Wash Method and Investigation Derived Waste Management.

09 April 2020 **Phase II** – Soil boring step-outs at the Former Fire Training Area by the Current Entomology Building and Fire Station #1 Spray Test Area.

Phase III - Step-ins/step-outs for Temporary Monitoring Wells and Soil Borings

02 August 2019 **Phase III –** Temporary monitoring wells and nested monitoring wells based on the Remedial Program Manager meeting scheduled on the 31 July 2019.

22 October 2019 **Phase III –** Relocation of soil boring 19PS-FFTA-ENT-SB04.

28 May 2020 **Phase III** – Access and right of way issues for temporary monitoring well locations TW-42, TW-43, TW-44, TW-45, TW-47, TW-48, and TW-54.

28 May 2020 **Phase III** – Access issues for temporary monitoring well location TW-36.

Phase IV - Installation of Permanent Wells

19 August 2020 **Phase IV** – Permanent monitoring wells based on the Remedial Program Manager meeting scheduled on the 29 July 2020.

24 September 2020 **Phase IV** – Access issues for permanent monitoring well location MW-21, proposed surface water sample to replace groundwater sample.

25 September 2020 **Phase IV** – Access issues for permanent monitoring well location MW04, due to Trans Alaska Pipeline Right of Way.

13 April 2021 **Phase IV** – Additional monitoring wells agreed upon by USAF and stakeholder not included in Field Change Form dated 19 August 2020.

20 April 2021 **Phase IV** - Decommission monitoring wells 20PS-MW26, 20PS-MW28, 20PS-MW31, 20PS-MW32, and 20PS-MW33 in accordance with ADEC's Monitoring Well Guidance.

Phase V - Eielson AFB Surface Water and Sediment Sampling

04 May 2020 **Phase V** – Collocated surface water and sediment sample location PS02 on Piledriver Slough was added to Figure 10. Figure 12 was revised to indicate two co-located surface water and sediment sample locations at Moose Creek Landing Pond and the sample identification was revised to MLP.

Investigation Derived Waste (IDW) Management

16 October 2020 IDW with results below the cleanup levels for PFOS, PFOA, and PFBS was frozen and therefore could not be disposed on the surface at point of origination until spring 2021.

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix A.1 – Phase I - Sampling of Existing Monitoring Wells

(Phase I had no Field Change Forms)

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix A.2 – Phase II - Temporary Monitoring Wells, Clustered Monitoring Wells, and Soil Borings

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Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Eielson PFOA/PFOS SI, Eielson Air Force base, Alaska	Contract No. W911KB-17-D-0018 Task order No. W911KB18F0173	U.S. Army Corps of Engineers, Alaska District
Date prepared 03/09/20	**Two Party or Three Party** Three-Party	**Prepared by** S. Richmond

Title and version of work plan

EXPANDED PERFLUOROOCTANOIC ACID (PFOA) AND PERFLUOROOCTANE SULFONATE (PFOS) SITE INSPECTION
EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA
UNIFORM FEDERAL POLICY-QUALITY ASSURANCE PROJECT PLAN
WORK PLAN

Version: Final

Reason for action

1. When installing the 110 ft below ground surface (bgs) monitoring well at Deep Well Cluster #2, the field crew experienced difficulty drilling the hole and retrieving augers due to lithology. Installation of monitoring wells to 160 and 210 feet bgs at Well Clusters #1 and #2 may not be achievable using the agreed upon hollow stem auger method.

2. Changes to the agreed upon method for management of investigation derived waste (IDW) were discussed at the 3-4 March 2020 RPM meeting. IDW handling changes are captured in this FCF.

Existing plan or procedure

The approved UFP-QAPP states:
1. Monitoring wells at Deep Well Clusters #1 and #2 will be installed using a hollow stem auger.
2. IDW water from monitoring wells on Eielson AFB will remain staged on-Base at the point of generation, pending PFOA/PFOS sampling results from each well.
3. IDW water from monitoring wells not located on Eielson AFB will be containerized and transferred to Containment Cell #1 at LF003, pending PFOA/PFOS analytical results from each well sampled.
4. IDW soil may be moved to LF003 at the owner's request pending analytical results.

Proposed changes

1. To achieve depths of 160 ft bgs and 210 ft bgs at Deep Well Clusters #1 and #2, rotary wash drilling is proposed. A new SOP for Rotary Wash Method was prepared to summarize the drilling method - see SOP No. 01-RW for details of rotary wash method (attached). The Rotary Wash SOP is to be used with the SOPs included in Appendix D of the Final Expanded SI QAPP Work Plan.

2. Sundance-EA expects to generate approximately 10,000 gallons of water IDW during installation, development, and sampling of deep wells. Analytical results from deep well samples will not be used to characterize IDW. Instead, containerized water IDW will be sampled and sample results will be used to determine the appropriate disposal method.

3. IDW water will not be transported to the IDW holding cell at LF003 pending analytical results. Instead, IDW will remain containerized at the point of generation until analytical results of sampled IDW are received. NOTE: The UFP-QAPP states that IDW may be discharged to the ground surface at the point of generation if PFOA/PFOS results are less than ADEC Table C groundwater cleanup levels of 0.4 ug/L each. Sundance-EA may choose to use granular activated carbon (GAC) to treat IDW water before sampling. This approach is consistent with the Expanded SI Work Plan. Treated IDW water will be sampled before determining if surface discharge is an acceptable disposal option.

4. Soil IDW will not be moved to the IDW holding cell at LF003 pending analytical results. Soil IDW will remain staged at the point of generation until the method of disposal has been agreed upon and ADEC signs Approval to Transport.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☑ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

Project Manager: Mark Wilkinson Digitally signed by Mark Wilkinson Date: 2020.03.09 16:07:27 -08'00' **Date:** 03/09/20

External Review

Installation Remedial Project Manager: Date:

BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2020.03.19 15:04:27 -08'00'

ADEC Remedial Project Manager: Date:

Digitally signed by Dennis Shepard Date: 2020.03.25 08:09:47 -08'00'

EPA Remedial Project Manager: Date:

Digitally signed by DUSTAN BOTT Date: 2020.03.24 17:27:35 -07'00'

SUNDANCE-EA II, LLC
711 H Street, Suite 330, Anchorage, AK 99501
Office: (907) 334-3909 Fax: (907) 334-3932

Standard Operating Procedure No. 01-RW for Rotary Wash Drilling

INTRODUCTION:

This Standard Operating Procedure (SOP) established the protocol for rotary wash drilling methodology to perform subsurface characterization.

MATERIALS:

The following materials may be required: drill rig, inner steel casing, outer steel casing, tri-cone, logbook, personal protective equipment, source of approved PFAS-free water, Phosphate-free laboratory-grade detergent (e.g., Liquinox®, Alconox®, etc.), steam cleaner/sprayer combined with water obtained from approved source for decontaminating drilling equipment; poly tanks and steel drums for investigative-derived material, decontamination pad

PROCEDURE:

ROTARY WASH DRILLING

1. The subcontracted driller, GeoTek Alaska (GTA), will use the drill rig percussion hammer or a 340-lbs Auto-hammer to advance the steel drill casing (4.5-inch outer diameter (O.D.) by 3.75-inch inner diameter (I.D.)) allowing soils to enter the casing while advancing to refusal. It is estimated that the initial advancement of the drill casing will be able to achieve eighty feet (ft) below ground surface (bgs).

2. After the drill casing has been advanced to refusal, the soils inside the drill casing will be cleaned out using the rotary wash technique as described below:

    a. Inserting a tri-cone drill bit attached to the drill rod (2.625-inch O.D. by 1.0-inch I.D.), the drill rod tool string will be lowered until the drill bit reaches the soils inside the drill casing. The drill rod will be advanced from the top of the soils inside the casing to approximately 5 ft below the bottom of the drill casing, to facilitate casing advancement by reducing the side wall friction. This is accomplished by rotating the drill rod (rotary) while clean, certified PFAS-free water is injected at the top of the drill rod through a side port swivel, down through the inside of the drill rod, and out the bottom of the drill bit where it mixes with the drill cuttings and formation groundwater. The injected water is used as a transport fluid to remove (wash) the drill cuttings out of the drill casing. This is called the rotary wash drilling method.

    b. As the drill rod is rotated and lowered, the transport fluid moves the drill cuttings from inside the drill casing and up through the annulus between the drill casing and drill rod. The material is transported to the top of the drill casing and discharged at the surface through a diverter into a mud pan.

    c. A mud pan collects drill cuttings and transport fluid at the surface. The mud pan allows

soils to drop out of suspension in the transport fluid to the bottom of the pan. As soils are settling out of suspension, a pump will transfer the transport fluid into clean, 1,500-gallon poly tanks. Once the drill rod has reached approximately 5-ft below the drill casing, the rotation is stopped and PFAS-free water is injected until the transport fluid entering the mud pan is mostly clear of drill cuttings and then the water injection is stopped.

d. Once the water injection is terminated the drill rod is removed from inside the drill casing. A drive cap is placed on the drill casing and the process is repeated. This process is repeated until the drill casing has achieved the proposed total depth of the well.

MONITORNG WELL CONSTRUCTION

Once total depth is achieved, construction of the monitoring well will begin as described below:

1. Monitoring well casing will be lowered into the drill casing to the desired depth. Monitoring wells will be two inches in diameter, constructed of Schedule 40 polyvinyl chloride (PVC), flush-thread-joint casing with 0.010-inch slotted 10-ft prepacked screen. The screen will be placed in the bottom 10 ft of each well. Additional 10/20 silica sand will be added to approximately 2 feet above the pre-packed screen.

2. The seal will be installed immediately above the sand pack and will be constructed of Pel-Plug® coated bentonite chips. The seal will be placed from the level of the filter pack to 2 ft above the filter sand.

3. After the seal is set, the remainder of the annulus will be filled using a bentonite slurry injected through a tremie pipe. During this process the slurry will displace the water downhole forcing it to the surface where it will be captured and transferred into drums. The slurry injection process will conclude once the slurry is allowed to settle into place and is topped at the surface.

Monitoring well installation and construction will be completed in accordance with the Alaska Department of Environmental Conservation (ADEC) *Monitoring Well Guidance* (ADEC 2013), *Final Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Inspection Quality Assurance Project Plan* (Sundance-EA II, LLC 2019), and subsequent SOPs as noted below.

Reused materials (i.e. steel casing, drill rods) used during downhole advancement will be decontaminated as described in the *Final Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Inspection Quality Assurance Project Plan* (Sundance-EA II, LLC 2019).

INVESTIGATION DERIVED WASTE MANAGEMENT

Water and soil investigation derived waste generated during monitoring well installation will be handled and managed in accordance with the Waste Management Plan of the *Final Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Inspection Quality Assurance Project Plan* (Sundance-EA II, LLC 2019).

Refer to the following SOPs in Appendix D of the Final QAPP for additional procedures:

SOP 005 – Field Decontamination
SOP 019 – Monitoring Well Installation
SOP 042 – Disposal of Investigative-Derived Material

PRECAUTIONS:

Refer to the site-specific Health and Safety Plan for discussion of hazards and preventive measures during well development activities.

REFERENCES:

Alaska Department of Environmental Conservation (ADEC). 2013. *Monitoring Well Guidance*. September.

Sundance-EA II, LLC. 2019. *Final Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Inspection Quality Assurance Project Plan.* October.

Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Eielson PFOA/PFOS SI, Eielson Air Force base, Alaska	Contract No. W911KB-17-D-0018 Task order No. W911KB18F0173	U.S. Army Corps of Engineers, Alaska District
Date prepared 04/09/20	**Two Party or Three Party** Three-Party	**Prepared by** S. Richmond

Title and version of work plan

EXPANDED PERFLUOROOCTANOIC ACID (PFOA) AND PERFLUOROOCTANE SULFONATE (PFOS) SITE INSPECTION
EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA
UNIFORM FEDERAL POLICY-QUALITY ASSURANCE PROJECT PLAN WORK PLAN

Version: Final

Reason for action

To seek agreement on proposed locations for soil boring step-outs at the FFTA by the Current Entomology Building and Fire Station #1 spray test area.

Existing plan or procedure

The approved Final UFP-QAPP states: "If analytical data collected from a soil boring indicate that PFOA/PFOS concentrations meet or exceed the EPA RBSL, then another soil boring (i.e., step-in or step-out, as appropriate) will be installed to better refine contaminant boundaries. The step-in/step-out boring will be positioned approximately 30 feet away from the original boring." Step-out borings are necessary at the FFTA by the Current Entomology Building and at Fire Station #1 to better refine contaminant boundaries.

Proposed change

Some of the analytical results from soil samples collected at the FFTA by the Current Entomology Building and at Fire Station #1 exceed the EPA RBSL, so step-outs are necessary to delineate contaminant boundaries. The proposed step-out locations were discussed during the 29 January 2020 RPM meeting and refined in subsequent emails.

1. Attached Figures 5 and 6 present analytical results of the 2019 surface and subsurface soil sampling at the FFTA near the Current Entomology Building. Figure 7 shows the proposed step-out locations at the FFTA. Proposed step-outs are approximately 30 to 75 feet away from the original borings. Both depths will be sampled.

2. Attached Figures 8 and 9 present analytical results of the 2019 surface and subsurface soil sampling at Fire Station #1. Figure 10 shows the proposed step-out locations at Fire Station #1. Proposed step-outs are approximately 50 to 75 feet away from the original borings. Both depths will be sampled.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☒ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

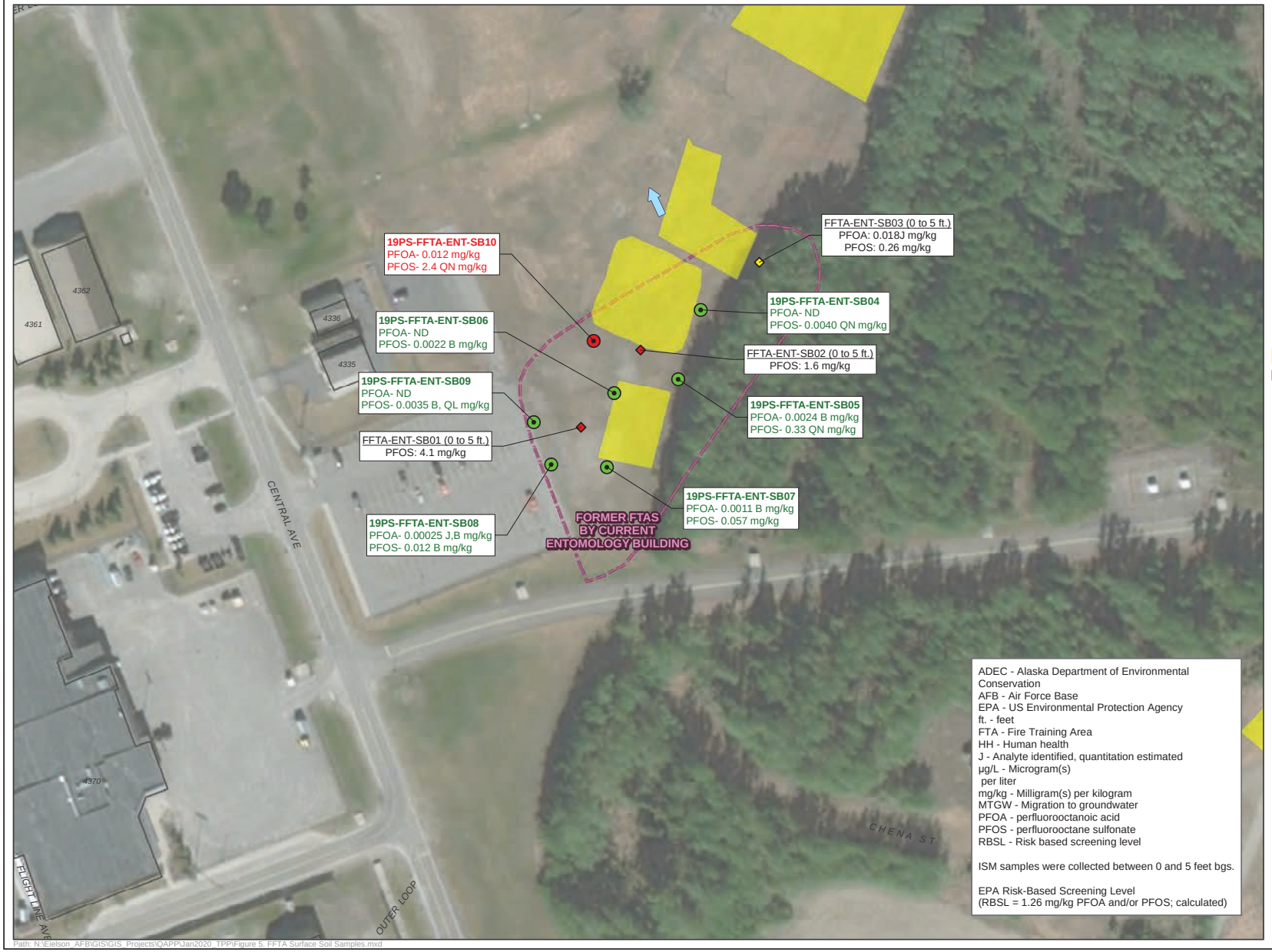
Project Manager: Mark Wilkinson Digitally signed by Mark Wilkinson Date: 2020.04.09 10:54:19 -08'00' **Date:** 04/09/20

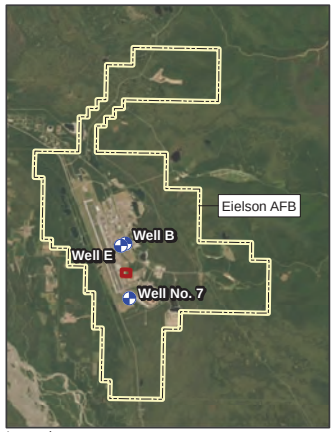
External Review

Installation Remedial Project Manager: BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2020.04.09 11:26:16 -08'00' Date: 04/09/20

ADEC Remedial Project Manager: Digitally signed by Dennis Shepard Date: 2020.04.09 16:12:52 -08'00' Date: 04/09/20

EPA Remedial Project Manager: Digitally signed by DUSTAN BOTT Date: 2020.04.09 17:06:07 -07'00' Date: 04/09/20





Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Existing Soil Stockpiles
- Approximate Groundwater Flow
- Water Supply Well

2019 Soil Boring Locations

- PFOA and/or PFOS < EPA RBSL
- PFOA and/or PFOS > EPA RBSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA - US Environmental Protection Agency
ft. - feet
FTA - Fire Training Area
HH - Human health
J - Analyte identified, quantitation estimated
µg/L - Microgram(s) per liter
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk based screening level

ISM samples were collected between 0 and 5 feet bgs.

EPA Risk-Based Screening Level
(RBSL = 1.26 mg/kg PFOA and/or PFOS; calculated)

0 50 100 200
Feet

1 inch = 100 feet

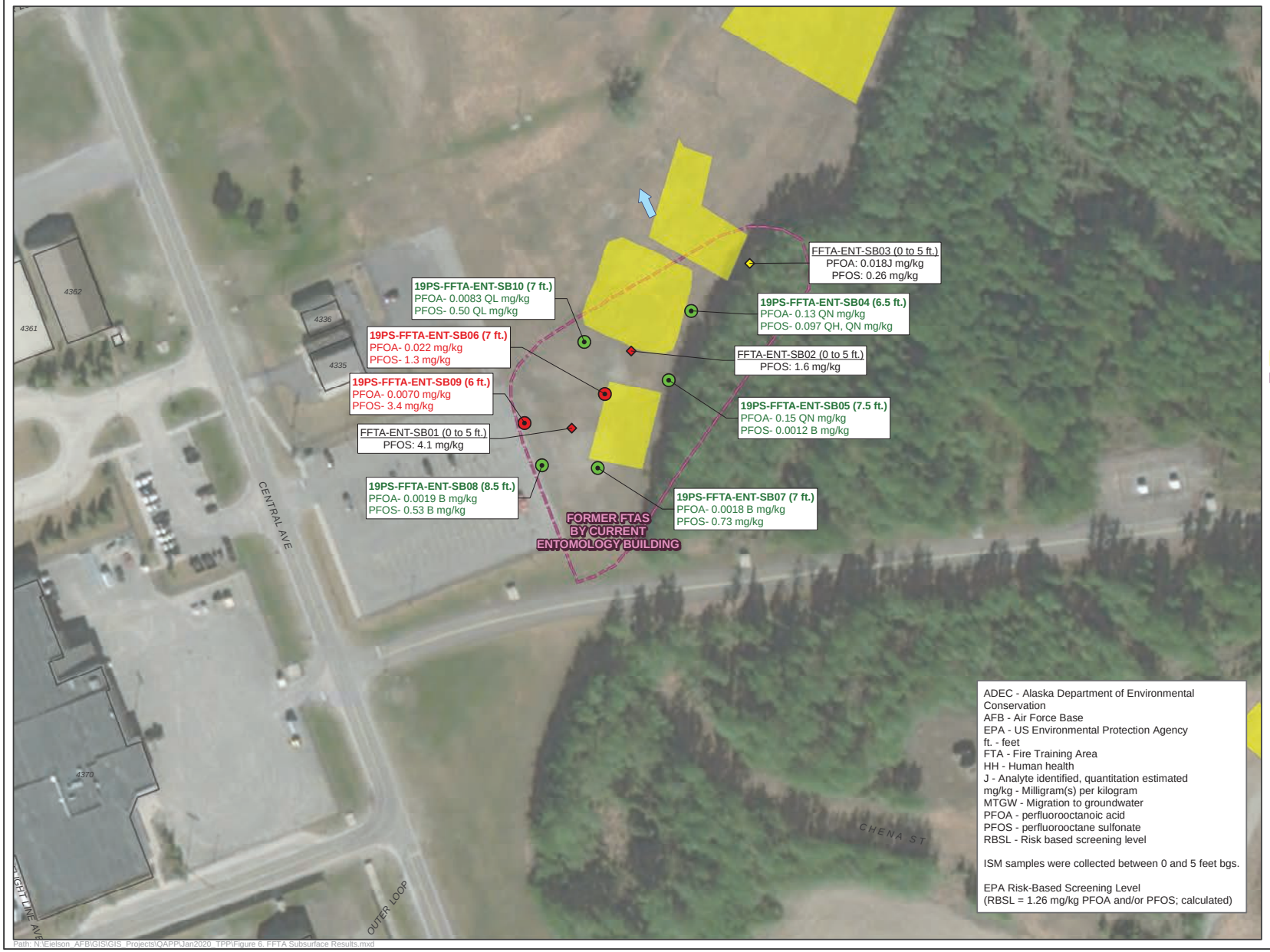
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

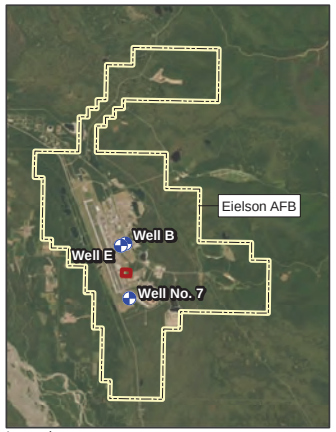
Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Surface Soil Results at the Former Fire Training Area Near the Entomology Building

Figure 5

Path: N:\Eielson_AFB\GIS\GIS_Projects\QAPP\Jan2020_TPP\Figure 5. FFTA Surface Soil Samples.mxd





Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Existing Soil Stockpiles
- Approximate Groundwater Flow
- Water Supply Well

2019 Soil Boring Locations

- PFOA and/or PFOS < EPA RBSL
- PFOA and/or PFOS > EPA RBSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

0 50 100 200
Feet

1 inch = 100 feet

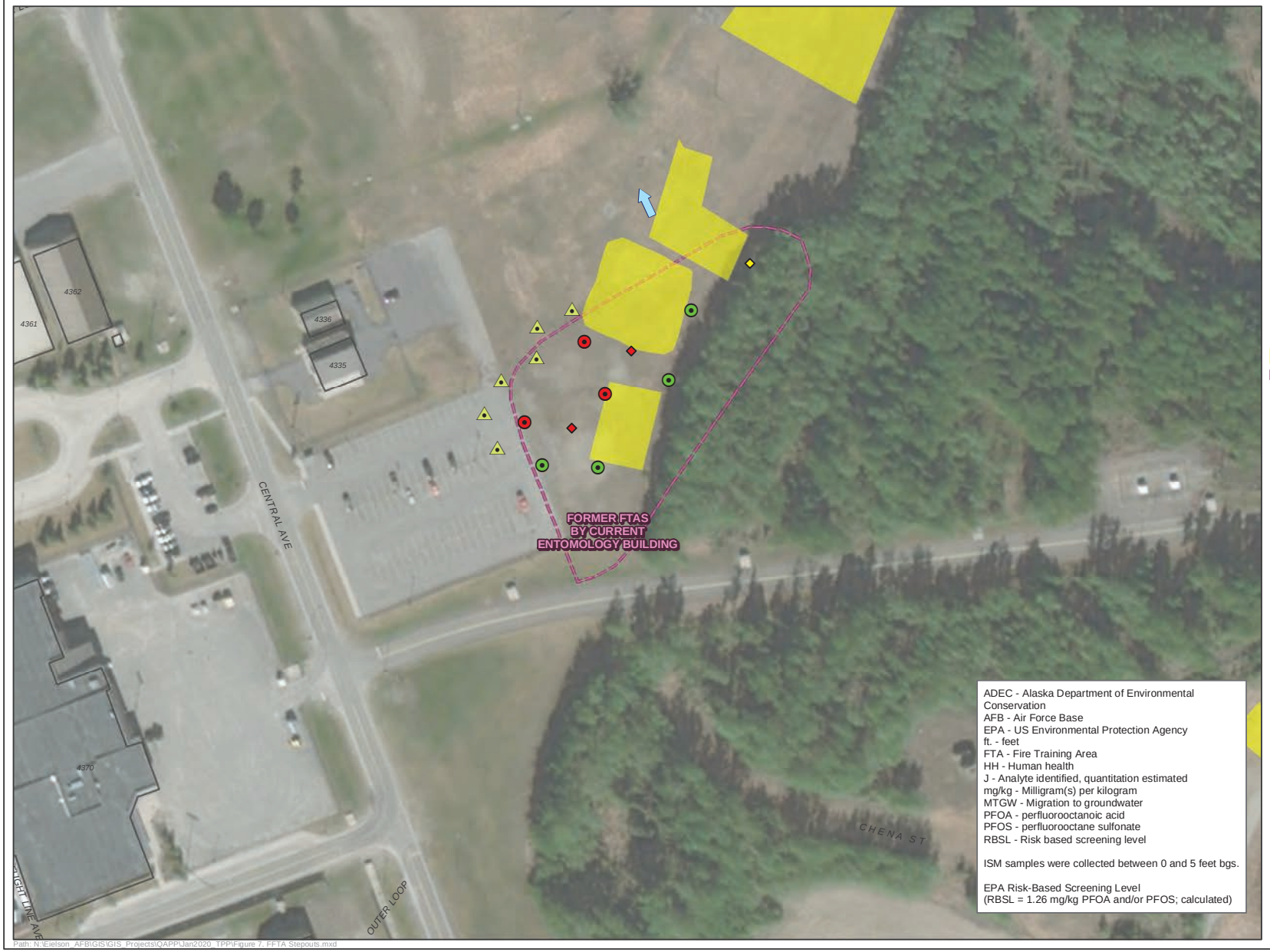
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

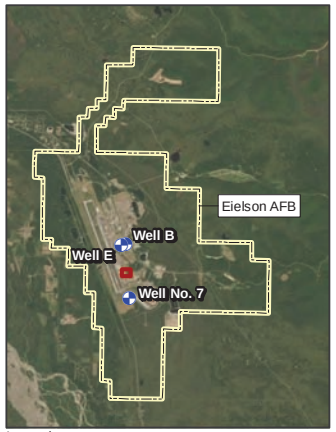
Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Subsurface Soil Results at the Former Fire Training Area Near the Entomology Building

Figure 6

Path: N:\Eielson_AFB\GIS\GIS_Projects\QAPP\Jan2020_TPP\Figure 6. FFTA Subsurface Results.mxd





Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Existing Soil Stockpiles
- Approximate Groundwater Flow
- Proposed Step-out Location
- Water Supply Well

2019 Soil Boring Locations

- PFOA and/or PFOS < EPA RBSL
- PFOA and/or PFOS > EPA RBSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

0 50 100 200
Feet

1 inch = 100 feet

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA - US Environmental Protection Agency
ft. - feet
FTA - Fire Training Area
HH - Human health
J - Analyte identified, quantitation estimated
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk based screening level

ISM samples were collected between 0 and 5 feet bgs.

EPA Risk-Based Screening Level
(RBSL = 1.26 mg/kg PFOA and/or PFOS; calculated)

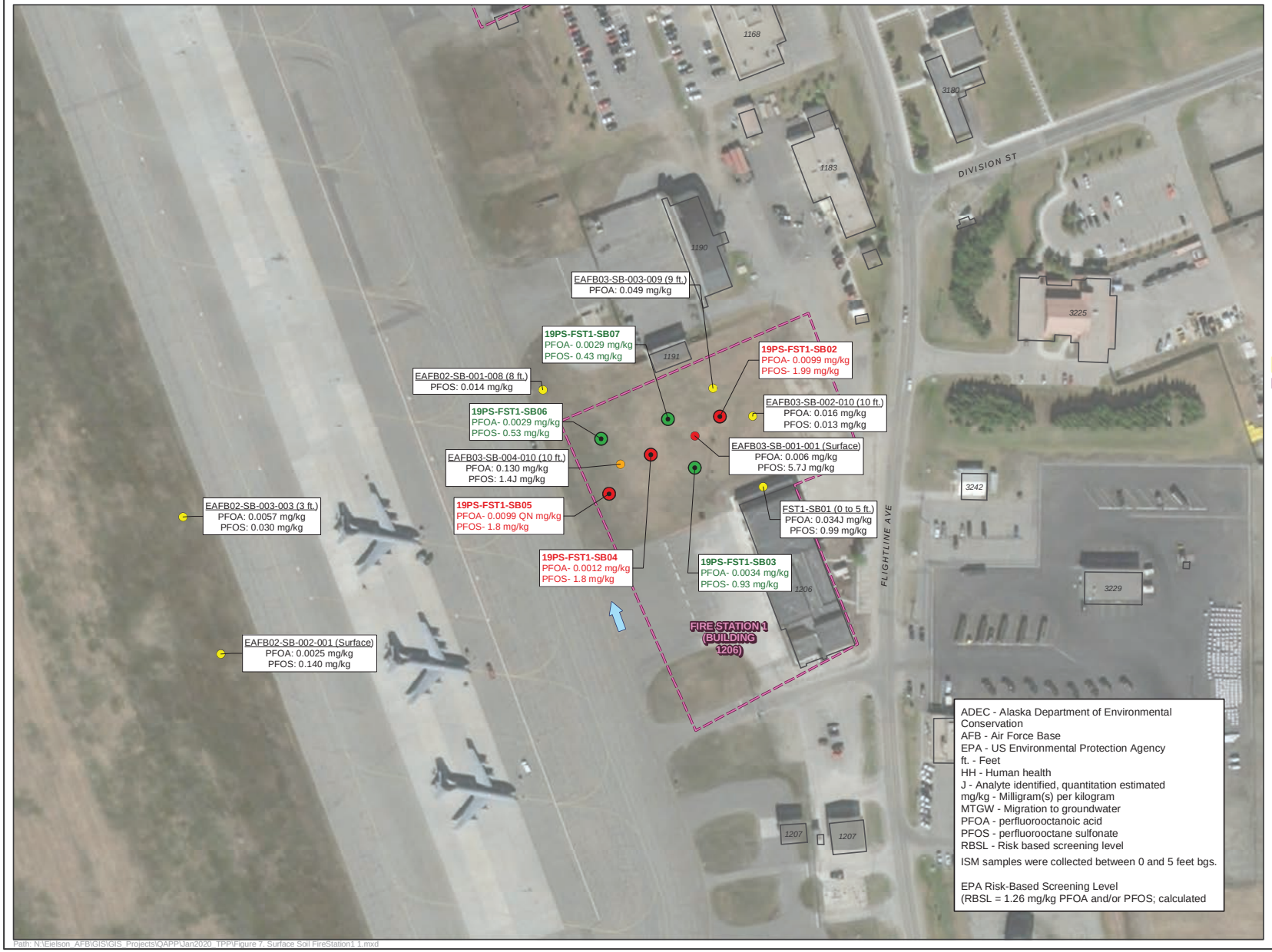
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Proposed Step-outs at the Former Fire Training Area Near the Entomology Building

Figure 7

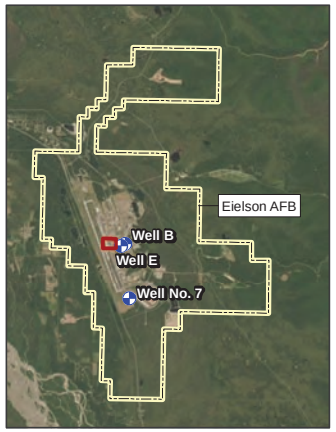
Path: N:\Eielson_AFB\GIS\GIS_Projects\QAPP\Jan2020_TPP\Figure 7. FFTA Stepouts.mxd



ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA - US Environmental Protection Agency
ft. - Feet
HH - Human health
J - Analyte identified, quantitation estimated
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk based screening level

ISM samples were collected between 0 and 5 feet bgs.

EPA Risk-Based Screening Level
(RBSL = 1.26 mg/kg PFOA and/or PFOS; calculated



Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Approximate Groundwater Flow
- Water Supply Well

2019 Soil Boring Locations

- PFOA and/or PFOS < EPA RBSL
- PFOA and/or PFOS > EPA RBSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above EPA RBSL and Below ADEC HH Cleanup Levels (1.26 mg/kg and 1.6 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

0 50 100 200
Feet

1 inch = 150 feet

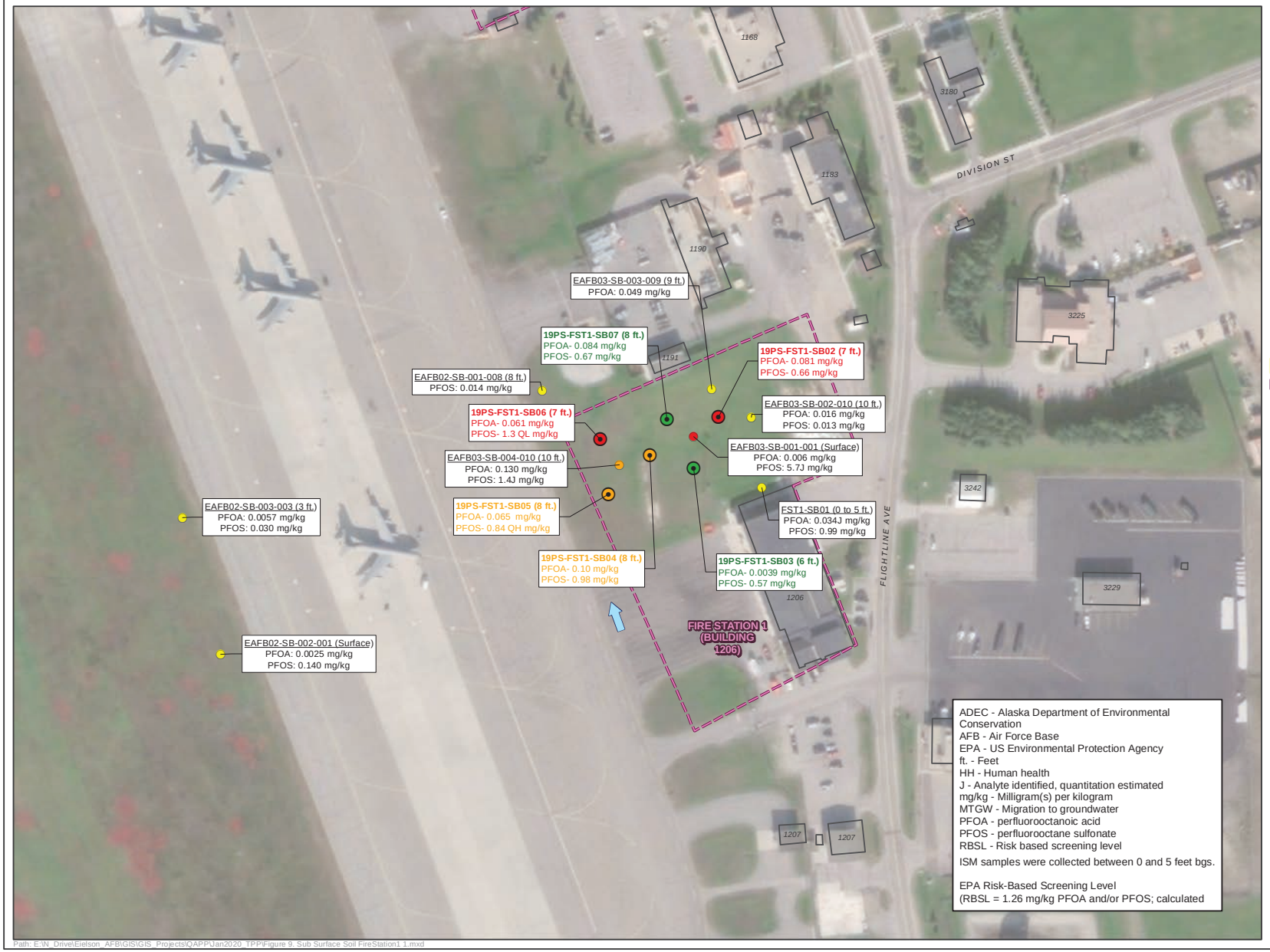
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

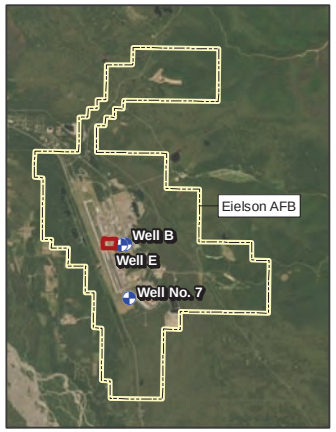
Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Surface Soil Results at
Fire Station #1 (Building 1206)

Figure 8

Path: N:\Eielson_AFB\GIS\GIS_Projects\QAPP\Jan2020_TPP\Figure 7. Surface Soil FireStation1 1.mxd





Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Approximate Groundwater Flow
- Water Supply Well

2019 Soil Boring Locations

- PFOA and/or PFOS < EPA RBSL
- >EPA RBSL and < ADEC HH Cleanup Level
- PFOA and/or PFOS > EPA RBSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above EPA RBSL and Below ADEC HH Cleanup Levels (1.26 mg/kg and 1.6 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

0 50 100 200
Feet

1 inch = 150 feet

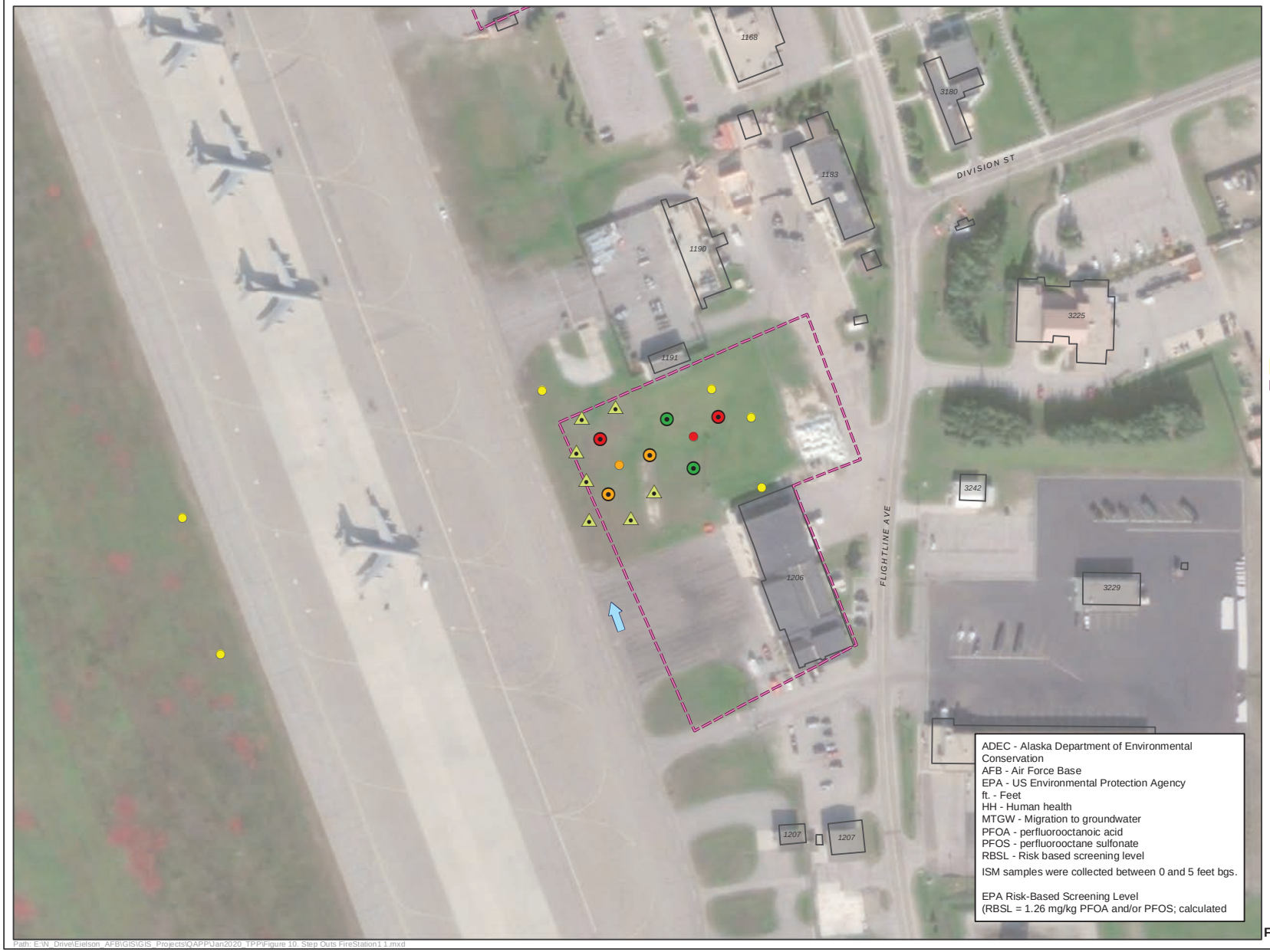
Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

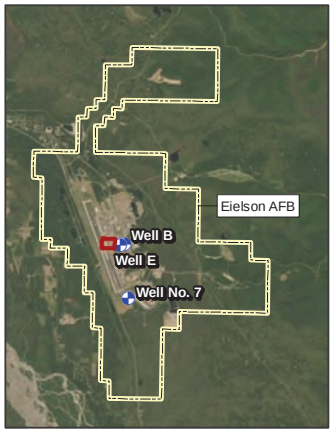
Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Sub-surface Soil Results at Fire Station 1 (Building 1206)

Figure 9

Path: E:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\Jan2020_TPP\Figure 9. Sub Surface Soil FireStation1 1.mxd





Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Approximate Groundwater Flow
- Water Supply Well
- Proposed Step-out Location

2019 Soil Boring Locations

- PFOA and/or PFOS <EPA RBSL
- >EPA RBSL and < ADEC HH Cleanup Level
- PFOA and/or PFOS > EPA RBSL

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above EPA RBSL and Below ADEC HH Cleanup Levels (1.26 mg/kg and 1.6 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

0 50 100 200
Feet

1 inch = 150 feet

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA - US Environmental Protection Agency
ft. - Feet
HH - Human health
MTGW - Migration to groundwater
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk based screening level

ISM samples were collected between 0 and 5 feet bgs.

EPA Risk-Based Screening Level (RBSL = 1.26 mg/kg PFOA and/or PFOS; calculated

Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

Path: E:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\Jan2020_TPP\Figure 10. Step Outs FireStation1 1.mxd

Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Proposed Surface and Subsurface Step-Out Locations
Fire Station 1 (Building 1206)

Figure 10

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix A.3 – Phase III - Step-ins/step-outs for Temporary Monitoring Wells and Soil Borings

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Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Expanded PFOA and PFOS SI at Eielson Air Force Base, Alaska	Contract No. W911KB-17-D-0018, Task Order W911KB17F0173	Sundance-EA
Date prepared	**Two Party or Three Party**	**Prepared by**
07/31/19	Three Party	M. Wilkinson

Title and version of work plan

UFP-QAPP Work Plan for
Expanded PFOA and PFOS Site Inspection at Eielson AFB, Alaska

Reason for action

Locations of temporary wells and nested well clusters were agreed upon at the 31 July 2019 TPP meeting, based on available historical data and recently collected data from sampling of existing monitoring wells in May-July 2019.

Existing plan or procedure

Install and sample temporary wells and 2 nested well clusters on Eielson Air Force Base, in Moose Creek, and/or in the larger vicinity, to laterally and vertically delineate PFOA and PFOS contamination in groundwater. Selection of locations was planned to occur following receipt of existing monitoring well data.

Proposed change

Install and sample 35 temporary wells and 2 nested well clusters in the locations shown on the attached figure.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☐ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☒ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

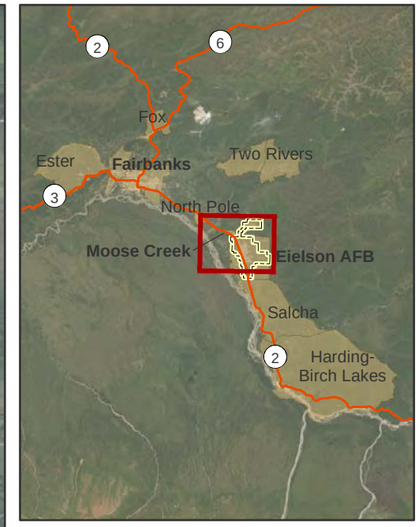
Project Manager: SHARP-DAHL.JULIE.LYNN.12477624 57 Digitally signed by SHARP-DAHL.JULIE.LYNN.1247762457 Date: 2019.08.01 08:40:28 -08'00' **Date:** 08/01/19

External Review

Installation Remedial Project Manager: GALLAGHER.AMANDA.CATHERINE.1501298057 Digitally signed by GALLAGHER.AMANDA.CATHERINE.1501298057 Date: 2019.08.01 13:29:46 -08'00' Date: 08/01/19

ADEC Remedial Project Manager: Digitally signed by M. Dennis Shepard Date: 2019.08.01 15:48:28 -08'00' Date: 08/01/19

EPA Remedial Project Manager: Digitally signed by Dustan Bott Date: 2019.08.02 17:03:56 -07'00' Date: 08/02/19



Legend

- Eielson AFB Installation Boundary
- Moose Creek Private Property
- Roads
- Proposed Temporary Well Locations
- Sampled in Phase I
- Not Sampled in Phase I
- Proposed Well Cluster by Sundance-EA
- Sampled North Pole Drinking Water Well
- Regional Groundwater Flow

AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate

0 0.5 1 2
Miles

1 in = 1 miles

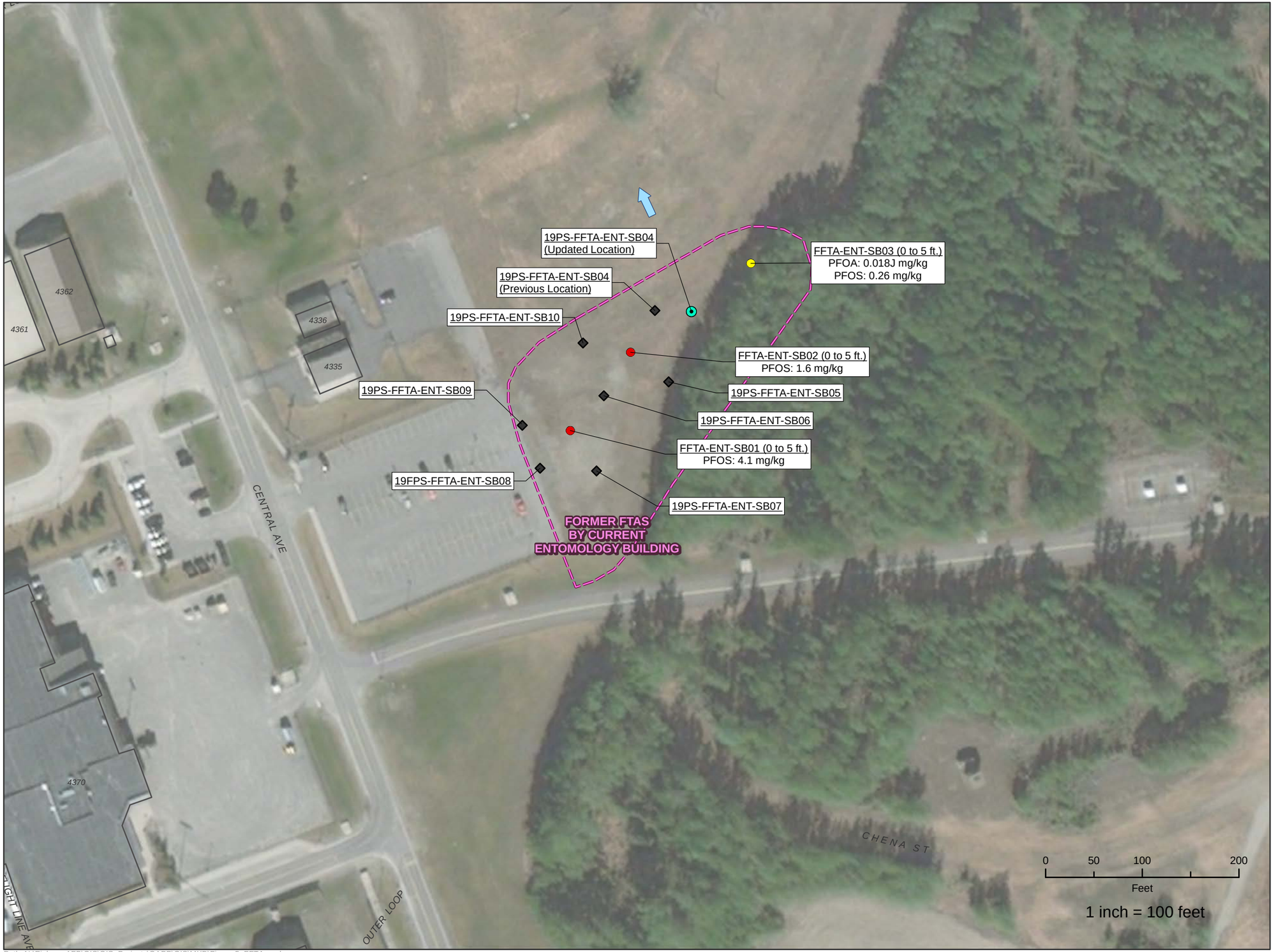
Imagery: Esri, 2015

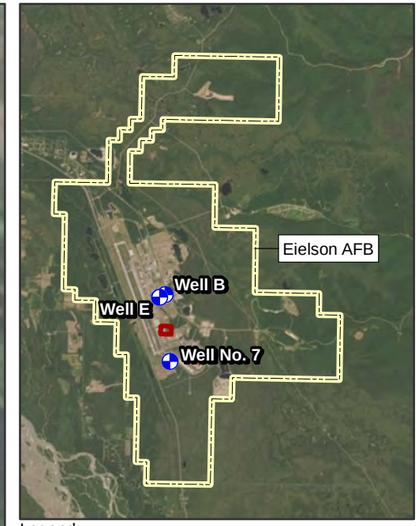
Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Proposed Temporary Well Locations at Eielson Air Force Base and Moose Creek

Figure 6

Path: N:\Eielson_AFB\GIS\GIS_Projects\QAPP\GIS\MXD\Figure 6. Proposed Temporary Well Locations Update.mxd





Legend

- Eielson AFB Installation Boundary
- Area of Possible Release
- Approximate Groundwater Flow
- Proposed Soil Boring Location
- Updated Proposed Soil Boring Location
- Water Supply Well

Former Soil Boring Locations

- Above ADEC MTGW Cleanup Levels and Below EPA RBSL (0.0030 or 0.0017 mg/kg and 1.26 mg/kg)
- Above ADEC HH Cleanup Level (1.6 mg/kg)

ADEC - Alaska Department of Environmental Conservation
AFB - Air Force Base
EPA - US Environmental Protection Agency
ft. - feet
FTA - Fire Training Area
HH - Human health
J - Analyte identified, quantitation estimated
mg/kg - Milligram(s) per kilogram
MTGW - Migration to groundwater
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
RBSL - Risk based screening level

ISM samples were collected between 0 and 5 feet bgs.

Data: CH2M Hill, 2018; Jacobs, 2018; PACAF, 2018
Imagery: Esri, 2015; Pictometry, 2012

Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Proposed Soil Boring Locations at Former Fire Training Area Near Entomology Building

Figure 5

Path: N:\Eielson_AFB\GIS\GIS_Projects\QAPP\GIS\MXD\Figure 5. FFTA.mxd

Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Eielson PFAS SI, Eielson Air Force Base, Alaska	Contract No. W911KB-17-D-0018 Task Order No. W911KB18F0173	U.S. Army Corps of Engineers
Date prepared	**Two Party or Three Party**	**Prepared by**
10/21/19	Three Party	N .Stoecklein

Title and version of work plan

Title: EXPANDED PERFLUOROOCTANOIC ACID (PFOA) AND PERFLUOROOCTANE SULFONATE (PFOS) SITE INSPECTION EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA UNIFORM FEDERAL POLICY-QUALITY ASSURANCE PROJECT PLAN WORK PLAN

Version: Final

Reason for action

Proposed soil boring location, 19PS-FFTA-ENT-SB04, is located under a stockpile more than 30 feet from the proposed location.

Existing plan or procedure

Sample proposed soil boring locations at or with in thirty feet radius of proposed location. If an accessible location exceeds thirty feet from the proposed location, a field change form will be submitted with new location.

Proposed change

Relocate 19PS-FFTA-ENT-SB04 to the closest accessible point. See attached figure.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☒ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

Project Manager: Mark Wilkinson Digitally signed by Mark Wilkinson Date: 2019.10.21 07:55:38 -08'00' **Date:** 10/21/19

External Review

Installation Remedial Project Manager: BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2019.10.21 11:56:47 -08'00' Date: 10/21/19

ADEC Remedial Project Manager: Digitally signed by M. Dennis Shepard Date: 2019.10.21 13:31:03 -08'00' Date: 10/21/19

EPA Remedial Project Manager: Digitally signed by Dustan Bott Date: 2019.10.22 14:02:36 -07'00' Date: 10/22/19

Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Expanded PFOA and PFOS SI at Eielson Air Force Base, Alaska	Contract No. W911KB-17-D-0018 Task Order W911KB17F0173	U.S. Army Corps of Engineers
Date prepared	**Two Party or Three Party**	**Prepared by**
05/27/20	Three Party	C. Rust

Title and version of work plan

Title: EXPANDED PERFLUOROOCTANOIC ACID (PFOA) AND PERFLUOROOCTANE SULFONATE (PFOS) SITE INSPECTION EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA UNIFORM FEDERAL POLICY-QUALITY ASSURANCE PROJECT PLAN WORK PLAN

Version: Final

Reason for action

Several proposed temporary monitoring well locations, TW-42,TW-43, TW-44, TW-45, TW-47, TW-48, and TW-54, have been adjusted due to access issues. Including being inaccessible due to current ground conditions and stream water levels within the Chena Flood Control Project Area. See attached Figure 4, aerial photographs, and photographs showing access issues and alternative proposed sampling locations.

Existing plan or procedure

Sample proposed temporary monitoring well locations at or within a fifty feet radius of proposed location. If an accessible location exceeds fifty feet from the proposed location, a field change form will be submitted with new location.

Proposed change

Upon field reconnaissance, it was determined that the temporary monitoring well (TW) locations TW-43, TW-44, TW-45, and TW-54 were inaccessible by a Geoprobe® or drill rig due to perched water and boggy conditions (TW-43, TW-44, and TW-54) or steep terrain (TW-45) as shown in the attached photographs. These TWs will be installed using hand tools at the original proposed TW locations. Care will be taken to minimize influence of perched surface water. The proposed method will be to hand auger through surficial frost to access the underlying water via piezometer or pore water sampler.

Upon field reconnaissance, it was determined that the TW-42 was inaccessible by a Geoprobe® or drill rig due to high water conditions. A proposed location approximately 2,000 ft to the E-NE is being proposed as a new TW location as shown in the attached aerial image and Figure 4.

The inaccessible temporary monitoring well locations,TW-47 and TW-48, will be adjusted to outside of the Alyeska/TAPS Pipeline Right of Way (approximately 50-100 feet). See attached aerial images showing access issues and alternative proposed sampling locations in Figure 4.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☑ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

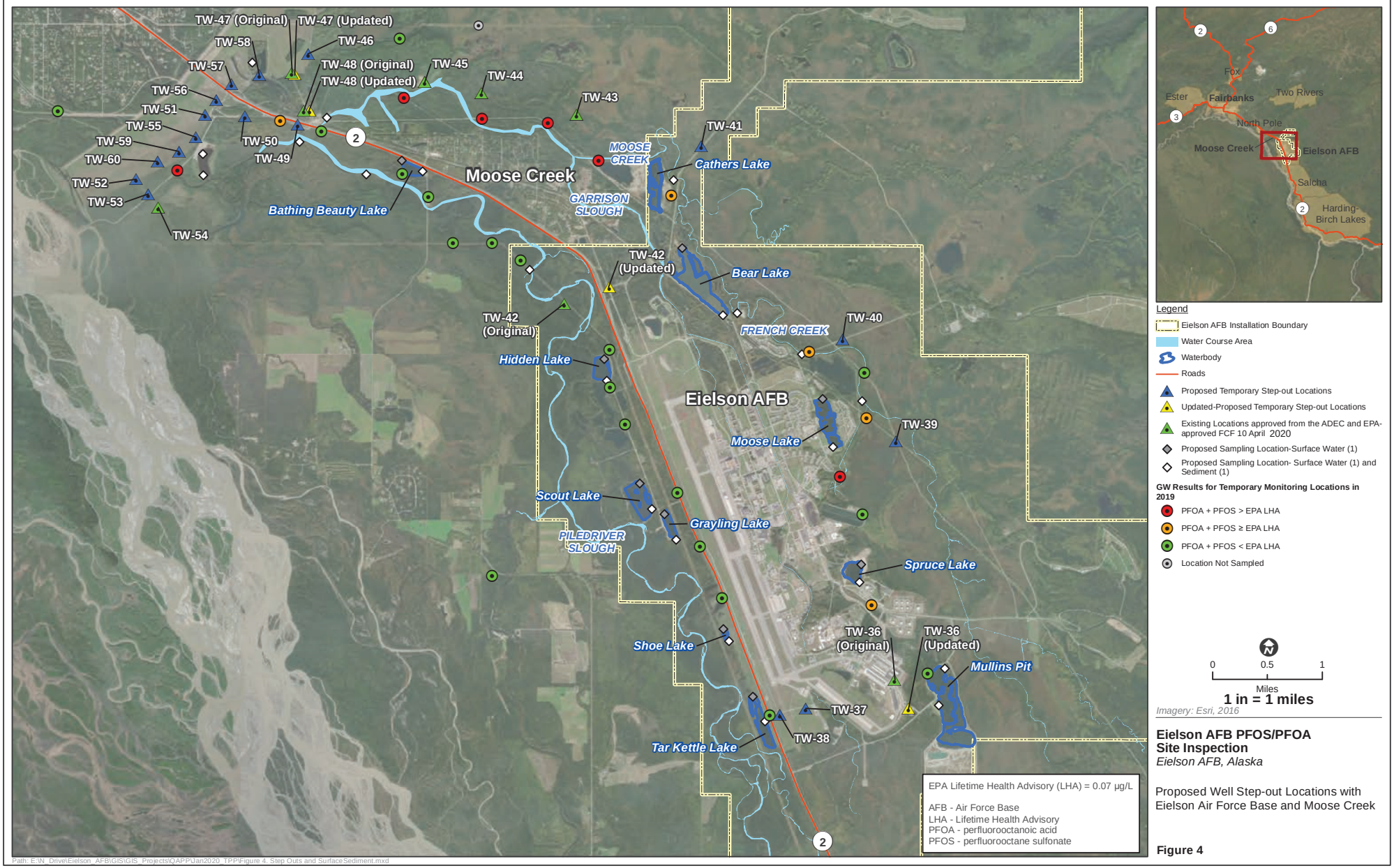
Project Manager: Colleen Rust Digitally signed by Colleen Rust Date: 2020.05.27 06:34:36 -06'00' **Date:** 05/27/20

External Review

Installation Remedial Project Manager: BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2020.05.27 07:32:07 -08'00' Date: 05/27/20

ADEC Remedial Project Manager: Digitally signed by Dennis Shepard Date: 2020.05.28 16:08:11 -08'00' Date: 05/28/20

EPA Remedial Project Manager: Digitally signed by DUSTAN BOTT Date: 2020.05.28 16:33:10 -07'00' Date: 05/28/20

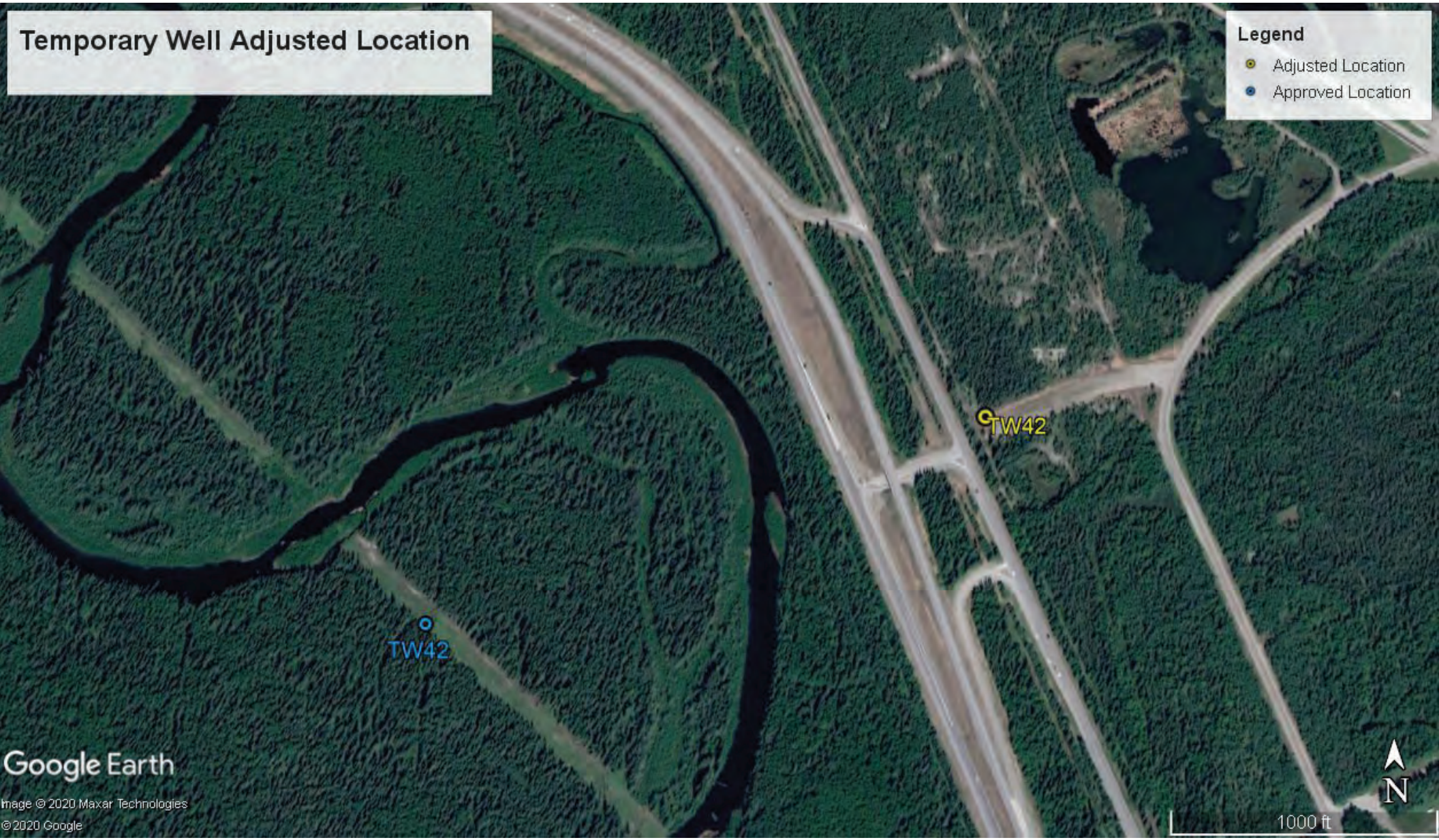


Path: E:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\Jan2020_TPP\Figure 4. Step Outs and SurfaceSediment.mxd

Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Proposed Well Step-out Locations with Eielson Air Force Base and Moose Creek

Figure 4


Temporary Well Adjusted Location
Legend
Adjusted Location
Approved Location
TW42
TW42
Google Earth
Image © 2020 Maxar Technologies
© 2020 Google
N
1000 ft


Temporary Well Location Adjustment
Legend
Adjusted Location
Approved Location
TW47
TW47
TW48
TW48
Google Earth
Image © 2020 Maxar Technologies
© 2020 Google
N
600 ft

Table of Contents

Photograph 1. TW-43 & TW-44: Trail access point from road (pick-up truck in background)

Photograph 2. TW-43 & TW-44: Trail between proposed locations

Photograph 3. TW-45: 75 vertical feet uphill on Moose Creek Bluff with a 45-degree slope

Photograph 4. TW-54: Access across slough and along powerlines

Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Expanded PFOA and PFOS SI at Eielson Air Force Base, Alaska	Contract No. W911KB-17-D-0018 Task Order W911KB17F0173	U.S. Army Corps of Engineers
Date prepared	**Two Party or Three Party**	**Prepared by**
05/27/20	Three Party	C. Rust

Title and version of work plan

Title: EXPANDED PERFLUOROOCTANOIC ACID (PFOA) AND PERFLUOROOCTANE SULFONATE (PFOS) SITE INSPECTION EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA UNIFORM FEDERAL POLICY-QUALITY ASSURANCE PROJECT PLAN WORK PLAN

Version: Final

Reason for action

A EIE436 Site Investigation Work Plan describes the advancement, installation, and sampling of soil borings and groundwater monitoring wells for PFOA/PFOS starting June 1st 2020, near the originally proposed temporary monitoring well location, TW-36 as shown in the attached R&M Construction Inc. figure. To avoid redundancy of data the proposed temporary monitoring well location, TW-36, has been adjusted to along South Loop area 10 feet from the existing monitoring well, MW-BKG-05, not sampled during Phase I. The existing monitoring well, MW-BKG-05, was not sampled because it was compromised at time of sampling. See the attached Figure 4 showing the alternative proposed sampling location 10 feet from the existing monitoring well, MW-BKG-05.

Existing plan or procedure

Sample proposed temporary monitoring well locations at or within a fifty feet radius of proposed location. If an accessible location exceeds fifty feet from the proposed location, a field change form will be submitted with new location.

Proposed change

The temporary monitoring well location,TW-36, will be adjusted to along South Loop area 10 feet from the existing monitoring well, MW-BKG-05. See the attached Figure 4 showing the alternative proposed sampling location.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☑ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

Project Manager: Colleen Rust Digitally signed by Colleen Rust Date: 2020.05.27 06:41:53 -06'00' **Date:** 05/27/20

External Review

Installation Remedial Project Manager: BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2020.05.27 07:34:31 -08'00' Date: 05/27/20

ADEC Remedial Project Manager: Digitally signed by Dennis Shepard Date: 2020.05.28 15:58:33 -08'00' Date: 05/28/20

EPA Remedial Project Manager: Digitally signed by DUSTAN BOTT Date: 2020.05.28 16:39:48 -07'00' Date: 05/28/20

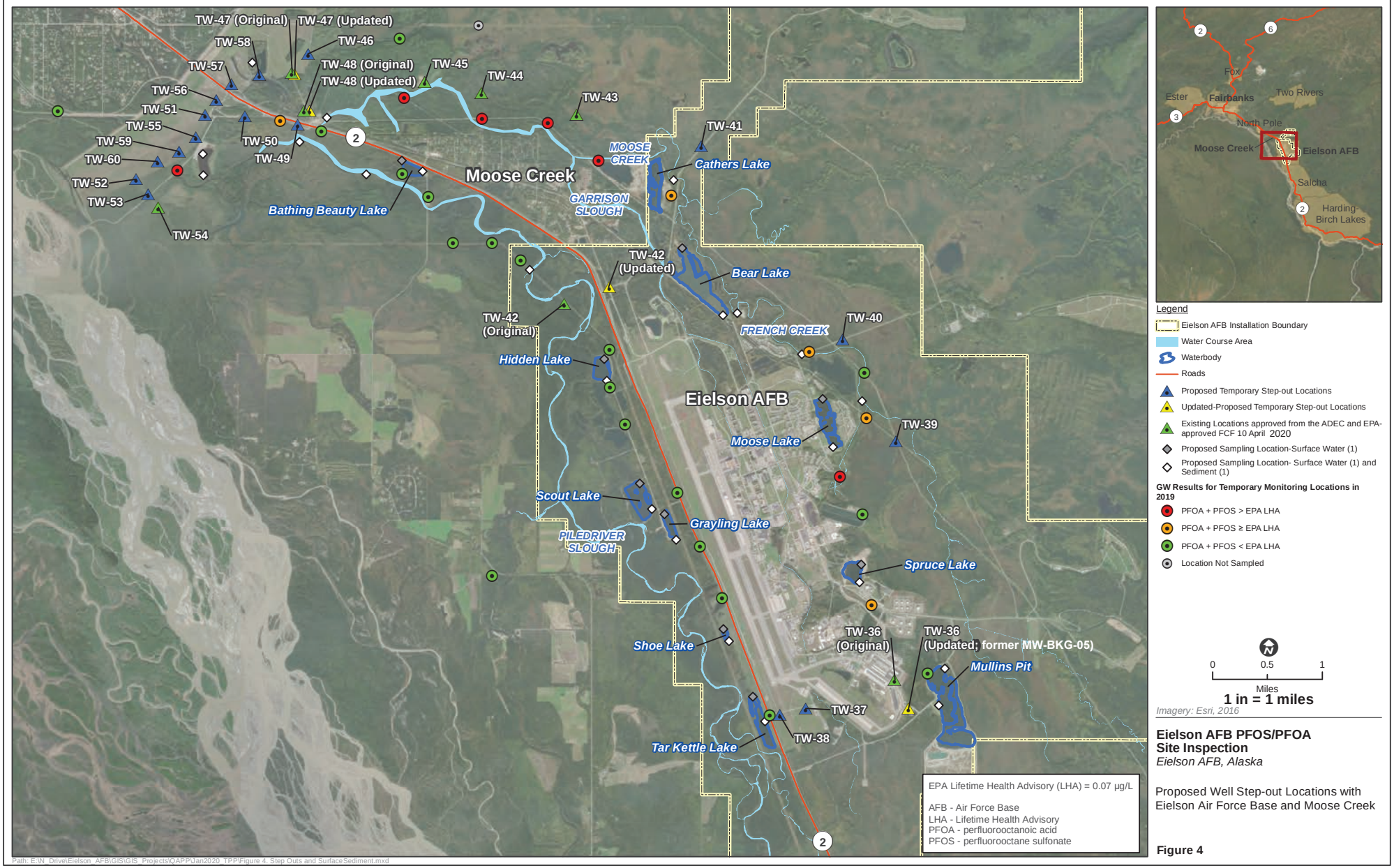
PROJ.NO:	2440.14
DATE:	MAY 2020
REF:	EIE436
DWG.:	A-04

EIE436, AME STORAGE FACILITY

INVESTIGATION LOCATION MAP

R&M CONSULTANTS, INC.

Date Saved: 5/13/2020 9:16:35 AM by CFell Z:_GIS\Projects\2440.00 USACE Geotechnical Term AE Services\Map Documents\EIE436_WrkPln\A-04_InvestLoc436.mxd



Path: E:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\Jan2020_TPP\Figure 4. Step Outs and SurfaceSediment.mxd

Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Proposed Well Step-out Locations with Eielson Air Force Base and Moose Creek

Figure 4

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix A.4 – Phase IV - Installation of Permanent Wells

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Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Expanded PFOA and PFOS SI at Eielson Air Force Base, Alaska	Contract No. W911KB-17-D-0018 Task Order W911KB17F0173	Sundance/EA (U.S. Army Corps of Engineers Contract)
Date prepared	**Two Party or Three Party**	**Prepared by**
08/19/20	Three Party	G. Garner

Title and version of work plan

Title: EXPANDED PERFLUOROOCTANOIC ACID (PFOA) AND PERFLUOROOCTANE SULFONATE (PFOS) SITE INSPECTION EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA UNIFORM FEDERAL POLICY-QUALITY ASSURANCE PROJECT PLAN WORK PLAN

Version: Final

Reason for action

Installation of proposed permanent monitoring wells and sampling of existing monitoring wells for Phase IV of the approved Work Plan based on input received at the July 29, 2020 RPM meeting.

Existing plan or procedure

Installation permanent monitoring wells and sampling of existing monitoring wells for Phase IV of the approved Work Plan as identified on Figure 6 and Figure 7.

Proposed change

Permanent monitoring wells and existing monitoring wells were identified as part of an iterative process based on the approved Work Plan and based on analytical data from previous phases of field work. Permanent monitoring wells and existing monitoring wells to be sampled were identified in areas suspected of having PFOA + PFOS levels in the range of 1/4 to 1/2 the current EPA LHA. Identified locations are provide on Figure 6 and Figure 7.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☒ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

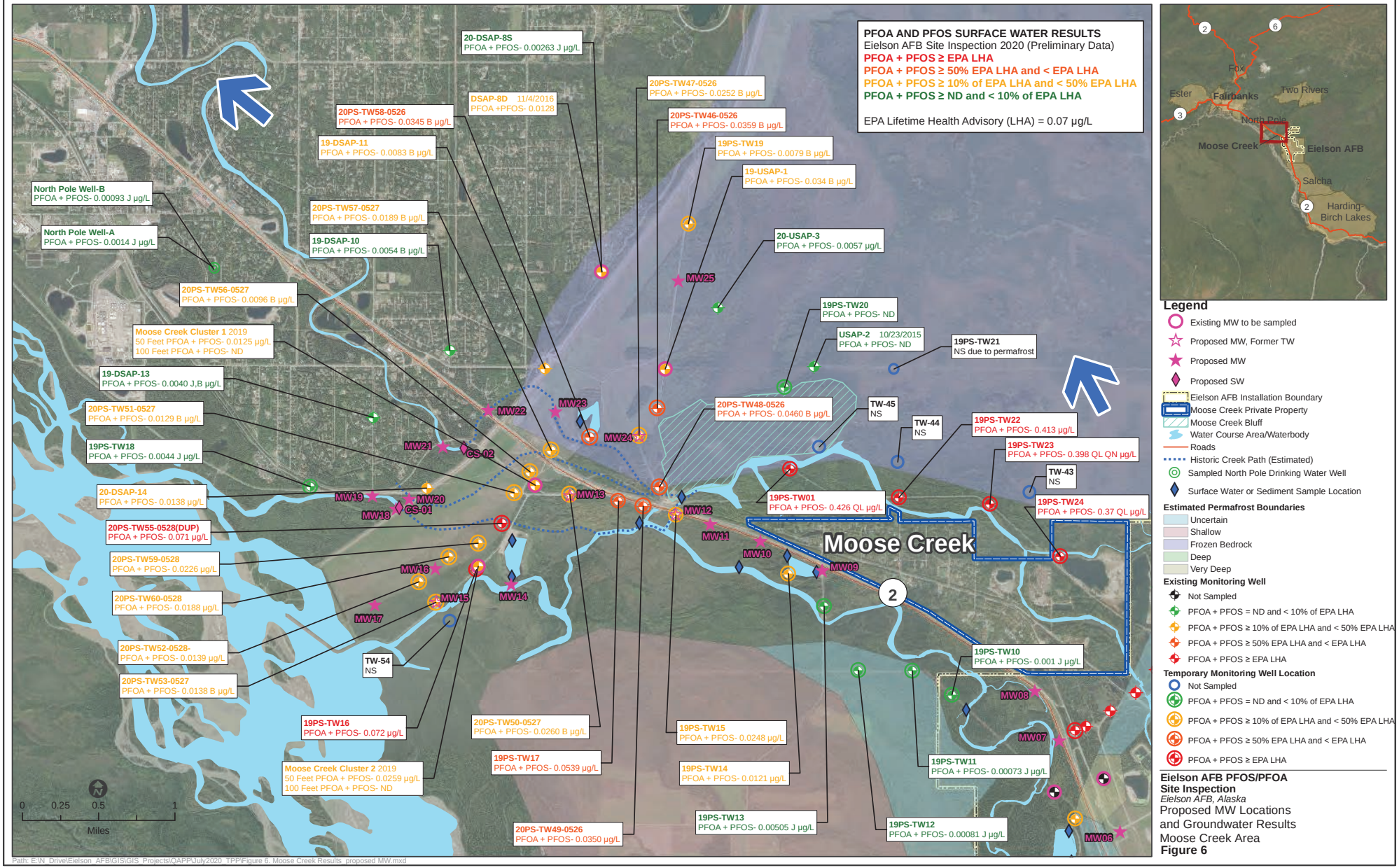
Project Manager: Colleen Rust Digitally signed by Colleen Rust Date: 2020.08.19 11:04:16 -08'00' **Date:** 08/19/20

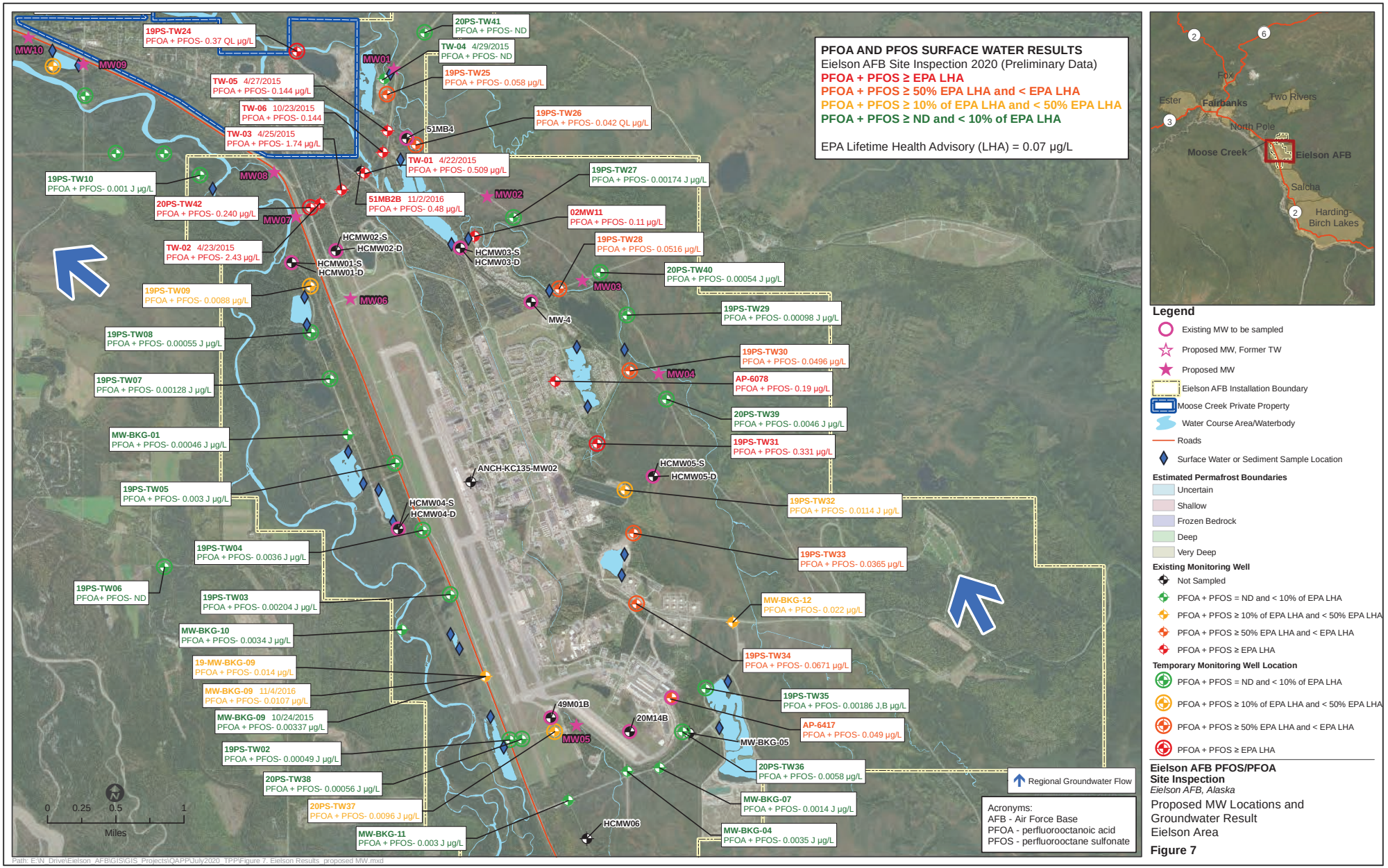
External Review

Installation Remedial Project Manager: BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2020.08.19 12:52:08 -08'00' Date: 08/19/20

ADEC Remedial Project Manager: Digitally signed by Dennis Shepard Date: 2020.08.19 16:56:29 -08'00' Date: 08/19/20

EPA Remedial Project Manager: Digitally signed by DUSTAN BOTT Date: 2020.08.19 17:40:15 -07'00' Date: 08/19/20


PFOA AND PFOS SURFACE WATER RESULTS
Eielson AFB Site Inspection 2020 (Preliminary Data)
PFOA + PFOS ≥ EPA LHA
PFOA + PFOS ≥ 50% EPA LHA and < EPA LHA
PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA LHA
PFOA + PFOS ≥ ND and < 10% of EPA LHA
EPA Lifetime Health Advisory (LHA) = 0.07 µg/L
20-DSAP-8S PFOA + PFOS- 0.00263 J µg/L
DSAP-8D 11/4/2016 PFOA +PFOS- 0.0128
20PS-TW58-0526 PFOA + PFOS- 0.0345 B µg/L
19-DSAP-11 PFOA + PFOS- 0.0083 B µg/L
North Pole Well-B PFOA + PFOS- 0.00093 J µg/L
North Pole Well-A PFOA + PFOS- 0.0014 J µg/L
20PS-TW57-0527 PFOA + PFOS- 0.0189 B µg/L
19-DSAP-10 PFOA + PFOS- 0.0054 B µg/L
20PS-TW56-0527 PFOA + PFOS- 0.0096 B µg/L
Moose Creek Cluster 1 2019
50 Feet PFOA + PFOS- 0.0125 µg/L
100 Feet PFOA + PFOS- ND
19-DSAP-13 PFOA + PFOS- 0.0040 J,B µg/L
20PS-TW51-0527 PFOA + PFOS- 0.0129 B µg/L
19PS-TW18 PFOA + PFOS- 0.0044 J µg/L
20-DSAP-14 PFOA + PFOS- 0.0138 µg/L
20PS-TW55-0528(DUP) PFOA + PFOS- 0.071 µg/L
20PS-TW59-0528 PFOA + PFOS- 0.0226 µg/L
20PS-TW60-0528 PFOA + PFOS- 0.0188 µg/L
20PS-TW52-0528- PFOA + PFOS- 0.0139 µg/L
20PS-TW53-0527 PFOA + PFOS- 0.0138 B µg/L
19PS-TW16 PFOA + PFOS- 0.072 µg/L
Moose Creek Cluster 2 2019
50 Feet PFOA + PFOS- 0.0259 µg/L
100 Feet PFOA + PFOS- ND
20PS-TW50-0527 PFOA + PFOS- 0.0260 B µg/L
19PS-TW17 PFOA + PFOS- 0.0539 µg/L
20PS-TW49-0526 PFOA + PFOS- 0.0350 µg/L
20PS-TW47-0526 PFOA + PFOS- 0.0252 B µg/L
20PS-TW46-0526 PFOA + PFOS- 0.0359 B µg/L
19PS-TW19 PFOA + PFOS- 0.0079 B µg/L
19-USAP-1 PFOA + PFOS- 0.034 B µg/L
20-USAP-3 PFOA + PFOS- 0.0057 µg/L
19PS-TW20 PFOA + PFOS- ND
USAP-2 10/23/2015 PFOA + PFOS- ND
19PS-TW21 NS due to permafrost
20PS-TW48-0526 PFOA + PFOS- 0.0460 B µg/L
TW-45 NS
TW-44 NS
19PS-TW22 PFOA + PFOS- 0.413 µg/L
19PS-TW23 PFOA + PFOS- 0.398 QL QN µg/L
TW-43 NS
19PS-TW24 PFOA + PFOS- 0.37 QL µg/L
19PS-TW01 PFOA + PFOS- 0.426 QL µg/L
19PS-TW15 PFOA + PFOS- 0.0248 µg/L
19PS-TW14 PFOA + PFOS- 0.0121 µg/L
19PS-TW13 PFOA + PFOS- 0.00505 J µg/L
19PS-TW12 PFOA + PFOS- 0.00081 J µg/L
19PS-TW11 PFOA + PFOS- 0.00073 J µg/L
19PS-TW10 PFOA + PFOS- 0.001 J µg/L
MW01 MW02 MW03 MW04 MW05 MW06 MW07 MW08 MW09 MW10 MW11 MW12 MW13 MW14 MW15 MW16 MW17 MW18 MW19 MW20 MW21 MW22 MW23 MW24 MW25
CS-01 CS-02
TW-54 NS
Moose Creek
2
0 0.25 0.5 1 Miles
Path: E:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\July2020_TPP\Figure 6. Moose Creek Results_proposed MW.mxd
Fox
Ester
Fairbanks
Two Rivers
North Pole
Moose Creek
Eielson AFB
Salcha
Harding-Birch Lakes
Legend
Existing MW to be sampled
Proposed MW, Former TW
Proposed MW
Proposed SW
Eielson AFB Installation Boundary
Moose Creek Private Property
Moose Creek Bluff
Water Course Area/Waterbody
Roads
Historic Creek Path (Estimated)
Sampled North Pole Drinking Water Well
Surface Water or Sediment Sample Location
Estimated Permafrost Boundaries
Uncertain
Shallow
Frozen Bedrock
Deep
Very Deep
Existing Monitoring Well
Not Sampled
PFOA + PFOS = ND and < 10% of EPA LHA
PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA LHA
PFOA + PFOS ≥ 50% EPA LHA and < EPA LHA
PFOA + PFOS ≥ EPA LHA
Temporary Monitoring Well Location
Not Sampled
PFOA + PFOS = ND and < 10% of EPA LHA
PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA LHA
PFOA + PFOS ≥ 50% EPA LHA and < EPA LHA
PFOA + PFOS ≥ EPA LHA
Eielson AFB PFOS/PFOA
Site Inspection
Eielson AFB, Alaska
Proposed MW Locations
and Groundwater Results
Moose Creek Area
Figure 6


PFOA AND PFOS SURFACE WATER RESULTS
Eielson AFB Site Inspection 2020 (Preliminary Data)
PFOA + PFOS ≥ EPA LHA
PFOA + PFOS ≥ 50% EPA LHA and < EPA LHA
PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA LHA
PFOA + PFOS ≥ ND and < 10% of EPA LHA
EPA Lifetime Health Advisory (LHA) = 0.07 µg/L
19PS-TW24 PFOA + PFOS- 0.37 QL µg/L
MW10
MW09
MW01
20PS-TW41 PFOA + PFOS- ND
TW-04 4/29/2015 PFOA + PFOS- ND
19PS-TW25 PFOA + PFOS- 0.058 µg/L
TW-05 4/27/2015 PFOA + PFOS- 0.144 µg/L
TW-06 10/23/2015 PFOA + PFOS- 0.144
TW-03 4/25/2015 PFOA + PFOS- 1.74 µg/L
51MB4
19PS-TW26 PFOA + PFOS- 0.042 QL µg/L
TW-01 4/22/2015 PFOA + PFOS- 0.509 µg/L
19PS-TW10 PFOA + PFOS- 0.001 J µg/L
MW08
19PS-TW27 PFOA + PFOS- 0.00174 J µg/L
MW02
20PS-TW42 PFOA + PFOS- 0.240 µg/L
MW07
51MB2B 11/2/2016 PFOA + PFOS- 0.48 µg/L
02MW11 PFOA + PFOS- 0.11 µg/L
HCMW02-S
HCMW02-D
HCMW01-S
HCMW01-D
HCMW03-S
HCMW03-D
19PS-TW28 PFOA + PFOS- 0.0516 µg/L
TW-02 4/23/2015 PFOA + PFOS- 2.43 µg/L
20PS-TW40 PFOA + PFOS- 0.00054 J µg/L
MW03
19PS-TW09 PFOA + PFOS- 0.0088 µg/L
MW06
MW-4
19PS-TW29 PFOA + PFOS- 0.00098 J µg/L
19PS-TW08 PFOA + PFOS- 0.00055 J µg/L
19PS-TW30 PFOA + PFOS- 0.0496 µg/L
MW04
19PS-TW07 PFOA + PFOS- 0.00128 J µg/L
AP-6078 PFOA + PFOS- 0.19 µg/L
20PS-TW39 PFOA + PFOS- 0.0046 J µg/L
MW-BKG-01 PFOA + PFOS- 0.00046 J µg/L
19PS-TW31 PFOA + PFOS- 0.331 µg/L
ANCH-KC135-MW02
HCMW05-S
HCMW05-D
19PS-TW05 PFOA + PFOS- 0.003 J µg/L
19PS-TW32 PFOA + PFOS- 0.0114 J µg/L
HCMW04-S
HCMW04-D
19PS-TW04 PFOA + PFOS- 0.0036 J µg/L
19PS-TW33 PFOA + PFOS- 0.0365 µg/L
19PS-TW06 PFOA+ PFOS- ND
19PS-TW03 PFOA + PFOS- 0.00204 J µg/L
MW-BKG-12 PFOA + PFOS- 0.022 µg/L
MW-BKG-10 PFOA + PFOS- 0.0034 J µg/L
19PS-TW34 PFOA + PFOS- 0.0671 µg/L
19-MW-BKG-09 PFOA + PFOS- 0.014 µg/L
MW-BKG-09 11/4/2016 PFOA + PFOS- 0.0107 µg/L
19PS-TW35 PFOA + PFOS- 0.00186 J,B µg/L
MW-BKG-09 10/24/2015 PFOA + PFOS- 0.00337 µg/L
49M01B
20M14B
AP-6417 PFOA + PFOS- 0.049 µg/L
MW05
MW-BKG-05
19PS-TW02 PFOA + PFOS- 0.00049 J µg/L
20PS-TW36 PFOA + PFOS- 0.0058 µg/L
20PS-TW38 PFOA + PFOS- 0.00056 J µg/L
MW-BKG-07 PFOA + PFOS- 0.0014 J µg/L
20PS-TW37 PFOA + PFOS- 0.0096 J µg/L
HCMW06
MW-BKG-11 PFOA + PFOS- 0.003 J µg/L
MW-BKG-04 PFOA + PFOS- 0.0035 J µg/L
Regional Groundwater Flow
Acronyms:
AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
0 0.25 0.5 1
Miles
Fox
Ester
Fairbanks
Two Rivers
North Pole
Moose Creek
Eielson AFB
Salcha
Harding-Birch Lakes
Legend
Existing MW to be sampled
Proposed MW, Former TW
Proposed MW
Eielson AFB Installation Boundary
Moose Creek Private Property
Water Course Area/Waterbody
Roads
Surface Water or Sediment Sample Location
Estimated Permafrost Boundaries
Uncertain
Shallow
Frozen Bedrock
Deep
Very Deep
Existing Monitoring Well
Not Sampled
PFOA + PFOS = ND and < 10% of EPA LHA
PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA LHA
PFOA + PFOS ≥ 50% EPA LHA and < EPA LHA
PFOA + PFOS ≥ EPA LHA
Temporary Monitoring Well Location
PFOA + PFOS = ND and < 10% of EPA LHA
PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA LHA
PFOA + PFOS ≥ 50% EPA LHA and < EPA LHA
PFOA + PFOS ≥ EPA LHA
Eielson AFB PFOS/PFOA
Site Inspection
Eielson AFB, Alaska
Proposed MW Locations and Groundwater Result
Eielson Area
Figure 7
Path: E:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\July2020_TPP\Figure 7. Eielson Results_proposed MW.mxd

Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Expanded PFOA and PFOS SI at Eielson Air Force Base, Alaska	Contract No. W911KB-17-D-0018, Task Order W911KB17F0173	Sundance-EA
Date prepared	**Two Party or Three Party**	**Prepared by**
09/23/20	Three Party	G.Garner

Title and version of work plan

UFP-QAPP Work Plan for
Expanded PFOA and PFOS Site Inspection at Eielson AFB, Alaska

Reason for action

The proposed location of MW21 is inaccessible by the drill rig and support vehicles due to steep slopes and thick timber.

Existing plan or procedure

2020.8.19 FCF Expanded SI_Phase 4.pdf. The approved FCF dated 19 August 2020 provides the location of permanent monitoring wells and surface water samples for Phase IV of the field efforts.

Proposed change

Change proposed permanent monitoring well MW21 to a surface water sample in the same general area as the proposed monitoring well location of MW19 as shown on Figure 6. The estimated historic creek channel that MW21 was targeting has two permanent monitoring wells (MW22 and MW23) up gradient from the proposed location. Surface water sample CS-2 also targets the same historic channel. The proposed surface water sample, CS-3, will be roughly co-located with MW19 to give a better understanding of groundwater/surface water interaction along these historic channels/preferential pathways.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☒ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

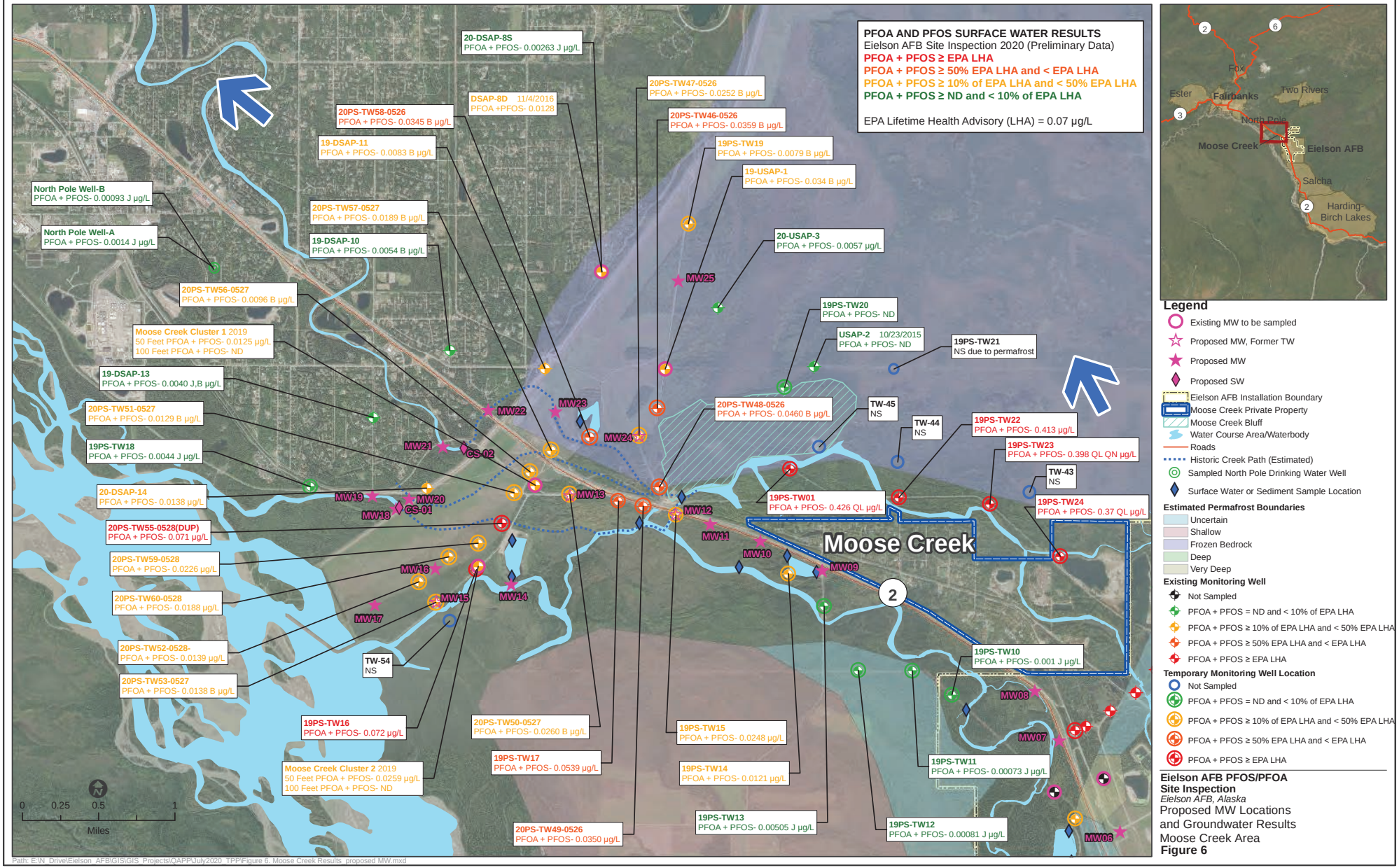
Project Manager: Colleen Rust Digitally signed by Colleen Rust Date: 2020.09.24 07:10:02 -06'00' **Date:** 09/24/20

External Review

Installation Remedial Project Manager: BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2020.09.24 08:35:51 -08'00' Date: 09/24/20

ADEC Remedial Project Manager: Digitally signed by Dennis Shepard Date: 2020.09.24 11:15:38 -08'00' Date: 09/24/20

EPA Remedial Project Manager: Digitally signed by DUSTAN BOTT Date: 2020.09.24 15:09:20 -07'00' Date: 09/24/20


PFOA AND PFOS SURFACE WATER RESULTS
Eielson AFB Site Inspection 2020 (Preliminary Data)
PFOA + PFOS ≥ EPA LHA
PFOA + PFOS ≥ 50% EPA LHA and < EPA LHA
PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA LHA
PFOA + PFOS ≥ ND and < 10% of EPA LHA
EPA Lifetime Health Advisory (LHA) = 0.07 µg/L
20-DSAP-8S PFOA + PFOS- 0.00263 J µg/L
DSAP-8D 11/4/2016 PFOA +PFOS- 0.0128
20PS-TW58-0526 PFOA + PFOS- 0.0345 B µg/L
19-DSAP-11 PFOA + PFOS- 0.0083 B µg/L
North Pole Well-B PFOA + PFOS- 0.00093 J µg/L
North Pole Well-A PFOA + PFOS- 0.0014 J µg/L
20PS-TW57-0527 PFOA + PFOS- 0.0189 B µg/L
19-DSAP-10 PFOA + PFOS- 0.0054 B µg/L
20PS-TW56-0527 PFOA + PFOS- 0.0096 B µg/L
Moose Creek Cluster 1 2019
50 Feet PFOA + PFOS- 0.0125 µg/L
100 Feet PFOA + PFOS- ND
19-DSAP-13 PFOA + PFOS- 0.0040 J,B µg/L
20PS-TW51-0527 PFOA + PFOS- 0.0129 B µg/L
19PS-TW18 PFOA + PFOS- 0.0044 J µg/L
20-DSAP-14 PFOA + PFOS- 0.0138 µg/L
20PS-TW55-0528(DUP) PFOA + PFOS- 0.071 µg/L
20PS-TW59-0528 PFOA + PFOS- 0.0226 µg/L
20PS-TW60-0528 PFOA + PFOS- 0.0188 µg/L
20PS-TW52-0528- PFOA + PFOS- 0.0139 µg/L
20PS-TW53-0527 PFOA + PFOS- 0.0138 B µg/L
19PS-TW16 PFOA + PFOS- 0.072 µg/L
Moose Creek Cluster 2 2019
50 Feet PFOA + PFOS- 0.0259 µg/L
100 Feet PFOA + PFOS- ND
20PS-TW50-0527 PFOA + PFOS- 0.0260 B µg/L
19PS-TW17 PFOA + PFOS- 0.0539 µg/L
20PS-TW49-0526 PFOA + PFOS- 0.0350 µg/L
20PS-TW47-0526 PFOA + PFOS- 0.0252 B µg/L
20PS-TW46-0526 PFOA + PFOS- 0.0359 B µg/L
19PS-TW19 PFOA + PFOS- 0.0079 B µg/L
19-USAP-1 PFOA + PFOS- 0.034 B µg/L
20-USAP-3 PFOA + PFOS- 0.0057 µg/L
19PS-TW20 PFOA + PFOS- ND
USAP-2 10/23/2015 PFOA + PFOS- ND
19PS-TW21 NS due to permafrost
20PS-TW48-0526 PFOA + PFOS- 0.0460 B µg/L
TW-45 NS
TW-44 NS
19PS-TW22 PFOA + PFOS- 0.413 µg/L
19PS-TW23 PFOA + PFOS- 0.398 QL QN µg/L
TW-43 NS
19PS-TW24 PFOA + PFOS- 0.37 QL µg/L
19PS-TW01 PFOA + PFOS- 0.426 QL µg/L
19PS-TW15 PFOA + PFOS- 0.0248 µg/L
19PS-TW14 PFOA + PFOS- 0.0121 µg/L
19PS-TW13 PFOA + PFOS- 0.00505 J µg/L
19PS-TW12 PFOA + PFOS- 0.00081 J µg/L
19PS-TW11 PFOA + PFOS- 0.00073 J µg/L
19PS-TW10 PFOA + PFOS- 0.001 J µg/L
MW01 MW02 MW03 MW04 MW05 MW06 MW07 MW08 MW09 MW10 MW11 MW12 MW13 MW14 MW15 MW16 MW17 MW18 MW19 MW20 MW21 MW22 MW23 MW24 MW25
CS-01 CS-02
TW-54 NS
Moose Creek
2
0 0.25 0.5 1 Miles
Path: E:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\July2020_TPP\Figure 6. Moose Creek Results_proposed MW.mxd
Fox
Ester
Fairbanks
Two Rivers
North Pole
Moose Creek
Eielson AFB
Salcha
Harding-Birch Lakes
Legend
Existing MW to be sampled
Proposed MW, Former TW
Proposed MW
Proposed SW
Eielson AFB Installation Boundary
Moose Creek Private Property
Moose Creek Bluff
Water Course Area/Waterbody
Roads
Historic Creek Path (Estimated)
Sampled North Pole Drinking Water Well
Surface Water or Sediment Sample Location
Estimated Permafrost Boundaries
Uncertain
Shallow
Frozen Bedrock
Deep
Very Deep
Existing Monitoring Well
Not Sampled
PFOA + PFOS = ND and < 10% of EPA LHA
PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA LHA
PFOA + PFOS ≥ 50% EPA LHA and < EPA LHA
PFOA + PFOS ≥ EPA LHA
Temporary Monitoring Well Location
Not Sampled
PFOA + PFOS = ND and < 10% of EPA LHA
PFOA + PFOS ≥ 10% of EPA LHA and < 50% EPA LHA
PFOA + PFOS ≥ 50% EPA LHA and < EPA LHA
PFOA + PFOS ≥ EPA LHA
Eielson AFB PFOS/PFOA
Site Inspection
Eielson AFB, Alaska
Proposed MW Locations
and Groundwater Results
Moose Creek Area
Figure 6


CS-3
Write a description for your map.
Legend
Feature 1
Wildflower Dr
Yarrow Dr
Farrior Dr
Carr St
Rosehip Dr
Harry B Rd
Dyke Rd
Old Richardson Hwy
MW21 Proposed
MW19 Adjusted Proposed
CS-3
MW20 Installed
MW18 Installed
Google Earth
Image © 2020 Maxar Technologies
© 2020 Google
N
1000 ft

Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Expanded PFOA and PFOS SI at Eielson Air Force Base, Alaska	Contract No. W911KB-17-D-0018, Task Order W911KB17F0173	Sundance-EA
Date prepared	**Two Party or Three Party**	**Prepared by**
09/25/20	Three Party	G.Garner

Title and version of work plan

UFP-QAPP Work Plan for Expanded PFOA and PFOS Site Inspection at Eielson AFB, Alaska

Reason for action

The proposed location of MW04 needs to be moved along the access road associated with the Trans Alaska Pipeline Right of Way (TAPS ROW) due to a present underground utilities and wide TAPS ROW on either side of the creek.

Existing plan or procedure

2020.8.19 FCF Expanded SI_Phase 4. The approved FCF dated 19 August 2020 provides the location of permanent monitoring wells and surface water samples for Phase IV of the field efforts.

Proposed change

The proposed permanent monitoring well MW04 will be moved SSE along the TAPS ROW pipeline access road to be just outside the TAPS ROW as shown in red shade on the provide figures. The TAPS ROW is much wider (red shaded area) on the north and south sides of the bridge to accommodated the buried fiber optics a that cross on either side of the bridge. The proposed location of MW04 will be moved to just outside of the widest part of the TAPS ROW between PLMP 477.3 and PLMP 477.4 as shown on the inset map. The red dashed line on the inset map is the buried pipeline location.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☑ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

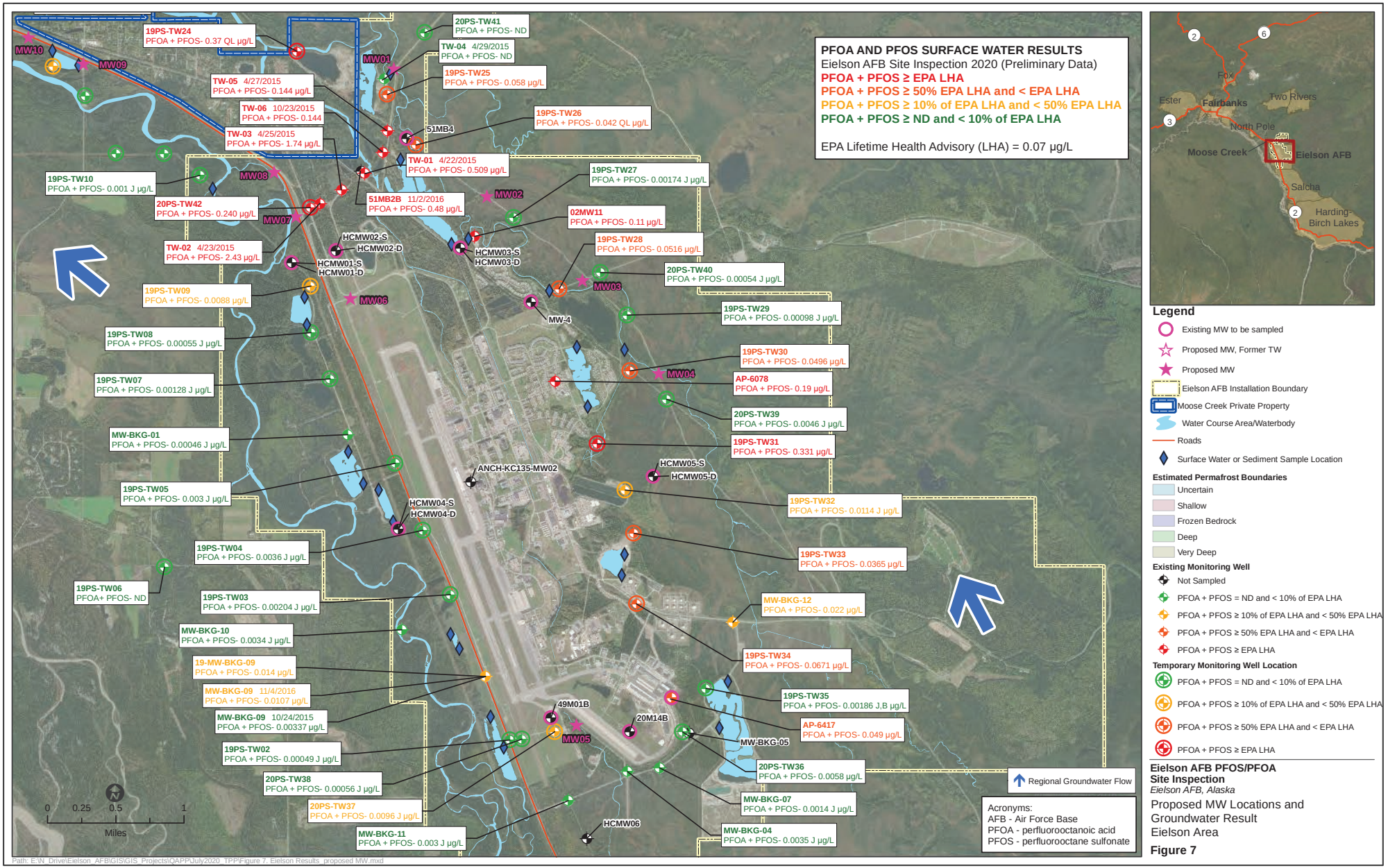
Project Manager: Colleen Rust Digitally signed by Colleen Rust Date: 2020.09.25 06:28:07 -06'00' **Date:** 09/25/20

External Review

Installation Remedial Project Manager: SMITH.KRISTINA.ANNE.1164325063 Digitally signed by SMITH.KRISTINA.ANNE.1164325063 Date: 2020.09.25 09:54:54 -08'00' Date: 09/25/20

ADEC Remedial Project Manager: Digitally signed by Dennis Shepard Date: 2020.09.25 12:17:02 -08'00' Date: 09/25/20

EPA Remedial Project Manager: Digitally signed by DUSTAN BOTT Date: 2020.09.25 13:29:17 -07'00' Date: 09/25/20

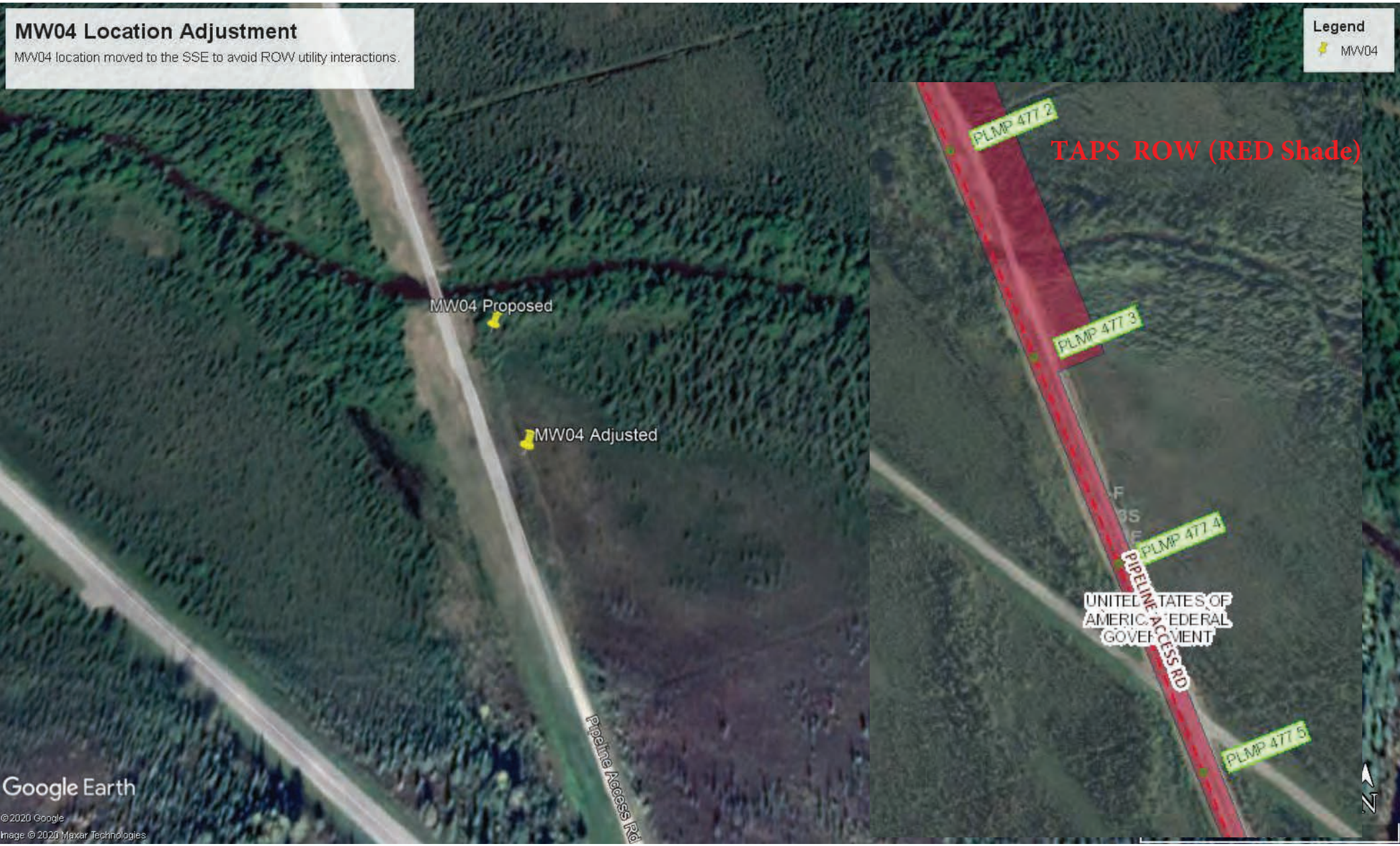


Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Proposed MW Locations and Groundwater Result
Eielson Area

Figure 7

Path: E:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\July2020_TPP\Figure 7. Eielson Results_proposed MW.mxd


MW04 Location Adjustment
MW04 location moved to the SSE to avoid ROW utility interactions.
Legend
MW04
MW04 Proposed
MW04 Adjusted
Pipeline Access Rd
Google Earth
©2020 Google
Image © 2020 Maxar Technologies
TAPS ROW (RED Shade)
PLMP 477.2
PLMP 477.3
PLMP 477.4
PLMP 477.5
PIPELINE ACCESS RD
UNITED STATES OF AMERICA FEDERAL GOVERNMENT
N

Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Eielson PFOA/PFOS SI, Eielson Air Force Base (EAFB), AK	Contract No. W911KB-17-D-0018 Task Order No. W911KB18F0173	U.S. Army Corps of Engineering, Alaska District
Date prepared 10/23/20	**Two Party or Three Party** Three-party	**Prepared by** N .Stoecklein

Title and version of work plan

EXPANDED PERFLUOROOCTANOIC ACID (PFOA) AND
PERFLUOROOCTANE SULFONATE (PFOS) SITE INSPECTION
EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA
UNIFORM FEDERAL POLICY-QUALITY ASSURANCE PROJECT PLAN
WORK PLAN Version: Final

Reason for action

The proposed location for monitor well MW-05 is in an area where a network of underground communication and fiber-optic lines are located.

Existing plan or procedure

Install monitor well MW-05 on the south side of Unnamed Road (revised MW-05). Refer to figure Proposed Monitor Well Location (attached).

Proposed change

Install monitor well MW-05 on the north side of Unnamed Road, ~ 44 feet north of the proposed location. Refer to figure Proposed Monitor Well Location (attached).

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☒ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

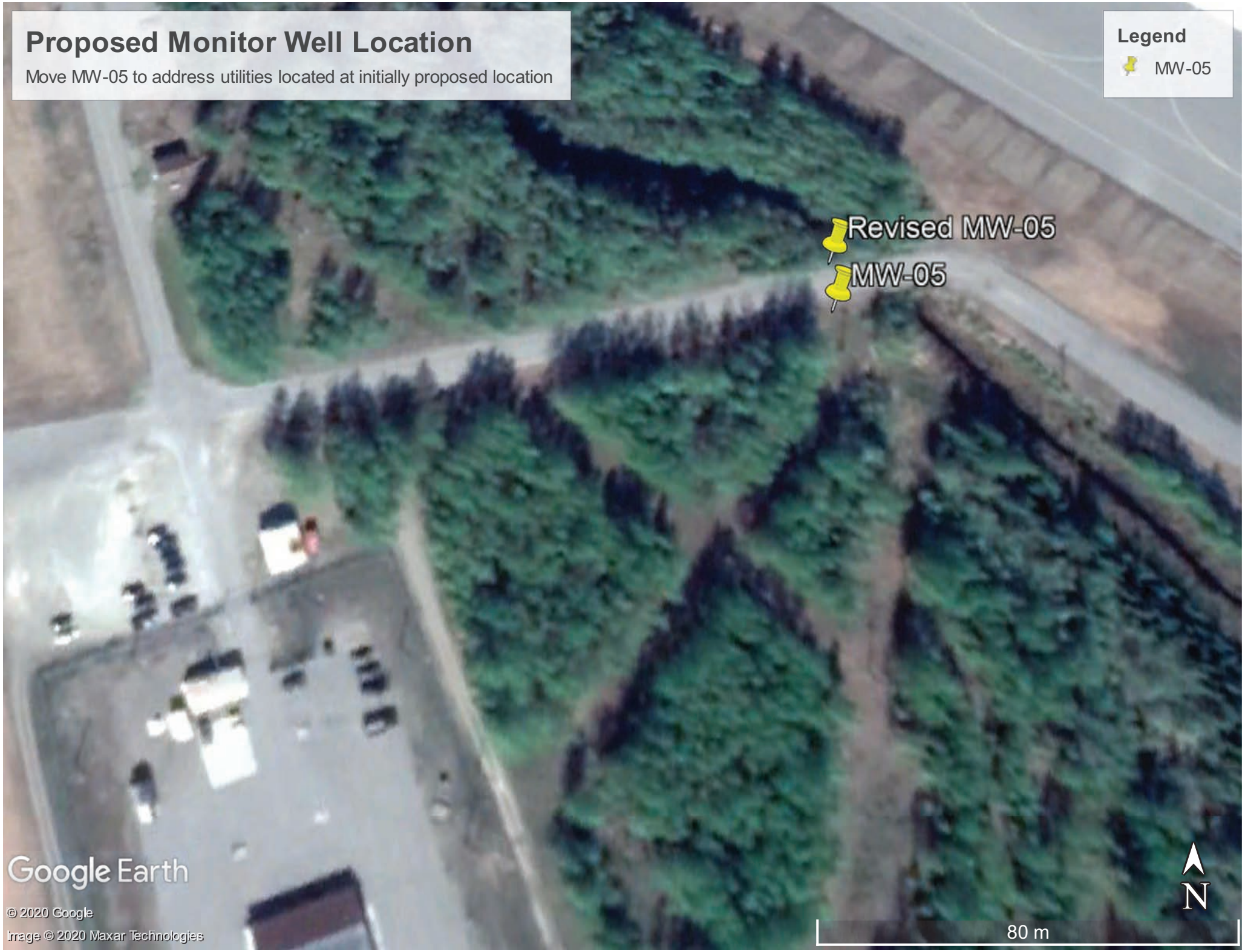
Project Manager: Mark Wilkinson Digitally signed by Mark Wilkinson Date: 2020.10.26 08:56:51 -08'00' **Date:** 10/26/20

External Review

Installation Remedial Project Manager: BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2020.10.26 16:56:32 -08'00' Date: 10/26/20

ADEC Remedial Project Manager: Digitally signed by Dennis Shepard Date: 2020.10.27 12:35:58 -08'00' Date: 10/27/20

EPA Remedial Project Manager: Digitally signed by DUSTAN BOTT Date: 2020.10.27 12:39:47 -07'00' Date: 10/27/20


Proposed Monitor Well Location
Move MW-05 to address utilities located at initially proposed location
Legend
MW-05
Revised MW-05
MW-05
Google Earth
© 2020 Google
Image © 2020 Maxar Technologies
N
80 m

Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Eielson PFAS SI, Eielson Air Force Base, Alaska	Contract No. W911KB-17-D-0018 Task Order No. W911KB18F0173	U.S. Army Corps of Engineers
Date prepared	**Two Party or Three Party**	**Prepared by**
04/13/21	Three Party	N. Stoecklein

Title and version of work plan

Title: EXPANDED PERFLUOROOCTANOIC ACID (PFOA) AND PERFLUOROOCTANE SULFONATE (PFOS) SITE INSPECTION EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA UNIFORM FEDERAL POLICY-QUALITY ASSURANCE PROJECT PLAN WORK PLAN

Version: Final

Reason for action

Permanent monitoring wells 20PS-MW26, 20PS-MW28, 20PS-MW31, 20PS-MW32, and 20PS-MW33 were installed at locations that were not agreed upon by U.S. Air Force (USAF) and stakeholders as part of Phase IV of the Work Plan. These permanent monitoring wells exceeded 30 feet from the agreed upon locations. Monitoring wells 20PS-MW26 through 20PS-MW33 are additional installations not included in the Phase IV Field Change Form dated 19 August 2020. The USAF agreed to retain monitoring wells 20PS-MW27, 20PS-MW29, and 20PS-MW30 which provide additional information. See attached Plume Map figure.

Existing plan or procedure

Installation of permanent groundwater monitoring wells at locations agreed upon by USAF and stakeholders.

Proposed change

Decommission monitoring wells 20PS-MW26, 20PS-MW28, 20PS-MW31, 20PS-MW32, and 20PS-MW33 in accordance with Alaska Department of Environmental Conservation's Monitoring Well Guidance.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☒ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

Project Manager: Mark Wilkinson Digitally signed by Mark Wilkinson Date: 2021.04.13 11:55:16 -07'00' **Date:** 04/13/21

External Review

Installation Remedial Project Manager: BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2021.04.13 11:31:39 -08'00' Date: 04/13/21

ADEC Remedial Project Manager: Digitally signed by Dennis Shepard Date: 2021.04.20 12:26:28 -08'00' Date: 04/20/21

EPA Remedial Project Manager: Digitally signed by DUSTAN BOTT Date: 2021.04.20 13:41:28 -07'00' Date: 04/20/21

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix A.5 – Phase V - Eielson AFB Surface Water and Sediment Sampling

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Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Eielson PFOA/PFOS SI, Eielson AFB, AK	Contract No. W911KB-17-D-0018 Task Order No. W911KB18F0173	USACE, AK District
Date prepared 04/30/20	**Two Party or Three Party** 3P	**Prepared by** Sundance-EA II, LLC

Title and version of work plan

Eielson Surface Water and Sediment Sampling, Final Addendum to the Work Plan for Expanded PFOA and PFOS Si, Eielson AFB, AK, 6 April 2020

Reason for action

Update figures to be consistent with text and clarify sample number and locations.

Existing plan or procedure

Figure 10 location of PS02 is missing from figure. Figure 12 indicates 4 surface water samples for Moose Creek Landing Pond and Sample ID of MCL.

Proposed change

Surface water/sediment sample location PS02 on Piledriver Slough was added to Figure 10. Figure 12 was revised to indicate two co-located surface water/sediment sample locations at Moose Creek Landing Pond and sample ID was revised to MLP.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☒ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

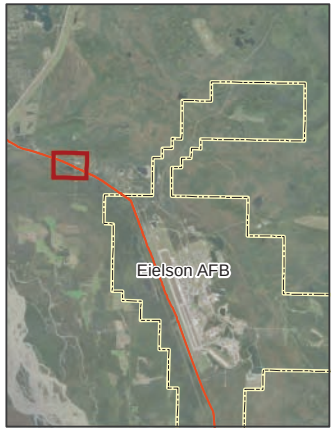
Project Manager: Mark Wilkinson Digitally signed by Mark Wilkinson Date: 2020.04.30 10:14:06 -08'00' **Date:** 04/30/20

External Review

Installation Remedial Project Manager:
BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2020.04.30 12:12:16 -08'00'
Date: 04/30/20

ADEC Remedial Project Manager:
Digitally signed by Dennis Shepard Date: 2020.05.04 15:01:02 -08'00'
Date: 05/04/20

EPA Remedial Project Manager:
Digitally signed by DUSTAN BOTT Date: 2020.05.04 14:57:05 -07'00'
Date: 05/04/20



Legend

- Proposed Sampling Location- Surface Water (1)
- Proposed Sampling Location - Surface Water (2) and Sediment (1)
- Surface Water (1) and Sediment (1)
- Eielson AFB Installation Boundary
- Waterbody
- Road

AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctanoic sulfonate

0 125 250 500
Feet

1 inch = 350 feet

Imagery: Esri, 2015

Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Proposed Surface Water and Sediment Sampling Locations at Bathing Beauty Lake

Figure 10

Legend

- Proposed Sampling Location-Surface Water (1)
- Proposed Sampling Location-Surface Water (1) and Sediment (1)
- Waterbody
- Eielson AFB Installation Boundary
- Road

AFB - Air Force Base
PFOA - perfluorooctanoic acid
PFOS - perfluorooctanoic sulfonate

0 125 250 500
Feet

1 inch = 500 feet

Imagery: Esri, 2019

Eielson AFB PFOS/PFOA Site Inspection
Eielson AFB, Alaska

Proposed Surface Water and Sediment Sampling Locations at Moose Creek Landing Pond

Figure12

Path: E:\N_Drive\Eielson_AFB\GIS\GIS_Projects\QAPP\Expanded_SI\GIS_Deliverable\MXD\Figure 12. Moose Creek Landing.mxd

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix A.6 – Investigation Derived Waste (IDW) Management

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Eielson AFB
Field Change Form

Project Name and Location	Project/Task Order Number	Client Name
Eielson PFOA/PFOS SI, Eielson Air Force Base (EAFB), AK	Contract No. W911KB-17-D-0018 Task Order No. W911KB18F0173	U.S. Army Corps of Engineering, Alaska District
Date prepared 10/16/20	**Two Party or Three Party** Three-party	**Prepared by** N .Stoecklein

Title and version of work plan

EXPANDED PERFLUOROOCTANOIC ACID (PFOA) AND
PERFLUOROOCTANE SULFONATE (PFOS) SITE INSPECTION (SI)
EIELSON AIR FORCE BASE AND MOOSE CREEK, ALASKA
UNIFORM FEDERAL POLICY-QUALITY ASSURANCE PROJECT PLAN
WORK PLAN Version: Final

Reason for action

Investigation derived waste (IDW) with results below the cleanup levels (clean) for PFOA/PFOS is frozen and therefore can not be surface disposed at point of origination.

Existing plan or procedure

1. Sundance-EA expects to generate approximately 10,000 gallons of water IDW during installation, development, and sampling of deep wells. Analytical results from deep well samples will not be used to characterize IDW. Instead, containerized water IDW will be sampled and sample results will be used to determine the appropriate disposal method.
2. IDW water will not be transported to the IDW holding cell at LF003 pending analytical results. Instead, IDW will remain containerized at the point of generation until analytical results of sampled IDW are received.
NOTE: The UFP-QAPP states that IDW may be discharged to the ground surface at the point of generation if PFOA/PFOS results are less than ADEC Table C groundwater cleanup levels of 0.4 ug/L each. Sundance-EA may choose to use granular activated carbon (GAC) to treat IDW water before sampling. This approach is consistent with the Expanded SI Work Plan. Treated IDW water will be sampled before determining if surface discharge is an acceptable disposal option.

Proposed change

1. Sundance-EA will transport IDW to EAFB cell #1 to stage during the winter months. Spring 2021, Sundance-EA will transport IDW back to the point of generation and surface dispose. IDW was generated in September 2020 during Phase IV of the PFOA/PFOS SI. All IDW is currently containerize and includes soil cuttings (~25 pounds) and development/purge water (~958 gallons) from the newly installed wells.

Note-IDW noted in the existing plan or procedure (above) has been surface disposed at the point of generation. The only IDW being transported is that detailed/quantified above per the Phase IV field effort.

Internal Review

Check appropriate box and forward as necessary per project communication pathways:

- ☐ Internal Change: Proceed with Change, in-scope and within approved budget, PM will forward cost estimate to project controls
- ☒ Technical Change: PM to initiate discussion with stakeholders per project communication pathways for approval or concurrence
- ☐ External Scope Change: PM to submit to client's Contracting Officer for approval, coordinate with contracts administrator
- ☐ Rejected: take no further action

Project Manager: Mark Wilkinson Digitally signed by Mark Wilkinson Date: 2020.10.15 08:35:09 -08'00' **Date:** 10/16/20

External Review

Installation Remedial Project Manager: BOESE.MICHAEL.LAWRENCE.1381192713 Digitally signed by BOESE.MICHAEL.LAWRENCE.1381192713 Date: 2020.10.16 08:57:31 -08'00' Date: 10/16/20

ADEC Remedial Project Manager: Digitally signed by Dennis Shepard Date: 2020.10.16 09:56:06 -08'00' Date: 10/16/20

EPA Remedial Project Manager: Digitally signed by DUSTAN BOTT Date: 2020.10.16 11:31:00 -07'00' Date: 10/16/20

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX B –CONCEPTUAL SITE MODEL

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HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Eielson Air Force Base and Community of Moose Creek, Alaska (PFAS)

Completed By: Sundance-EA, II LLC

Date Completed: March 10, 2022

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Current & Future Receptors: Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil → check soil	☑ soil	☑ Incidental Soil Ingestion	C/F	C/F	C/F	C/F	C/F	C/F	
	☑ Migration to subsurface → check soil		☑ Dermal Absorption of Contaminants from Soil	I	I	I	I	I	I	
	☑ Migration to groundwater → check groundwater		☑ Inhalation of Fugitive Dust	C/F	C/F	C/F	C/F	C/F	C/F	
	☐ Volatilization → check air									
	☑ Runoff or erosion → check surface water									
	☑ Uptake by plants or animals → check biota									
	☐ Other (list):									
☑ Subsurface Soil (2-15 ft bgs)	☑ Direct release to subsurface soil → check soil	☑ groundwater	☑ Ingestion of Groundwater	C/F	C/F	C/F	C/F	C/F	C/F	
	☑ Migration to groundwater → check groundwater		☑ Dermal Absorption of Contaminants in Groundwater	I	I	I	I	I	I	
	☐ Volatilization → check air		☐ Inhalation of Volatile Compounds in Tap Water							
	☑ Uptake by plants or animals → check biota									
	☐ Other (list):									
☑ Ground-water	☑ Direct release to groundwater → check groundwater	☐ air	☐ Inhalation of Outdoor Air							
	☐ Volatilization → check air		☐ Inhalation of Indoor Air							
	☑ Flow to surface water body → check surface water		☐ Inhalation of Fugitive Dust							
	☑ Flow to sediment → check sediment									
	☑ Uptake by plants or animals → check biota									
	☐ Other (list):									
☑ Surface Water	☑ Direct release to surface water → check surface water	☑ surface water	☑ Ingestion of Surface Water	C/F	C/F	C/F	C/F	C/F	C/F	
	☐ Volatilization → check air		☑ Dermal Absorption of Contaminants in Surface Water	I	I	I	I	I	I	
	☑ Sedimentation → check sediment		☐ Inhalation of Volatile Compounds in Tap Water							
	☑ Uptake by plants or animals → check biota									
	☐ Other (list):									
☑ Sediment	☑ Direct release to sediment → check sediment	☑ sediment	☑ Direct Contact with Sediment	I	I	I	I	I	I	
	☑ Resuspension, runoff, or erosion → check surface water									
	☑ Uptake by plants or animals → check biota									
	☐ Other (list):									
		☑ biota	☑ Ingestion of Wild or Farmed Foods	C/F	C/F	C/F	C/F	C/F	C/F	

Revised, 10/01/2010

Print Form

Human Health Conceptual Site Model Scoping Form and Standardized Graphic (ADEC, 2017; Appendix A)

Site Name: Eielson Air Force Base and Community of Moose Creek, Alaska (PFAS)

File Number: 107.38.150

Completed by: Sundance-EA, II LLC

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☒ USTs
- ☒ ASTs
- ☐ Dispensers/fuel loading racks
- ☒ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: aqueous film-forming foam use/operations

Release Mechanisms *(check potential release mechanisms at the site)*

- ☒ Spills
- ☐ Leaks
- ☒ Direct discharge
- ☐ Burning
- ☒ Other: aqueous film-forming foam use/operations

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☐ Air
- ☒ Sediment
- ☒ Groundwater
- ☒ Surface water
- ☒ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☒ Subsistence harvester (i.e. gathers wild foods)
- ☒ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☒ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

PFAS compounds are present in soil between 0 to 15 feet bgs at concentrations exceeding risk-based screening levels. This pathway is considered potentially complete for current commercial/industrial and future residential land use scenarios.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

This pathway is considered insignificant because dermal absorption of PFAS compounds is slow and does not result in significant exposure.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the ground-water is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Eielson Air Force Base and Moose Creek currently have water treatment systems installed; however, this is still considered a complete exposure pathway.

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☒

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

PFOA+PFOS were reported at concentrations exceeding the Lifetime Health Advisory level and ADEC Groundwater Cleanup Level in surface water samples. Surface water is not currently used for drinking water but is used for recreation at times.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☒

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☒

If all of the boxes are checked, label this pathway complete: Complete

Comments:

Eielson AFB is surrounded by large areas of forested wetland and surface water bodies that provide potential ecological habitat. Because terrestrial and aquatic ecological exposure pathways could be complete, the wild food ingestion pathway is considered potentially complete.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Because the PFAS of concern are not volatile, this pathway is considered incomplete for the current and future commercial/industrial land use scenarios.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☐

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Because the PFAS of concern are not volatile, this pathway is considered incomplete for the current and future commercial/industrial land use scenarios.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

PFAS in groundwater and surface water have the potential to permeate skin. However, this pathway is considered insignificant because dermal absorption of PFAS compounds is slow and does not result in significant exposure.

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

The PFAS of concern are not volatile.

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Fugitive dust from surface soil impacts is considered potentially complete for the current and future commercial/industrial land use scenarios.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

The results of the Expanded SI indicated that PFAS concentrations in sediment from surface water bodies on Eielson AFB and around Moose Creek were consistently less than 1/100 of the risk-based screening levels. Therefore, this pathway is considered insignificant.

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

For future evaluations, the data indicates that given the available habitat and ecosystems, potential ecological exposure pathways would (at least) include:
• Potential direct exposure of aquatic resources (e.g., fish, benthic macroinvertebrates, and epibenthic organisms) to chemicals present in sediment,
• Potential direct exposure (e.g., incidental ingestion during foraging or burrowing activities) of wildlife to chemicals in surface soil and/or sediment, and
• Bioconcentration or bioaccumulation through ingestion of food items by avian wildlife (for example, piscivorous birds) and aquatic organisms (e.g., marine fish) using ponded and near shore lagoon or ocean areas.

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX C – SITE INSPECTION PHOTOGRAPHS

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix C.1 – Phase I - Sampling of Existing Monitoring Wells Site Inspection Photographs

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Appendix C.1. Table of Contents

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Photograph C.1-1. View of USAP-2 upon arriving to well.

Photograph C.1-2. View of MW-BKG-04 with lid closed.

Photograph C.1-3. View of MW-BKG-07 with lid closed.

Photograph C.1-4. View of 51MB4 damage.

Photograph C.1-5. View of 51MB2B flush mount.

Photograph C.1-6. View of MW-BKG-11.

Photograph C.1-7. View of broken outer casing of MW-BKG-05.

Photograph C.1-8. View of broken outer casing of MW-BKG-12.

Photograph C.1-9. View of MW-BKG-01.

Photograph C.1-10. View of MW-BKG-09 flush mount.

Photograph C.1-11. View of MW-BKG-10 with lid on.

Photograph C.1-12. View of 02MW11 well during purging. LDPE tubing from well in background.

Photograph C.1-13. View of DSAP-14.

Photograph C.1-14. View of DSAP-8S.

Photograph C.1-15. View of USAP-3.

Photograph C.1-16. View of frost jacking of USAP-3.

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix C.2 – Phase II - Temporary Monitoring Wells, Clustered Monitoring Wells, and Soil Borings Site Inspection Photographs

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Appendix C.2. Table of Contents

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Photograph C.2-1. Drilling of 19PS-MW02A.

Photograph C.2-2. Containment of soils extracted from 19PS-MW02A.

Photograph C.2-3. View of field personnel logging soils from 19PS-MW02A.

Photograph C.2-4. View of the sump, end cap, and top cap of the well construction.

Photograph C.2-5. View of stamped well ID on well lid of 19PS-MW02A.

Photograph C.2-6. Overview of the drilling operation at 19PS-MW02B.

Photograph C.2-7. View of Sundance-EA, LLC, personnel documenting parameters during development of 19PS-MW02B.

Photograph C.2-8. View of newly installed 19PS-MW02A and 19PS-MW02B.

Photograph C.2-9. View of Sundance-EA, LLC, personnel conducting low flow sampling of 19PS-MW02A.

Photograph C.2-10. View of the installation of 19PS-MW01A.

Photograph C.2-11. View of Sundance-EA, LLC, personnel at 19PS-MW01A during the development process.

Photograph C.2-12. View of completed wells 19PS-MW2A and 19PS-MW2B in Well Cluster #2 area.

Photograph C.2-13. View of completed wells 19PS-MW1A and 19PS-MW1B and bollards in Well Cluster #1 area.

Photograph C.2-14. View of 20PS-MW02C.

Photograph C.2-15. View of the decon pad for casing and rod cleaning.

Photograph C.2-16. Drilling of 20PS-MW02D.

Photograph C.2-17. Installation of 20PS-MW02D.

Photograph C.2-18. Purging process during development of 20PS-MW02D.

Photograph C.2-19. Drilling of 20PS-MW01D.

Photograph C.2-20. Well completions at Well Cluster #2.

Photograph C.2-21. Well completions at Well Cluster #1.

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix C.3 – Phase III - Step-ins/step-outs for Temporary Monitoring Wells and Soil Borings Site Inspection Photographs

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Appendix C.3. Table of Contents

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Photograph C.3-1. View of drilling of 19PS-FFTA-ENT-SB05.

Photograph C.3-2. Soils extracted from SB05.

Photograph C.3-3. View of drilling of 19PS-FFTA-ENT-SB06.

Photograph C.3-4. View of drilling of 19PS-FFTA-ENT-SB10.

Photograph C.3-5. Soils extracted from SB10.

Photograph C.3-6. View of drilling of 19PS-FST1-SB06.

Photograph C.3-7. View of soil from SB06 at FST1.

Photograph C.3-8. View of sample team collecting soil samples at FST1.

Photograph C.3-9. View of drilling of 19PS-FST1-SB02.

Photograph C.3-10. Soil core for 20PS-FFTA-ENT-SB11.

Photograph C.3-11. Drilling of 20PS-FFTA-ENT-SB11.

Photograph C.3-12. Drilling of 20PS-FFTA-ENT-SB14.

Photograph C.3-13. Asphalt patch for soil borings drilled through asphalt.

Photograph C.3-14. Drilling of 20PS-FST1-SB13.

Photograph C.3-15. SP-16 temporary well ready for purging at TW03.

Photograph C.3-16. Purging and sampling setup at TW03.

Photograph C.3-17. Drilling TW19 in the Chena Flood Control Project.

Photograph C.3-18. Drilling TW01 along DLA pipeline in Moose Creek.

Photograph C.3-19. Setting SP-16 well screen at TW01.

Photograph C.3-20. Purging /Sampling setup at TW29.

Photograph C.3-21. Drilling at TW34 along railway.

Photograph C.3-22. TW58 location staked and facing West.

Photograph C.3-23. Geoprobe drill rig drilling TW46 in Chena Flood Control Project.

Photograph C.3-24. Sampling setup at TW58.

Photograph C.3-25. Sampling setup at TW57. AK-2 Bridge in background.

Photograph C.3-26. Sampling setup at TW38 along south end of runway.

Photograph C.3-27. Frozen silt chips recovered from TW44 piezometer install attempts.

Photograph C.3-28. Attempt to install piezometer at TW43. Unable to penetrate frozen soil.

Photograph C.3-29. Attempt to sample TW45 using piezometer as well screen.

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix C.4 – Phase IV - Installation of Permanent Wells Site Inspection Photographs

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Appendix C.4. Table of Contents

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Photograph C.4-1. Drilling of MW-17.

Photograph C.4-2. Decon of tooling.

Photograph C.4-3. Screen and casing being placed at MW-13.

Photograph C.4-4. Development of MW-17.

Photograph C.4-5. Development of MW-15.

Photograph C.4-6. Previous drill location for MW-23 where refusal was encountered and new drill location offset 15 feet.

Photograph C.4-7. Pouring pea gravel as base for flush mount.

Photograph C.4-8. Setting Well MW-12.

Photograph C.4-9. Installation of MW-23.

Photograph C.4-10. Drilling of MW-1.

Photograph C.4-11. Drill rod connection during drilling.

Photograph C.4-12. Surface water sample CS-03 collection.

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix C.5 – Phase V - Eielson AFB Surface Water and Sediment Sampling Site Inspection Photographs

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Appendix C.5. Table of Contents

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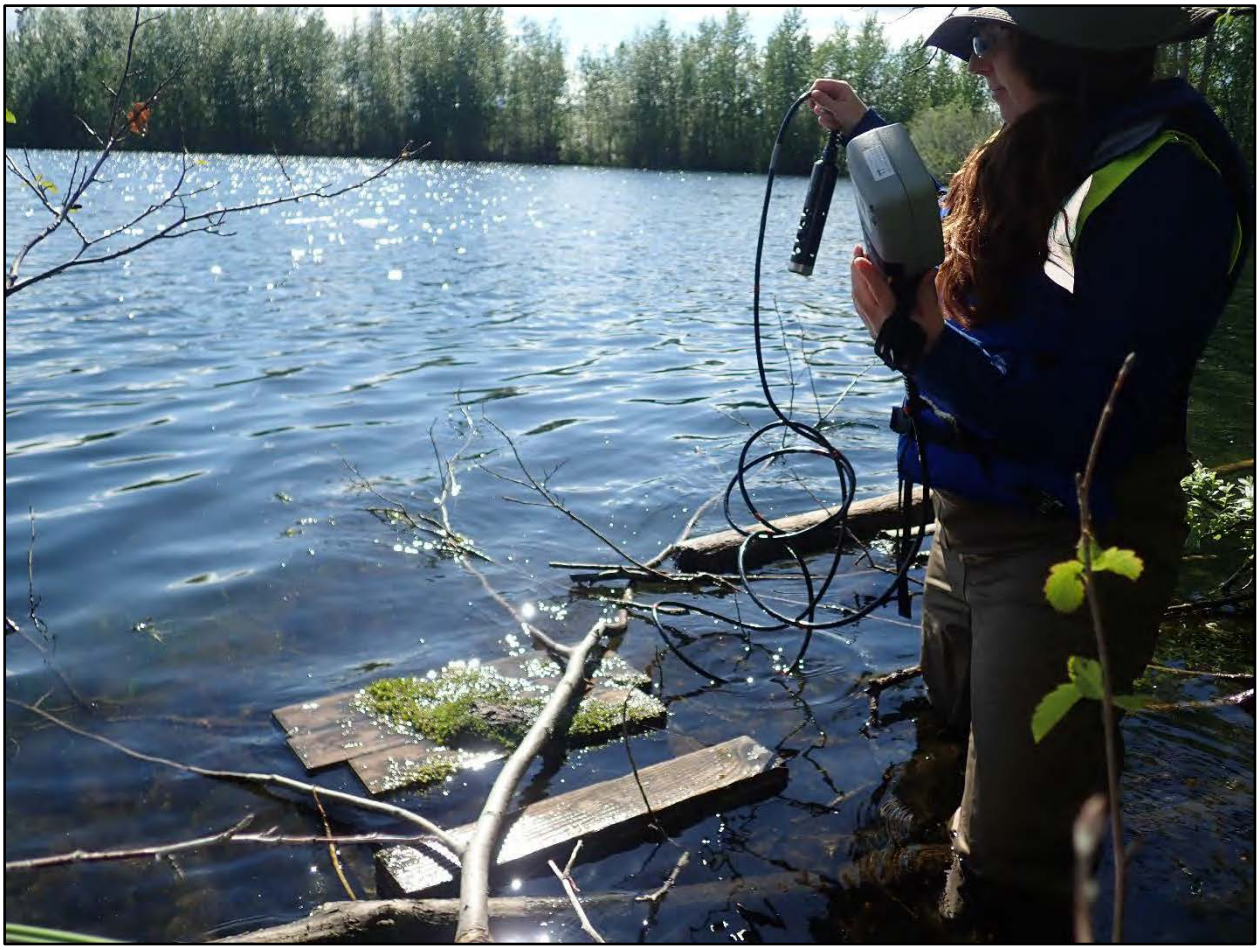
Photograph C.5-1. Collecting water quality parameters at MP02; facing east.

Photograph C.5-2. Collecting surface water sample at SP01; facing north.

Photograph C.5-3. Collecting water quality parameters at ML02; facing east.



Photograph C.5-4. Collecting water quality parameters at ML01; facing south.

Photograph C.5-5. Attempt to collect sediment sample at SP01, facing down. Sample collection unsuccessful at this location.

Photograph C.5-6. Collecting water quality parameters at FC02; facing east/northeast.

Photograph C.5-7. Collecting surface water sample at BR02; facing northeast.

Photograph C.5-8. Collecting water quality parameters at ZP01; facing west.

Photograph C.5-9. Collecting water quality parameters at TK01; facing west.

Photograph C.5-10. Collection of sediment sample at PS03; facing southeast.

Photograph C.5-11. Collecting sediment sample with the Ponar at HL02; facing west.

Photograph C.5-12. Collection of surface water sample at SC01; facing southeast.

Photograph C.5-13. Collection of sediment sample at shore of SC02; facing down.

Photograph C.5-14. Collection of surface water sample at SC02; facing west.

Photograph C.5-15. General site condition overview of GL02; facing northwest.

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix C.6 – Investigation Derived Waste (IDW) Management Site Inspection Photographs

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Appendix C.6. Table of Contents

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Photograph C.6-1. Site conditions at well cluster #1.

Photograph C.6-2. Surface disposed soils from Well Cluster #1 drums 121, 122, and 130.

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX D – SITE ACCESS

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix D.1 – 811 One Calls and Locates

(Provided on CD/DVD)

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #: 2019310246**
Company: SUNDANCE CONSULTING	**Work Start Date: 07/31/2019 16:00:00**
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: EIELSON AFB	**Borough:** ALASKA
Subdivision: MW # 19PS-TW01 THRU 19PS-TW05	
Address: **Unit:** **To:**	**Intersection 1:** CARGAIN RD
Street: RICHARDSON HWY	**Intersection 2:** RICHARDSON HWY APPROX MP 340
GPS: 64.65967250, -147.10094700	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks: TKT 1 OF 12 THIS PROJECT

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified: ACS INTERIOR
GCI FAIRBANKS
AT&T ALASCOM

*** Not all facility owners subscribe to 811 Alaska Digline service. Visit our web site for the current list of members.

- Do not start work until all facility owners have either marked or contacted you. Check the status online using ticket search.
- Respect the tolerance zone by hand digging within 24 inches of the outside dimensions of buried facilities; if digging depper than 10 feet hand dig within 30 inches. Depth of facilities are not provided.
- Private/consumer owned facilities are not marked through this service.
- Pre-mark/Outline your dig area in white paint; black paint if snow is present. Submit a Relocate if marks are not visible.

Red = Eletric Yellow = Gas Orange = Telecom Blue = Water Sewer = Green

Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #:** 2019310247
Company: SUNDANCE CONSULTING	**Work Start Date:** 07/31/2019 16:04:00
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: EIELSON AFB	**Borough:** ALASKA
Subdivision: MW # 19PS-TW06	
Address: **Unit:** **To:**	**Intersection 1:** OLD VALDEZ TRL
Street: EIELSON FARM RD	**Intersection 2:**
GPS: 64.66162350, -147.16969300	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified: ACS INTERIOR

*** Not all facility owners subscribe to 811 Alaska Digline service. Visit our web site for the current list of members.

- Do not start work until all facility owners have either marked or contacted you. Check the status online using ticket search.
- Respect the tolerance zone by hand digging within 24 inches of the outside dimensions of buried facilities; if digging depper than 10 feet hand dig within 30 inches. Depth of facilities are not provided.
- Private/consumer owned facilities are not marked through this service.
- Pre-mark/Outline your dig area in white paint; black paint if snow is present. Submit a Relocate if marks are not visible.

Red = Eletric Yellow = Gas Orange = Telecom Blue = Water Sewer = Green

Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #: 2019310250**
Company: SUNDANCE CONSULTING	**Work Start Date: 07/31/2019 16:04:00**
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: EIELSON AFB	**Borough:** ALASKA
Subdivision: MW# 19PS-TW07 THRU 19PS-TW11	
Address: **Unit:** **To:**	**Intersection 1:** RICHARDSON HWY
Street: E TANK RD	**Intersection 2:** BOZEMAN AVE
GPS: 64.67352850, -147.14538750	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified: ACS INTERIOR
GCI FAIRBANKS
AT&T ALASCOM

*** Not all facility owners subscribe to 811 Alaska Digline service. Visit our web site for the current list of members.

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- Private/consumer owned facilities are not marked through this service.
- Pre-mark/Outline your dig area in white paint; black paint if snow is present. Submit a Relocate if marks are not visible.

Red = Eletric Yellow = Gas Orange = Telecom Blue = Water Sewer = Green

Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #: 2019310251**
Company: SUNDANCE CONSULTING	**Work Start Date: 07/31/2019 16:05:00**
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: NORTH POLE	**Borough:** ALASKA
Subdivision: MW # 19PS-TW12 THRU 19PS-TW14	
Address: **Unit:** **To:**	**Intersection 1:** BOZEMAN AVE
Street: EIELSON FARM RD	**Intersection 2:** RAILROAD R.O.W., MP 20
GPS: 64.70701450, -147.22415050	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified:
ACS INTERIOR
AT&T ALASCOM
ALASKA RAILROAD CORP.
GCI FIBER OPTIC CABLE SYSTEMS

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #: 2019310254**
Company: SUNDANCE CONSULTING	**Work Start Date: 07/31/2019 16:06:00**
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: NORTH POLE	**Borough:** ALASKA
Subdivision: MW# 19PS-TW15 THRU 17	
Address: **Unit:** **To:**	**Intersection 1:** LAURANCE RD
Street: RICHARDSON HWY	**Intersection 2:** DYKE RD
GPS: 64.73219350, -147.27966200	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified:
ACS INTERIOR
GCI FAIRBANKS
GOLDEN VALLEY ELECTRIC ASSOC.
AT&T ALASCOM
GCI FIBER OPTIC CABLE SYSTEMS
INTERIOR AK NATURAL GAS UTILITY

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #: 2019310255**
Company: SUNDANCE CONSULTING	**Work Start Date: 07/31/2019 16:08:00**
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: NORTH POLE	**Borough:** ALASKA
Subdivision: MW # 19PS-TW18	
Address: **Unit:** **To:**	**Intersection 1:** OLD RICHARDSON HWY
Street: LAURANCE RD	**Intersection 2:**
GPS: 64.73357350, -147.32995950	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified:
ACS INTERIOR
GCI FAIRBANKS
MATANUSKA TELEPHONE ASSOC.
ALASKA RAILROAD CORP.
INTERIOR AK NATURAL GAS UTILITY

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #:** 2019310262
Company: SUNDANCE CONSULTING	**Work Start Date:** 07/31/2019 16:09:00
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: NORTH POLE	**Borough:** ALASKA
Subdivision: MW# 19PS-TW19	
Address: **Unit:** **To:**	**Intersection 1:** CHENA LAKES ACCESS RD
Street: LAURANCE EXT RD	**Intersection 2:**
GPS: 64.75190150, -147.22167700	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified: ACS INTERIOR GCI FAIRBANKS

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #:** 2019310270
Company: SUNDANCE CONSULTING	**Work Start Date:** 07/31/2019 16:10:00
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: NORTH POLE	**Borough:** ALASKA
Subdivision: MW #19PS-TW20 & 19PS-TW21	
Address: **Unit:** **To:**	**Intersection 1:** WEST OF ROBIN RD
Street: SECTION LINE EASEMENT	**Intersection 2:** EASST OF LAURANCE RD
GPS: 64.73496750, -147.16880050	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified: ACS INTERIOR
GCI FAIRBANKS
DOYON FTWAINWRIGHT

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #:** 2019310273
Company: SUNDANCE CONSULTING	**Work Start Date:** 07/31/2019 16:10:00
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: NORTH POLE	**Borough:** ALASKA
Subdivision: MW# 19PS-TW22 THRU 19PS-TW25	
Address: **Unit:** **To:**	**Intersection 1:** MOOSE CREEK
Street: PIPELINE ACCESS RD	**Intersection 2:** TRANSMITTER RD
GPS: 64.71425400, -147.15043800	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [x] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified:
ACS INTERIOR
GCI FAIRBANKS
ALYESKA PIPELINE SERVICE CO.
GCI FIBER OPTIC CABLE SYSTEMS

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #: 2019310276**
Company: SUNDANCE CONSULTING	**Work Start Date: 07/31/2019 16:11:00**
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: EIELSON AFB	**Borough:** ALASKA
Subdivision: MW# 19PS-TW26 THRU 19PS-TW30	
Address: **Unit:** **To:**	**Intersection 1:** TRANSMITTER RD
Street: PIPELINE ACCESS RD	**Intersection 2:** MOOSE LAKE DR
GPS: 64.69479500, -147.07992750	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [x] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified:
ACS INTERIOR
DOYON FTWAINWRIGHT
GCI FIBER OPTIC CABLE SYSTEMS
ALYESKA PIPELINE SERVICE CO.
GCI FAIRBANKS

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #:** 2019310279
Company: SUNDANCE CONSULTING	**Work Start Date:** 07/31/2019 16:12:00
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: EIELSON AFB	**Borough:** ALASKA
Subdivision: MW #19PS-TW31 THRU 19PS-TW34	
Address: **Unit:** **To:**	**Intersection 1:** MOOSE LAKE RD
Street: INDUSTRIAL DR	**Intersection 2:** QUARRY RD
GPS: 64.66650800, -147.05630950	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [x] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified: ACS INTERIOR GCI FAIRBANKS

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #:** 2019310281
Company: SUNDANCE CONSULTING	**Work Start Date:** 07/31/2019 16:13:00
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 07/29/2019
Working for:	**Date Processed:** 07/29/2019

City: EIELSON AFB	**Borough:** ALASKA
Subdivision: MW# 19PS-TW35	
Address: **Unit:** **To:**	**Intersection 1:** MULLINS PIT RD
Street: QUARRY RD	**Intersection 2:**
GPS: 64.65243150, -147.03814500	
Access: Yes	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: 35 TEMPORARY MONITORING WELL LOCATIONS AROUN D EIELSON AFB, CHENA FLOOD CONTROL, AND MOOSE CREEK.MAXIM UM DEPTH OF WELLS IS 25 FT BGS.

Remarks:

N/A

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [x] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified: ACS INTERIOR

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: NICOLE STOECKLEIN	**REQUEST #:** 2019360991
Company: EA ENGINEERING	**Work Start Date:** 09/10/2019 14:11:00
Phone: (907)456-4751 Ext: 102	**Status:** STANDARD
Cell: ( ) -	**Request Type:** REGULAR
Email: nstoecklein@eaest.com	**Update of:**
Alt Contact: NICOLE STOECKLEIN	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 09/06/2019
Working for: EIELSON AIR FORCE BASE	**Date Processed:** 09/06/2019

City: EIELSON AFB	**Borough:** FAIRBANKS NORTH STAR
Subdivision: BLDG 3229	
Address: **Unit:** **To:**	**Intersection 1:** DIVISION ST (EAFB)
Street: FLIGHTLINE AVE	**Intersection 2:**
GPS: 64.66680950, -147.08909550	
Access: No	**Site Meet:** No

Type of Work: REMOVE FUEL OIL LINE

Scope of Work: W1909061255040 REAR OF BLDG 3229 & OUT 10', UST G ETTING NEW PROBE/INTERNAL PARTS; BAY OF BLDG 1246CAPPING OV ERFLOW FUEL LINE FROM UST. SEE ATTACHED TKT 1 OF 2

Remarks: MUST CHECK IN @ BLDG 3243

N/A

- ☐ ROAD R.O.W.
- ☐ EASEMENT
- ☐ FRONT YARD
- ☐ BACK YARD
- ☐ RAILROAD R.O.W.
- ☐ PIPELINE R.O.W.
- ☐ DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 6.00 FT

Notified: ACS INTERIOR GCI FAIRBANKS

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: NICOLE STOECKLEIN	**REQUEST #:** 2019360998
Company: EA ENGINEERING	**Work Start Date:** 09/10/2019 14:12:00
Phone: (907)456-4751 Ext: 102	**Status:** STANDARD
Cell: ( ) -	**Request Type:** REGULAR
Email: nstoecklein@eaest.com	**Update of:**
Alt Contact: NICOLE STOECKLEIN	**Job #:**
Alt Phone: ( ) -	**Date Submitted:** 09/06/2019
Working for: EIELSON AIR FORCE BASE	**Date Processed:** 09/06/2019

City: EIELSON AFB	**Borough:** FAIRBANKS NORTH STAR
Subdivision: BLDG 1246	
Address: **Unit:** **To:**	**Intersection 1:** LOOP ACCESS RD
Street: FLIGHTLINE AVE	**Intersection 2:**
GPS: 64.65158700, -147.07906500	
Access: No	**Site Meet:** No

Type of Work: REMOVE FUEL OIL LINE

Scope of Work: W1909061255040 REAR OF BLDG 3229, UST GETTING NE **Remarks:** IF NEED ACCESS TO FLIGHT LINE CHECK IN W/SECURITY O W PROBE/INTERNAL PARTS; BAY OF BLDG 1246 CAPPINGOVERFLOW F R POL.
UEL LINE FROM UST. SEE DRAWING ATTACHED TO TKT 2019360991. TKT
2 OF 2

N/A

- ☐ ROAD R.O.W.
- ☐ EASEMENT
- ☐ FRONT YARD
- ☐ BACK YARD
- ☐ RAILROAD R.O.W.
- ☐ PIPELINE R.O.W.
- ☐ DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 3.00 FT

Notified: ACS INTERIOR GCI FAIRBANKS

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Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #:** 2020180690
Company: SUNDANCE CONSULTING	**Work Start Date:** 05/04/2020 12:15:00
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:** 2527
Alt Phone: ( ) -	**Date Submitted:** 04/30/2020
Working for:	**Date Processed:** 04/30/2020

City: NORTH POLE	**Borough:** FAIRBANKS NORTH STAR
Subdivision:	
Address: **Unit:** **To:**	**Intersection 1:** RICHARDSON HWY
Street: EIELSON FARM RD	**Intersection 2:**
GPS: 64.72113350, -147.25465750	
Access: No	**Site Meet:** No

Type of Work: MONITOR WELLS

Scope of Work: Install 2" temporary monitoring wells to 25 ft using Geoprobe rig. Blue Triangles on map are well locations (labeled TW-##). GPS Coordinates included. Mostly within Chena Flood Control Project and Eielson AFB.

Remarks:

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 25.00 FT

Notified:
ACS INTERIOR
ALYESKA PIPELINE SERVICE CO.
GCI FAIRBANKS
GENERAL COMMUNICATIONS INC.
ALASKA RAILROAD CORP.
AT&T ALASCOM
GCI FIBER OPTIC CABLE SYSTEMS
MATANUSKA TELEPHONE ASSOC.

*** Not all facility owners subscribe to 811 Alaska Digline service. Visit our web site for the current list of members.

- Do not start work until all facility owners have either marked or contacted you. Check the status online using ticket search.
- Respect the tolerance zone by hand digging within 24 inches of the outside dimensions of buried facilities; if digging deeper than 10 feet hand dig within 30 inches. Depth of facilities are not provided.
- Private/consumer owned facilities are not marked through this service.
- Pre-mark/Outline your dig area in white paint; black paint if snow is present. Submit a Relocate if marks are not visible.

Red = Eletric **Yellow = Gas** **Orange = Telecom** **Blue = Water** **Sewer = Green**

Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

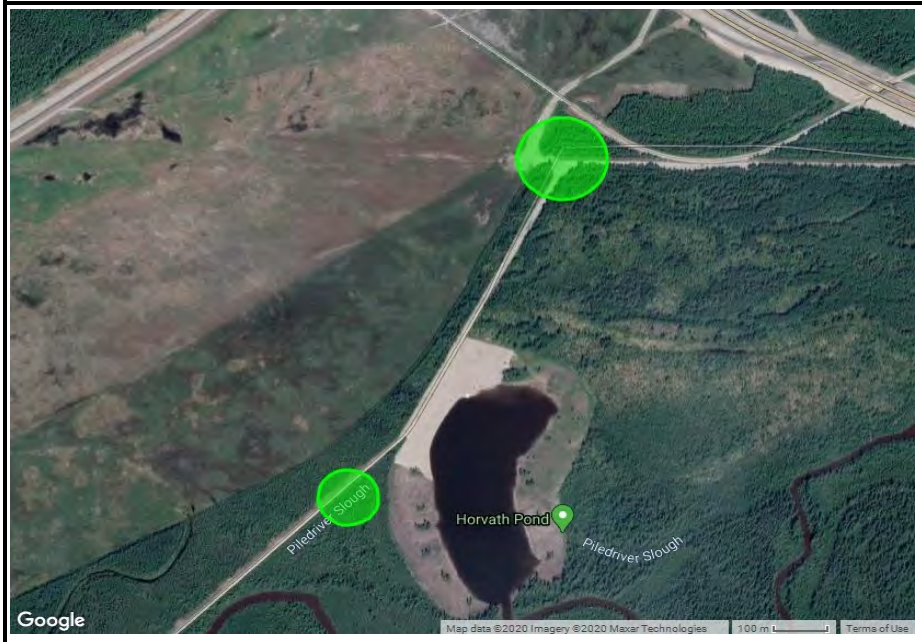
Excavator: Nicole Stoecklein	**REQUEST #: 2020191049**
Company: EA ENGINEERING	**Work Start Date: 05/11/2020 14:14:00**
Phone: (907)456-4751	**Status:** STANDARD
Cell: ( ) -	**Request Type:** REGULAR
Email: nstoecklein@eaest.com	**Update of:**
Alt Contact:	**Job #:** 6321403
Alt Phone: ( ) -	**Date Submitted:** 05/07/2020
Working for: army corp of engineers	**Date Processed:** 05/07/2020

City: FAIRBANKS NORTH STAR BOROUGH	**Borough:** FAIRBANKS NORTH STAR
Subdivision:	
Address: **Unit:** **To:**	**Intersection 1:** PILEDRIVER SLOUGH RD
Street: RICHARDSON HWY/PILEDRIVER SLOUGH RD	**Intersection 2:**
GPS: 64.71857550, -147.26120850	
Access: Yes	**Site Meet:** No

Type of Work: MONTIOR WELLS

Scope of Work: WILL BE DRILLING 4 MONITOR WELLS, 2 IN EACH LOCATION INDICATED ON THE MAPS ATTACHED. THERE ARE EXISTING WELLS IN THE AREA FOR EACH LOCATION. LOC A 20' R OF EACH EXISTING WELL SEE ATTACHED MAPS

Remarks:



- ☐ ROAD R.O.W.
- ☐ EASEMENT
- ☐ FRONT YARD
- ☐ BACK YARD
- ☐ RAILROAD R.O.W.
- ☐ PIPELINE R.O.W.
- ☑ DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W:
*DEPTH: 210.00 FT

Notified:
ACS INTERIOR
GCI FIBER OPTIC CABLE SYSTEMS
ALASKA RAILROAD CORP.
GENERAL COMMUNICATIONS INC.

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- Private/consumer owned facilities are not marked through this service.
- Pre-mark/Outline your dig area in white paint; black paint if snow is present. Submit a Relocate if marks are not visible.

Red = Eletric **Yellow = Gas** **Orange = Telecom** **Blue = Water** **Sewer = Green**

Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: Nicole Stoecklein	**REQUEST #: 2020211640**
Company: EA ENGINEERING	**Work Start Date: 05/27/2020 08:38:00**
Phone: (907)456-4751	**Status:** STANDARD
Cell: (512)653-1343	**Request Type:** REGULAR
Email: nstoecklein@eaest.com	**Update of:**
Alt Contact: Gilbert Manning	**Job #:** 6321403
Alt Phone: (512)433-9918	**Date Submitted:** 05/22/2020
Working for: USAF	**Date Processed:** 05/22/2020

City: EIELSON AFB	**Borough:** FAIRBANKS NORTH STAR
Subdivision:	
Address: **Unit:** **To:**	**Intersection 1:** OUTER LOOP
Street: INNER LOOP	**Intersection 2:**
GPS: 64.65554250, -147.07726800	
Access: No	**Site Meet:** No

Type of Work: SOIL BORINGS

Scope of Work: 6 soil borings are proposed for the highlighted area. Soil borings will be installed from ground surface to the top of the water table at 10-15 ft bgs.

Remarks:

- ☐ ROAD R.O.W.
- ☐ EASEMENT
- ☐ FRONT YARD
- ☐ BACK YARD
- ☐ RAILROAD R.O.W.
- ☐ PIPELINE R.O.W.
- ☑ DIG AREA IS PREMARKED

DIG SIZE:
L:
DIR:
W: 0.17 FT
*DEPTH: 15.00 FT

Notified: ACS INTERIOR GENERAL COMMUNICATIONS INC.

*** Not all facility owners subscribe to 811 Alaska Digline service. Visit our web site for the current list of members.

- Do not start work until all facility owners have either marked or contacted you. Check the status online using ticket search.
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- Private/consumer owned facilities are not marked through this service.
- Pre-mark/Outline your dig area in white paint; black paint if snow is present. Submit a Relocate if marks are not visible.

Red = Eletric **Yellow = Gas** **Orange = Telecom** **Blue = Water** **Sewer = Green**

Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #:** 2020220562
Company: SUNDANCE CONSULTING	**Work Start Date:** 05/29/2020 08:44:00
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:** Eielson PFAS
Alt Phone: ( ) -	**Date Submitted:** 05/27/2020
Working for:	**Date Processed:** 05/27/2020

City: EIELSON AFB	**Borough:** FAIRBANKS NORTH STAR
Subdivision:	
Address: 1199 **Unit:** **To:**	**Intersection 1:** RICHARDSON HWY
Street: OLD RICHARDSON HWY	**Intersection 2:**
GPS: 64.69928250, -147.13537500	
Access: No	**Site Meet:** No

Type of Work: DRILLING MONITOR WELL

Scope of Work: Drill one 25 foot monitoring well along the east side of the southbound Richardson Highway/Eielson Exit offramp and the Old Richardson highway intersection.

Remarks:

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L: 1.00 FT
DIR:
W: 1.00 FT
*DEPTH: 25.00 FT

Notified: ACS INTERIOR
GENERAL COMMUNICATIONS INC.
AT&T ALASCOM

*** Not all facility owners subscribe to 811 Alaska Digline service. Visit our web site for the current list of members.

- Do not start work until all facility owners have either marked or contacted you. Check the status online using ticket search.
- Respect the tolerance zone by hand digging within 24 inches of the outside dimensions of buried facilities; if digging deeper than 10 feet hand dig within 30 inches. Depth of facilities are not provided.
- Private/consumer owned facilities are not marked through this service.
- Pre-mark/Outline your dig area in white paint; black paint if snow is present. Submit a Relocate if marks are not visible.

Red = Eletric **Yellow = Gas** **Orange = Telecom** **Blue = Water** **Sewer = Green**

Locate Request Confirmation

This request is valid for 15 working days if marks are visible, beginning on the Work Start Date indicated below.

Excavator: GEORGE GARNER	**REQUEST #:** 2020220564
Company: SUNDANCE CONSULTING	**Work Start Date:** 05/29/2020 08:44:00
Phone: (907)646-0213	**Status:** STANDARD
Cell: (251)605-1931	**Request Type:** REGULAR
Email: ggarner@sundance-inc.net	**Update of:**
Alt Contact:	**Job #:** Eielson PFAS
Alt Phone: ( ) -	**Date Submitted:** 05/27/2020
Working for:	**Date Processed:** 05/27/2020

City: EIELSON AFB	**Borough:** FAIRBANKS NORTH STAR
Subdivision:	
Address: **Unit:** **To:**	**Intersection 1:** UNAMED RD
Street: RICHARDSON HWY	**Intersection 2:**
GPS: 64.64380850, -147.04234900	
Access: No	**Site Meet:** No

Type of Work: DRILLING MONITOR WELL

Scope of Work: Drill one 25 foot monitoring well near the former location of a Monitoring Well by the ordnance holding area for the South Taxiway Loop.

Remarks:

- [x] ROAD R.O.W.
- [ ] EASEMENT
- [ ] FRONT YARD
- [ ] BACK YARD
- [ ] RAILROAD R.O.W.
- [ ] PIPELINE R.O.W.
- [ ] DIG AREA IS PREMARKED

DIG SIZE:
L: 1.00 FT
DIR:
W: 1.00 FT
*DEPTH: 25.00 FT

Notified: ACS INTERIOR

*** Not all facility owners subscribe to 811 Alaska Digline service. Visit our web site for the current list of members.

- Do not start work until all facility owners have either marked or contacted you. Check the status online using ticket search.
- Respect the tolerance zone by hand digging within 24 inches of the outside dimensions of buried facilities; if digging deeper than 10 feet hand dig within 30 inches. Depth of facilities are not provided.
- Private/consumer owned facilities are not marked through this service.
- Pre-mark/Outline your dig area in white paint; black paint if snow is present. Submit a Relocate if marks are not visible.

Red = Eletric **Yellow = Gas** **Orange = Telecom** **Blue = Water** **Sewer = Green**

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix D.2 – U.S. Air Force Dig Permits

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BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

(See Instructions on Reverse)

DATE PREPARED: 20190729

1. Clearance is requested to proceed with work at Eielson AFB

on Work Order No. W911KB18F0173, Contract No. W911KB-17-D-0018, involving excavation or utility disturbance per attached sketch. This area ☐ has ☒ has not been staked or clearly marked.

2. TYPE OF FACILITY/WORK INVOLVED

☐ A. PAVEMENTS	☐ D. FIRE DETECTION & PROTECTION SYSTEMS			☐ G. AIRCRAFT OR VEHICULAR TRAFFIC FLOW
☐ B. DRAINAGE SYSTEMS	☐ E. UTILITY	☐ OVERHEAD	☒ UNDERGROUND	☐ H. SECURITY
☐ C. RAILROAD TRACKS	☐ F. COMM	☐ OVERHEAD	☒ UNDERGROUND	☐ I. OTHER

3. DATE CLEARANCE REQUIRED: 20190805

4. DATE OF CLEARANCE:

5. SIGNATURE OF REQUESTING OFFICIAL: George Garner (Digitally signed by George Garner, Date: 2019.07.29 15:23:36 -08'00')

6. TELEPHONE NO.: (251) 605-1931

7. ORGANIZATION: Sundance-EA

8. BASE CIVIL ENGINEERING — ORGANIZATION	REMARKS *(Use Reverse for additional comments)*	REVIEWER'S NAME AND INITIALS
A. ELECTRICAL DISTRIBUTION	Electrical Shop, 377-2297 Call before digging, Bldg. 1132 203 Hand Dig Within 3'	Click to sign
B. STEAM DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128 Clear Utilidors	Click to sign
C. WATER DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128 Clear	Click to sign
D. POL DISTRIBUTION	~~Fuels Shop, 377-2140~~ Call before digging, Bldg. 4231 clear	Click to sign
E. SEWER DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128 Clear Utilidors	Click to sign
F. ENVIRONMENTAL	Environmental, 377-1164 Restoration OK 10-1-19 (An 813 is required if digging is required) Bldg 2258 ACG	Click to sign
G. PAVEMENTS/ GROUNDS	Dirt Boyz, 377-1270 Call before digging, Bldg. 4105	55ft Dumping Click to sign 10Oct19
H. FIRE PROTECTION	Fire Prevention, 377-1293 Do not block roads or fire hydrants, Bldg. 4870	Click to sign
I. ZONE CEOIH	HVAC, 377-5133 Call before digging, Bldg. 2350	Click to sign
J. OTHER *(Specify)* Natural Resources	Natural Resources, 377-5182 Bldg. 2310 (address 2215)	Click to sign
9. SECURITY POLICE	SFS/S5, 377-5224, 377-1474 PURSUANT TO FREEZONE Obtain Security briefing, Bldg. 3134 OR ESCORT REQ'TS.	Click to sign
10. SAFETY	Safety Office, 377-4260 Obtain Safety briefing, Bldg. 3112 Rm. 181	Click to sign
11. COMMUNICATIONS 19-020	CS/SCOIC, 377-2368, 377-6969 Call 24 hours before digging, Bldg. 1127	Click to sign
12. BASE OPERATIONS	Airfield Management, 377-3233 If airfield vehicle pass needed, Bldg. 1215	Click to sign
13. CABLE TV	CS/SCOIC, 377-2368, 377-6969 Call 24 hours before digging, Bldg. 1127	Click to sign
14. COMMERCIAL UTILITY COMPANY ☒ TELEPHONE ☐ GAS ☐ ELECTRIC	Alaska Dig Line, 1-800-478-3121 or 811 Control Number 201-332-0360	Click to sign

15. OTHER *(Specify)* Contact Housing (3112) at 372-2299 and resident prior to digging. Bring approved 103 to customer service.

16. REQUESTED CLEARANCE ☒ APPROVED ☐ DISAPPROVED

17. TYPED NAME AND SIGNATURE OF APPROVING OFFICER *(Chief of Operations Flight or Chief of Engineering Flight)*

DONALD E. FRY, WS-16, DAF
Deputy Chief of Operations

Click to sign — Donald E Fry

17a. DATE SIGNED: 20 OCT 2019

AF IMT 103, 19940801, V3

PREVIOUS EDITIONS ARE OBSOLETE.

INSTRUCTIONS

The BCE work clearance request is used for any work (contract or in-house) that may disrupt aircraft or vehicular traffic flow, base utility services, protection provided by fire and intrusion alarm system, or routine activities of the installation. This form is used to coordinate the required work with key base activities and keep customer inconvenience to a minimum. It is also used to identify potentially hazardous work conditions in an attempt to prevent accidents. The work clearance request is processed just prior to the start of work. If delays are encountered and the conditions at the job site change (or may have changed) this work clearance request must be reprocessed.

18. REMARKS. *(This section must describe specific precautionary measure to be taken before and during work accomplishment. Specific comments concerning the approved method of excavation, hand or powered equipment, should be included.)*

Temporary monitoring well (35) and soil boring (13) installation to investigate possible PFOA/PFOS contamination. The temporary monitoring wells will be installed across the base, and off-site base locations to the north east (Attached Figure 6, and Table 1). The site inspection is performed under contract to United States Army Corps of Engineers (USACE) Alaska District. Temporary monitoring wells will be installed via Geoprobe drill rig. The wells will be constructed of 1.625 inch pre-pack screen will be inserted into the bore-hole using a SP16 sampler. Monitoring wells will be drilled to a maximum depth of 25 feet below ground surface. Soil cuttings generated during monitoring well installation will be containerized and stored at the point of generation (or at the owner's request at LF003).

Proposed drilling methods for borehole advancement include the use of a Geoprobe® DT45 rods with imer sample barrel, GeoProbe dual system with 3.25-inch-diameter drill rods to collect continuous soil cores in 2.1-inch-diameter liners. Soil borings will be advanced to the top of the groundwater table or to a maximum total depth of 15 feet bgs. Once the desired sample depth is reached, soil samples for PFOA and PFOS analysis will be collected. Soil boring locations are identified on Figure 4 and 5 and Table 2 (Attached). Soil cuttings generated will be containerized and stored at the point of generation (or at the owner's request at LF003).

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

(See Instructions on Reverse)

DATE PREPARED: 30 Apr 2020

1. Clearance is requested to proceed with work at: Eielson Air Force Base-Soil borings adjacent to ENT building and FS #1

on Work Order No. W911KB18F0173, Contract No. WW911KB-17-D-0018, involving excavation or utility disturbance per attached sketch. This area [X] has [ ] has not been staked or clearly marked.

2. TYPE OF FACILITY/WORK INVOLVED

[ ] A. PAVEMENTS	[ ] D. FIRE DETECTION & PROTECTION SYSTEMS			[ ] G. AIRCRAFT OR VEHICULAR TRAFFIC FLOW
[ ] B. DRAINAGE SYSTEMS	[ ] E. UTILITY	[ ] OVERHEAD	[X] UNDERGROUND	[ ] H. SECURITY
[ ] C. RAILROAD TRACKS	[ ] F. COMM	[ ] OVERHEAD	[X] UNDERGROUND	[ ] I. OTHER

3. DATE CLEARANCE REQUIRED: 1 Jun 2020

4. DATE OF CLEARANCE:

5. SIGNATURE OF REQUESTING OFFICIAL: Click to sign

6. TELEPHONE NO.: 9074564757

7. ORGANIZATION: Sundance-EA II, LLC

8. BASE CIVIL ENGINEERING ORGANIZATION	REMARKS *(Use Reverse for additional comments)*	REVIEWER'S NAME AND INITIALS
A. ELECTRICAL DISTRIBUTION	Electrical Shop, 377-2297 Call before digging, Bldg. 1132 243	Click to sign
B. STEAM DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128 Cleared	Click to sign
C. WATER DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128	Click to sign
D. POL DISTRIBUTION	Fuels Shop, 377-2140 Call before digging, Bldg. 4231 Clear	Click to sign
E. SEWER DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128 Cleared	Click to sign
F. ENVIRONMENTAL	Environmental, 377-1164 Haz Waste trng ✓ (An 813 is required if digging is required) Bldg 2258	Click to sign
G. PAVEMENTS/ GROUNDS	Dirt Boyz, 377-1270 Call before digging, Bldg. 4105	Click to sign
H. FIRE PROTECTION	Fire Prevention, 377-1293 Do not block roads or fire hydrants, Bldg. 4870	Click to sign
I. ZONE CEOIH	HVAC, 377-5133 Call before digging, Bldg. 2350	Click to sign
J. OTHER *(Specify)* Natural Resources	Natural Resources, 377-5182 Bldg. 2310 (address 2215)	Click to sign 1 May 20
9. SECURITY POLICE	SFS/S5, 377-5224, 377-1474 PURSUANT TO FREEZONE OR ESCORT REQ'T. Obtain Security briefing, Bldg. 3134	Click to sign
10. SAFETY	Safety Office, 377-4260 Obtain Safety briefing, Bldg. 3112 Rm. 181	Click to sign
11. COMMUNICATIONS 20-016	CS/SCOIC, 377-2368, 377-6969 Call 24 hours before digging, Bldg. 1127	Click to sign
12. BASE OPERATIONS coordinate w/AM 72hrs prior	Airfield Management, 377-3233 If airfield vehicle pass needed, Bldg. 1215	Click to sign
13. CABLE TV	CS/SCOIC, 377-2368, 377-6969 Call 24 hours before digging, Bldg. 1127	Click to sign
14. COMMERCIAL UTILITY COMPANY [X] TELEPHONE [ ] GAS [ ] ELECTRIC	Alaska Dig Line, 1-800-478-3121 or 811 Control Number 201-332-0360 Call prior to digging	Click to sign

15. OTHER *(Specify)*: Contact Housing (3112) at 372-2299 and resident prior to digging. Bring approved 103 to customer service.

16. REQUESTED CLEARANCE: [X] APPROVED [ ] DISAPPROVED

17. TYPED NAME AND SIGNATURE OF APPROVING OFFICER *(Chief of Operations Flight or Chief of Engineering Flight)*: Click to sign Tonia M. Jones

17a. DATE SIGNED: 4 May 20

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

(See Instructions on Reverse)

DATE PREPARED: 30 Apr 2020

1. Clearance is requested to proceed with work at Eielson Air Force Base-Soil borings adjacent to ENT building and FS #1

on Work Order No. W911KB18F0173, Contract No. WW911KB-17-D-0018, involving excavation or utility disturbance per attached sketch. This area ☒ has ☐ has not been staked or clearly marked.

2. TYPE OF FACILITY/WORK INVOLVED

☐ A. PAVEMENTS	☐ D. FIRE DETECTION & PROTECTION SYSTEMS					☐ G. AIRCRAFT OR VEHICULAR TRAFFIC FLOW		
☐ B. DRAINAGE SYSTEMS	☐ E. UTILITY	☐ OVERHEAD	☒ UNDERGROUND			☐ H. SECURITY		
☐ C. RAILROAD TRACKS	☐ F. COMM	☐ OVERHEAD	☒ UNDERGROUND			☐ I. OTHER		

3. DATE CLEARANCE REQUIRED: 1 Jun 2020

4. DATE OF CLEARANCE:

5. SIGNATURE OF REQUESTING OFFICIAL: Click to sign

6. TELEPHONE NO.: 9074564757

7. ORGANIZATION: Sundance-EA II, LLC

8. BASE CIVIL ENGINEERING ORGANIZATION	REMARKS *(Use Reverse for additional comments)*	REVIEWER'S NAME AND INITIALS
A. ELECTRICAL DISTRIBUTION	Electrical Shop, 377-2297 Call before digging, Bldg. 1132 243	Click to sign
B. STEAM DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128 Cleared	Click to sign
C. WATER DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128	Click to sign
D. POL DISTRIBUTION	Fuels Shop, 377-2140 Call before digging, Bldg. 4231 Clear	Click to sign
E. SEWER DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128 Cleared	Click to sign
F. ENVIRONMENTAL	Environmental, 377-1164 Haz Waste trng (An 813 is required if digging is required) Bldg 2258	Click to sign
G. PAVEMENTS/ GROUNDS	Dirt Boyz, 377-1270 Call before digging, Bldg. 4105	Click to sign
H. FIRE PROTECTION	Fire Prevention, 377-1293 Do not block roads or fire hydrants, Bldg. 4870	Click to sign
I. ZONE CEOIH	HVAC, 377-5133 Call before digging, Bldg. 2350	Click to sign
J. OTHER *(Specify)* Natural Resources	Natural Resources, 377-5182 Bldg. 2310 (address 2215)	Click to sign 1 May 20
9. SECURITY POLICE	SFS/S5, 377-5224, 377-1474 PURSUANT TO FREEZONE OR ESCORT REQ'T. Obtain Security briefing, Bldg. 3134	Click to sign
10. SAFETY	Safety Office, 377-4260 Obtain Safety briefing, Bldg. 3112 Rm. 181	Click to sign
11. COMMUNICATIONS 20-016	CS/SCOIC, 377-2368, 377-6969 Call 24 hours before digging, Bldg. 1127	Click to sign
12. BASE OPERATIONS Coordinate w/AM 72hrs prior	Airfield Management, 377-3233 If airfield vehicle pass needed, Bldg. 1215	Click to sign
13. CABLE TV	CS/SCOIC, 377-2368, 377-6969 Call 24 hours before digging, Bldg. 1127	Click to sign
14. COMMERCIAL UTILITY COMPANY ☒ TELEPHONE ☐ GAS ☐ ELECTRIC	Alaska Dig Line, 1-800-478-3121 or 811 Control Number 201-332-0360 Call prior to digging	Click to sign

15. OTHER *(Specify)*: Contact Housing (3112) at 372-2299 and resident prior to digging. Bring approved 103 to customer service.

16. REQUESTED CLEARANCE: ☒ APPROVED ☐ DISAPPROVED

17. TYPED NAME AND SIGNATURE OF APPROVING OFFICER *(Chief of Operations Flight or Chief of Engineering Flight)*: Click to sign Tonia M. Sims

17a. DATE SIGNED: 4 May 20

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

(See Instructions on Reverse)

DATE PREPARED: 20200514

1. Clearance is requested to proceed with work at Eielson AFB

on Work Order No. W911KB18F0173, Contract No. W911KB-17-D-0018, involving excavation or utility disturbance per attached sketch. This area ☐ has ☒ has not been staked or clearly marked.

2. TYPE OF FACILITY/WORK INVOLVED

☐ A. PAVEMENTS	☐ D. FIRE DETECTION & PROTECTION SYSTEMS			☐ G. AIRCRAFT OR VEHICULAR TRAFFIC FLOW
☐ B. DRAINAGE SYSTEMS	☐ E. UTILITY	☐ OVERHEAD	☒ UNDERGROUND	☐ H. SECURITY
☐ C. RAILROAD TRACKS	☐ F. COMM	☐ OVERHEAD	☒ UNDERGROUND	☐ I. OTHER

3. DATE CLEARANCE REQUIRED: 20200525

4. DATE OF CLEARANCE: 21 MAY 2020

5. SIGNATURE OF REQUESTING OFFICIAL: George Garner (Digitally signed by George Garner, Date: 2020.05.14 08:42:31 -08'00')

6. TELEPHONE NO.: (251) 605-1931

7. ORGANIZATION: Sundance-EA

	ORGANIZATION	REMARKS *(Use Reverse for additional comments)*	REVIEWER'S NAME AND INITIALS
8. BASE CIVIL ENGINEERING	A. ELECTRICAL DISTRIBUTION	Electrical Shop, 377-2297 Call before digging, Bldg. 1132 (250)	Click to sign
	B. STEAM DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128	MCCORD.REYNARD.KENDELL.1391630042 Digitally signed by MCCORD.REYNARD.KENDELL.1391630042 Date: 2020.05.18 07:42:46 -08'00'
	C. WATER DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128	MCCORD.REYNARD.KENDELL.1391630042 Digitally signed by MCCORD.REYNARD.KENDELL.1391630042 Date: 2020.05.18 07:43:16 -08'00'
	D. POL DISTRIBUTION	Fuels Shop, 377-2140 — entry Call before digging, Bldg. 4231	Click to sign
	E. SEWER DISTRIBUTION	Utilities Shop, 377-2172 Call before digging, Bldg. 1128	MCCORD.REYNARD.KENDELL.1391630042 Digitally signed by MCCORD.REYNARD.KENDELL.1391630042 Date: 2020.05.18 07:43:57 -08'00'
	F. ENVIRONMENTAL	Environmental, 377-1164 (An 813 is required if digging is required) Bldg 2258	Click to sign
	G. PAVEMENTS/ GROUNDS	Dirt Boyz, 377-1270 Call before digging, Bldg. 4105	Click to sign 18May2020
	H. FIRE PROTECTION	Fire Prevention, 377-1293 Do not block roads or fire hydrants, Bldg. 4870	Click to sign
	I. ZONE CEOIH	HVAC, 377-5133 Call before digging, Bldg. 2350	SANTOS.DONNIE.A.1047307941 Digitally signed by SANTOS.DONNIE.A.1047307941 Date: 2020.05.14 12:47:48 -08'00'
	J. OTHER *(Specify)* Natural Resources	Natural Resources, 377-5182 Bldg. 2310 (address 2215)	Click to sign
9. SECURITY POLICE		SFS/S5, 377-5224, 377-1474 Obtain Security briefing, Bldg. 3134	Click to sign 18 MAY 20
10. SAFETY		Safety Office, 377-4260 Obtain Safety briefing, Bldg. 3112 Rm. 181	Click to sign 18 May 2020
11. COMMUNICATIONS 20-024		CS/SCOIC, 377-2368, 377-6969 Call 24 hours before digging, Bldg. 1127	Click to sign
12. BASE OPERATIONS		Airfield Management, 377-3233 If airfield vehicle pass needed, Bldg. 1215	Click to sign
13. CABLE TV		CS/SCOIC, 377-2368, 377-6969 Call 24 hours before digging, Bldg. 1127	Click to sign
14. COMMERCIAL UTILITY COMPANY ☒ TELEPHONE ☐ GAS ☐ ELECTRIC		Alaska Dig Line, 1-800-478-3121 or 811 Control Number 201-332-0360 2020180690 – Request #	Click to sign

15. OTHER *(Specify)*: Contact Housing (3112) at 372-2299 and resident prior to digging. Bring approved 103 to customer service.

16. REQUESTED CLEARANCE: ☒ APPROVED ☐ DISAPPROVED

17. TYPED NAME AND SIGNATURE OF APPROVING OFFICER *(Chief of Operations Flight or Chief of Engineering Flight)*

DONALD E. FRY, WS-16, DAF
Deputy Chief of Operations

Click to sign

17a. DATE SIGNED: 21 May 2020

INSTRUCTIONS

The BCE work clearance request is used for any work (contract or in-house) that may disrupt aircraft or vehicular traffic flow, base utility services, protection provided by fire and intrusion alarm system, or routine activities of the installation. This form is used to coordinate the required work with key base activities and keep customer inconvenience to a minimum. It is also used to identify potentially hazardous work conditions in an attempt to prevent accidents. The work clearance request is processed just prior to the start of work. If delays are encountered and the conditions at the job site change (or may have changed) this work clearance request must be reprocessed.

18. REMARKS. *(This section must describe specific precautionary measure to be taken before and during work accomplishment. Specific comments concerning the approved method of excavation, hand or powered equipment, should be included.)*

Temporary monitoring well (25) installation to investigate possible PFOA/PFOS contamination. The temporary monitoring wells will be installed across the base, and off-site base locations to the north east (Attached Figure 4, and Table 1). The site inspection is performed under contract to United States Army Corps of Engineers (USACE) Alaska District. Temporary monitoring wells will be installed via Geoprobe drirect push drill rig. The wells will be constructed of 1.625 inch pre-pack screen will be inserted into the bore-hole using a SP16 sampler. Monitoring wells will be drilled to a maximum depth of 25 feet below ground surface. All groundwater removed during sampling will be containerized and stored at LF003.

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix D.3 – Right of Way and Right of Entry Agreements

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THE STATE
of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Natural Resources
DIVISION OF MINING, LAND & WATER
Northern Regional Land Office

3700 Airport Way
Fairbanks, Alaska 99709-4699
Main: 907.451.2740
TDD: 907.451.2770
Fax: 907.451.2751

October 4, 2019

September Myres
Sundance-EA II, LLC
711 H Street, Suite 330
Anchorage, AK 99501

Ms. Myres,

An application for a Land Use Permit was submitted on August 13, 2019, for installation and subsequent removal of two temporary groundwater monitoring wells to determine the boundary of PFAS contamination emanating from Eielson Air Force Base. The lands are managed by the State of Alaska, Department of Natural Resources, Division of Mining, Land, and Water.

The first site location is within Section 21 of Township 2 South, Range 3 East, Fairbanks Meridian, which were received under General Grant GS 40 and patented on 9/18/81 under patent number 50-81-0172. This site location is designated as Habitat and classified as Habitat and Public Recreation. The second site location is within Sections 16 and 21 of Township 3 South, Range 3 East, Fairbanks Meridian, was received under Mental Health Grant MH-173 and patented under patent number 50-67-0437. This site location is designated as Agricultural and classified as Agricultural and Settlement.

Installation and subsequent removal of two temporary groundwater monitoring wells, one at each of the above referenced site locations, to determine the boundary of PFAS contamination emanating from Eielson Air Force Base. The information gathered from the temporary wells will be used to determine the location of permanent wells to be installed at a later date under a separate land use permit, if necessary. Vehicle use of access roads, as well as minimal off-road usage by the drill rig to install and remove the wells. Samples will be collected using two five-gallon buckets at each site location. Samples will be removed from the site location and will be stored in a secure area on Eielson Air Force Base. Any Investigation Derived Waste (IDW) will be disposed of according to regulatory standards as necessary within 90-days of collection.

Because the proposed activities will cause little disturbance and have minimal impact on State lands, the authorization of activities is granted by this letter. Activities are subject to the following stipulations:

- Permittee assumes all responsibility, risk and liability for all activities of Permittee, its employees, agents, invitees, contractors, subcontractors, or licensees directly or

indirectly conducted in connection with this permit, including environmental and hazardous substance risks and liabilities, whether accruing during or after the term of this permit. Permittee shall defend, indemnify, and hold harmless the State of Alaska, its employees, and agents from and against any and all suits, claims, actions, losses, costs, penalties, and damages of whatever kind or nature, including all attorney's fees and litigation costs, arising out of, in connection with, or incident to any act of omission by Permittee, its employees, agents, invitees, contractors, subcontractors, or licensees, unless the sole proximate cause of the injury or damage is the negligence or willful misconduct of the State or anyone acting on the State's behalf. Within 15 days Permittee shall accept any such cause or action or proceeding upon tender by the State. This indemnification shall survive the termination of the permit.

- This letter of authorization does not convey an interest in state land and as such is revocable immediately with or without cause.

- Field location of the proposed experiment shall be achieved in such a way as to minimize visual impacts to the highway, and shall be located a minimum of 100 meters from the nearest developed infrastructure.

- The issuance of this authorization does not alleviate the necessity of the grantee to obtain authorizations required by other agencies for this activity.

- This authorization is valid through June 30, 2020.

If you have any questions, please contact me at harvey.templeton@alaska.gov or at(907) 451-2727.

Sincerely,

Harvey Templeton
Natural Resource Specialist

By signing below the grantee agrees to the above terms:

September Myres

Digitally signed by September Myres
DN: cn=September Myres, o=Sundance Consulting, Inc., ou, email=smyres@sundance-inc.net, c=US
Date: 2019.10.04 18:35:18 -06'00'

September Myres, Sundance-EA II, LLC

A person affected by this decision may appeal it, in accordance with 11 AAC 02. Any appeal must be received within 20 calendar days after the date of "issuance" of this decision, as defined in 11 AAC 02.040(c) and (d) and may be mailed or delivered to the Commissioner, Department of Natural Resources, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska 99501; faxed to 1-907-269-8918, or sent by electronic mail to dnr.appeals@alaska.gov. Under 11

AAC 02.030, appeals and requests for reconsideration filed under 11 AAC 02 must be accompanied by the fee established in 11 AAC 05.160(d)(1)(F), which has been set at $200 under the provisions of 11 AAC 05.160 (a) and (b).

This decision takes effect immediately. If no appeal is filed by the appeal deadline, this decision becomes a final administrative order and decision of the department on the 31st calendar day after issuance. An eligible person must first appeal this decision in accordance with 11 AAC 02 before appealing this decision to Superior Court. A copy of 11 AAC 02 may be obtained from any regional information office of the Department of Natural Resources.

Alyeska pipeline SERVICE COMPANY

P.O Box 196660 ANCHORAGE, ALASKA 99519-6660 TELEPHONE (907) 787-8700

Date: October 10, 2019
(Alyeska signature)

LETTER OF NON-OBJECTION

George Garner, Geologist
Sundance Consulting Inc.
711 H Street, Suite 330
Anchorage, AK 99501

Tel: (907) 646-0213 Cell: (251) 605-1931 Email: ggarner@sundance-inc.net

RE: Access to/across these Trans-Alaska Pipeline System ("TAPS") Facilities;
Pipeline Workpad, Pipeline Mileposts 472.2 to 477.5 (intersection of fuel pipeline)

Dear Mr. Garner:

By your email received August 12, 2019, on behalf of Sundance Consulting Inc. and the United State Army Corps of Engineers and persons thereby represented including employees, agents and/or contractors ("Applicant"), you have requested non-objection from Alyeska Pipeline Service Company ("Alyeska")to utilize those certain TAPS facilities described in the subject line above ("Subject Property") to gain access via light truck, driller truck and Geoprobe Rig from Eielson Airforce Base and the Richardson Highway for the purpose of soil and groundwater testing.

This Letter of Non-Objection does not in itself constitute authorization for entry or use of the land underlying Subject Property, and Applicant must secure any authorization(s) that may be required from the pertinent landowner(s). Alyeska does not warrant that the Subject Property is either suitable or safe to conduct applicant's activities.

To reflect Applicant's acceptance, please review the conditions stated in this letter and have the appropriate official sign, date below and return it to me. Sundance Consulting Inc. will ensure that all parties included in the collective Applicant comply with each and all provisions of this agreement. The copy of this letter, fully-signed, dated above and returned to you, may be used to demonstrate Alyeska's non-objection in obtaining any additional authorization(s) that may be required.

As agent for the Permittees/Lessees/Grantees of the Trans Alaska Pipeline System rights-of-way, Alyeska provides its non-objection to the described use by Applicant of the Subject Property, insofar as Alyeska may do so under rights granted by the pertinent landowners, including the Bureau of Land Management, State of Alaska and/or private property owners, for a period commencing October 1, 2019 or the date

signed by Alyeska, whichever is later, and terminating October 31, 2019, subject to the following conditions:

1. **APPLICANT WILL CONTACT THE ALYESKA CIVIL MAINTENANCE COORDINATOR (CMC) AT THE FAIRBANKS RESPONSE BASE, TELEPHONE (907) 450-5406,** to obtain clearance in advance of Applicant's requested access and to make any other necessary arrangements including reviewing the specific drilling locations, bridge decking protection and completion notification. The CMC may require Applicant to submit a written work plan describing Applicant's procedures in detail, especially covering drilling, for protecting the safety of Alyeska personnel, the integrity of the subject property and the environmental quality on the TAPS right(s)-of-way.

2. **Applicant will contact Alyeska Security, 615 Bidwill Avenue, Fairbanks, telephone (907)450-5707,** in advance to identify each person of Applicant, and to obtain a key to any gate across Subject Property. Applicant will return the key to Alyeska Security as requested by Alyeska Security but in no case any later than three (3) days after the expiration date of this Letter of Non-Objection. Applicant will not have duplicates made of the key(s) issued by Alyeska.

   Applicant agrees to a) notify Alyeska Security of any and all personnel changes in advance, b) provide additional reasonable information as requested by Alyeska Security from time to time and c) notify Alyeska Security prior to each and every visit to Subject Property during the term of this non-objection unless the requirement for repeat notifications is specifically waived by Alyeska Security.

3. Applicant understands that there may be times when Alyeska blocks access to Subject Property due to adverse surface conditions, pipeline-related construction activities or security conditions, and Applicant agrees to abide by Alyeska's decision in this regard. Applicant further understands that Alyeska does not provide support to Applicant for water, waste, food, lodging, minor medical or fuel.

4. Applicant will locate the test holes at the edge of the cleared right-of-way on Subject Property outside of the pipeline workpad drivelane on the side opposite the location of the buried pipeline and will remove the test wells from Subject Property before the termination of this letter of non-objection.

   Applicant will restrict its equipment and vehicles to that speed that is most safe and prudent under the weather and terrain conditions existing at the time of Applicant's use of Subject Property or to the posted speed limit, whichever is slower. Applicant will respect all vehicle block points, will not exit the workpad in vehicles except at locations approved by the CMC, will cross the above-ground pipeline only at constructed workpad drivelane crossings and will cross the below ground pipeline no closer than 100 feet from an above/below-ground transition. Furthermore, Applicant will cross all low water crossings with the transmission engaged in four-wheel-drive and at a low speed, creating no waves or splashes, and not disengaging the transmission until all four wheels are on level ground and out of the channel.

Applicant will cross any bridge on Subject Property by **a)** keeping vehicles centered (left-right) and on the timber traffic planks, **b)** travel under 5 miles per hour, **c**) not allow more than one vehicle at a time on the bridge and **d)** not stop or start equipment or shift gears while on the bridge. Furthermore, prior to crossing the bridge with heavy loads or equipment, Applicant will **d)** analyze its equipment axle loads in relation to the posted load limits and provide a minimum of two weeks advance notice to the CMC with any overload permit requests for loads which would exceed the posted load limits.

Applicant will not conduct any snowplowing by vehicle power. Applicant will not conduct any snowplowing or back up any vehicle in the direction of the pipeline(s), in either the buried or above-ground mode. All crossings of the oil pipeline shall be made as close as practical to a right angle to the pipeline bearing and will avoid stopping or starting within ten feet of the oil pipeline. Furthermore, Applicant will take all precautions necessary to prevent injuries to persons and damage to property including, but not limited to, roads, pads, water bars, transverse levies, survey monuments, cathodic protection devices, monitoring rods or any other Alyeska facilities and will promptly reimburse Alyeska for any related losses or damages.

Applicant will notify the CMC immediately on becoming aware of personal injuries or any disturbance or damage to property including, but not limited to, the pipeline or any other Alyeska facility. Applicant shall be responsible for all repairs for damages caused by its activities within Subject Property that may be reasonably required by the CMC including, but not limited to any rehabilitation, restoration, revegetation, re-scarification, or seeding.

5. Applicant will ensure that any and all access control gates are closed and locked immediately following Applicant's passage each and every time.

   Applicant will not conduct any fueling or equipment/vehicle maintenance activities in Subject Property and will keep Applicant's vehicle and/or equipment in sound working order.

6. Applicant will comply with all applicable local, state and federal laws, regulations and ordinances.

   Applicant will not conduct any camping, fishing, trapping, hunting or shooting within, from, or across the Subject Property.

   Applicant will take all precautions necessary to prevent wild land fires. If a wild land fire is started, Applicant shall immediately report it to the appropriate public agencies and the CMC.

   Applicant will take all precautions necessary to prevent spills or leaks of any hazardous substance as defined by Alaska Statute 46.03.826(5) including, but not limited to, crude oil, fuels, lubricants, hydraulic fluids or antifreeze. If such a spill or leak of any amount does occur, **Applicant shall immediately report it**

to the Alyeska CMC and to any appropriate public agencies. Applicant is responsible for the containment and cleanup of any such spill to the satisfaction of the responsible public agencies and Alyeska.

7. By acceptance hereof and pursuant to the provisions of the Federal Tort Claims Act, 28 U.S.C. 2671, et. seq., and the Military Claims Act, 10 U.S.C. 2731, et. seq., the Government assumes full responsibility for the Applicant's activities, the operation of its equipment, and the conduct of its personnel. Subject to the availability of funds and without assuming any liability therefore, Applicant agrees to request and diligently pursue the appearance of Justice Department appear on behalf of, and in the defense of the Alyeska Pipeline Service Company and each of its Owner Companies listed below in any action, including but not limited to claims incurred with regard to any spill of oil or other hazardous substance or other environmental damage, arising out of or in any way attributable to the Federal Government's activities or the use or occupancy of the Subject Property which may be brought under the Federal Tort Claims Act or the Military Claims Act and in which the Alyeska Pipeline Service Company and each of its Owner Companies listed below may be joined as parties, on the basis of the execution of this letter of non-objection. "Availability" is here defined as any funds appropriated and which could be legally used for defending Alyeska Pipeline Service Company and/or each of its Owner Companies in such action.

   Applicant agrees to pay Alyeska for costs incurred by Alyeska for the repair or remedy of any damage or injury to persons or property (including Alyeska or Owner Company Property) for damage or injury caused by Applicant. All claims will be processed, reviewed, and paid through the Federal Tort Claims Act, The Military Claims Act, or the Personnel Claims Act upon presentation of adequate evidence demonstrating Applicant was responsible for the damage or injury.

8. At a minimum, Applicant shall carry and maintain with carriers approved to conduct business in the State of Alaska the following insurance covering its activities on Subject Property:

   a. Commercial General Liability Insurance, including Contractual Liability insuring the indemnity obligations set out in this Letter of Non-Objection, with the minimum coverage of a combined single limit of $1,000,000 (One Million Dollars) per occurrence for bodily and property damage liability.

   b. Business auto liability insurance covering with minimum coverage of a combined single limit of $1,000,000 (One Million Dollars) per occurrence for bodily injury, including death, and property damage.

   c. Workers' Compensation Insurance and Employers Liability Insurance in accordance with the laws of the State of Alaska.

   All non-statutory insurance policies required in this Letter of Non-objection agreement must be primary to any and all other insurance of Alyeska, and contain a waiver of subrogation against Alyeska, the Trans Alaska Pipeline System Permittees/Lessees and their respective agents, employees,

stockholders and affiliated companies. Applicant, including its contractors and/or subcontractors, will not waive the right to select independent counsel as provided under Alaska Statute 21.89.100 or otherwise.

The insurance required in no way limits or restricts Applicant's obligations to indemnify Alyeska in accordance with other provision of this Letter of Non-Objection, nor will any limitation on the scope of Applicant's indemnity obligations set out in this Letter of Non-Objection agreement in any way limit, negate or reduce the above described insurance coverage.

9. Applicant will provide Alyeska with copies of the final investigation report for the test holes accessed via the Subject Property upon its completion.

Failure to fully comply with the conditions set out in this letter of non-objection may result in revocation by Alyeska, at its sole discretion, of its non-objection.

The undersigned accepts and agrees to all provisions described in this letter of non-objection agreement and represents that s/he has full authority to accept and agree on behalf of Applicant, and to bind Applicant to the terms of this letter of non-objection.

Please call me at (907) 787-8170 if there are any questions.

Very truly yours,

ALYESKA PIPELINE SERVICE COMPANY
Agent for Owners of the
Trans Alaska Pipeline System

BP PIPELINES (ALASKA), INC.
EXXONMOBIL PIPELINE COMPANY
CONOCOPHILLIPS TRANSPORTATION ALASKA, INC.
UNOCAL PIPELINE COMPANY

By: _____
PETER C. NAGEL
Lands Manager

ACCEPTED AND AGREED to this
3rd day of October, 2019.

By: September Myres
Signature

Name: September Myres

Title: CEO
Sundance Consulting Inc.

CONCUR:

By: _____

Name: _____
USACE Project Manager

cc: USBLM, Branch Lands and Realty
ADNR State Pipeline Coordinator's Section
USACE Chena River Lakes Flood Control Project

Colleen Rust, PG-WA

From: George Garner
Sent: Tuesday, September 17, 2019 9:47 AM
To: Colleen Rust, PG-WA
Cc: John Consoletti
Subject: FW: Temp Well Points within Flood Control Project

Looks like the Chena Flood Control temp well locations are all ok. We just need to let them know when we lock in a start date.

George Garner | Geologist
Woman-Native American-Owned Small Business
711 H Street Suite 330 | Anchorage, AK 99501
(907) 646-0213 Direct | (251) 605-1931 Cell

-----Original Message-----
From: Lewellyn, Levi M CIV USARMY CEPOA (USA) <Levi.M.Lewellyn@usace.army.mil>
Sent: Tuesday, September 17, 2019 7:27 AM
To: George Garner <ggarner@sundance-inc.net>
Subject: RE: Temp Well Points within Flood Control Project

George,
Those marked locations are good spots for the temp wells. Let me know when you lock in a start date please.

Respectfully,
Levi Lewellyn
Park Manager, Chena Flood Control Project Alaska District, US Army Corps of Engineers
O: 907.488.5401 | C: 907.347.1197

-----Original Message-----
From: George Garner [mailto:ggarner@sundance-inc.net]
Sent: Monday, September 16, 2019 3:47 PM
To: Lewellyn, Levi M CIV USARMY CEPOA (USA) <Levi.M.Lewellyn@usace.army.mil>
Cc: Colleen Rust, PG-WA <crust@sundance-inc.net>
Subject: [Non-DoD Source] Temp Well Points within Flood Control Project

Mr. Lewellyn,

I wanted to follow up on the status of temporary well point locations that you verified back in August. As of the last time we spoke, you were verifying the well locations and checking with the dam engineer if the points were too close to the actual dam structures. Were the locations ok or did the engineer need more information?

We have received conditional approval and intend to install them in mid to early October if possible.

<Blockedhttp://www.sundance-inc.net/>

George Garner | Geologist
Woman-Native American-Owned Small Business
711 H Street Suite 330 | Anchorage, AK 99501
(907) 646-0213 Direct | (251) 605-1931 Cell

<Blockedhttps://www.linkedin.com/company/sundance-consulting-inc-/about/>

SUNDANCE-EA II, LLC

711 H Street, Suite 330, Anchorage, AK 99501
Office: (907) 334-3909 Fax: (907) 334-3932

June 26, 2019

JJAL, Inc.
PO Box 60610
Fairbanks, AK, 99706

RE: Permission for Sundance-EA II, LLC to access JJAL, Inc.'s Property in Moose Creek for the Purpose of Installing Two Temporary Monitoring wells for the PFAS Site Investigation

Doug Workes:

Sundance-EA II, LLC (Sundance-EA) works as a contractor to the U.S. Army Corps of Engineers (USACE), whom is the prime contractor of the U.S. Air Force at Eielson Air Force Base (AFB). Sundance-EA has been contracted to conduct a Site Inspection in the summer and fall of 2019 to determine the extent of per- and polyfluoroalkyl substances (PFAS) in groundwater located in the vicinity of Moose Creek Community, Alaska.

JJAL, Inc. holds the title to the surface and subsurface lands shown in the attached maps and described as follows:

- 3540 Old Richardson Highway
- TL-2700 Section 27 T2S-R3E.

The lands on and adjacent to Eielson AFB and Moose Creek Community will be assessed for environmental impacts associated with former military use of aqueous film forming foam (AFFF) and to assess PFAS compounds potentially present in groundwater. As part of this Site Inspection, Sundance-EA will need to install one temporary groundwater monitoring well with a Geoprobe track drill rig on JJAL property and gain access to a second location on Eielson AFB property as shown on the attached Figure 1. Sundance-EA will remove construction debris, waste, and refuse from the drilling site and decontamination area daily. Sundance-EA will minimize erosion and damage to site vegetation during drilling activities. Sundance-EA will clean up all refuse, excess materials, temporary structures, and equipment, leaving all parts of the site in a neat and presentable condition. The temporary monitoring well will be decommissioned after sampling.

Sundance-EA respectfully requests permission to access the for mentioned lands to conduct the Site Inspection as described above.

We respectfully request you provide written permission to access the for mentioned lands by no later than July 2, 2019. Sundance-EA is coordinating with USACE to conduct the Site Inspection tentatively between July 2019 and August 2019.

Please let us know if we can be of further assistance or provide you with additional documentation to aid in your decision. You may contact me directly at (907) 590-4787 or mwilkinson@eaest.com. In addition, we would be glad to provide an in-person site walk through with proposed temporary monitoring well locations.

Thank you for your time and assistance regarding this request.

Sincerely,

Mark Wilkinson
Project Manager

Attachment:

Figure 1 – Temporary Monitoring Well Locations 19PS-TW12 and 19PS-TW11

cc:

Julie Sharp-Dahl, Project Manager, USACE – Alaska District

Gary Fink, USAF AFCEC 673 CES/CZOP

Carolyn Tallant, USAF AFCEC 354 CES/CZOP

September Myers, Sundance-EA

John Consoletti, Sundance-EA

Legend

- Eielson AFB Installation Boundary
- Private Property Line
- Access Route
- Parking/Equipment Staging
- Proposed Temporary Well Locations

0 125 250 500

Feet

1 in = 296 feet

Imagery: Esri, 2015

Figure 1

Path: N:\Eielson_AFB\GIS\GIS_Projects\QAPP Updates\Figure X. JJAL property.mxd

From:	Wait, Alexander J (DNR)
To:	George Garner
Subject:	RE: Temporary PFAS Sampling Well
Date:	Tuesday, March 24, 2020 3:49:55 PM

This activity falls under Generally Allowed Uses. No further authorization is required.

From: George Garner
Sent: Thursday, March 19, 2020 3:52 PM
To: Wait, Alexander J (DNR) <aj.wait@alaska.gov>
Subject: Temporary PFAS Sampling Well

Good Afternoon,

I am working on an environmental investigation around the PFAS plume in Moose Creek. Our project has one temporary well that needs to be sampled on state land. The temporary well will be drilled and sampled the same day or next day and removed after sampling. The 3-4" hole will be plugged with bentonite after the temporary well is sampled. No equipment, well casing etc, will be left behind after sampling. All groundwater removed from the hole as part of the sampling will be containerized and stored on Eielson AFB for disposal. I have attached a map of the temporary well location and the Land Use Permit that I prepared just in case one is required. Please let me know if you have any more questions.

Sundance Consulting Inc.

George Garner | Geologist
Woman-Native American-Owned Small Business
711 H Street Suite 330 | Anchorage, AK 99501
(907) 646-0213 Direct | (251) 605-1931 Cell

Colleen Rust, PG-WA

From: George Garner
Sent: Monday, May 11, 2020 12:01 PM
To: Colleen Rust, PG-WA
Subject: FW: PFAS Investigation Temporary Well Drilling

FYI below.

-----Original Message-----
From: Lewellyn, Levi M CIV USARMY CEPOA (USA) <Levi.M.Lewellyn@usace.army.mil>
Sent: Wednesday, April 29, 2020 4:10 AM
To: George Garner <ggarner@sundance-inc.net>
Subject: RE: PFAS Investigation Temporary Well Drilling

George,
Please let me know when you get them marked and send me a map so I can go look at them. Thanks.

Respectfully,
Levi Lewellyn
Park Manager, Chena Flood Control Project Alaska District, US Army Corps of Engineers
O: 907.488.5401 | C: 907.347.1197

-----Original Message-----
From: George Garner [mailto:ggarner@sundance-inc.net]
Sent: Tuesday, April 28, 2020 1:10 PM
To: Lewellyn, Levi M CIV USARMY CEPOA (USA) <Levi.M.Lewellyn@usace.army.mil>
Cc: Colleen Rust, PG-WA <crust@sundance-inc.net>
Subject: [Non-DoD Source] RE: PFAS Investigation Temporary Well Drilling

Levi,

I have included GPS Coordinates (highlighted green on the excel sheet) for the Temporary Well Locations within the Chena Flood Control Area to be installed in May. These are the locations that will submitted for the utility locates across the flood project area and eventually staked. Until I can get up there and stake the locations, verify they are not within any utility corridors, and check ground conditions these are as close to final as possible. I assume you would drive around to verify locations when they are staked like you did last year. Let me know if you need any more details about the project.

George Garner | Geologist
Woman-Native American-Owned Small Business
711 H Street Suite 330 | Anchorage, AK 99501
(907) 646-0213 Direct | (251) 605-1931 Cell

-----Original Message-----
From: Lewellyn, Levi M CIV USARMY CEPOA (USA) <Levi.M.Lewellyn@usace.army.mil>
Sent: Saturday, April 25, 2020 3:36 AM
To: George Garner <ggarner@sundance-inc.net>
Cc: Colleen Rust, PG-WA <crust@sundance-inc.net>
Subject: RE: PFAS Investigation Temporary Well Drilling

George,
Those general locations look good to me. None of them are on dikes or levees. Let me know when you get specific locations please.

Respectfully,
Levi Lewellyn
Park Manager, Chena Flood Control Project Alaska District, US Army Corps of Engineers
O: 907.488.5401 | C: 907.347.1197

-----Original Message-----
From: George Garner [mailto:ggarner@sundance-inc.net]
Sent: Friday, April 24, 2020 2:55 PM
To: Lewellyn, Levi M CIV USARMY CEPOA (USA) <Levi.M.Lewellyn@usace.army.mil>
Cc: Colleen Rust, PG-WA <crust@sundance-inc.net>
Subject: [Non-DoD Source] PFAS Investigation Temporary Well Drilling

Good Afternoon,

We met last year when our company Sundance-EA was installing some temporary monitoring wells in the Chena Flood Channel Project area. We have another round of the same type of temporary well installation and sampling scheduled for mid-May. I have attached the approved locations included in our work plan. I believe TW-43 through TW-60 (Figure 4 attached) are on USACE managed lands. I wanted to verify what we need to do get access to the gate at Moose Creek Bluff and get the locations cleared by you or someone in your office. They aren't currently flagged, but I wanted to verify that the general locations are acceptable and won't need special clearance due to sufficient distance from the dike/levees. Please give me a call on my cell if you have questions. Thanks for the help.

<BlockedBlockedhttp://www.sundance-inc.net/>

George Garner | Geologist
Woman-Native American-Owned Small Business
711 H Street Suite 330 | Anchorage, AK 99501
(907) 646-0213 Direct | (251) 605-1931 Cell

<BlockedBlockedhttps://www.linkedin.com/company/sundance-consulting-inc-/about/>

Please consider the environment before printing this e-mail

From:	Nagel, Peter C.
To:	September Myres
Cc:	George Garner; Mark Rigatti; John Consoletti; Wilkinson, Mark; Colleen Rust, PG-WA; Jones, Michael
Subject:	RE: Letter of Non-Objection No. 19-12, Extension no. 1, RE: Dig Line Request 2020380554
Date:	Friday, September 25, 2020 7:29:22 PM
Attachments:	image001.png image004.png image005.png image006.png

Thank you, and your acceptance is hereby acknowledged.

From: September Myres <smyres@sundance-inc.net>
Sent: Friday, September 25, 2020 1:33 PM
To: Nagel, Peter C. <Peter.Nagel@alyeska-pipeline.com>
Cc: George Garner <ggarner@sundance-inc.net>; Mark Rigatti <mrigatti@sundance-inc.net>; John Consoletti <jconsoletti@sundance-inc.net>; Wilkinson, Mark <mwilkinson@eaest.com>; Colleen Rust, PG-WA <crust@sundance-inc.net>; Jones, Michael <mjones@eaest.com>
Subject: [EXTERNAL]: Letter of Non-Objection No. 19-12, Extension no. 1, RE: Dig Line Request 2020380554

Mr. Nagel,

Please accept this email as confirmation that Sundance will abide by all conditions listed in your email noted below and the attached Letter of Non-Objection.

Please feel free to contact me if you have any questions.

Thank you,

Times are tough, but so are we!

September Myres | CEO
Sundance Consulting Inc
Woman-Native American-Owned Small Business
305 N 3rd Ave., Suite B | Pocatello, ID 83201
(208) 576-4961 Direct | (208) 243-0108 Cell
www.sundance-inc.net

From: Nagel, Peter C. <Peter.Nagel@alyeska-pipeline.com>
Sent: Thursday, September 24, 2020 10:57 AM
To: George Garner <ggarner@sundance-inc.net>; Judd Parson <jparson@sundance-inc.net>; Galen Kornowske <gkornowske@sundance-inc.net>
Subject: Letter of Non-Objection No. 19-12, Extension no. 1, RE: Dig Line Request 2020380554

George Garner, Geologist
Sundance Consulting Inc.
711 H Street, Suite 330
Anchorage, AK 99501

Tel: (907) 646-0213 Cell: (251) 605-1931 Email: ggarner@sundance-inc.net

RE: Letter of Non-Objection No. 19-12, Extension no. 1

Dear George Garner:

Per your emails below, you have requested amendment of the Alyeska Pipeline Service Company letter of non-objection dated October 10, 2019, and referenced above by Alyeska file number. Accordingly, Alyeska Pipeline Service Company, Agent for the below listed Permittees of the Trans Alaska Pipeline System, hereinafter referred to as "Alyeska", insofar as Alyeska may do so under rights granted by the pertinent landowners, evidences on the date above its non-objection to said amendment described as follows:

1. The description of Subject Property in the Subject Line is changed in its entirety to read:
"Access to/across these Trans-Alaska Pipeline System ("TAPS") Facilities;
Pipeline Workpad, Pipeline Mileposts PLMP 474.5 (Transmitter Road xing) to 477.5 (intersection of EAFB fuel pipeline)"
2. The term of this letter of non-objection is extended to commence September 24, 2020 or the date this extension is affirmed by Applicant and acknowledged by Alyeska, whichever is later, and terminate November 30, 2020.
3. The first subparagraph of Condition 4. is amended in its entirety to read:
"Applicant will locate the two test holes (MW02 and MW04) to the side of the pipeline workpad drivelane opposite the location of the buried pipeline and at least ten (10) feet outside of the pipeline right-of-way boundaries or ten (10) feet outside of the pipeline gravel workpad, whichever is further from the buried pipeline."

All other conditions and terms of the subject letter of non-objection (attached), including but not limited to key use and return, continue in full force and effect.

Please have the appropriate official reply to this email in the affirmative to signify your agreement with these conditions. This non-objection amendment will become effective only after my acknowledgement of receipt of such affirmation. And, we note that separate arrangements will need to be made with Alyeska in writing for long term access to Subject Property, as amended, for test hole monitoring.

Sincerely, Pete Nagel

Peter C. Nagel, SR/WA
Lands Manager, Alyeska Pipeline Service Company
3700 Centerpoint Drive (P.O.Box 196660) Anchorage, Alaska 99519
Phone: 907.787.8170 Fax: 907.787.8337
E-mail: peter.nagel@alyeska-pipeline.com

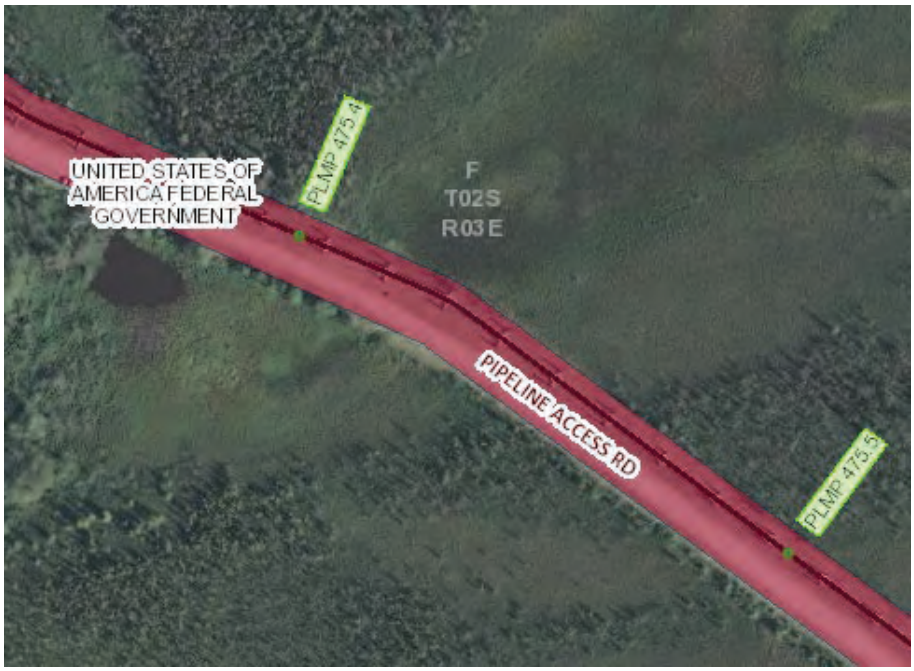
From: George Garner <ggarner@sundance-inc.net>
Sent: Friday, September 18, 2020 12:18 PM
To: Nagel, Peter C. <Peter.Nagel@alyeska-pipeline.com>; Judd Parson <jparson@sundance-inc.net>; Galen Kornowske <gkornowske@sundance-inc.net>
Subject: [EXTERNAL]: RE: Dig Line Request 2020380554

Mr. Nagel,

I believe we can adjust farther down the pipeline closer to PLMP 477.4.

From: Nagel, Peter C. <Peter.Nagel@alyeska-pipeline.com>
Sent: Friday, September 18, 2020 12:04 PM
To: George Garner <ggarner@sundance-inc.net>; Judd Parson <jparson@sundance-inc.net>; Galen Kornowske <gkornowske@sundance-inc.net>
Subject: RE: Dig Line Request 2020380554

George, We would rather not have the wells inside the TAPS ROW which is wider than usual at MW04 (first snip). It should also not be located within the gravel workpad. Will that work for you? Pete



From: Nagel, Peter C.
Sent: Friday, September 18, 2020 11:23 AM

To: 'George Garner' <ggarner@sundance-inc.net>; Judd Parson <jparson@sundance-inc.net>; Galen Kornowske <gkornowske@sundance-inc.net>
Cc: Williams, Nathan <Nathan.Williams@alyeska-pipeline.com>; Owen, Adam H. <Adam.Owen@alyeska-pipeline.com>
Subject: RE: Dig Line Request 2020380554

OK, thank you, and now I remember our conversation that only the bold magenta symbols are the Phase 4 wells being installed. Also, MW3, though close to the pipeline is accessed from Manchu Road directly. I will expedite the Alyeska review for non-objection.

From: George Garner <ggarner@sundance-inc.net>
Sent: Friday, September 18, 2020 11:14 AM
To: Nagel, Peter C. <Peter.Nagel@alyeska-pipeline.com>; Judd Parson <jparson@sundance-inc.net>; Galen Kornowske <gkornowske@sundance-inc.net>
Cc: Williams, Nathan <Nathan.Williams@alyeska-pipeline.com>; Owen, Adam H. <Adam.Owen@alyeska-pipeline.com>
Subject: [EXTERNAL]: RE: Dig Line Request 2020380554

Mr. Nagel,

Only MW02 and MW04 are within the ROW. The MW01 aerial was included to clarify that it is out of the ROW. Mr. Owen seemed to think it was within the ROW in the email below. I have the included a copy of the overview map with the locations highlighted with Red Boxes. The well locations have been flagged for utility locates.

Thanks,

George Garner | Geologist
Woman-Native American-Owned Small Business
711 H Street Suite 330 | Anchorage, AK 99501
(907) 646-0213 Direct | (251) 605-1931 Cell
www.sundance-inc.net

From: Nagel, Peter C. <Peter.Nagel@alyeska-pipeline.com>
Sent: Friday, September 18, 2020 10:55 AM
To: George Garner <ggarner@sundance-inc.net>; Judd Parson <jparson@sundance-inc.net>; Galen Kornowske <gkornowske@sundance-inc.net>
Cc: Williams, Nathan <Nathan.Williams@alyeska-pipeline.com>; Owen, Adam H. <Adam.Owen@alyeska-pipeline.com>
Subject: RE: Dig Line Request 2020380554

OK, and you say MS 2 and 4 but also include an aerial of MW1. Please verify which ones need TAPS access and hilite them on your general overview map you sent earlier.

From: George Garner <ggarner@sundance-inc.net>
Sent: Friday, September 18, 2020 9:59 AM
To: Nagel, Peter C. <Peter.Nagel@alyeska-pipeline.com>; Judd Parson <jparson@sundance-inc.net>; Galen Kornowske <gkornowske@sundance-inc.net>
Cc: Williams, Nathan <Nathan.Williams@alyeska-pipeline.com>; Owen, Adam H. <Adam.Owen@alyeska-pipeline.com>
Subject: [EXTERNAL]: RE: Dig Line Request 2020380554

Mr. Nagel,

My apologies for the delay. Here are the answers to your specific questions. I believe wells MW02 and MW04 are the only wells proposed within the TAPS ROW. I have included aerial photos of the other locations mentioned in the email below as well for verification. Any other stipulations or procedures mentioned in the previous access document from 2019 would be followed.
1) Start dates would be to install the wells next week (Sept 21-24) if possible and upon location verification and clearance. They would be sampled quarterly by USAF/USACE (roughly 10 days per year) for the next 25+ years as long as they are functional.
2) All well locations would be on the opposite side of the TAPS access road from the buried or above ground pipeline and at the edge of the woodline.
3) Initial installation would be with a F550, trailer, and Geoprobe 8040 drill rig (total weight 28000lbs). If needed the rig can be removed from the trailer and walked over the bridges. The sampling teams would be in typical 4WD truck (3500 HD or similar).

If you have any questions or need more information please let me know.

Thanks,

George Garner | Geologist
Woman-Native American-Owned Small Business
711 H Street Suite 330 | Anchorage, AK 99501

(907) 646-0213 Direct | (251) 605-1931 Cell
www.sundance-inc.net

From: Nagel, Peter C. <Peter.Nagel@alyeska-pipeline.com>
Sent: Thursday, September 17, 2020 9:01 AM
To: Judd Parson <jparson@sundance-inc.net>; George Garner <ggarner@sundance-inc.net>
Cc: Williams, Nathan <Nathan.Williams@alyeska-pipeline.com>; Owen, Adam H. <Adam.Owen@alyeska-pipeline.com>
Subject: RE: Dig Line Request 2020380554

Actually, the email from G. Garner on the 24th was the initial concept info, and we talked the next day. I do not have a specific request with dates, vehicle types and TAPS locations, although Adam's call (1,2,4) may be correct. Please help expedite the review by targeting the well sites which require TAPS workpad access, stating offset-from-pipeline dimension, and the types of vehicles if different from last year and stating the frequency and duration of continued access needs.

From: Nagel, Peter C.
Sent: Thursday, September 17, 2020 8:48 AM
To: Owen, Adam H. <Adam.Owen@alyeska-pipeline.com>; jparson@sundance-inc.net
Cc: Williams, Nathan <Nathan.Williams@alyeska-pipeline.com>
Subject: RE: Dig Line Request 2020380554

Good eye, Adam, and Sundance's George Garner sent the request on Aug 24. I will expedite the review with you today and draft an amendment to last year's LNO 19-12 (attached). Pete

---

From: Owen, Adam H. <Adam.Owen@alyeska-pipeline.com>
Sent: Thursday, September 17, 2020 8:12 AM
To: jparson@sundance-inc.net
Cc: Nagel, Peter C. <Peter.Nagel@alyeska-pipeline.com>; Williams, Nathan <Nathan.Williams@alyeska-pipeline.com>
Subject: Dig Line Request 2020380554

Jason – it appears from the attached photos that MW's 1, 2, and 4 would be on TAPS Right-of-

Way (ROW). Please contact Pete Nagel, Alyeska ROW and Lands Manager, at 787-8170 or via email at Peter.Nagel@alyeska-pipeline.com to request access via a Letter of Non-Objection. Until this approval occurs you are not authorized to access TAPS ROW for this work.

Thank you.

Adam Owen
FRB Civil Maintenance Coordinator
Office: (907) 450-5406 Cell: 460-0482

-----Original Message-----
From: akticket@ak811.net <akticket@ak811.net>
Sent: Wednesday, September 16, 2020 4:45 PM
To: DL, DigLine <DigLine@alyeska-pipeline.com>
Subject: [EXTERNAL]: DO NOT REPLY Request 2020380554

811 ALASKA DIGLINE NOTICE OF EXCAVATION

Priority: STANDARD Ticket #: 2020380554 Seq. #: 3
Type: REGULAR Mark By: 09/18/2020 04:44:00 PM
Update of:
Received: 09/16/2020 04:44:19 PM Transmitted: 09/16/2020 04:44:32 PM

Company: Sundance Consulting
Primary: Judson Parson Phone: (503)686-3810
Email: jparson@sundance-inc.net Mobile:
Job #: 20461 Fax:
Secondary: Sec Ph:
Excavator/Project Owner:

City: EIELSON AFB, FAIRBANKS NORTH STAR
Subdivision:
Lot: Block:
Address: Unit: To:
Street: MANCHU RD
Intx 1: PIPELINE ACCESS RD Intx 2:
GPS: 64.67926200 -147.09734850
MAP PAGE: FB0166
PID #:

Project: WATER WELL
Road ROW: N Easement: N RR ROW: N Pipeline ROW: N
Front Yd: N Back Yd: N Premarked: Y Access: Y Site Meet: N

Excav Size: Length: 0.00 FT Dir: Width: 0.00 FT Depth: 25.00 FT

Scope of Work: 8 Permanent Environmental Monitoring Wells, marked in green, maxi
mum depth of 25 ft. 4 inch diameter surface casing with a product
ion casing of 2 inches in diameter. Base dig permit has been star
ted and is almost complete.

Remarks: Zoomed in pictures of proposed well locations are attached as well as
a spreadsheet with their coordinates.

811 Members Notified:

*TAPS-ALYESKA	GFCS	ACS FB	GCI FB
GCI-FIBER FNSB	AT&T	MTA FH	

Locator Notes:

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX E – FIELD DOCUMENTATION

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix E.1 – Field Daily Activity Logs

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SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: Eielson PFAS SI	Contract Number: W911KB-17-D-0015	Task Order:
Project Location: Eielson AFB	Date: 5/30/19	Time: 1030
PM: Sharon Richmond	SS: Gilbert M.	SSHO: Gilbert M.

Personnel On-Site

Personnel Name	Organization	Hours
Gilbert Manning	Sundance-EA	7.5

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	64	75
Wind	Light	"
Humidity	Low	"
Comments		

Site Safety Topics

Slip, Trip, Falls,
Buddy system - call Markw as needed

Tasks Performed Today (Defined by AHAs)

Sample AP-6078

Tasks Planned for Tomorrow

None

Issues, Deviations, Variances & Corrective Measure

Issues with pump. Leave site to make repairs. Return to site at 1615. Sample tubing was not set at ½ screen or 2 ft below groundwater due to turbidity issues.

Gilbert Manning — Reported by Name

[signature] — Reported by Signature

5/30/19 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Eielson AFB, AK	Date: 16 July 2019	Time: 0725
PM: J. Corsdeth/M. Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Eng.	10
G. Gardner	Sundance	10

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	60 °F	
Wind	Calm	
Humidity	high	
Comments	rain	

Site Safety Topics

- Insect awareness
- slips, trips, and falls

Tasks Performed Today (Defined by AHAs)

- sampling existing monitor wells.

Tasks Planned for Tomorrow

- continue sampling existing monitor wells.

Issues, Deviations, Variances & Corrective Measure

- Some wells the field team encountered were damaged beyond sampling and/or contained transducers.

Damaged: BKG-05, 51MB4

Transducer: 51MB2

Nicole Stoecklein
Reported by Name

Reported by Signature

16 July 2019
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:7/17/2019**	**Time:1900**
PM: John Consoletti	**SS: Gilbert Manning**	**SSHO: Nicole Stocklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Gilbert Manning	Sundance-EA	-
Nicole Stocklein	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	70S	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Lifting, vehicle operations, wildlife

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Existing well sampling.
- IDW Management

TASKS PLANNED FOR TOMORROW

- Existing well sampling

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Wells with transducers were not sampled due to PFAS-containing o-rings.

George Garner	*George Garner*	7/17/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:7/18/2019**	**Time:1900**
PM: John Consoletti	**SS: Gilbert Manning**	**SSHO: Nicole Stocklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Gilbert Manning	Sundance-EA	-
Nicole Stocklein	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	60S	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Lifting, vehicle operations, wildlife

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Existing well sampling.
- IDW Management

TASKS PLANNED FOR TOMORROW

- IDW Management
- Sample shipping

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Wells with transducers were not sampled due to PFAS-containing O-rings.
- Locks with unknown combinations were cut and replaced with USACE combination locks set to combination supplied by USACA Chena Flood Control personnel.

George Garner	*George Garner*	7/18/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:10/14/2019`**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Beth Davis	Sundance-EA	-
Becky Hendrix	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	20s	
WIND	LIGHT	
HUMIDITY	50%	
COMMENTS		

SITE SAFETY TOPICS

Icy conditions

TASKS PERFORMED TODAY (DEFINED BY AHAS)

Field Prep, Equipment Prep

TASKS PLANNED FOR TOMORROW

- Get base passes at 7 am
- Meet drillers at 7:30 am Visitor Center for Safety Brief
- Begin drilling on South End of Runway TW02 and proceed north along the west side of highway

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

George Garner	*George Garner*	10/14/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:10/15/2019**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Beth Davis	Sundance-EA	-
Becky Hendrix	Sundance-EA	-
Ryan Beck	Geotek	-
Steve Simas	Geotek	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	20s	
WIND	LIGHT	
HUMIDITY	50%	
COMMENTS		

SITE SAFETY TOPICS

Roadway operations, icy conditions

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Drilled and Sampled 6 Wells (TW02, TW03 (Dup and MS/MSD), TW04, TW05, TW07, and TW08)
- Late start (11am Drilling) due to Driller Base pass issue, picking up equipment, and PFAS free water delivery.

TASKS PLANNED FOR TOMORROW

-Begin drilling at TW09 around 8:30 due to light conditions.
-Proceed North along the west side of the Richardson Highway.
- Meet with Alyeska Personnel to verify drill locations and determine if an escort is needed for drilling.
-Check out gate key from USACE Chena Flood Control.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Issues

  Working on Access with Alyeska and coordination of field team (If an escort is required).

George Garner	George Garner	10/15/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:10/16/2019**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Beth Davis	Sundance-EA	-
Becky Hendrix	Sundance-EA	-
Ryan Beck	Geotek	-
Steve Simas	Geotek	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	20s	
WIND	LIGHT	
HUMIDITY	50%	
COMMENTS		

SITE SAFETY TOPICS

Icy conditions, footing

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Completed and Sampled 7 Wells (TW06, TW09, TW13 (Dup), TW14, TW15, TW17, TW18)
- Secured keys for USACE Chena Flood Gates
- Got site verification clearance from Alyeska Pipeline

TASKS PLANNED FOR TOMORROW

-Complete Soil borings
-Ship first set of Samples to ELLE

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

George Garner	*George Garner*	10/16/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:10/17/2019**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Beth Davis	Sundance-EA	-
Becky Hendrix	Sundance-EA	-
Ryan Beck	Geotek	-
Steve Simas	Geotek	-
Nicole Stocklein	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	15-20	
WIND	LIGHT	
HUMIDITY	LIGHT	
COMMENTS		

SITE SAFETY TOPICS

Cold weather injuries, icy conditions

TASKS PERFORMED TODAY (DEFINED BY AHAS)

Soil Borings
- Completed 6 of 7 Soil Borings at FFTA ENT Site.

Groundwater Sampling
- Completed 2 Temporary Wells (TW 16 and TW19)
- Gathered anti spill equipment for Alyeska Pipeline Drilling locations.
- Shipped Samples (Fedex Overnight Tracking #780329641560)

TASKS PLANNED FOR TOMORROW

- Complete TW10-12, TW20-22
- Contact Alyeska Pipeline to check out gate key
- Contact Alyeska to notify them of Temp Well drilling schedule (Saturday/Sunday).

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Remaining soil boring location will require a Field Change form (it's located under a stockpile more than 30 feet from an accessible point).

George Garner	*George Garner*	10/17/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:10/18/2019**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Beth Davis	Sundance-EA	-
Becky Hendrix	Sundance-EA	-
Ryan Beck	Geotek	-
Steve Simas	Geotek	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	TEENS	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

TASKS PERFORMED TODAY (DEFINED BY AHAS)

-Completed and sampled 5 Temporary Wells (TW10, TW11, TW12, TW20, and TW21).
-Secured Alyeska Pipeline Key for access over the weekend.
- Contacted all required base utilities as required on Dig Permit.

TASKS PLANNED FOR TOMORROW

-Begin drilling and sampling at TW01 along DLA pipeline and begin moving south along Alyeska Pipeline

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

-TW20 had a total depth of 16 ft due to refusal (either permafrost or possibly schist. It is at the base of Moose Creek Bluff.) It produced plenty of water and was sampled.
-TW21 was drilled but not sampled. The lithology was a silty peat and the drill rod pushed to depth without a hammer. The boring ended in permafrost (frozen from 23-25ft bgs). There was surface water below a layer of frozen soil/surface ice, but not enough to sample at depth. The soils were moist but not permeable enough to produce any water for sampling. We tried 2 pumps, lifted screen up to 16 ft bgs and 10 ft bgs to try and get water in screen, with no results.

George Garner	*George Garner*	10/18/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:10/19/2019**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Beth Davis	Sundance-EA	-
Becky Hendrix	Sundance-EA	-
Ryan Beck	Geotek	-
Steve Simas	Geotek	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	TEENS	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Icy conditions, road safety

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Completed and sampled 10 Temp Wells (TW01, TW22, TW23, TW24, TW25, TW26, TW27, TW28, TW29, and TW30) along the north and east side of Eielson.
-

TASKS PLANNED FOR TOMORROW

-Complete remaining temporary wells on Eielson AFB (TW31, TW32, TW33, TW34, and TW35).
-Prep remaining samples for shipment on Monday
-QC Field Paperwork

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Driller (Steven Simas) has been pulled to another job, but Ryan is experienced and capable of completing the last 5 holes with no issues.

George Garner	*George Garner*	10/18/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:10/20/2019**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Beth Davis	Sundance-EA	-
Becky Hendrix	Sundance-EA	-
Ryan Beck	Geotek	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	TEENS	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Icy conditions, heavy lifting

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- All Temporary Wells have been completed and sampled. (TW31, TW32, TW33(DUP/MS/MSD), TW34, and TW35)
- Drafted COCs for Review prior to shipment.
-

TASKS PLANNED FOR TOMORROW

-Ship all remaining GW and Soil Samples collected through 10/20/2019.
-Drill and sample soil borings adjacent to Fire Station (Pending escort)

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

George Garner	*George Garner*	10/20/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:10/21/2019**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Beth Davis	Sundance-EA	-
Becky Hendrix	Sundance-EA	-
Ryan Beck	Geotek	-
Nicole Stocklein	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION
Joe Price	USAF

WEATHER

	AM	PM
TEMPERATURE	TEENS	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Flightline Operations

TASKS PERFORMED TODAY (DEFINED BY AHAS)

Shipped samples COC 11, 12, and 13
- Fedex Tracking Numbers (780404356427, 780404356449, 780404356438)
- Completed Soil Borings at FST1 along flightline. (6 borings SB02-SB07)
- Prepped soil samples for shipment on 10-22-2019

TASKS PLANNED FOR TOMORROW

-Begin drilling cluster wells (mid-day)
-Ship remaining samples from soil borings

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

George Garner	*George Garner*	10/21/2019
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel, Well Cluster #2	**Date:10-22-19**	**Time:0900**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	10
Ryan Wortman	Sundance	10
Glen Rawson	GeoTek Alaska	11
James Beckner	GeoTek Alaska	11

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION
Levi Lewfilyn	Chena Flood Control USACE
Shaun Griar	Pioneer Wells

WEATHER

	AM	PM
TEMPERATURE	28	35
WIND		
HUMIDITY		
COMMENTS		

SITE SAFETY TOPICS

Proper PPE, cold weather awareness

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Mobilization to the site
- Installation of monitoring wells

TASKS PLANNED FOR TOMORROW

Continue drilling and installing 19PS-MW02A.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

Well 19PS-MW02A was set at a total depth of 59 feet below ground surface due to the collapsing of material downhole during well construction. This is a deviation from the Work Plan.

Nicole Stoecklein	Nicole Stoecklein	**10/22/19**
Reported by Name	**Reported by Signature**	**Date**
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel, Well Cluster #2	**Date:10-23-19**	**Time:0900**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	10
Ryan Wortman	Sundance	10
Glen Rawson	GeoTek Alaska	11
James Beckner	GeoTek Alaska	11

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	37	42
WIND	7 mph	7 mph
HUMIDITY		
COMMENTS		

SITE SAFETY TOPICS

Frozen surfaces, working in an area with vehicular traffic

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Drilling

TASKS PLANNED FOR TOMORROW

Develop 19PS-MW02A.
Continue drilling 19PS-MW02B.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Nicole Stoecklein — **10/23/19**

Reported by Name | **Reported by Signature** | **Date**

Project Manager Name | **Project Manager Signature** | **Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel, Well Cluster #2	**Date:10-24-19**	**Time:0830**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	12
Ryan Wortman	Sundance	10
Glen Rawson	GeoTek Alaska	11
James Beckner	GeoTek Alaska	11

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION
Julie Sharp-Dahl	USACE
Scott Thorsell	USACE

WEATHER

	AM	PM
TEMPERATURE	29	32
WIND		
HUMIDITY		
COMMENTS		

SITE SAFETY TOPICS

Tripping hazards while developing a monitoring well (cords, etc.); proper lifting

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Drilling

TASKS PLANNED FOR TOMORROW

Continue developing 19PS-MW02A.
Continue dwell completion of 19PS-MW02B.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

Had issues with rental equipment while developing 19PS-MW02A. There was a fluctuation in voltage to the equipment running the submersible pump. Consulted with rental equipment company and they assumed the power supply was not affective. Field team will return set of equipment and get a new set in the morning, to include a rechargeable battery, and resume development of 19PS-MW02A tomorrow.

Nicole Stoecklein	Nicole Stoecklein	**10/24/19**
Reported by Name	**Reported by Signature**	**Date**
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel, Well Cluster #2	**Date:10-25-19**	**Time:0845**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	11
Ryan Wortman	Sundance	10
Glen Rawson	GeoTek Alaska	11
James Beckner	GeoTek Alaska	11
Ben Leach	EA Engineering	2

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	30	31
WIND	10 mph	calm
HUMIDITY		
COMMENTS	Recent snow	

SITE SAFETY TOPICS

Slippery surfaces, proper hearing protection while working around drill rig

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Drilling

TASKS PLANNED FOR TOMORROW

Continue developing 19PS-MW02B.
Mob to Well Cluster #1.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein	Nicole Stoecklein	**10/25/19**
Reported by Name	**Reported by Signature**	**Date**
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel, Well Cluster #1 & 2	**Date:10-26-19**	**Time:0820**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	11.5
Ryan Wortman	Sundance	10
Glen Rawson	GeoTek Alaska	11
James Beckner	GeoTek Alaska	11

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	28	35
WIND		
HUMIDITY		
COMMENTS		

SITE SAFETY TOPICS

Pinch points during drilling and securing lids on IDW/drums.

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Drilling
- Sampling groundwater well

TASKS PLANNED FOR TOMORROW

Collect SB04 from FFTA on Eielson AFB.
Mob and start drilling in Well Cluster #1 area.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

Difficulty drilling down hole and retrieving augers due to lithology occurred while drilling the 110 feet (ft) below ground surface (bgs) monitoring well at Well Cluster #2. The installation of proposed monitoring wells to depths of 160 feet below ground surface (bgs) and 210 ft bgs at Well Clusters #1 and #2 may not be achieved using the hollow stem auger drilling method. A field change form will be submitted to get approval to use rotary wash drilling method to achieve the 160' bgs and 210' bgs depths/wells.

Nicole Stoecklein	Nicole Stoecklein	**10/26/19**
Reported by Name	**Reported by Signature**	**Date**
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel, Well Cluster #1, EAFB	**Date:10-27-19**	**Time:0815**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	11.5
Glen Rawson	GeoTek Alaska	12
Orlin Sutliff	GeoTek Alaska	12
James Beckner	GeoTek Alaska	12

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	36	40
WIND		
HUMIDITY		
COMMENTS		

SITE SAFETY TOPICS

Slippery surfaces after recent snow and current rain during cold temps.

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Drilling
- Sampling groundwater well

TASKS PLANNED FOR TOMORROW

Develop 19PS-MW01A.
Continue and complete drilling of 19PS-MW01B.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Nicole Stoecklein — **10/26/19**

Reported by Name | **Reported by Signature** | **Date**

Project Manager Name | **Project Manager Signature** | **Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel, Well Cluster #1	**Date:10-28-19**	**Time:0815**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	11.5
Hallie Peterson	EA Engineering	11
Orlin Sutliff	GeoTek Alaska	12
James Beckner	GeoTek Alaska	12

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	45	39
WIND		
HUMIDITY		
COMMENTS		

SITE SAFETY TOPICS

Tripping hazards and proper PPE.

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Drilling
- Groundwater sampling

TASKS PLANNED FOR TOMORROW

Develop 19PS-MW01B.
Sample 19PS-MW01A.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Nicole Stoecklein — **10/28/19**

Reported by Name | **Reported by Signature** | **Date**

Project Manager Name | **Project Manager Signature** | **Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel, Well Cluster #1	**Date:10-29-19**	**Time:0900**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	10.5
Hallie Peterson	EA Engineering	10
Orlin Sutliff	GeoTek Alaska	12
James Beckner	GeoTek Alaska	12

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	45	39
WIND		
HUMIDITY		
COMMENTS		

SITE SAFETY TOPICS

Proper lifting; slips, trips, and falls.

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Groundwater sampling
- Demobilization

TASKS PLANNED FOR TOMORROW

Sample 19PS-MW01B.
Move IDW from the site to EAFB holding cell.
Install bollards around applicable wells.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Nicole Stoecklein — **10/29/19**

Reported by Name | **Reported by Signature** | **Date**

Project Manager Name | **Project Manager Signature** | **Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel, Well Cluster #1	**Date:10-30-19**	**Time:0845**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	11
Orlin Sutliff	GeoTek Alaska	11
James Beckner	GeoTek Alaska	11

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	32	33
WIND		
HUMIDITY		
COMMENTS	Light rain	Snow

SITE SAFETY TOPICS

Being visible and safe around equipment while its operating and carrying heavy loads (ie-skidsteer with IDW drums).

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Groundwater sampling
- Demobilization

TASKS PLANNED FOR TOMORROW

Ship out groundwater samples to laboratories
Continue and conclude demobilization from the site.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Nicole Stoecklein — **10/30/19**

Reported by Name | **Reported by Signature** | **Date**

Project Manager Name | **Project Manager Signature** | **Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB17F0173**
Project Location: Chena Flood Channel	**Date:10-31-19**	**Time:0845**
PM: J. Consoletti/M. Wilkinson	**SS: N. Stoecklein**	**SSHO: N. Stoecklein**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Nicole Stoecklein	EA Engineering	3
Orlin Sutliff	GeoTek Alaska	8
James Beckner	GeoTek Alaska	8

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	24	35
WIND		
HUMIDITY		
COMMENTS		

SITE SAFETY TOPICS

Pinch points when strapping down equipment.

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Demobilization

TASKS PLANNED FOR TOMORROW

None.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Reported by Name

Nicole Stoecklein — Reported by Signature

10/31/19 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Chena Flood Channel	Date: 4/16/2020	Time: 0900
PM: J. Consoletti / M. Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Eng.	7.75
B. Leach	EA Eng.	7.75

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	29	42
WIND	10	10
HUMIDITY	—	—
COMMENTS		

SITE SAFETY TOPICS

- Wearing safety masks per COVID
- Slips, trips, falls due to slushy ice

TASKS PERFORMED TODAY (DEFINED BY AHAS)

Well Sampling

TASKS PLANNED FOR TOMORROW

None.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

Could not cut lock off well DSAP-8D. Therefore could not sample well.

Nicole Stoecklein
Reported by Name

Reported by Signature

4/16/2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel	Date: 14 May 2020	Time: 0800
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Engineering	9
Glen Rawson	GeoTek Alaska	9.5
Steven Simas	GeoTek Alaska	9.5

Visitors On-Site

Visitor Name	Organization
Lindell Zesiger	Rolling Stone

Weather

	AM	PM
Temperature	45°F	61°F
Wind	10 mph	13 mph
Humidity	20%	20%
Comments		

Site Safety Topics

- Working on uneven surfaces
- Trips, slips, and falls
- All personnel w/in 6' have to wear masks per COVID

Tasks Performed Today (Defined by AHAs)

- Mob to site (unload equipment in staging area)

Tasks Planned for Tomorrow

- Start drilling 160' bgs well in well Cluster #2 location

Issues, Deviations, Variances & Corrective Measure

None.

Nicole Stoecklein — Reported by Name

Reported by Signature

14 May 2020. — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel	Date: 5/15/2020	Time: 0725
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	8.25
Glen Rawson	GeoTek AK	8.25
Steven Simias	GeoTek AK	8.25

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	47°F	64°F
WIND	4 mph	1 mph
HUMIDITY	42%	25%
COMMENTS		

SITE SAFETY TOPICS

- proper PPE
- proper lifting techniques

TASKS PERFORMED TODAY (DEFINED BY AHAS)

Install wells - cluster wells

TASKS PLANNED FOR TOMORROW

Continue drilling wells at Well Cluster #2.
Clean out & set 20PS-MW02C

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein
Reported by Name

Reported by Signature

15 May 2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS S1	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC#2	Date: 16 May 2020	Time: 0725
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	10.5
Glen Rawson	GeoTek Alaska	11
Steven Simjas	GeoTek Alaska	11

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	44°F 34°F	57°F
WIND	2mph	13 mph
HUMIDITY	83 %	28%
COMMENTS		

SITE SAFETY TOPICS

- masks when w/in 6' of each other per COVID
- tripping hazards - hoses on site
- proper hearing protection

TASKS PERFORMED TODAY (DEFINED BY AHAs)

drilling - cluster wells (installation)

TASKS PLANNED FOR TOMORROW

- decon ~~outer~~ casing
- start driving casing on 20PS-MW02D

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

20PS-MW02C was set at 161' bgs instead of 160' bgs.

Nicole Stoecklein
Reported by Name

Reported by Signature

16 May 2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel wc #2	Date: 17 May 2020	Time: 0800
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	10.75
Glen Rawson	GeoTek AK	11.0
Steven Seginais	GeoTek AK	11.0

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	38°F	53°F
WIND	7 mph	8 mph
HUMIDITY	48%	20%
COMMENTS		

SITE SAFETY TOPICS

- traffic awareness while working along side road
- pinch points when dealing w/ drums and equipment

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- decontamination (dealing w/wastes/IDW)
- Sampling of IDW
- Installation of wells

TASKS PLANNED FOR TOMORROW

Continue drilling 20PS-MW02D.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Reported by Name

Reported by Signature

17 May 2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC#2	Date: 18 May 2020	Time: 0755
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	9
Glen Rawson	GeoTek AK	~~9.75~~ 10.25
Steven Simino	GeoTek AK	10.25

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	44°F	63°F
WIND	8 mph	17 mph
HUMIDITY	31%	20%
COMMENTS		

SITE SAFETY TOPICS

- proper hearing protection around drill/heavy equipment
- staying hydrated while conducting field work

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- installation of wells
- Sampling of IDW

TASKS PLANNED FOR TOMORROW

- develope 20PS-MW02C
- reach 210' & construct 20PS-MW02D

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Reported by Name

Reported by Signature

18 May 2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/18/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	50	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Flightline Operations

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Dig Permit Processing
- Site marking
- Access verification

TASKS PLANNED FOR TOMORROW

- Stake temporary well locations.
- Utility clearances.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

NONE

George Garner	*George Garner*	05/18/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC #2	Date: 19 May 2020	Time: 0731
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	10.5
H. Peterson	EA Engineering	8.75
G. Rawson	GeoTek AK	10.5
S. Siemion	GeoTek AK	10.5

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	49°F	62°F
WIND	11 mph	10 mph
HUMIDITY	33%	25%
COMMENTS		

SITE SAFETY TOPICS

- staying hydrated while working
- making sure you're visible to equipment operator (drill, Bobcat)

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Clean out 20PS-MW02D to 210' bgs
- complete well construction of 20PS-MW02D
- develop 20PS-MW02C

TASKS PLANNED FOR TOMORROW

- Continue drilling to achieve 210' bgs.
- Install/construct well 20PS-MW02D
- developed 20PS-MW02C

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein
Reported by Name

Reported by Signature

19 May 2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/19/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	50	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Vehicle Operations, wildlife interaction

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Dig Permit Processing
- Site marking
- Temporary Well Staking
- Utility clearance

TASKS PLANNED FOR TOMORROW

- Stake temporary well locations.
- Utility clearances.
- Verify site access

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

NONE

George Garner	*George Garner*	05/19/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFOA/PFOS S1	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Channel Flood Channel WC#2	Date: 20 May 2020	Time: 0728
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Engineering	10
H. Peterson	EA Engineering	9.5
James Beckner	GeoTek AK	10.5
Glen Rawson	GeoTek AK	10.5

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	44 F	66 F
Wind	calm	6 mph
Humidity	48%	20%
Comments		

Site Safety Topics

- slips, trips, and falls
- know hospital route in the event of an emergency.

Tasks Performed Today (Defined by AHAs)

- achieve 210' bgs, install and construct 20PS-~~20PS~~MW02D.
- Start development on 20PS-MW02C.

Tasks Planned for Tomorrow

- Complete well construction of 20PS-MW02D
- sample 20PS-MW02C
- decon casing/rods.
- mob to well Cluster #1

Issues, Deviations, Variances & Corrective Measure

When lowering well casing to 210' bgs during construction of 20PS-MW02D, the casing did not go to 210' bgs. Drillers indicated it's likely due to the casing getting hung up/stuck on sediment (lingering) w/in the outer casing. Tomorrow drillers will clean out the last few feet (again) to 210' bgs and lower well casing into place.

Nicole Stoecklein — Reported by Name

Reported by Signature

20 May 2020. — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/20/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	50	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Slips/trips/falls, wildlife

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Dig Permit Processing
- Site marking
- Temporary Well Staking
- Utility clearance

TASKS PLANNED FOR TOMORROW

- Stake temporary well locations.
- Utility clearances.
- Verify site access

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Access assistance is required for TW 40 (Manchu Road Gate), TW36, TW37, and TW38 (Escort and gate codes required to access locations within the flight line fence.) Joe Price was in contact today about escort and gate access.
- The proposed locations for TW43 and TW44 are currently inaccessible due to water. The access trail and proposed locations are currently under 6” to 2 ft of standing water. Sediment and surface water samples could be collected in lieu of the temporary monitoring wells.
- Move TW50 outside to railroad ROW adjusted within acceptable variance.
- Moved TW40 location out of standing water in wetland.

George Garner	*George Garner*	05/20/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC#2	Date: 5/21/2020	Time: 0715
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	10.5
H. Peterson	EA Engineering	8
G. Rawson	GeoTek AK	11
J. Bechner	GeoTek AK	11

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	51°F	71°F
WIND	1 mph	12 mph
HUMIDITY	51%	20%
COMMENTS		

SITE SAFETY TOPICS

- Proper PPE
- Wildlife awareness

TASKS PERFORMED TODAY (DEFINED BY AHAs)

- Collect samples, groundwater
- install wells (cluster).
- decon rods/casing/tremie pipes

TASKS PLANNED FOR TOMORROW

- decon (continue) casing/rods/tremie pipes
- Start drilling 20PS-MW01C.
- Start development on 20PS-MW02D.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein
Reported by Name

Reported by Signature

5/5/2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/21/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	50	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Flight line operations

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Site marking
- Temporary Well Staking
- Access verification to well locations
- Arrange for flight line training.

TASKS PLANNED FOR TOMORROW

- Flight line training

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- TW42 temp well location is flooded and inaccessible due to high river levels. Will verify levels in a few days to see if a water levels have dropped.
- Access assistance is required for TW 40 (Manchu Road Gate at French Creek). Sundance is contacting base operations and security forces to determine the gate combination.

George Garner	*George Garner*	05/21/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC#1&2	Date: 22 May 2020	Time: 0722
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	10.5
H. Peterson	EA Engineering	8.75
J. Bechenor	GeoTek AK	11
G. Rawson	GeoTek AK	11

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	52°F	65°F
WIND	1 mph	11 mph
HUMIDITY	47%	35%
COMMENTS		

SITE SAFETY TOPICS

- insect awareness, use only Deet-free sprays
- staying hydrated

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- ~~steve~~ e
- installation of wells
- IDW

TASKS PLANNED FOR TOMORROW

- Continue drilling 20PS-MW01D
- Start/Complete development of 20PS-MW02D.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Reported by Name

Reported by Signature

22 May 2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/22/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	50	
WIND	LIGHT	
HUMIDITY	LOW	
COMMENTS		

SITE SAFETY TOPICS

Flight line operations

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Flight line training.

TASKS PLANNED FOR TOMORROW

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

George Garner — *George Garner* — 05/22/2020
Reported by Name — **Reported by Signature** — **Date**

John Consoletti
Project Manager Name — **Project Manager Signature** — **Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC #182	Date: 05/23/2020	Time: 0724
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	10.5
H. Peterson	EA Engineering	10
J. Beckner	GeoTek AK	11
G. Rawson	GeoTek AK	11

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	48 ~~34~~ °F	~~73~~ °F
WIND	1 mph	8 mph
HUMIDITY	61 ~~64~~ %	26 %
COMMENTS		

SITE SAFETY TOPICS

- Working around heavy equipment, be visible, make eye contact
- Wash hands before any hand to mouth activities

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- installation of well
-

TASKS PLANNED FOR TOMORROW

- Continue installation of 20PS-MW01D
- Sample 20PS-MW02D.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein
Reported by Name

Reported by Signature

23 May 2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC#1&2	Date: 7/24/2020	Time: 0725
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	~~10.75~~ EP
H. Peterson	EA Engineering	9
G. Rawson	GeoTek AK	10.5
J. Beckner	GeoTek AK	10.5

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION
~~DTE~~ 9.25	

WEATHER

	AM	PM
TEMPERATURE	56°F	62°F
WIND	8 mph	3 mph
HUMIDITY	43%	100%
COMMENTS		

SITE SAFETY TOPICS

- 3 points of contact when using ladder
- Stop work authority if an issue/weather arises

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- drilling/install of well
- sampling of 1 well

TASKS PLANNED FOR TOMORROW

- continue drilling 20PS-MW01D

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein
Reported by Name

Reported by Signature

24/May/2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: EE Chena Flood Channel WCH	Date: 7/26/2020	Time: 0734
PM: J. Consoletti / M. Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Eng	10
H. Peterson	EA Eng.	10.7
J. Bechner	GeoTek AK	10.5
G. Rawson	GeoTek AK	10.5
S. Newman	Sundance	10

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	50°F	
Wind	4 mph	
Humidity	85%	
Comments		

Site Safety Topics

- biological hazards - bugs
- know ~~hosp~~ hospital route in the case of an emergency.

Tasks Performed Today (Defined by AHAs)

- drilling / install of well

Tasks Planned for Tomorrow

- Complete drilling / installation of 20PS-MW01D.

Issues, Deviations, Variances & Corrective Measure

None.

Nicole Stoecklein
Reported by Name

Reported by Signature

26 May 2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/26/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-
K. Copeland	Sundance-EA	-
S. Simas	Geotek	-
B. Foster	Geotek	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	50	
WIND	LIGHT	
HUMIDITY	MODERATE	
COMMENTS		

SITE SAFETY TOPICS

Drill operations, vehicle operations

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Temp Well Drilling
- Groundwater Sampling

TASKS PLANNED FOR TOMORROW

- Continue drilling and sampling temporary wells located within the Chena Flood Control Project.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None

George Garner	*George Garner*	05/26/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel, WC#1	Date: 27 May 2020	Time: 0705
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	10.5
H. Peterson	EA Engineering	10.0
S. Newman	Sundance	10.0
G. Rawson	GeoTek AK	10.5
J. Beckner	GeoTek AK	10.5

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	44°F	59°F
WIND	3mph	8mph
HUMIDITY	75%	low
COMMENTS		

SITE SAFETY TOPICS

- slips, trips, and falls
- proper hydration

TASKS PERFORMED TODAY (DEFINED BY AHAs)

- well installation (20PS-MW01C)

TASKS PLANNED FOR TOMORROW

- continue drilling / well install 20PS-MW01C

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Reported by Name

Reported by Signature

27 May 2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/27/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-
K. Copeland	Sundance-EA	-
S. Simas	Geotek	-
B. Foster	Geotek	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	50	
WIND	LIGHT	
HUMIDITY	MODERATE	
COMMENTS		

SITE SAFETY TOPICS

Muddy conditions, wildlife interactions

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Temp Well Drilling
- Groundwater Sampling

TASKS PLANNED FOR TOMORROW

-Continue drilling and sampling temporary wells located within the Chena Flood Control Project and move to Eielson. (Six approved and drill rig accessible sites remain outside of secured areas.)

-Ship samples collected on May 26-27 to laboratory

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Pending Gate Access for Vehicle Gate-40 and Manchu Road Gate. Contacted Base Ops, Security Forces, Army Range Control, and Joe Price (USAF) to secure gate access codes for Sampling TW40, TW36, TW37, and TW38. Work will be delayed if gate codes are not available by Friday morning.

George Garner	*George Garner*	05/27/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel Well Cluster #1	Date: 28 May 2020	Time: 0715
PM: Mark Wilkinson	SS: Nicole Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Engineering	10
H. Peterson	EA Engineering	10
S. Newman	Sundance	10
G. Rawson	GeoTek AK	10.5
J. Bedmer	GeoTek AK	10.5

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	45	52
Wind	1 mph	5 mph
Humidity	79%	33%
Comments		

Site Safety Topics

- proper PPE (high-vis vest, hard hat, hearing protection, safety glasses)
- proper heavy lifting techniques

Tasks Performed Today (defined by AHAs)

- continue drilling 20PS-MW01C, and reach depth ~160' bgs with outer casing.
- IDW handling/management (water) at well cluster #2.

Tasks Planned for Tomorrow

- development of 20PS-MW01D.
- well construction of 20PS-MW01C after completing rotary wash clean out with inner rods to depth.

Issues, Deviations, Variances & Corrective Measure

N/A

Hallie Peterson
Reported by Name

Reported by Signature

May 28, 2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/28/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-
K. Copeland	Sundance-EA	-
S. Simas	Geotek	-
B. Foster	Geotek	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	50	
WIND	LIGHT	
HUMIDITY	MODERATE	
COMMENTS		

SITE SAFETY TOPICS

Muddy conditions, wildlife interactions

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Temp Well Drilling
- Groundwater Sampling

TASKS PLANNED FOR TOMORROW

-Continue drilling and sampling temporary wells on Eielson. (Three Temporary Well Locations with approved dig permits.)
- Meet Joe Price to access TW37 and TW38 at 0700 Friday. He has arranged for access and has the correct contacts for access.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None

George Garner	*George Garner*	05/28/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS S1	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC #1	Date: 29 May 2020	Time: 0715
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	11.0
H. Peterson	EA Engineering	10.5
J. Bechner	GeoTek AK	11.5
T. Bechner	GeoTek AK	11.5
S. Newman	Sundance	11.0

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	54°F	74°F
WIND	1mph	14 mph
HUMIDITY	75%	46%
COMMENTS		

SITE SAFETY TOPICS

- biological hazards - insects
- staying hydrated, warm days ahead

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- drill, install, construct 20PS-MW01C
- development of 20PS-MW01D

TASKS PLANNED FOR TOMORROW

- demob (start)
- well completions ~~Sample IDs generated for 20PS-MW01C.~~
- ~~Sample 20PS-MW01D & 20PS-MW01C.~~
- develop 20PS-MW01C.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein
Reported by Name

Reported by Signature

29 May 2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION		
Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/29/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-
K. Copeland	Sundance-EA	-
S. Simas	Geotek	-
B. Foster	Geotek	-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION
Joe Price	USAF

WEATHER

	AM	PM
TEMPERATURE	50	
WIND	LIGHT	
HUMIDITY	MODERATE	
COMMENTS		

SITE SAFETY TOPICS

Flight line operations, hearing protection

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Temp Well Drilling
- Groundwater Sampling
- Shipped samples

TASKS PLANNED FOR TOMORROW

-Temp Well Drilling
-Groundwater Sampling
- Sample shipment.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None

George Garner	*George Garner*	05/29/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFOA/PFOS S1	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel, WC #1	Date: 05/30/2020	Time: 1000
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Engineering	5.5
H. Peterson	EA Engineering	6.5
S. Newman	Sundance	6.5
~~G. Rawson~~ T. Bednar	GeoTek AK	8.0
J. Beckner	GeoTek AK	8.0

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	70°	~~77°~~
Wind	5 mph	6 mph
Humidity	38%	23°
Comments		

Site Safety Topics

- sun protection (sunscreen, proper hydration).
- be aware of drilling equipment in site vicinity (slips, trips, falls).

Tasks Performed Today (defined by AHAs)

- development of 20PS-MW01C.

Tasks Planned for Tomorrow

- sampling MWs 20PS-MW01C and 20PS-MW07D (+ QC and IDW samples).

Issues, Deviations, Variances & Corrective Measure

None.

Hallie Peterson — Reported by Name

Hallie Peterson — Reported by Signature

05/30/2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: EAFB Entomology (FFTA) Building	Date: 30 May 2020	Time: 0830
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Engineering	2.75
K. Copeland	Sundance	2.5
S. Simas	GeoTek AK	3.0
R. Foster	GeoTek AK	3.0

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	72 F	
Wind	10 mph	
Humidity	low	
Comments		

Site Safety Topics

- Proper PPE
- staying hydrated.

Tasks Performed Today (defined by AHAs)

- drilling (soil borings)

Tasks Planned for Tomorrow

NA.

Issues, Deviations, Variances & Corrective Measure

None

Nicole Stoecklein — Reported by Name

Reported by Signature

30 May 2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/30/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-
		-
		-
		-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	70	
WIND	LIGHT	
HUMIDITY	MODERATE	
COMMENTS		

SITE SAFETY TOPICS

Muddy conditions, wildlife interactions, Lifting, slips/trips/falls

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Temp Well Drilling (by hand)
- Groundwater Sampling

TASKS PLANNED FOR TOMORROW

-Temp Well Drilling
- Groundwater Sampling
- Sample shipment.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Permafrost encountered at TW44 and TW43 locations. Unable to sample.

George Garner	*George Garner*	05/28/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS S1	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC#122	Date: 31 May 2020	Time: 0715
PM: Mark Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	10
H. Peterson	↓	10
S. Newman	↓	10
J. Bechner	GeoTek AK	10.5
T. Bechner	↓	10.5
S. Siemas	↓	5.0
R. Foster	↓	5.0

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	65°F	68°F
WIND	5 mph	10 mph
HUMIDITY	44%	48%
COMMENTS		

SITE SAFETY TOPICS

- staging clearest visible when operation of equipment (Bobcat)
- biohazards - bugs - REALLY BAD today.

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- sampling wells
- demob
- Sampling IDW

TASKS PLANNED FOR TOMORROW

- will return to the site 2 June to conclude demob.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein
Reported by Name

Reported by Signature

31 May 20
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION		
Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:05/31/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-
		-
		-
		-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	70	
WIND	LIGHT	
HUMIDITY	MODERATE	
COMMENTS		

SITE SAFETY TOPICS

Muddy conditions, wildlife interactions

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Temp Well Drilling
- Groundwater Sampling

TASKS PLANNED FOR TOMORROW

-- Sample shipment.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Unable to sample TW45 due to low recharge. This was a second effort since the drill rig is unable to access the location. TW45 will not be sampled.

George Garner	*George Garner*	05/31/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: Birch Lake Spanned AFOA/PFAS	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Birch Lake Recreation Site	Date: 6/1/20	Time: 1800
PM: Marc Wilkinson	SS:	SSHO: N. Stoecklein

Personnel On-site

Personnel Name	Organization	Hours
Lindsey Kenyon	EA	~~12.5~~ 6
Kayla Copeland	Sundance	6
Bryce Foster	Geotek	6
Steve Simas	Geotek	6

Visitors On-site

Visitor Name	Organization
Mike	ACS - utility locator

Weather

	AM	PM
Temperature	59°F	65°F
Wind	4 mph	6 mph
Humidity		
Comments	Scattered rain	

Site Safety Topics

- Biohazards
- Weather
- Pinch points

Tasks Performed Today (defined by AHAs)

Borehole drilling (8)
Vehicle operations

Tasks Planned for Tomorrow

Borehole drilling (2)

Issues, Deviations, Variances & Corrective Measure

No deviations from the work plan.
No issues.

Lindsey Kenyon — Reported by Name
Lindsey Kenyon — Reported by Signature
6/1/20 — Date

Project Manager Name
Project Manager Signature
Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: Birch Lake SW, Sed, & Soil	Contract Number: W911KB-17-D0018	Task Order: W911KB18F0173
Project Location: Birch Lake Rec Site	Date: 6/2/20	Time: 1800
PM: M. Wilkinson	SS:	SSHO: N. Stoeckeler

Personnel On-Site

Personnel Name	Organization	Hours
Lindsey Kenyon	EA	4
Kayla Copeland	Sundance	4
Bryce Foster	GeoTek	4
Steve Simas	GeoTek	4

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	53°F	65°F
Wind	0 mph	–
Humidity		
Comments		

Site Safety Topics

- Pinch points
- Drilling safety & emergency stop
- Sample handling

Tasks Performed Today (Defined by AHAs)

Drilled 2 boreholes, sample management, sample handling, vehicle operations

Tasks Planned for Tomorrow

None

Issues, Deviations, Variances & Corrective Measure

None

Lindsey Kenyon
Reported by Name

Lindsey Kenyon
Reported by Signature

6/2/20
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: Chena Flood Channel WC#122	Date: 2 Jun 2020	Time: 0920
PM: Mark Wilkinson	SS: N Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Engineering	~~2~~ 2.5
J. Beckner	GeoTek AK	~~2~~ 2

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	56 · F	
Wind	1 mph	
Humidity	72%	
Comments		

Site Safety Topics

- proper lifting
- slips, trips, and falls

Tasks Performed Today (defined by AHAs)

- demos

Tasks Planned for Tomorrow

- SB sampling at Fire Station #1.

Issues, Deviations, Variances & Corrective Measure

None.

Nicole Stoecklein — Reported by Name

Reported by Signature

2 Jun 2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

SW & Sed Sampling

PROJECT INFORMATION

Project Name: Expanded PFOA/PFOS SI	Contract Number: W911KB17D0018	Task Order: W911KB18F0173
Project Location: Eielson AFB	Date: 6/3/20	Time: 1800
PM: M. Wilkinson	SS:	SSHO: N. Stoecklin

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Lindsey Kenyon	EA	8.5
Kayla Copeland	Sundance	8.5

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	52°F	59°F
WIND	3mph	3mph
HUMIDITY		
COMMENTS	showers	

SITE SAFETY TOPICS

- Work in water
- Wildlife
- Slips/Trips/Falls
- Mask on Base
- Towing

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Surface water sampling
- Vehicle operations

TASKS PLANNED FOR TOMORROW

- Surface water & sediment sampling
- Vehicle operations

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Some ponds are very deep & vegetated, so some sediment samples will require the use of an auger/trowel and/or ponar sampling tool. Equipment blanks will be taken on any equipment to be used for sample collection. → Not a deviation from the work plan.

Lindsey Kenyon	Lindsey Kenyon	6/3/20
Reported by Name	Reported by Signature	Date
Project Manager Name	Project Manager Signature	Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFOA/PFOS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB18F0173
Project Location: EAFB FS#1	Date: 3 Jun 2020	Time: 0730
PM: Mark Wilkinson	SS: Nicole Stoecklein	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
N. Stoecklein	EA Engineering	3
J. Parson	Sundance	2.5
S. Siemas	GeoTek PK	3
B. Foster	↓	3
J. Price	EAFB CE Restoration	2.5

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	56 °F	
WIND	5 mph	
HUMIDITY	90%	
COMMENTS	—	

SITE SAFETY TOPICS

- proper hearing protection while around rig / taxiways
- being visible while around equipment / aircraft.

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- sampling (soil) / GBs
- mob / demob to / from site

TASKS PLANNED FOR TOMORROW

- ship samples to lab.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Nicole Stoecklein — Reported by Name

Reported by Signature

3 Jun 2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Eielson SW & Sed	Contract Number: W911KB17D0018	Task Order: W911KB18F0173
Project Location: Eielson AFB	Date: 6/4/20	Time: 1720
PM: M. Wilkinson	SS:	SSHO: N. Stoeckleni

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Lindsey Kenyon	EA	10
T. Copeland	Sundance	10

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	53°F	69°F
WIND	3 mph	6 mph
HUMIDITY	75%	35%
COMMENTS	Isolated T storms in PM	

SITE SAFETY TOPICS

- PFD & work over water
- slips/trips/falls
- vehicle operations
- weather

TASKS PERFORMED TODAY (DEFINED BY AHAs)

- collect SW & sed samples
- vehicle operations
- wildlife safety

TASKS PLANNED FOR TOMORROW

None @ Eielson.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

- SP01 could not be collected due to heavy root and vegetation cover

Lindsey Kenyon	Lindsey Kenyon	6/4/20
Reported by Name	Reported by Signature	Date
Project Manager Name	Project Manager Signature	Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: Birch Lake PPDS/PFDA	Contract Number: W911KB-17-D-0018	Task Order: W911KB18 F0173
Project Location: Birch Lake	Date: 6/5/20	Time: 2030
PM: M. Williamson	SS:	SSHO: N. Stoeckeler

Personnel On-Site

Personnel Name	Organization	Hours
Lindsey Kenyon	EA	8.5
Kayla Copeland	Sundance	8.5
Stephen Newman	Sundance	8.5

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	60°F	71°F
Wind	5 mph	7 mph
Humidity	37%	26%
Comments		

Site Safety Topics

- Work over water
- Boat safety
- Shoreline safety

Tasks Performed Today (defined by AHAs)

- Proposed sampling & surface water
- Towing
- work over water

Tasks Planned for Tomorrow

None @ Birch Lake

Issues, Deviations, Variances & Corrective Measure

None

Lindsey Kenyon
Reported by Name

Lindsey Kenyon
Reported by Signature

6/5/20
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFOA/PFOS SI	Contract Number: W911KB17D0018	Task Order: W911KB18F0173
Project Location: Eielson AFB & adjacent property	Date: 6/16/20	Time: 2015
PM: M. Wilkinson	SS:	SSHO: N. Stoecklein

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Lindsey Kenyon	EA	8
Stephen Newman	Sundance	8

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	53° F	
WIND	5 mph	
HUMIDITY	67%	
COMMENTS		

SITE SAFETY TOPICS

- work over water
- wildlife

TASKS PERFORMED TODAY (DEFINED BY AHAs)

- surface water sampling & sediment sampling
- Towing
- work over water

TASKS PLANNED FOR TOMORROW

- same as 6/16

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

Attempt to collect sample (sediment) at ZP01; however the pond floor is covered in thick, impenetrable vegetation. Could not collect.

Lindsey Kenyon — Reported by Name

Lindsey Kenyon — Reported by Signature

6/16/20 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: Gelson SW & sed sampling	Contract Number: W911KB17D0018	Task Order: W911KB18F0173
Project Location: Fielson AFB	Date: 6/7/20	Time: 1900
PM: M. Wilkinson	SS:	SSHO: N. Stoeckle

Personnel On-Site

Personnel Name	Organization	Hours
Lindsey Kenyon	EA	12
Kayla Copeland	Sundance	12

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	59°F	70°F
Wind	5 mph	—
Humidity	66%	
Comments		

Site Safety Topics

- PFD
- Vehicle operations
- Dehydration & weather

Tasks Performed Today (Defined by AHAs)

- SW & sed sampling
- Vehicle operations
- work in water

Tasks Planned for Tomorrow

same as today

Issues, Deviations, Variances & Corrective Measure

None.

Lindsey Kenyon
Reported by Name

Lindsey Kenyon
Reported by Signature

6/7/20
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: EXPANDED PFOA/PFOS	Contract Number: W911KB17D0018	Task Order: W911KB18F0173
Project Location: ~~MOOSE CREEK~~ Eielson AFB SW (KL) seed sampling	Date: 6/8/2020	Time: 1200
PM: M. Wilkinson	SS:	SSHO: N. Strechlen

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
LINDSEY KENYON	EA	7
JUDSON PARSON	SUNDANCE	7

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE		73°F
WIND	LK	9mph
HUMIDITY		65%
COMMENTS		

SITE SAFETY TOPICS

- WILDLIFE
- TOWING
- ATV USAGE
- LOAD PREPARATION
- SAMPLING PPE

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- SURFACE WATER AND SEDIMENT SAMPLING
- ATV TRAVEL

TASKS PLANNED FOR TOMORROW

- SURFACE WATER AND SEDIMENT SAMPLING

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

NONE

JUDSON PARSON — Reported by Name

Reported by Signature

6/9/20 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Chena Flood Channel	Date: 8 June 2020	Time: 1020
PM: J. Consoletti / M. Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Engineering	1.5
B. Leach	EA Engineering	1.5

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	57 F	
Wind	calm	
Humidity	high	
Comments		

Site Safety Topics

biological hazards
wildlife awareness.

Tasks Performed Today (Defined by AHAs)

Sampling (existing wells)

Tasks Planned for Tomorrow

None.

Issues, Deviations, Variances & Corrective Measure

None -

Nicole Stoecklein
Reported by Name

Reported by Signature

8 Jun 2020.
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFOA/PFOS	Contract Number: W911KB17D0018	Task Order: W911KB 18F0173
Project Location: Eielson AFB	Date: 6/9/20	Time: 1700
PM: M. Wilkinson	SS:	SSHO: N. Steckler

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Lindsey Kenyon	EA	5
Judson Parson	Sundance	9
Galen Kornowske	Sundance	3

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	68°F	65°F
WIND	4 mph	NE 16 mph
HUMIDITY	62%	49%
COMMENTS		

SITE SAFETY TOPICS

- Wildlife
- work over water
- Vehicle Operations
- lightning
- PPE
- ergonomics

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Surface water and sediment sampling

TASKS PLANNED FOR TOMORROW

- Surface water and sediment sampling

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None

Galen Kornowske
Reported by Name

Galen Kornowske
Reported by Signature

6/9/20
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Eielson SW & Sed Sampling	Contract Number: W911KB17D0018	Task Order: W911KB18F6173
Project Location: Eielson AFB	Date: 6/10/20	Time: 1600
PM: M. Wilkinson	SS:	SSHO: N. Stoedeler

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
Lindsey Kenyon	EA	4.5
Judson Parson	Sundance	4.5
Galen Kornowske	sundance	4.5

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	51°F	73°F
WIND	4mph	4mph
HUMIDITY	80%	27%
COMMENTS	Sunny	

SITE SAFETY TOPICS

- work over water - ergonomics
- PPE - vehicle operations
- wildlife

TASKS PERFORMED TODAY (DEFINED BY AHAS)

Surface water & sed. sampling

TASKS PLANNED FOR TOMORROW

None. Project complete.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

None.

Lindsey Kenyon — Reported by Name

Lindsey Kenyon — Reported by Signature

6/10/20 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: Expanded PFAS SI	**Contract Number: W911KB-17-D-0018**	**Task Order: W911KB18F0173**
Project Location: Eielson AFB	**Date:06/27/2020**	**Time:1900**
PM: John Consoletti	**SS: George Garner**	**SSHO: George Garner**

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
George Garner	Sundance-EA	-
Judd Parson	Sundance-EA	-
		-
		-
		-

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	70	
WIND	LIGHT	
HUMIDITY	MODERATE	
COMMENTS		

SITE SAFETY TOPICS

Roadside operations, vehicle operations

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- Temp Well Drilling
- Groundwater Sampling

TASKS PLANNED FOR TOMORROW

-- Sample shipment.

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- The one remaining temp well location (TW54) is currently underwater due to current flooding along the Tanana and Chena Rivers and is not accessible for drilling/sampling.

George Garner	*George Garner*	06/27/2020
Reported by Name	**Reported by Signature**	**Date**
John Consoletti		
Project Manager Name	**Project Manager Signature**	**Date**

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location:	Date: 09/09/2020	Time: 1020
PM: J. Consoletti / M. Wilkinson	SS:	SSHO:

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
David L Cockston	EA	
DAVE NORTH	GTA	
BRUCE FOSTER	GTA	
Noah Robinson	EA	
Travis Heaman	EA	

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	46	
WIND	0	
HUMIDITY	95%	
COMMENTS		

SITE SAFETY TOPICS

TASKS PERFORMED TODAY (DEFINED BY AHAS)

- purged/sampled Moose Creek Cluster 19PS-MW02A
- purged/sampled Moose Creek Cluster 20PS-MW02B

TASKS PLANNED FOR TOMORROW

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

- Had issue matching existing wells to well ID's/locations. Spoke with Colleen from Sundance who provided us with a spreadsheet of existing wells to be sampled which contained necessary well ID's & location coordinates.
- Mob out onto Flood Plain to drill MW-16 and MW-17. Set well at 17 ft bgl. because of heeving sands. The well completed is MW-16. Did not get MW-17 because drill crew is getting additional supplies. Plan to met back onsite at 0800 tomorrow.

David Cockston
Reported by Name

David J. Cockston
Reported by Signature

9/9/2020
Date

Mark Wilkinson
Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Chena Flood Canal	Date: 9/10/2020	Time: 0828
PM: J. Consoletti / M. Wilkinson	SS: David L. Cookston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L. Cookston	EA	
DAVID NORTH	GTA	
BRUCE FOSTER	GTA	
Noah Robinson	EA	
Travis Herman	EA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	37	
Wind	6 MPH	
Humidity	87%	
Comments		

Site Safety Topics

Watch for slip, trips, and falls.

Tasks Performed Today (Defined by AHAs)

Drilling, Well Installation, Decon ning Mobilization. Sample Crew - Sampling

Tasks Planned for Tomorrow

Drilling, Well Installation, Well head completions.

Issues, Deviations, Variances & Corrective Measure

MW-14 had heaving sands and had to be redrilled. Used 15 gallons of PFAS free water to stablize heaving sand the second time and successful installed well.

Sample Crew collected the following:
- Field Blank
- Purge/Sampled 20PS-DASP-85-0910 with wrong nomenclature.
- Collect Dup from same 20PS-DASP-85-0910.
- Unsuccessful cutting lock from 20-DSAP-8D.
- Collected surface water samples 20PS-CS-01-0910
- Purged/Sample well 20PS-USAP 20PS-CS-02-0910.

There is a phone with Eileen Mauro tomorrow morning to fix errors.

David L. Cookston — Reported by Name
Reported by Signature — Date: 09/10/2020

Mark Wilkinson — Project Manager Name
Project Manager Signature — Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Chena Flood Canal	Date: 9/11/2020	Time: 1054
PM: J. Consoletti / M. Wilkinson	SS: David L. Cookston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L Cookston	EA	
Noah Robinson	EA	
Travis Herman	EA	
DAVE NORTH	GTA	
BRYCE FOSTER	GTA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	41	
Wind	6 mph	
Humidity	87%	
Comments		

Site Safety Topics

Tasks Performed Today (Defined by AHAs)

Drilling,
Well Completions,
Well Development
Well Purging/Sampling

Tasks Planned for Tomorrow

Well Development
Well Purging/Sampling.
Well Drilling.

Issues, Deviations, Variances & Corrective Measure

Conference first thing this morning due to crew failing to collect QC samples as outlined in QAPP and Work Plan. Issues were resolved and the wells in question were resampled.

David L Cookston
Reported by Name

David L. Cookston
Reported by Signature

9/11/2020
Date

Mark Wilkinson
Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location:	Date: 9/12/2020	Time:
PM: J. Consoletti / M. Wilkinson	SS:	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
DAVE NORTH	GTA	
BRUCE FOSTER	GTA	
Travis Herman	EA	
Noah Robinson	EA	
Dave Cookston	EA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	37	
Wind	0 mph	
Humidity	87%	
Comments		

Site Safety Topics

Tasks Performed Today (Defined by AHAs)

Developed MW-13, MW-14, and MW-15.
Label all drums generated today for FDW.
Mob equipment and rig to west side of Flood Canal
Sampled 4 wells, collected 2 duplicates, 1 dup.
Sampled 2 surface water samples, 1 dup.
Collected 1 Field Blank in the PM.

Tasks Planned for Tomorrow

Drill MW-18, and MW-20.
Mob to MW-22. Drill MW-22 and MW-23.
Sample MW-15, MW-16, and MW-17.
Finish wells drilled with flushmounts or stick-ups as needed.

Issues, Deviations, Variances & Corrective Measure

None

David L Cookston
Reported by Name

David L. Cookston
Reported by Signature

9/12/2020
Date

Mark Wilkinson
Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Cheaha Flood Canal	Date: 9/13/2020	Time: 0941
PM: J. Consoletti / M. Wilkinson	SS: David Cockston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L. Cockston	EA	
Dave North	GTA	
Bobby Lee Foster	GTA	
Mark Robinson	EA	
Travis Herman	EA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	35	
Wind	0 mph	
Humidity		
Comments		

Site Safety Topics

Tasks Performed Today (Defined by AHAs)

Sampled 3 Wells today, MW-01A, MW-01B and MW-16.
Drilled and completed surface completion on MW-18 and MW-20. Surface completion for MW-22 not completed

Tasks Planned for Tomorrow

Drill MW-23, MW-24 and MW-25.
Develop MW-18 and MW-20.
Sample wells MW-13, MW-14, MW-15, and MW-17.

Issues, Deviations, Variances & Corrective Measure

David L. Cockston — Reported by Name

David L. Cockston — Reported by Signature

9/13/2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Chena Flood Canal	Date: 9/14/2020	Time:
PM: J. Consoletti / M. Wilkinson	SS: Dave Cockston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L. Cockston	EA	
Bruce Foster	GTA	
Dave North	GTA	
Noah Robinson	EA	
Travis Herman	EA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	43	
Wind	0 mph	
Humidity	84%	
Comments		

Site Safety Topics

Keep an watch out for sting insects. There are bee's and wasp fly around

Tasks Performed Today (Defined by AHAs)

Completed surface completion for MW-23. Drilled, set well, and surface completion for MW-24 and MW-25
Sample new wells MW-13, MW-14, MW-15 and MW-17

Tasks Planned for Tomorrow

Try to install MW-23. Encountered refusal so we moved on and completed MW-24 and MW-25, Sample crew will obtain base passes and sampling wells on base.

Issues, Deviations, Variances & Corrective Measure

MW-23 encounter refusal at 11 feet below ground. Decided to come back and attempt again at end of todays work then decided to attempt first thing in morning.

David L Cockston
Reported by Name

Reported by Signature

9/14/2020
Date

Mark Wilkinson
Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Cheney Flood Canal	Date: 9/15/2020	Time: 0826
PM: J. Consoletti / M. Wilkinson	SS: David Cookston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L. Cookston	EA	
DAVE NORTH	GTA	
BRYCE FOSTER	GTA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	46°F	
Wind	ENE 5 mph	
Humidity	72%	
Comments		

Site Safety Topics

PPE use. Safety Glasses. especially.

Tasks Performed Today (Defined by AHAs)

Drill, set well for MW-23
Developed, MW-18, MW-20, and MW-22

Tasks Planned for Tomorrow

Develop MW-23, MW-24, and MW-25.
Continue to sample new and existing wells.

Issues, Deviations, Variances & Corrective Measure

David L. Cookston
Reported by Name

David L. Cookston
Reported by Signature

9/15/2020
Date

Mark Wilkinson
Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: CFC	Date: 9/16/2020	Time: 1046
PM: J. Consoletti / M. Wilkinson	SS: David L. Cockston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L. Cockston	EA	
BRYCE FOSTER	GTA	
JUDSON PARSON	SUNDANCE/EA	
Galen Kaminske	Sundance	
George Garner	Sundance	
Travis Herman	EA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	46	
Wind	3 mph	
Humidity	92%	
Comments		

Site Safety Topics

Tasks Performed Today (Defined by AHAs)

Tasks Planned for Tomorrow

Issues, Deviations, Variances & Corrective Measure

Reported by Name

Reported by Signatnre

Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: CFC	Date: 9/17/2022	Time: 1226
PM: J. Consoletti / M. Wilkinson	SS: David L Cookston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
Travis Herman	EA	
Dave North	GTA	
Bryce Foster	GTA	
Noah Robinson	EA	
David L. Cookston	EA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	50°F	
Wind	11mph ENE	
Humidity	65%	
Comments		

Site Safety Topics

Taking care of yourself and the you work with. Everyone needs to drink water. If you are thirsty you are dehydrated. If your pee is yellow or orange you are dehydrated.

Tasks Performed Today (Defined by AHAs)

Tasks Planned for Tomorrow

Issues, Deviations, Variances & Corrective Measure

Reported by Name _____ Reported by Signature _____ Date _____

Project Manager Name _____ Project Manager Signature _____ Date _____

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: MC/CFC	Date: 9/18/2020	Time: 0730
PM: J. Consoletti / M. Wilkinson	SS: David L. Cookston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L. Cookston	EA	
Colen Kornacki	Sundance	
Judson Parson	SUNDANCE	
Noah Robinson	EA	
Travis Herman	EA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	41°F	
Wind	E 0 mph	
Humidity	89%	
Comments		

Site Safety Topics

Tasks Performed Today (Defined by AHAs)

Tasks Planned for Tomorrow

Issues, Deviations, Variances & Corrective Measure

Reported by Name _____ Reported by Signature _____ Date _____

Project Manager Name _____ Project Manager Signature _____ Date _____

SUNDANCE-EA II, LLC

Daily Field Activity Summary

PROJECT INFORMATION

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: EAFB / CFC	Date: 9/19/2020	Time: 0810
PM: J. Consoletti / M. Wilkinson	SS: David L. Cookston	SSHO:

PERSONNEL ON-SITE

PERSONNEL NAME	ORGANIZATION	HOURS
David L. Cookston	EA	
Noah Robinson	EA	
BRYCE FOSTER	GTA	
Matthias morrison	GTA	
DAVE NORTH	GTA	
Travis Herman	EA	
JUDSON PARSON	SUNDANCE	
GALEN KORNUSKE	SUNDANCE	

VISITORS ON-SITE

VISITOR NAME	ORGANIZATION

WEATHER

	AM	PM
TEMPERATURE	43°F	
WIND	SE 6 mph	
HUMIDITY	94%	
COMMENTS		

SITE SAFETY TOPICS

TASKS PERFORMED TODAY (DEFINED BY AHAS)

TASKS PLANNED FOR TOMORROW

ISSUES, DEVIATIONS, VARIANCES & CORRECTIVE MEASURE

Reported by Name

Reported by Signature

Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-006	Task Order: W911KB17F0173
Project Location: EAFB	Date: 9/20/2020	Time: 1015
PM: J. Corsdeth/M. Wilkinson	SS: David Cookston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L Cookston	EA	
Judson Parson	Sundance	
Matthias Morrison	Geo Tek	
Dave North	GTA	
Bryce Foster	GTA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	37	
Wind	3mph E	
Humidity	100%	
Comments		

Site Safety Topics

Tasks Performed Today (defined by AHAs)

Tasks Planned for Tomorrow

Issues, Deviations, Variances & Corrective Measure

Reported by Name

Reported by Signature

Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: CFC/MC	Date: 9/21/2020	Time:
PM: J. Corsdeth/M. Wilkinson	SS:	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L Cookston	EA	
BRUCE BOSTER	GTA	
DAVE NORTH	GTA	
TRAVIS HERMAN	EA	
Noah Robison	EA	
Galen Kennedy	Sundance	
JUDSON PARSON	SUNDANCE	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature		
Wind		
Humidity		
Comments		

Site Safety Topics

Tasks Performed Today (Defined by AHAs)

Tasks Planned for Tomorrow

Issues, Deviations, Variances & Corrective Measure

Reported by Name

Reported by Signature

Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0016	Task Order: W911KB17F0173
Project Location: CFC/EAFB	Date: 9/22/2020	Time:
PM: J. Consoletti/M. Wilkinson	SS:	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David Cookston	EA	
BRYCE FOSTER	GTA	
Travis Herman	EA	
Noah Robinson	EA	
Caden Kornowske	Sundance	
Judson Parsons	SUNDANCE	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature		
Wind		
Humidity		
Comments		

Site Safety Topics

Tasks Performed Today (defined by AHAs)

Tasks Planned for Tomorrow

Issues, Deviations, Variances & Corrective Measure

Reported by Name _____ Reported by Signature _____ Date _____

Project Manager Name _____ Project Manager Signature _____ Date _____

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-008	Task Order: W911KB17F0173
Project Location: CFC	Date: 9/23/2020	Time: 0738
PM: J Consoletti/M. Wilkinson	SS: David Cookston	SSHO:

Personnel On-Site

Personnel Name	Organization	Hours
David L. Cookston	EA	
Noah Robison	EA	
Travis Hennen	EA	
Judson Parson	Sundance	
Galen Kannaste	Sundance	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	43	
Wind	1 mph NE	
Humidity	78%	
Comments		

Site Safety Topics

Tasks Performed Today (defined by AHAs)

Tasks Planned for Tomorrow

Issues, Deviations, Variances & Corrective Measure

Reported by Name

Reported by Signature

Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Eielson AFB, AK	Date: 21 Oct. 2020	Time: 0815
PM: J. Consoletti/M. Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Eng.	8
B. Lang	US Ecology	8
C. Hamelton	US Ecology	8

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	20°F	25°F
Wind	calm	calm
Humidity		
Comments		

Site Safety Topics

- slips, trips, falls
- proper lifting techniques

Tasks Performed Today (defined by AHAs)

handle, transport, disposal of IDW

Tasks Planned for Tomorrow

none.

Issues, Deviations, Variances & Corrective Measure

none.

Reported by Name	Reported by Signature	Date
Nicole Stoecklein	Nicole Stoecklein	21 Oct 2020
Project Manager Name	Project Manager Signature	Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-008	Task Order: W911KB17F0173
Project Location: Eielson AFB, AK	Date: 10/27/20	Time: 0915
PM: J Consdetti/M. Wilkinson	SS: N. Stoeckleni	SSHO: N. Stoeckleni

Personnel On-Site

Personnel Name	Organization	Hours
Nicole Stoeckleni	EA Eng.	12.75
James Gough	GeoTek AK	12.5
James Beckner	GeoTek AK	12.5

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	29°F	31°F
Wind	6mph	5mph
Humidity	90%	85%
Comments		

Site Safety Topics

- slips trips & falls
- proper hearing protection while working w/in flightline path & around drilling

Tasks Performed Today (Defined by AHAs)

- drilling (monitor well)

Tasks Planned for Tomorrow

- drilling (monitor well)
- sampling monitor wells.

Issues, Deviations, Variances & Corrective Measure

None.

Nicole Stoeckleni
Reported by Name

Reported by Signature

27 oct 2020
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PEAS SI	Contract Number: W911KB-17-D-0006	Task Order: W911KB17F0173
Project Location: Eielson AFB, AK	Date: 28 Oct. 2020	Time: 1107
PM: J. Corbett/M. Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Eng.	9
J. Beckner	GeoTek AK	11
T. Gough	GeoTek AK	11
J. Price	EAFB CE/POC	—
J. Parsons	Sundance	13
B. Leach	EA Eng.	13

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	19°F	20°F
Wind	1 mph	1 mph
Humidity	85%	84%
Comments		

Site Safety Topics

- Proper hearing protection while around heavy equip./aircraft
- Cold weather awareness

Tasks Performed Today (Defined by AHAs)

- drilling monitor wells
- sampling monitor wells

Tasks Planned for Tomorrow

- drilling monitor well
- development & 1st sampling of wells

Issues, Deviations, Variances & Corrective Measure

- Couldn't located 49MO1B on w/ GPS unit.
- AP-6417 in fenced in area without known access.
- 20M14B upon field team and escort attempting to access Cargain Flightline access gate, an Air Force personnel told all we do not have permission to work in this area.
- Minor access issues w/ escort not knowing code to gate.
- freezing issues due to colder temperatures.

Nicole Stoecklein
Reported by Name

Reported by Signature

28 Oct 20.
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PEAS SI	Contract Number: W911KB-17-D-006	Task Order: W911KB17F0173
Project Location: Eielson AFB, AK	Date: 29 Oct 20	Time: 0810
PM: J. Corsetti/M. Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Eng.	8
B. Leach	EA Eng.	12
J. Parson	Sundance	12
J. Beckerman	GeoTek AK	11
J. Gough	GeoTek AK	11

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	15°F	
Wind	Calm	
Humidity	86%	
Comments		

Site Safety Topics

- being visible while working on road accessible by vehicles
- buddy system while working in remote locations.

Tasks Performed Today (defined by AHAs)

- drilling monitor well
- Sampling / development of monitor wells

Tasks Planned for Tomorrow

- develop 20PS-MW05 ~~4~~ 2
- sample 20PS-MW05

Issues, Deviations, Variances & Corrective Measure

- Sampling team could not locate 49M01B w/ metal detector.

Nicole Stoecklein — Reported by Name

Reported by Signature

29 Oct 20 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PEAS SI	Contract Number: W911KB-17-D-0008	Task Order: W911KB17F0173
Project Location: Eielson AFB, AK	Date: 10/31/20	Time: 0930
PM: J. Corsetti/M. Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Eng	5.0
B. Leach	EA Eng	5.0

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	9°F	
Wind	Calm	
Humidity	75%	
Comments		

Site Safety Topics

- buddy system
- cold weather awareness

Tasks Performed Today (Defined by AHAs)

- Sampling monitor well

Tasks Planned for Tomorrow

Sample management 11/2/20.

Issues, Deviations, Variances & Corrective Measure

None.

Nicole Stoecklein — Reported by Name

Reported by Signature

31 Oct 2020 — Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0016	Task Order: W911KB17F0173
Project Location: EAFB, MC, Flood Channel	Date: 14 June 2021	Time: 1240
PM: J. Corsaletti/M. Wilkinson	SS: N. Stoecklein	SSHO: N. Stoecklein

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoecklein	EA Eng.	4.5

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature		75 °F
Wind		10 mph
Humidity		45 %
Comments		

Site Safety Topics

Pinch Points
Proper PPE

Tasks Performed Today (Defined by AHAs)

Sampling (Soil)

Tasks Planned for Tomorrow

Ship sample.
Work on removing clean IDW from LF003 & disposing at point of generation.

Issues, Deviations, Variances & Corrective Measure

None.

Nicole Stoecklein		14 June 2021
Reported by Name	Reported by Signature	Date
Project Manager Name	Project Manager Signature	Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0016	Task Order: W911KB17F0173
Project Location: EAFB, Moore Creek, Flood Channel	Date: 15 June 2021	Time: 10-07
PM: J. Consdetti/M. Wilkinson	SS: N. Stoeckle	SSHO: N. Stoeckle

Personnel On-site

Personnel Name	Organization	Hours
N. Stoeckle	EA Eng.	8.0
Larry Hestilon	US Ecology	8.0
James Simons	US Ecology	8.0

Visitors On-site

Visitor Name	Organization

Weather

	AM	PM
Temperature	72°F	81°F
Wind	<5 mph	<5 mph
Humidity	25	35
Comments		

Site Safety Topics

Tasks Performed Today (defined by AHAs)

IDW management

Tasks Planned for Tomorrow

Continue IDW management of bleach material/disposal.

Issues, Deviations, Variances & Corrective Measure

None.

Nicole Stoeckle
Reported by Name

Reported by Signature

15 June 2021
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0016	Task Order: W911KB17F0173
Project Location: EAFB, MC, FC	Date: 0904	Time: 6/16/21
PM: J. Corsetti/M. Wilkinson	SS: N. Stoeckleri	SSHO: N. Stoeckleri

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoeckleri	EA Eng.	9.25
Larry Hestilon	US Ecology	9.25
James Simons	" "	9.25

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	58'F	78'F
Wind	Calm	Calm
Humidity	low	low
Comments		

Site Safety Topics

- being visible while around equipment (bobcat)
- proper hydration

Tasks Performed Today (Defined by AHAs)

IDW management

Tasks Planned for Tomorrow

None, will continue 18 June 2021.

Issues, Deviations, Variances & Corrective Measure

None.

Nicole Stoeckleri
Reported by Name

Reported by Signature

16 June 2021
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0016	Task Order: W911KB17F0173
Project Location: MC, FC, EAFB	Date: 6/18/21	Time: 0652
PM: J. Consdeth/M. Wilkinson	SS: N. Stoeckelen	SSHO: N. Stoeckelen

Personnel On-Site

Personnel Name	Organization	Hours
N. Stoeckelen	EA Eng.	10.0
L. Hestilon	US Ecology	10.0
Jo Simons	US Ecology	10.0

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	48°F	
Wind	Calm	
Humidity	low	
Comments		

Site Safety Topics

- Proper hydration
- Pinch points

Tasks Performed Today (Defined by AHAs)

IDW management

Tasks Planned for Tomorrow

None.

Issues, Deviations, Variances & Corrective Measure

None.

Nicole Stoeckelen
Reported by Name

Reported by Signature

18 June 21
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Moose Creek	Date: 6/21/2021	Time: 1700
PM: J. Consolatti / M. Wilkinson	SS:	SSHO: G. Garner

Personnel On-Site

Personnel Name	Organization	Hours
G. Garner	Sundance-EA	
B. Foster	GTA	
T. Yaslovil	GTA	
J. Beckner	GTA	

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	50s	70s
Wind	Light	light
Humidity	50%	high
Comments	overcast	Rain

Site Safety Topics

slips, Trips, Falls, winching,

Tasks Performed Today (Defined by AHAs)

Well decommissioning

Well completions

Tasks Planned for Tomorrow

Well decommissioning

Well completions

Issues, Deviations, Variances & Corrective Measure

No issues. Well MW26, MW28, and MW33 decommissioned. Well pads for MW29 and MW23 completed.

George Garner
Reported by Name

Reported by Signature

6/21/21
Date

Project Manager Name

Project Manager Signature

Date

SUNDANCE-EA II, LLC

Daily Field Activity Summary

Project Information

Project Name: PFAS SI	Contract Number: W911KB-17-D-0018	Task Order: W911KB17F0173
Project Location: Moose Creek / Eielson	Date: 6/22/21	Time: 1700
PM: J. Consoletti / M. Wilkinson	SS:	SSHO: G. Garner

Personnel On-Site

Personnel Name	Organization	Hours
George Garner	Sundance	8
Bryce Foster	GTA	6
James Beckner	GTA	6
Tanner Toshavik	GTA	6

Visitors On-Site

Visitor Name	Organization

Weather

	AM	PM
Temperature	58	80
Wind	light	light
Humidity	Moderate	low
Comments	clear/warm	clear/warm

Site Safety Topics

lines under tension

Tasks Performed Today (Defined by AHAs)

Well completions

Well decommissioning

Tasks Planned for Tomorrow

None

Issues, Deviations, Variances & Corrective Measure

George Garner
Reported by Name

Reported by Signature

22 June 2021
Date

Project Manager Name

Project Manager Signature

Date

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix E.2 – Tailgate Safety Meetings & Job Safety Analysis

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SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name:	Eidson PFAS SI		
Contract Number:	W911KB-17-D-0018	**Task Order:**	W911KB18F0173
Project Location:	Eidson / Moose Creek	**Date:** 26 May 2020	**Time:** 0730
PM: ~~Colleen~~ Josh		**SSHO:** G. Garner	
SUXOS:			

Weather

	AM	PM
Temperature	50	605
Wind	10	
Humidity	high	
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:
Drilling / Sampling Groundwater

Hazards Related to Task: (check all that apply)

- Biological Hazards
- Chemicals
- Contaminant Exposure
- Dehydration
- Explosives
- Extreme Weather (heat/cold)
- Pinch
- Radiation
- Slip/Trip/Fall
- Spills
- ~~Sun Exposure~~
- ~~Vehicle Operations~~
- ~~Weather (rain/snow/wind)~~
- Wildlife
- Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Steve Simas	GTA	
Bryce Foster	GTA	
Judson Parson	SUNDANCE	
Kayla Copeland	SUNDANCE	
Stephen Newman	Sundance	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

PROJECT & PERSONNEL INFORMATION		
Project Name: Eielson PFAS SI		
Contract Number: W911KB-17-D-0018	**Task Order:** W911KB18F0173	
Project Location: Eielson/Moose Creek	**Date:** 5/27/2020	**Time:** 0730
PM:	**SSHO:** G. Garner	
SUXOS:		

WEATHER	AM	PM
TEMPERATURE	50s	70s
WIND	light	light
HUMIDITY	low	
COMMENTS		

ACTIVITIES, HAZARDS, EQUIPMENT & SAFETY

Activities to be Performed & Equipment Used:

Drilling, Temp Well Install, GW sampling

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	~~Sun Exposure~~
Chemicals	Pinch	~~Vehicle Operations~~
~~Contaminant Exposure~~	Radiation	~~Weather (rain/snow/wind)~~
~~Dehydration~~	~~Slip/Trip/Fall~~	~~Wildlife~~
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

SIGNATURES

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance-EA	
Steve Simas	GTA	
Bryce Foster	GTA	
Judson Parson	SUNDANCE	
KAYLA COPELAND	SUNDANCE	
Stephen Newman	Sundance	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Eidson PFAS SI		
Contract Number: W911KB-17-D-0018	**Task Order:** W911KB 18 F0173	
Project Location: Moose Creek	**Date:** 5/28/2020	**Time:** 0730
PM:	**SSHO:** G. Garner	
SUXOS:		

Weather

	AM	PM
Temperature	50s	70s
Wind	light	light
Humidity	Cloudy	
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

Drilling, sampling, sample shipment

Hazards Related to Task: (check all that apply)

- Biological Hazards
- ✓ Chemicals
- ✓ Contaminant Exposure
- ✓ Dehydration
- Explosives
- Extreme Weather (heat/cold)
- ✓ Pinch
- Radiation
- ✓ Slip/Trip/Fall
- Spills
- Sun Exposure
- Vehicle Operations
- ✓ Weather (rain/snow/wind)
- ✓ Wildlife
- Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance EA	
Jason Parson	Sundance EA	
Steve Simas	GTA	
Boyle Foster	GTA	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Eielson PFAS SI		
Contract Number: W911KB-17-D-0018	**Task Order:** W911KB18 F0173	
Project Location: Eielson / Moose Creek	**Date:** 5/29/2020	**Time:** 0700
PM:	**SSHO:** G. Garner	
SUXOS:		

Weather

	AM	PM
Temperature	60	70s
Wind	light	light
Humidity	low	
Comments	clear, sunny	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

Drilling, sampling on flightline

Hazards Related to Task: (check all that apply)

- Biological Hazards
- Chemicals
- Contaminant Exposure
- Dehydration
- Explosives
- Extreme Weather (heat/cold)
- Pinch
- Radiation
- Slip/Trip/Fall
- Spills
- Sun Exposure
- Vehicle Operations
- Weather (rain/snow/wind)
- Wildlife
- Other: Aircraft

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance-EA	
KAYLA COPELAND	SUNDANCE-EA	
JUDSON PARSON	SUNDANCE-EA	
Steve Simms	GTA	
BRYLIE Foster	GTA	
JOSEPH PRICE	AFCEC	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Eielson PFAS SI		
Contract Number: W911KB-17-D-0018	**Task Order:** W911KB 18 F0173	
Project Location: Moose Creek	**Date:** 5/30/2020	**Time:** 0800
PM:	**SSHO:** G. Garner	
SUXOS:		

Weather

	AM	PM
Temperature	60s	80.
Wind	light	
Humidity	low	
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

Hand driving Piezometers, GW sampling

Hazards Related to Task: (check all that apply)

- Biological Hazards
- Chemicals
- Contaminant Exposure
- Dehydration
- Explosives
- Extreme Weather (heat/cold)
- Pinch
- Radiation
- Slip/Trip/Fall
- Spills
- Sun Exposure
- Vehicle Operations
- Weather (rain/snow/wind)
- Wildlife
- Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance-EA	
Judson Parson	Sundance-EA	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name:	Eielson PFAS SI		
Contract Number:	W911KB-17-D-0018	**Task Order:**	W911KB18F0173
Project Location:	Moose Creek	**Date:** 5/31/2020	**Time:** 0700
PM:		**SSHO:**	G. Garner
SUXOS:			

Weather

	AM	PM
Temperature	60	80
Wind	light	10 mph
Humidity	& low	Rain
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

Hand drilling/driving temp wells, GW sampling

Hazards Related to Task: (check all that apply)

- Biological Hazards
- Chemicals
- Contaminant Exposure
- ~~Dehydration~~
- Explosives
- Extreme Weather (heat/cold)
- Pinch
- Radiation
- ~~Slip/Trip/Fall~~
- Spills
- ~~Sun Exposure~~
- ~~Vehicle Operations~~
- ~~Weather (rain/snow/wind)~~
- ~~Wildlife~~
- Other:

Additional Safety Topics or Discussions:

Insects, equipment failure while driving

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance - EA	
JUDSON PARSON	SUNDANCE-EA	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

PROJECT & PERSONNEL INFORMATION

Project Name: Birch Lake Surface Water, sediment, & Soil sampling		
Contract Number: W911KB-17-D-0018	**Task Order:** W911KB18F0173	
Project Location: Birch Lake	**Date:** 6/11/20	**Time:** 0730
PM: Mark Wilkinson	**SSHO:** Nicole Stoeckle in	
SUXOS:		

WEATHER

	AM	PM
TEMPERATURE	59°F	65°F
WIND	4 mph	6 mph
HUMIDITY		
COMMENTS		

ACTIVITIES, HAZARDS, EQUIPMENT & SAFETY

Activities to be Performed & Equipment Used:
Drilling & boreholes - geoprobe

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	Sun Exposure
Chemicals	Pinch	Vehicle Operations
Contaminant Exposure	Radiation	Weather (rain/snow/wind)
Dehydration	Slip/Trip/Fall	Wildlife
Explosives	Spills	Other:

Additional Safety Topics or Discussions:
- sharp tools / pinch points
- work around drilling - hard hat, slips/trips/falls, hearing protection

SIGNATURES

Personnel Name	Organization	Personnel's Signature
KAYLA COPELAND	SUNDANCE	
BRYCE FOSTER	GTA	
Steve Simas	GTA	
Lindsey Kenyon	EA	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

PROJECT & PERSONNEL INFORMATION

Project Name:	Birch Lake SW, Sed, & Soil Sampling		
Contract Number:	W911KB-17-D-0018	**Task Order:**	W911KB18F0173
Project Location:	Birch Lake	**Date:** 6/2/20	**Time:** 0800
PM:	M. Wilkinson	**SSHO:**	N. Stoecklein
SUXOS:			

WEATHER

	AM	PM
TEMPERATURE	53°F	65°F
WIND	0 mph	
HUMIDITY		
COMMENTS		

ACTIVITIES, HAZARDS, EQUIPMENT & SAFETY

Activities to be Performed & Equipment Used:

Drilling 2 boreholes, geoprobe

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	Sun Exposure
Chemicals	(Pinch)	(Vehicle Operations)
(Contaminant Exposure)	Radiation	(Weather (rain/snow/wind))
Dehydration	(Slip/Trip/Fall)	(Wildlife)
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

Pinch points & emergency rig stop
noise hazards

SIGNATURES

Personnel Name	Organization	Personnel's Signature
Lindsey Kenyon	EA	
KAYLA COPELAND	SUNDANCE	
BRUCE FOSTER	GTA	
Steve Sines	GTA	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name:	Expanded PFOA/PFOS - Eieleson AFB		
Contract Number:	W911KB17D0018	**Task Order:**	W911KB18F0173
Project Location:	Eieleson AFB	**Date:** 6/3/20	**Time:** 0800
PM:	Mark Wilkinson	**SSHO:**	N. Stoechlein
SUXOS:			

Weather

	AM	PM
Temperature	52°F	
Wind	1 mph	
Humidity	Showers!	
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

- Towing
- SW & SD sampling
- work in water

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	Sun Exposure
Chemicals	Pinch	~~Vehicle Operations~~
~~Contaminant Exposure~~	Radiation	~~Weather (rain/snow/wind)~~
~~Dehydration~~	~~Slip/Trip/Fall~~	~~Wildlife~~
Explosives	~~Spills~~ LK 6/3/20	Other:

Additional Safety Topics or Discussions:

- Need for PFD
- carrying Bear spray
- Speed limits enforced
- Towing/unloading/loading

Signatures

Personnel Name	Organization	Personnel's Signature
Lindsey Kenyon	EA	
KAYLA COPELAND	SUNDANCE	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name:	Expanded PFOA/PFOS SI - Eielson AFB		
Contract Number:	W911KB17D0018	**Task Order:**	W911KB18F0173
Project Location:	Eielson AFB	**Date:** 6/4/20	**Time:** 0720
PM:	Mark Wilkinson	**SSHO:**	N. Stoecklin
SUXOS:			

Weather

	AM	PM
Temperature	53°F	69°F
Wind	3 mph	6 mph
Humidity	75%	35%
Comments	Isolated thunderstorms in PM	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

- SW & Sed sampling - ponar / auger, dipping poles
- work in water

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	Sun Exposure
Chemicals	Pinch	Vehicle Operations
Contaminant Exposure	Radiation	Weather (rain/snow/wind)
Dehydration	Slip/Trip/Fall	Wildlife
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

- Need for PFD
- carrying bear spray
- speed limits

Signatures

Personnel Name	Organization	Personnel's Signature
Lindsey Kenyon	EA	Lindsey Kenyon
KAYLA COPELAND	SUNDANCE	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name:	Birch Lake Expanded PFAS/PFOA SI		
Contract Number:	W911KB-17-D-0018	**Task Order:**	W911KB18F0173
Project Location:	Birch Lake	**Date:** 6/5/20	**Time:** 0800
PM:	M. Wilkinson	**SSHO:**	N. Streckfein
SUXOS:			

Weather

	AM	PM
Temperature	60°F	71°F
Wind	5 mph	7 mph
Humidity	37%.	26%.
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

- Soil & sed sampling - ponar
- Work over water
- Towing

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	(Sun Exposure)
Chemicals	(Pinch)	(Vehicle Operations)
Contaminant Exposure	Radiation	(Weather (rain/snow/wind))
(Dehydration)	(Slip/Trip/Fall)	Wildlife
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

- Float plan
- Heavy equipment
- Shoreline safety
- ~~Float~~
- Weather

Signatures

Personnel Name	Organization	Personnel's Signature
Lindsey Kenyon	EA	Lindsey Kenyon
Stephen Newman	Sundance	
KAYLA COPELAND	SUNDANCE	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Elelson SW & sediment samplings		
Contract Number: W911KB-19-D-0018	**Task Order:** W911KB18F0193	
Project Location: Elelson AFB	**Date:** 6/16/20	**Time:** 0815
PM: U. Wilkinson	**SSHO:** N. Stoecklein	
SUXOS:		

Weather

	AM	PM
Temperature	53°F	69°F
Wind	5 mph	
Humidity	67 %	
Comments	sunny	sunny

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

- surface water & sediment sampling - auger or ponar
- work over water - PFD

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	Sun Exposure
Chemicals	Pinch	~~Vehicle Operations~~
Contaminant Exposure	Radiation	Weather (rain/snow/wind)
~~Dehydration~~	~~Slip/Trip/Fall~~	~~Wildlife~~
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

- working more w/in the woods, carry bear spray

Signatures

Personnel Name	Organization	Personnel's Signature
Lindsey Kenyon	EA	Lindsey Kenyon
Stephen Newman	Sundance	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name:	Expanded PFOA/PFOS SI		
Contract Number:	W911KB 17D0018	**Task Order:**	W911KB18 F0173
Project Location:	Eielson AFB	**Date:** 6/9/20	**Time:** 0945
PM:	M. Wilkinson	**SSHO:**	N. Steeklein
SUXOS:			

Weather

	AM	PM
Temperature	59°F	70°F
Wind	5 mph	
Humidity	66%	
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

surface water & sediment sampling - auger

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	~~Sun Exposure~~
Chemicals	Pinch	~~Vehicle Operations~~
~~Contaminant Exposure~~	Radiation	Weather (rain/snow/wind)
~~Dehydration~~	~~Slip/Trip/Fall~~	~~Wildlife~~
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

Parking next to highway

Signatures

Personnel Name	Organization	Personnel's Signature
Lindsey Kenyon	EA	Lindsey Kenyon
KAYLA COPELAND	SUNDANCE	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Eielson SW & sed sampling		
Contract Number: W911KB-17-D-0018	**Task Order:** W911KB18F0173	
Project Location: Eielson AFB	**Date:** 9/2/2020	**Time:** 0900
PM: M. Wilkinson	**SSHO:** N. Stecklein	
SUXOS:		

Weather

	AM	PM
Temperature	55°F	72°F
Wind	0 mph	
Humidity	76%	
Comments	hot & buggy!	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

- SW & sed sampling
- Vehicle operations - ATV
- Towing
- work over water

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	(Sun Exposure)
Chemicals	Pinch	(Vehicle Operations)
(Contaminant Exposure)	Radiation	Weather (rain/snow/wind)
(Dehydration)	(Slip/Trip/Fall)	(Wildlife)
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
Lindsey Kenyon	EA	Lindsey Kenyon
Judson Parson	SUNDANCE	
Galen Koroviske	Sundance	Galen Koroviske

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Elson SW & Sed Sampling		
Contract Number: W911KB17D0018	**Task Order:** W911KB18F0173	
Project Location: Elson AFB	**Date:** 6/10/20	**Time:** 0655
PM: M. Wilkinson	**SSHO:** N. Steckler	
SUXOS:		

Weather

	AM	PM
Temperature	51°F	73°F
Wind	4 mph	4 mph
Humidity	80%	27%
Comments	sunny	sunny

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

- SW & SD sampling
- work over water

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	(Sun Exposure)
Chemicals	Pinch	(Vehicle Operations)
(Contaminant Exposure)	Radiation	Weather (rain/snow/wind)
(Dehydration)	(Slip/Trip/Fall)	(Wildlife)
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
Galen Kornowske	Sundance	Galen Kornowske
Lindsey Kenyon	EA	Lindsey Kenyon
JUDSON PARSON	SUNDANCE	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: EAFB PFAS SI	
Contract Number: W911KB 17-D 0018	**Task Order:** W911KB17-F-0173
Project Location: EAFB, MC, Flood Channel	**Date:** 1240 ET **Time:** 6/14/21
PM: M. Wilkinson	**SSHO:** N. Stoecklein
SUXOS: N. Stoecklein	

Weather

	AM	PM
Temperature		75 °F
Wind		10 mph
Humidity		45%
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

Flagging dirty row Sampling soil - SS spoon / sample containers
flagging wells

Hazards Related to Task: (check all that apply)

(Biological Hazards)	(Extreme Weather (heat/cold))	Sun Exposure
Chemicals	(Pinch)	Vehicle Operations
(Contaminant Exposure)	Radiation	Weather (rain/snow/wind)
Dehydration	(Slip/Trip/Fall)	(Wildlife)
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
Nicole Stoecklein	EA Engineering	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: EAFB PFAS SI			
Contract Number: W911KB 17-D 0018		**Task Order:** W911KB17-F-0173	
Project Location: EAFB, MC, Flood Channel		**Date:** 15 June 2021	**Time:** 1001
PM: M. Wilkinson		**SSHO:** N. Stoecklein	
SUXOS: N. Stoecklein			

Weather

	AM	PM
Temperature	72°F	80°F
Wind	<5 mph	<5 mph
Humidity	25	35
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

skid steer
impact wrench

Hazards Related to Task: (check all that apply)

(Biological Hazards)	Extreme Weather (heat/cold)	(Sun Exposure)
Chemicals	(Pinch)	Vehicle Operations
(Contaminant Exposure)	Radiation	Weather (rain/snow/wind)
Dehydration	(Slip/Trip/Fall)	(Wildlife)
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
Nicole Stoecklein	EA Engineering	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name:	EAFB PFAS SI		
Contract Number:	W911KB 17D 0018	**Task Order:**	W911KB17F0173
Project Location:	EAFB, MC, Flood Channel	**Date:** 6/16/21	**Time:** 0904
PM:	M. Wilkinson	**SSHO:**	N. Steeklein
SUXOS:	N. Steeklein		

Weather

	AM	PM
Temperature	58°F	78°F
Wind	Calm	Calm
Humidity	low	low
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

IDW management

Hazards Related to Task: (check all that apply)

- Biological Hazards
- Chemicals
- Contaminant Exposure
- Dehydration
- Explosives
- Extreme Weather (heat/cold)
- Pinch
- Radiation
- Slip/Trip/Fall
- Spills
- Sun Exposure
- Vehicle Operations
- Weather (rain/snow/wind)
- Wildlife
- Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
Nicole Steeklein	EA Engineering	
Larry Hostetter	US Ecology	Larry Hostetter
James Simons	US Ecology	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: EAFB PFAS SI			
Contract Number: W911KB 17D 0018	**Task Order:** W911KB17F0173		
Project Location: EAFB, MC, Flood Channel	**Date:** 6/18/21	**Time:** 0652	
PM: M. Wilkinson	**SSHO:** N. Stoecklein		
SUXOS: N. Stoecklein			

Weather

	AM	PM
Temperature	48°F	
Wind	Calm	
Humidity	low	
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used:

IDW management

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	Sun Exposure
Chemicals	Pinch	Vehicle Operations
Contaminant Exposure	Radiation	Weather (rain/snow/wind)
Dehydration	Slip/Trip/Fall	Wildlife
Explosives	Spills	Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
Nicole Stoecklein	EA Eng.	
Larry Hestion	US Ecology	Larry Hesti
James Simons	US Ecology	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name:	Expanded PFAS SI		
Contract Number:	W911KB-17-D-0012	**Task Order:**	W911KB17F0173
Project Location:	Moose Creek, AK	**Date:** 21 June 21	**Time:** 0830
PM:	J. Consoletti / M. Wilkinson	**SSHO:**	George Garner
SUXOS:	NA		

Weather

	AM	PM
Temperature	50s	70s
Wind	light	light
Humidity	50%	50%
Comments	Overcast	Cloudy

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: Well completions and decommissioning.

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	(Sun Exposure)
Chemicals	Pinch	(Vehicle Operations)
Contaminant Exposure	Radiation	(Weather (rain/snow/wind))
Dehydration	(Slip/Trip/Fall)	Wildlife
Explosives	Spills	Other:

Additional Safety Topics or Discussions: Soft ground

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance-EA	
Bryce Foster	Geotek	
James Beckner	GTA	
Tanner Yodovich	GTA	

SUNDANCE-EA II, LLC

Tailgate Safety Meeting & Job Safety Analysis

PROJECT & PERSONNEL INFORMATION

Project Name: Expanded PFAS SI		
Contract Number: W911KB-17-D-0018	**Task Order:** W911KB17F0173	
Project Location: Moose Creek/Eielson	**Date:** 6/22/21	**Time:** 0730
PM: J. Conseletti / M. Wilkinson	**SSHO:** George Garner	
SUXOS:		

WEATHER

	AM	PM
TEMPERATURE	50s	60
WIND	light	light
HUMIDITY	low	low
COMMENTS	Clear + warm	Clear + hot

ACTIVITIES, HAZARDS, EQUIPMENT & SAFETY

Activities to be Performed & Equipment Used: Well completions
Well decommissioning

Hazards Related to Task: (check all that apply)

Biological Hazards	Extreme Weather (heat/cold)	(Sun Exposure)
Chemicals	Pinch	(Vehicle Operations)
Contaminant Exposure	Radiation	(Weather (rain/snow/wind))
(Dehydration)	(Slip/Trip/Fall)	(Wildlife)
Explosives	Spills	Other:

Additional Safety Topics or Discussions: lines under tension

SIGNATURES

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Bryce Foster	GTA	
James Beckner	GTA	
Tanner Toskovik	GTA	

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