



UNITED STATES AIR FORCE

Moose Creek, Alaska

ENVIRONMENTAL RESTORATION PROGRAM

FINAL

LAND USE CONTROLS IMPLEMENTATION PLAN

Air Force Civil Engineer Center

VERSION DATE: FEBRUARY 2024

UNITED STATES AIR FORCE

Moose Creek, Alaska

ENVIRONMENTAL RESTORATION PROGRAM

FINAL

LAND USE CONTROLS IMPLEMENTATION PLAN

Air Force Civil Engineer Center

Prepared For:
US Army Corps of Engineers
Alaska District
PO Box 6898
JBER, AK 99506-0898

and

US Air Force
AFCEC/CES
2310 Central Ave
Eielson AFB, AK 99702

Prepared By:
Bethel Environmental Solutions LLC
Contract: W911KB20D0014; W911KB21F0112
2605 Denali St., STE 102
Anchorage, AK 99503

VERSION DATE: FEBRUARY 2024

TABLE OF CONTENTS

1.0 Introduction and Purpose..... 1
 1.1 Objective and Plan Organization..... 1
2.0 Background Information 3
 2.1 Private Properties..... 4
 2.2 State Properties 5
 2.3 Federal Properties 5
 2.4 Selected Remedy 5
 2.5 Environmental Actions to Date 6
 2.6 On-Going Actions..... 7
3.0 Land Use Control 9
 3.1 Land Affected..... 9
 3.2 LUC Performance Objectives..... 9
 3.3 Description of LUCs..... 9
 3.4 LUCs-Affirmative Measures 9
4.0 Private Property LUC Implementation..... 11
 4.1 ICs/Prohibitions and Restrictions 11
 4.2 Public Outreach to Private Property Owners..... 11
 4.3 Foreclosure/Records Search 12
 4.4 Properties with No Environmental Covenants 13
 4.5 Outreach to Drilling Companies..... 13
5.0 State Property LUC Implementation 15
 5.1 Prohibitions and Restrictions..... 15
 5.2 Field Inspections..... 15
6.0 Federal Property LUC Implementation 17
 6.1 Prohibitions and Restrictions..... 17
 6.2 Field Inspections..... 17
7.0 LUC Maintenance and Reporting..... 19
 7.1 Monitoring and Maintenance of Plan 19
 7.2 LUCs Reporting..... 19
 7.2.1 Institutional Controls 19
 7.2.2 Affirmative Measures 20
8.0 LUCs and Affirmative Measures Responsibilities 21
9.0 LUC Modifications and Termination 23
10.0 Enforcement 25
11.0 References 27

LIST OF FIGURES

Figure 1. Vicinity Map

Figure 2. Site Vicinity Map of Private Properties in Moose Creek

Figure 3. Map of State and Federal Properties in Moose Creek

LIST OF APPENDICES

Appendix A: Property Listings Table

Appendix B: PFAS Timeline

Appendix C: Critical Water Management Area

Appendix D: Interim Record of Decision

Appendix E: Environmental Covenant Template

Appendix F: Mailing Questionnaire

Appendix G: Inspection Book

Appendix H: Record of Telephone Conversation Log

Appendix I: Review Comments

ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
AFCEC	Air Force Civil Engineer Center
AS	Alaska Statute
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWMA	Critical Water Management Area
EAFB	Eielson Air Force Base
EC	Environmental Covenant
EPA	U.S. Environmental Protection Agency
FNSB	Fairbanks North Star Borough
FRB	Fairbanks Recording District
HA	Health Advisory
IC	institutional control
IROD	Interim Record of Decision
LUC	land use control
LUCIP	Land Use Control Implementation Plan
NAUL	Notice of Activity and Use Limitations
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
PAN	property account number
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PHA	Provisional Health Advisory
ROD	Record of Decision
RPM	Remedial Project Manager
UECA	Uniform Environmental Covenants Act
USAF	United States Air Force
UU/UE	unlimited use/unrestricted exposure
WTP	Water Treatment Plant

Page intentionally left blank.

1.0 INTRODUCTION AND PURPOSE

The United States Air Force (USAF) developed this Land Use Control Implementation Plan (LUCIP) for the restriction of groundwater use in the community of Moose Creek, Alaska (Figure 1). This document describes the procedures for implementing the institutional controls required by the Interim Record of Decision (IROD), dated June 2019 (Air Force Civil Engineer Center [AFCEC], 2019). The selected remedy identified in the IROD introduces land use controls (LUCs) on non-USAF-owned properties within the designated Critical Water Management Area (CWMA) boundary to restrict the use of groundwater within the Community of Moose Creek, located along the northern border of Eielson Air Force Base (EAFB), and implements a provision to provide potable water supplied by the City of North Pole Water Treatment Plant (WTP).

The USAF is responsible for implementing, maintaining, reporting on, and enforcing LUCs established for the community of Moose Creek. LUCs are required to be maintained until the concentration of per- and poly-fluoroalkyl substances (PFAS) in the impacted media are at levels that allow for unrestricted use and unlimited exposure (UU/UE).

This plan is intended to be an appendix to the EAFB LUCIP which is updated annually. This is a living document and will be updated as necessary.

1.1 Objective and Plan Organization

The objectives of this LUCIP are to:

- summarize the site description and historical background; and
- summarize how the USAF will implement LUCs and supporting requirements specified in the IROD.

This LUCIP is organized as follows:

- **Section 1.0, Introduction and Purpose.** This section presents the purpose of this LUCIP and provides the organization and structure of the plan.
- **Section 2.0, Background Information.** This section provides background information and environmental actions taken to date for the community of Moose Creek.
- **Section 3.0, Land Use Control.** This section presents the LUCs with the definition of LUCs, land affected, LUC performance objectives, and LUC affirmative measures.
- **Section 4.0, Private Property LUC Implementation.** This section summarizes the implementation of LUCs for private properties, which entails public outreach.
- **Section 5.0, State Property LUC Implementation.** This section summarizes the implementation of LUCs for state properties, which entails field inspections.
- **Section 6.0, Federal Property LUC Implementation.** This section summarizes the implementation of LUCs for federal properties, which entails field inspections.

- **Section 7.0, LUC Maintenance and Reporting.** This section summarizes the LUC maintenance and reporting requirements.
- **Section 8.0, LUCs and Affirmative Measures Responsibilities.** This section describes the responsibilities encompassed by the LUC, including institutional controls (ICs) and affirmative measures.
- **Section 9.0, LUC Modification and Termination.** This section provides information regarding any modifications or the termination of the LUCs.
- **Section 10.0, Enforcement.** This section provides enforcement requirements.
- **Section 11.0, References.** This section provides a list of documents used to support the development of this plan.
- **Figures.** All figures referenced in this plan are presented at the end of the plan, in this section.
- **Appendix A, Property Listings Table.** (*Information regarding private properties is not included in this LUCIP for privacy reasons.*)
- **Appendix B, PFAS Timeline.**
- **Appendix C, Critical Water Management Area Documentation.**
- **Appendix D, Interim Record of Decision.**
- **Appendix E, Environmental Covenant Template.**
- **Appendix F, Mailing Questionnaire.**
- **Appendix G, Inspection Book.**
- **Appendix H, Record of Telephone Conversations Log**
- **Appendix I, Review Comments.**

2.0 BACKGROUND INFORMATION

The community of Moose Creek, Alaska is located approximately 120 miles south of the Arctic Circle, 21 miles southeast of Fairbanks, and 7 miles southeast of the City of North Pole, as illustrated on Figure 1. The community of Moose Creek is situated adjacent to the northern boundary of EAFB.

The community of Moose Creek has been exposed to PFAS released by EAFB operations or personnel training activities resulting in a groundwater plume which migrated off-base into the community of Moose Creek. PFAS, consisting of perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), have been identified in drinking water wells in the community of Moose Creek.

Concern over possible releases of PFAS were first brought to the attention of EAFB by the Alaska Department of Environmental Conservation (ADEC) and the US Environmental Protection Agency (EPA) in mid-2012. Initial efforts on EAFB began in 2014, when a nationwide contract was awarded and managed by AFCEC in San Antonio for sampling PFOA and PFOS at selected USAF Facilities.

In April 2015, the USAF tested the drinking water at the northern boundary of EAFB, which abuts the community of Moose Creek. PFOS exceeding the Provisional Health Advisory (PHA) level was identified near the base boundary. Because drinking water on base and in most wells in the community of Moose Creek showed concentrations above the prevailing PHA for PFOS, of 0.2 micrograms per liter ($\mu\text{g/L}$) in drinking water, action was taken by the USAF to eliminate that exposure. Residential properties with levels above the PHA in the community of Moose Creek were provided bottled water immediately (with treatment systems or storage tanks installed over the winter of 2015/2016) and the wells on EAFB that tested in excess of the PHA were taken out of production.

On 19 May 2016, the EPA rescinded the PHA and issued a lifetime Health Advisory (HA) for PFOS and PFOA of 0.070 $\mu\text{g/L}$ individually or combined. On 2 October 2019, the ADEC updated their Technical Memorandum Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water to bring state action levels into alignment with the federal action levels. The groundwater quality monitoring performed by USAF has established that the Moose Creek community waterbodies have been contaminated with PFOS and PFOA at levels above the HA of 0.070 $\mu\text{g/L}$. The use of contaminated water may negatively affect human health, spread contamination, and threaten the public interest (ATSDR, 2022).

The primary PFAS of concern for the Moose Creek-Eielson AFB community areas is PFOS. PFOS is found in groundwater at concentrations exceeding the HA. There are also some low-level detections (below the HA value) of PFOA in the groundwater. Routes of exposure in the community of Moose Creek are ingestion of groundwater. Other potential exposure pathways are being evaluated under the ongoing PFAS Remedial Investigation.

2.1 Private Properties

A description of private properties in the community of Moose Creek LUC, current as of 25 October 2022, is provided below:

- There is a total of 333 unique privately-owned properties with a property account number (PAN) in the community of Moose Creek. Of these, 297 property owners have returned environmental covenant (EC) paperwork (North Pole Water & Sewer requirement).
- There is a total of 192 PAN Water Customers (PAN is defined as a structure that is eligible to be connected to the water system. A parcel may include multiple water service connections, but the parcel is counted as a single Water Customer). Of the 192 PAN Water Customers, 185 have returned EC paperwork. A total of 178 PANs have had city water connections completed in 2021 and 2022. Of the remaining 14 Water Customers, four PANs have not submitted EC paperwork, seven PANs have declined water service, and three Water Customer PANs opted for an alternative agreement and did not sign the EC.
- There is a total of 141 Non-Water Customers (The total number of unique parcels in the community of Moose Creek, minus the number of Water Customers) in the community of Moose Creek. Of the 141 Non-Water Customers, 112 have returned EC paperwork. One PAN was a special circumstance in which the distance to connect was cost prohibitive, and therefore was not given the opportunity to connect to municipal water.
- As of the 2022 field season, 181 PANs have had wells decommissioned. The decommissioning of 179 wells was documented with ADEC and the Alaska Department of Natural Resources (ADNR). An additional two PANs had un-documented well disconnections. In one case, the owner decommissioned their own well. For the other PAN, the well was inaccessible. For this PAN, the service line from the well was cut, making the well unusable. There are four remaining PANs with known wells, excluding the PAN with a special circumstance, where the distance to connect was cost prohibitive, and therefore was not given the opportunity to sign an EC. Three of these properties have not provided consent to get their wells decommissioned. One of these property owners has provided permission to decommission their well, however the well was not accessible to be decommissioned and the property owner was not responsive throughout the construction season to resolve these constraints.

Properties that were vacant were not eligible for access to an alternative water source. Figure 2 provides a map showing the areas having private properties. A listing of private properties and their associated legal descriptions are not included in this LUCIP because such listing may contain Personally Identifiable Information that is protected from public release in accordance with the Freedom of Information Act (5 U.S.C. § 552(b)(6)) and US Department of Defense policy.

2.2 State Properties

The ADNR is the owner of six individual parcels within the CWMA. Figure 3 includes the area of the state-owned property within the CWMA. Appendix A provides the listing of state-owned properties with an abbreviated legal description for each.

2.3 Federal Properties

There are 98 individual parcels in the CWMA that are owned by the United States Federal Government. Figure 3 includes the area of federally owned properties within the CWMA. Appendix A provides the listing of federal owned properties with an abbreviated legal description for each.

2.4 Selected Remedy

The IROD selected remedy is limited in scope and addresses only the provision of an alternative drinking water supply to the community of Moose Creek. The selected action is designed to protect human health in the short-term while a comprehensive final remedial solution is being developed, which will be documented in a Final Record of Decision (ROD) (AFCEC 2019).

The selected remedy is to provide potable water supplied by the City of North Pole WTP to the community of Moose Creek.

Following are the major components of the selected remedy:

- A new water main has been installed 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 the community of Moose Creek.
- LUCs have been established to prohibit the use of contaminated groundwater. The LUCs include a CWMA, which was 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) requires the recording of ECs 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/LUCs, and 4) place a covenant on the property to prohibit future well installation/ contaminated-groundwater use.
- The previously installed water tanks and granular activated carbon systems will be removed, and tanker and bottled water delivery would stop.

- A remedial investigation of soil and groundwater contamination which began in August of 2020 is ongoing.

2.5 Environmental Actions to Date

Actions conducted by the USAF to protect human health and to be compliant with the selected remedy identified in the IROD as of publication of this LUCIP are summarized below.

- The USAF has funded expansion of the water system from the City of North Pole to the community of Moose Creek. The USAF is in the process of connecting developed properties with wells at no cost to the property owners. The USAF will take appropriate mitigation action for all public and private water sources reasonably believed to be contaminated by USAF actions.
- Out of a total of 192 properties that were eligible to be connected to water service, 185 environmental covenants (96%) were submitted and 178 of these properties (93%) were connected to water service by the end of 2022. There were just fourteen eligible properties (7% of the 192 total) not connected to water service at the completion of 2022. The owners of seven properties declined water service as they did not want to spend the money to meet the connection criteria because their homes are unoccupied and there is no need for water service. To meet the utility connection criteria, the following criteria must be met:
 - Permanent Electric – Connected to the local electric utility—Golden Valley Electric Association (GVEA)—with a permanent metered electrical connection
 - Permanent Heat – A permanent OPERATING heat source that will be running throughout the heating system. A wood stove, a pellet stove or other heat source that must be manually feed with fuel to provide heat does not classify as a permanent heat source
 - Functional Septic Tank – An operational septic system permanently connected to the habitable structure

Four properties were not connected to municipal water because the owners refused to submit service connection paperwork. Three homes turned in service connection paperwork but were unable to meet connection criteria.

- Over the course of 2021 and 2022, 246 wells in total were decommissioned on 183 off-base properties in Moose Creek out of 189 properties total (97% of all properties had wells decommissioned). Decommissioning of wells in the community of Moose Creek is now complete for all properties that the owners gave the USAF permission to decommission the wells for, and for all wells that the USAF could locate.
- The decommissioning of wells will prevent access to drinking water impacted by PFAS, protecting property owners, residents, and visitors from exposure. The provision of connection to the North Pole WTP will ensure that these properties have access to safe drinking water. The selected remedy ensures the remedial action objective of protecting

human health by preventing human ingestion of PFAS-impacted groundwater that exceeds the 2016 EPA HA value.

- Bottled water is being supplied to the Federal Property (USACE Chena Floodplain Office), which has two drinking water wells. These wells have not been decommissioned and are being sampled quarterly.

2.6 On-Going Actions

The following actions are on-going:

- Two wells, located at the USACE Chena Floodplain Office are tested quarterly to verify current PFAS levels are below HA levels.
- Sampling of private wells located within the downgradient distal portion of the plume, that have not been previously sampled for PFAS may be sampled at the owner's request. With changing regulations, the USAF may also request to sample private wells in the area. Evaluation of the distal end of the plume is ongoing through a semi-annual monitoring program.
- Continuing to provide tank and bottled water in limited circumstances.

Page intentionally left blank.

3.0 LAND USE CONTROL

This section describes elements currently established for LUCs for restriction of groundwater use for private properties, state properties, and federal properties in the community of Moose Creek.

3.1 Land Affected

The boundary of the LUC and CWMA are shown on Figure 3.

3.2 LUC Performance Objectives

Groundwater in the community of Moose Creek poses an unacceptable risk to human health if used for drinking water. Therefore, LUCs have been incorporated as a component of the selected groundwater remedy for the site as an interim remedy from the IROD.

For the purposes of the IROD remedy, the performance objective of the LUCs is to prevent access to or use of the groundwater, until EPA HAs are met and groundwater quality is demonstrated to be suitable for UU/UE.

3.3 Description of LUCs

The LUCs implemented within the community of Moose Creek will prohibit the use of the PFAS-impacted groundwater as presented below:

- A CWMA has been established to legally restrict the use of groundwater and prevent installation of new water wells within the CWMA designated zone. The USAF is monitoring compliance with the requirements of the CWMA and submit an annual report to ADNR and ADEC. The USAF will refer instances of non-compliance to ADNR for enforcement actions pursuant to state law.
- In accordance with the UECA (Alaska Statute [AS] 46.04 et. seq.), the USAF has informed affected property owners of the requirements of this act and is assisting them in establishing an EC on the real property. The USAF is negotiating 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/LUCs, and 4) place a covenant on the property to prohibit future well installation/contaminated-groundwater use.

3.4 LUCs-Affirmative Measures

In addition to the LUCs described above, the USAF will implement the following affirmative measures under this LUCIP to further ensure that the LUC performance objectives are being met.

- outreach via ongoing periodic mailing questionnaires and groundwater use assessments to be distributed to all property owners and residents with the stated goal of confirming that no drinking water wells are in use within the entire area of LUCs;
- distribution of this LUCIP to state and federal parties; and

- continued efforts to establish covenants for all private and state properties which do not currently have a covenant in place. Where applicable, a Notice of Activity and Use Limitations (NAUL) will be established on the Federal Properties.

Sections 4.0 provides a more detailed description of the affirmative measures for privately-owned properties presented above.

4.0 PRIVATE PROPERTY LUC IMPLEMENTATION

To meet the LUC performance objectives and to verify that LUCs are maintained and effectively preventing or reducing risk to human health, clearly defined responsibilities and procedures for LUC implementation, management, and compliance monitoring must be established. This section describes the LUCs in effect for private properties.

4.1 ICs/Prohibitions and Restrictions

The CWMA designation establishes restrictions on the future use of groundwater and surface water from within the defined area to protect public health, safety, and welfare in response to PFAS in the waters of the community of Moose Creek. The groundwater is not safe for drinking because it has become contaminated with PFOS and PFOA at levels that exceed the EPA HAs. Additionally, the groundwater is also above the ADEC groundwater cleanup levels for PFOS and PFOA. Accordingly, the USAF must impose LUCs to ensure the groundwater is not used for drinking water purposes until it is returned to EPA HA levels in accordance with the selected remedy in the IROD.

The CWMA also restricts future water appropriations and pending applications for water rights within the community of Moose Creek.

Additionally, the UECA requires the recording of ECs on all impacted real properties that will be negotiated between the USAF and impacted landowners. These ECs include activity and use limitations including 1) decommissioning existing wells, 2) discontinuing use of groundwater at the property for any purpose, 3) provide access for USAF monitoring of groundwater and LUCs, and 4) place a covenant on the property to prohibit future well installation and/or use of PFAS-impacted groundwater.

4.2 Public Outreach to Private Property Owners

The USAF has already contacted landowners and residents in the community of Moose Creek to explain the PFAS-impacted groundwater distribution in the aquifer. Under this LUCIP, the USAF will reach out to private property owners annually beginning in 2024 and conduct public outreach. The public outreach procedure is outlined below.

- The Air Force will contact each property owner with a recorded EC to ensure that the terms of the EC have not been violated. The first means of contact will be via a Mailing Questionnaire, consisting of assessment questions that the Air Force will develop. The questions will include whether there have been any changes in land use and whether ECs, if present, are still in place. The Mailing Questionnaire is provided in Appendix F. These assessments will be mailed with a postage paid envelope with the return address of the USAF. Before arranging for delivery, the USAF will coordinate with the Fairbanks North Star Borough (FNSB) to ensure that the mailing addresses on file for each property owner are still current and valid. Once accurate mailing addresses are confirmed, the USAF will arrange for FedEx to deliver the assessment questions and return envelope to each property

owner (signature required upon receipt). If FedEx attempts delivery three times but is still unsuccessful in getting a signature from the property owner, then FedEx can leave the mail parcel at the property without getting the required signature. The assessment will specify a requested response date which will be 60 days from the mailing date. The USAF will track the assessments that are returned and will also keep copies of all deliveries where we were able to get a signature of receipt from each property owner. All assessments and delivery receipts will be scanned into an electronic database and electronic copies will be provided to the Air Force Moose Creek Program Manager. All original assessments will be mailed to the Air Force Moose Creek Program Manager.

- For any properties that the USAF does not receive the assessment card back within thirty days of receipt of delivery, the USAF will coordinate with the FNSB to get accurate phone numbers for each property owner, if available. In addition, the USAF may attempt an online search of property owners for a phone number if there is no listing on the White Pages or other available database. The USAF shall call each property owner by telephone and the questions on the assessment will be presented over the phone. A record of the telephone contact will be documented on a Record of Telephone Communication Form, to include the name of the person contacted, a summary of the conversation, the name and signature of the person who conducted the interview, and the date and time of the interview. All phone assessment records will be scanned into an electronic database, and then shared with the Air Force Moose Creek Program Manager. All original phone assessments will be mailed to the Air Force Moose Creek Program Manager. The Record of Telephone Conversation Log is included as Appendix H.
- For any properties that the USAF is still unable to make contact with the property owner, the USAF shall attempt to make visual inspections of the properties. If properties cannot be visually inspected, documentation will be made as to the reason of why and a summary will be provided in the Field Inspection Report.

4.3 Foreclosure/Records Search

Beginning in 2024, the USAF will conduct a search of foreclosure records on an annual basis. This is because senior interests, to include mortgage agreements, are not subject to an EC unless specifically agreed to in a subordination agreement. ADEC waived the subordination requirement for the private properties, with the understanding that the USAF would try to secure ECs for properties with mortgages that are foreclosed on in the future, as the initial EC may no longer be valid. Thus, when foreclosures are identified, the USAF will make its best effort to obtain an EC from the new owner. This may require offering financial consideration to the new owner.

During the time of transition of property owners, the CWMA will still apply with or without an EC in place. Groundwater use will still be prohibited.

4.4 Properties with No Environmental Covenants

At the time of this plan, 36 properties do not have an EC. Those 36 properties consist of 18 developed properties and 18 undeveloped properties. The USAF previously contacted the owners for all 36 properties to request those owners place an EC on their properties in accordance with the remedy selected in the IROD. Those owners either did not respond or declined to do so. Although these 36 properties do not have ECs, the CWMA order has been recorded for every property within the CWMA boundary and would be discoverable in a title search. Prospective buyers performing a title search would therefore be on notice of the terms of the CWMA.

Consistent with the IROD remedy, the USAF will review at least every five years the FNSB property records to determine whether any of the 36 properties without ECs have new owners. In the event a new owner is identified, the USAF will request the new owner execute an EC. The USAF will use its best efforts to obtain an executed EC from the new owner, which efforts may or may not include, at the sole discretion of the USAF, an offer of consideration. Such consideration is subject to the availability of appropriated funds. The USAF may not obligate or pay funds in violation of the Anti-Deficiency Act and nothing in this LUCIP is intended to bind the USAF to commit, obligate, appropriate, or spend funds in violation of the Anti-Deficiency Act and other applicable law respecting Federal funding.

A checklist has been developed for the purposes of this review and is included in the inspection book provided in Appendix G.

4.5 Outreach to Drilling Companies

Annually, beginning in 2024, the USAF will notify all FNSB drilling companies via mail of the restrictions placed on the installing of drinking water wells within the Moose Creek CWMA and will confirm if new wells were installed within the CWMA boundary. A list of current drilling companies in the community of Moose Creek and surrounding areas is provided below:

The Drilling Company
3581 Mandeville Loop North Pole, AK 99705
(907) 322-2269

Alaskan Drilling & Water Services
1998 Badger Rd. North Pole, AK 99705
(907) 488-9577

Aurora Drilling
215 E. Van Horn Rd. Fairbanks, AK 99709
(907) 456-6712

G.F. Back Drilling Co.
919 Commerce St. Fairbanks, AK 99709
(907) 479-5554

Brotherton Drilling
3002 Industrial Ave. Fairbanks, AK 99701
(907) 451-8706

De Boer Drilling Co.
3205 N Van Horn Rd Fairbanks, AK 99701
(907) 452-2583

Onyx Drilling, LLC
3750 Bonita St. Fairbanks, AK 99701
(907) 456-6712

Alaska Diggers
2720 Davis Rd. Fairbanks, AK 99709
(907) 474-0572

Swan Well & Pump
205 Swan Lane Fairbanks, AK 99712
(907) 457-6003

Klondike Drilling
332 Old Chatanika Trail, Fairbanks, AK 99712
(907) 457-4440

Layne Christensen Co.
2370 Steese Hwy Fairbanks, AK 99712
(907) 455-0242

The drilling company list will be updated annually, with current addresses and contact information. New companies will be added, if found, and any companies that have gone out of business will be removed from the list.

In addition, the USAF will review the Well Log Tracking System annually to confirm whether any new wells have been installed within the CWMA boundary.

5.0 STATE PROPERTY LUC IMPLEMENTATION

This section describes the various LUCs in effect for state owned properties.

5.1 Prohibitions and Restrictions

The CWMA provided in Appendix C details prohibitions and restrictions to groundwater usage established by the ADNR.

5.2 Field Inspections

The field inspections assess the condition of state-owned properties with LUCs. Field inspections will be conducted annually, at a minimum, as determined by the IROD. These inspections will be used to accomplish the following:

- confirm that no undocumented construction or ground disturbing activities or changes in land use or groundwater use have occurred at the LUC sites in violation of the applicable controls that are in place; and
- ascertain whether the current land and groundwater uses in the areas are consistent with the IROD, the terms of the CWMA order, and land use restrictions contained in any EC that has been recorded for the property.

An inspection book for the state properties is provided as Appendix G. This book includes a site-specific description, site maps, inspection checklist, and lists the current site restrictions, and reporting requirements. The checklists can be modified, as appropriate, to meet the specific conditions and requirements for the site to be inspected. These checklists are only modified according to USAF and regulatory review and input.

Any activity that is inconsistent with the LUC objectives or use restrictions or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USAF as soon as practicable, but in no case will the process be initiated later than 10 days after the USAF becomes aware of the breach. The USAF Remedial Project Manager (RPM) will be responsible for notification of the ADNR of any activity that is inconsistent with the LUC objectives or use restrictions or any other action that may interfere with the effectiveness of the LUCs, and coordinating the response action to ensure that the appropriate personnel are notified, the violation is investigated and documented, and that appropriate corrective actions are put in place. USAF will ensure that the appropriate personnel undertake the necessary measures to ensure compliance with the LUCIP and IROD in coordination with ADNR.

The results of any field inspections will be documented in a field inspection report. The field inspection report will be sent to EPA, ADEC, and ADNR within 120 days of completing the field inspection. The USAF will provide notice of any IC/LUC changes to the EPA, ADEC, and ADNR for review.

Page intentionally left blank.

6.0 FEDERAL PROPERTY LUC IMPLEMENTATION

This section describes the various LUCs in effect for federal owned properties.

6.1 Prohibitions and Restrictions

The CWMA provided in Appendix C details prohibitions and restrictions to water usage established by the ADNR.

6.2 Field Inspections

The field inspections assess the condition of all federally owned property with LUCs. Field inspections will be conducted annually, or as determined by the IROD. These inspections will be used to accomplish the following:

- confirm that no undocumented construction or ground disturbing activities or changes in land use or groundwater use have occurred at the LUC sites in violation of the applicable controls that are in place; and
- ascertain whether the current land and groundwater uses in the areas consistent with the IROD, and the terms of the CWMA order.

An inspection book for the federal properties is provided as Appendix G. This book includes a site-specific description, site maps, inspection checklist, and lists the current site restrictions and reporting requirements. The checklists can be modified, as appropriate, to meet the specific conditions and requirements for the site to be inspected. These checklists are only modified according to USAF and regulatory review and input.

Any activity that is inconsistent with the LUC objectives or use restrictions or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USAF as soon as practicable, but in no case will the process be initiated later than 10 days after the USAF becomes aware of the breach. The USAF RPM will be responsible for coordinating the response action to ensure that the appropriate personnel are notified, the violation is investigated and documented, and that appropriate corrective actions are put in place. AFCEC will ensure that the appropriate personnel undertake the necessary measures to ensure compliance with the LUCIP and IROD.

The results of any field inspections will be documented in a field inspection report, included in the Annual LUC/IC Report. The field inspection report will be sent to EPA and ADEC within 120 days of completing the field inspection. The USAF will provide notice of any IC/LUC changes to the EPA, ADEC, and ADNR.

Page intentionally left blank.

7.0 LUC MAINTENANCE AND REPORTING

The USAF is responsible for ensuring that LUCs are maintained through monitoring and reporting. Following the initial implementation of the LUC, all LUCs will be maintained until the concentrations of contaminants of concern in the groundwater are at such levels as to allow UU/UE. Maintenance and reporting of the LUCs will be conducted annually beginning in 2024.

Monitoring of the environmental use restrictions and controls will be conducted annually by the USAF. The monitoring results will be included in a Land Use Control/Institutional Control report and provided to the EPA, ADEC, and ADNR. The annual monitoring reports will be used in preparation of the Five-Year Review to evaluate the effectiveness of the remedy.

The annual monitoring report, submitted to the regulatory agencies and ADNR by the USAF, will evaluate the status of the LUCs and how any LUC deficiencies or inconsistent uses have been addressed. The annual evaluation will address whether the use restrictions and controls referenced above were communicated in the deed(s), whether the owners and state and local agencies were notified of the use restrictions and controls affecting the property, and whether use of the property has conformed to such restrictions and controls.

7.1 Monitoring and Maintenance of Plan

The following monitoring and maintenance activities will occur annually beginning in 2024:

- a public outreach assessment of private residences will be conducted annually, as detailed in Section 4.2;
- a foreclosure/records search will be conducted annually, as detailed in Section 4.3;
- a mailing assessment to drilling companies will be conducted annually, as detailed in Section 4.5; and
- field inspections and completion of inspection checklists for state and federal properties will be conducted annually.

Any corrective actions noted will be reported in accordance with Section 10.0 below.

7.2 LUCs Reporting

7.2.1 Institutional Controls

An annual LUC compliance review, including outreach to private property owners, foreclosure/records search, outreach to drilling companies, review of aerial imagery, analytical sampling of drinking water wells, and monitoring of state and federal properties utilizing the Inspection Book presented in Appendix G, will be documented in the annual report and will be provided by the USAF to the EPA, ADEC, and ADNR. The annual review will include a summary of the items reviewed from the checklist, identification of deviations from this LUCIP, corrective actions necessary due to implementation issues or as a result of changes in site conditions or land use, and proposed changes to the plan and reporting frequency. If any deficiency, including any violations

of the ICs, should be found during the annual review, a written explanation will be prepared indicating the deficiency and what efforts or measures have or will be undertaken to correct the deficiency. The correction and enforcement of such deficiencies shall follow the requirements under Section 10.0 Enforcement.

7.2.2 Affirmative Measures

The annual review will include items identified on the Inspection Book in Appendix G. This checklist will be followed as a guideline to review required tasks and any updates that may be necessary due to changing circumstances over that year. The annual report will also address whether the use restrictions and controls referenced in this LUCIP were communicated appropriately via public outreach and education, whether the owners and state and local agencies were notified of the restrictions and controls, and whether use of the area has conformed to such restrictions and controls.

The annual reports will also be placed on the USAF Administrative Record website (<https://ar.afcec-cloud.af.mil/>) and on base. Property owners and resident addresses within the area of LUCs will receive notification of the availability of the annual reports via mail.

8.0 LUCS AND AFFIRMATIVE MEASURES RESPONSIBILITIES

The USAF is responsible for ensuring that LUCs are established and maintained through monitoring and reporting on the implementation, maintenance, and enforcement of LUCs, and coordination with federal and state governments and owners and occupants of properties subject to LUCs.

The USAF has provided notice of groundwater contamination and any land use restrictions referenced in the IROD. The USAF remains responsible for ensuring that the remedy remains protective of human health and the environment. The USAF will fulfill its responsibility and obligations under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Contingency Plan (NCP) as it implements, maintains, and reviews the selected remedy.

Page intentionally left blank.

9.0 LUC MODIFICATIONS AND TERMINATION

The LUCs required by the IROD and addressed in this LUCIP are expected to remain in place until the concentrations of contaminants of concern in the groundwater are at such levels as to allow UU/UE. If groundwater conditions change, land use objectives change, or remedial goals are met, the USAF shall propose modifications to the LUC component of the remedy in accordance with CERCLA and the NCP. In the event the IROD needs to be revised, a memo to the site file, Explanation of Significant Differences, or ROD amendment will be used to select and document changes to the selected remedy, including details regarding LUCs. The USAF will decide whether to modify or discontinue a LUC with the review and approval of EPA and ADEC. If LUCs are no longer needed, LUCs will be modified or terminated through the same process used to establish the land use control.

Page intentionally left blank.

10.0 ENFORCEMENT

If the USAF determines that LUCs are not being complied with, the USAF will address the non-compliance as soon as practicable, which may include, as in the case of the CWMA, referral to the State for enforcement actions pursuant to state law. Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USAF as soon as practicable, but in no case will the process be initiated later than ten days after the USAF becomes aware of the breach. The USAF will notify EPA, ADEC, and ADNR as soon as practicable but no longer than ten days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USAF will notify EPA, ADEC, and ADNR regarding how the USAF has or will address the breach within ten days of sending EPA, ADEC, and ADNR notification of the breach.

Should the USAF become aware that a land use within the CWMA boundary is in violation of one or more terms of the LUCs, the USAF will also work cooperatively with EPA , ADEC, and ADNR to re-establish compliance.

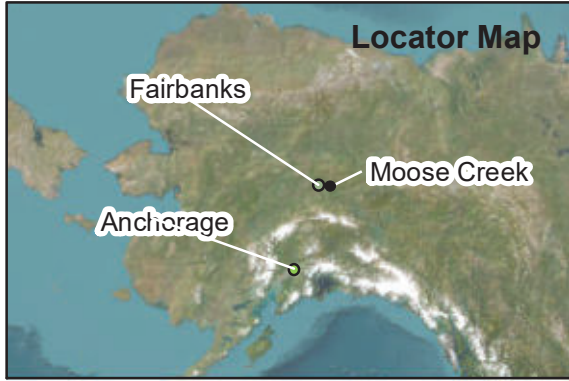
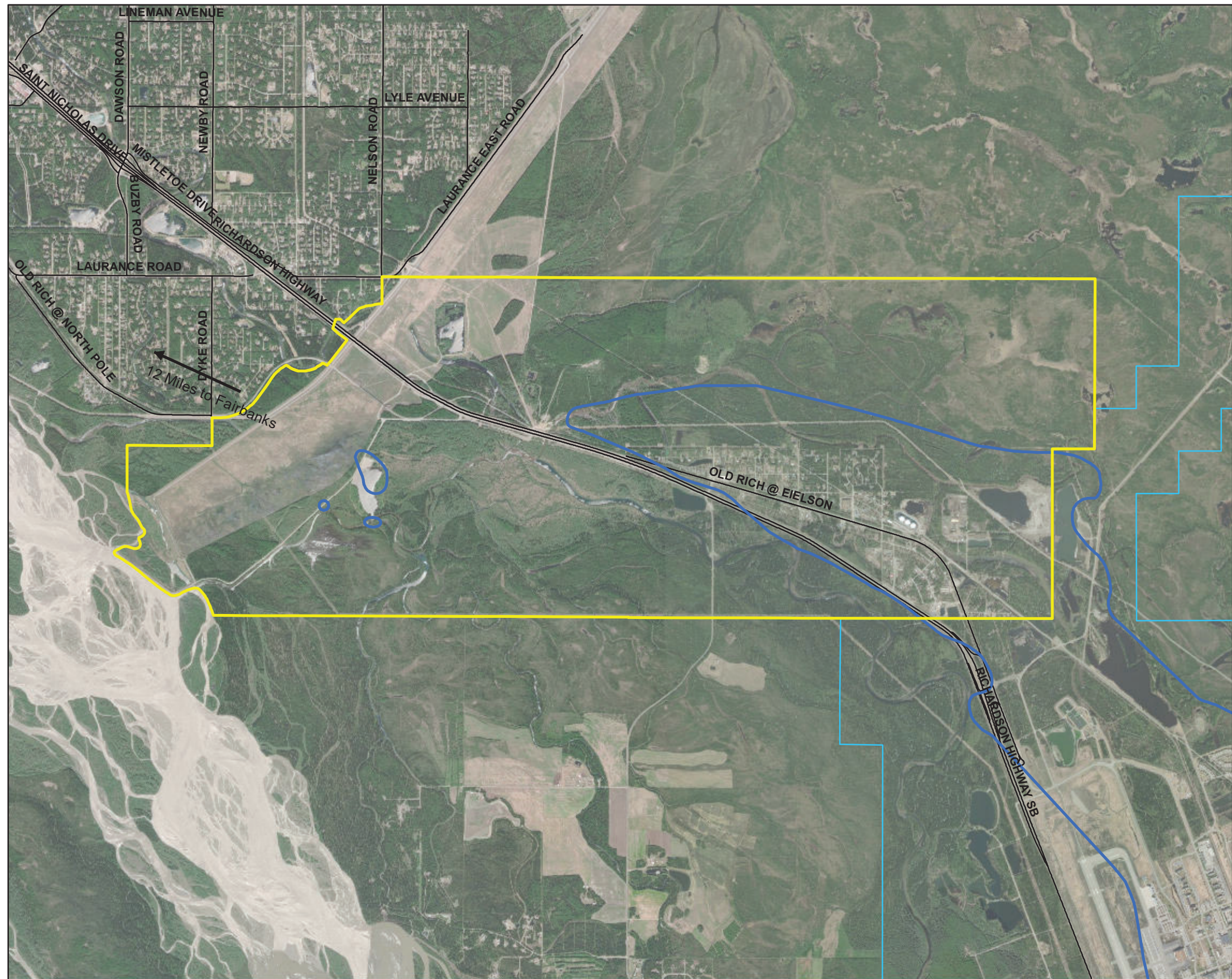
Page intentionally left blank.

11.0 REFERENCES

- ADEC. 2021. *18AAC 75: Oil and Other Hazardous Substances Pollution Control*. November 18.
- ADEC. 2019 *Technical Memorandum Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water*. October 2.
- Agency for Toxic Substances and Disease Registry (ASTDR), 2022. *Per- and Polyfluoroalkyl Substances (PFAS) and Your Health*. [Learn about PFAS | ATSDR \(cdc.gov\)](#). November 1.
- Air Force Civil Engineering Center (AFCEC). 2019. *Final Interim Record of Decision for Community of Moose Creek, Alaska, Long-Term Water Supply*. June.
- Alaska Department of Natural Resources (ADNR). 2021. *Department Order #153, Critical Water Management Area Designation, Community of Moose Creek*. April.
- RESPEC 2022. Memorandum, Covenant, Service Connection, and Well Decommissioning Status, End of 2022 Construction Season. October 25.
- U.S. EPA. 2016. *EPA-HQ-OW-2014-0138/FRL-9946-91-OW. Lifetime Health Advisories and Health Effects Support Documents for Perfluorooctanoic Acid and Perfluorooctane Sulfonate*. November.

Page intentionally left blank.

Figures



Legend

- Critical Water Management Area
- PFAS Plume as seen in 2021 EAFB Atlas
- Eielson AFB Main Installation Area
- Major Roads and Highways

1. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

UTM Zone 6N
WGS1984
Meters

N

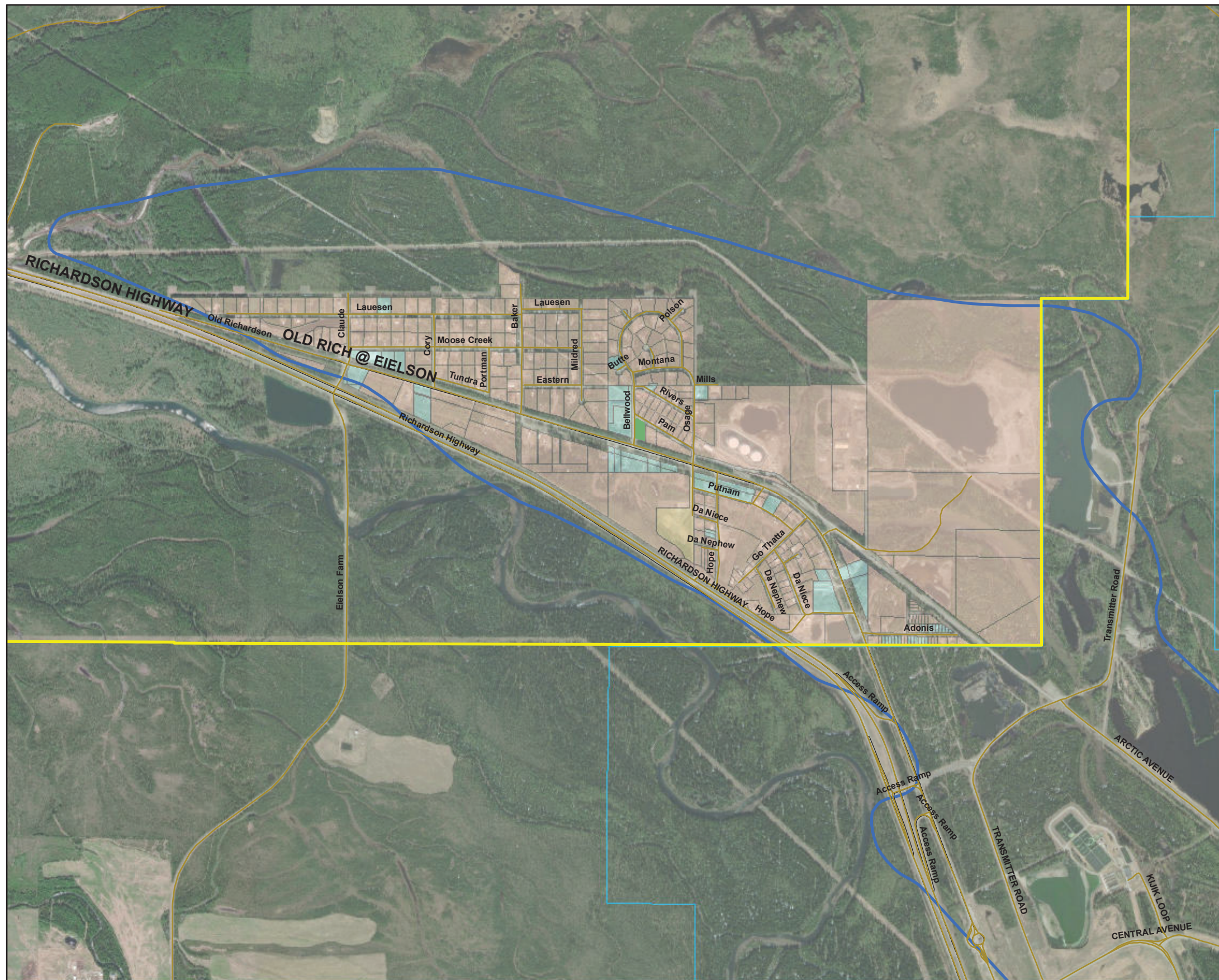
0 1,625 3,250
Feet

Figure 1

Vicinity Map
2022 Moose Creek LUCIP
Moose Creek, Alaska

Drawn By: SS	Date: 5/8/2023
Checked By: BN	Contract: W911KB20D0014 Delivery Order: W911KB21F0112





Legend

- Critical Water Management
- Local Roads
- Major Roads and Highways
- Moose Creek City of North Pole Parcel
- PFAS Plume as seen in 2021 EAFB Atlas
- Fairbanks North Star Borough
- Moose Creek Private Parcels not on *List
- Moose Creek Private Parcels on *List
- Eielson AFB Main Installation

Note: * List refers to original list of Moose Creek Area private properties provided to Bethel by Air Force - "PII_CUI_Protect Appropriately_Moose Creek Property Database_22Y02M10D_V2-Excel".

1. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

UTM Zone 6N
WGS1984
Meters

N

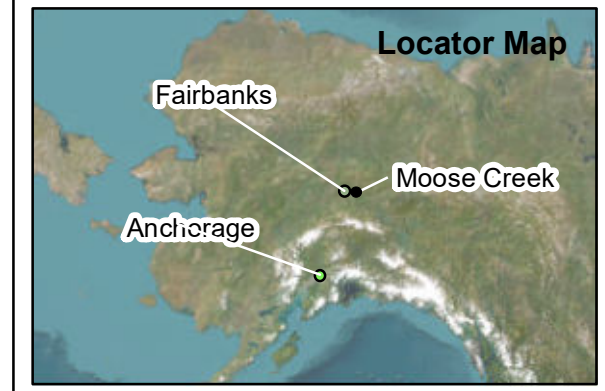
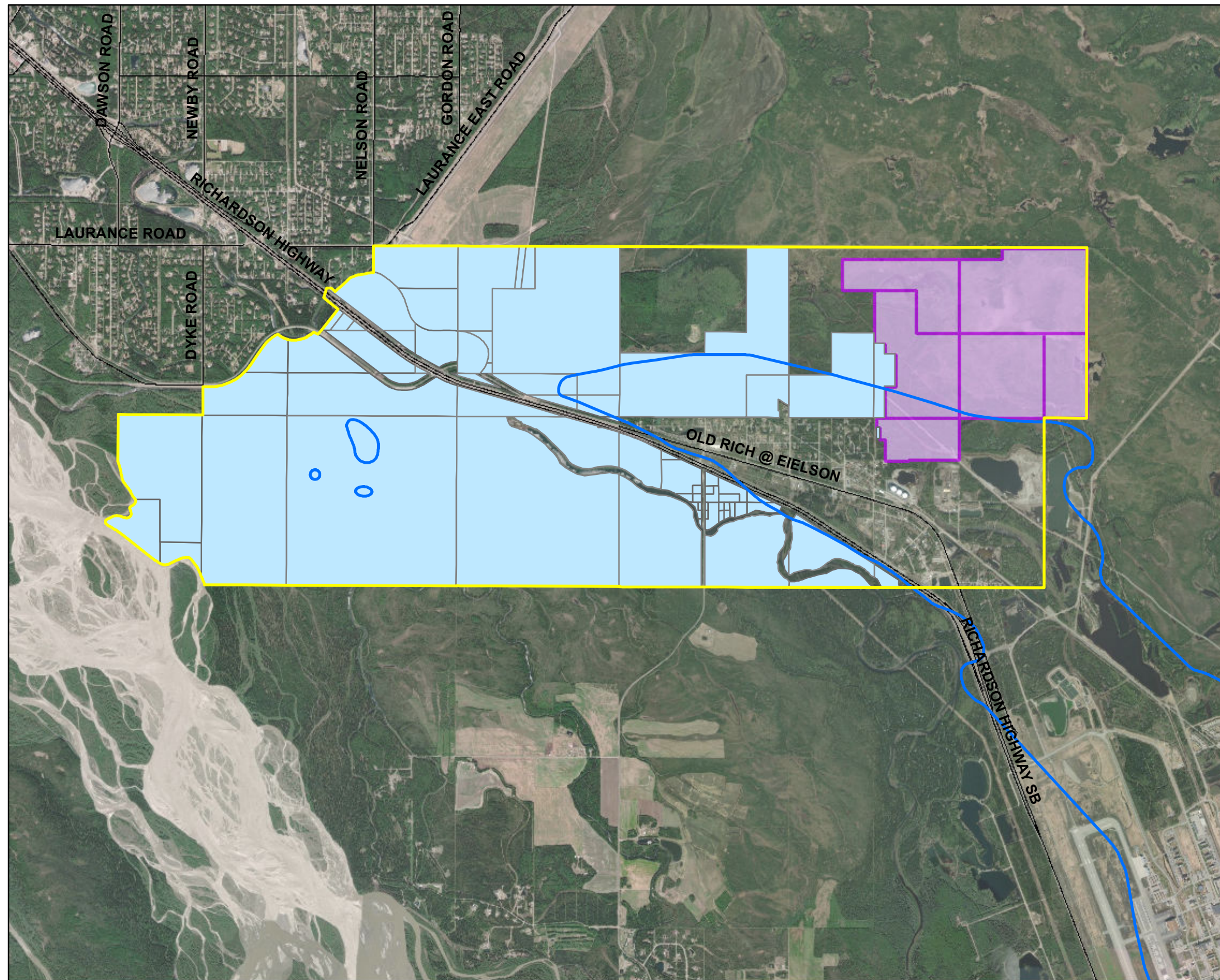
0 550 1,100
Feet

Figure 2

**Land Ownership In and Around
Moose Creek, Alaska
Private Properties**

2022 Moose Creek LUCIP
Moose Creek, Alaska

Drawn By: SS	Date: 5/8/2023	
Checked By: BN	Contract: W911KB20D0014 Delivery Order: W911KB21F0112	



Legend

- Critical Water Management Area
- PFAS Plume as seen in 2021 EAFB Atlas
- Moose Creek Area Federal Owned Land Parcels
- Moose Creek Area State Owned Land Parcels
- Major Roads and Highways

1. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

UTM Zone 6N
WGS1984
Meters

N

0
1,625
3,250

Feet

Figure 3

**Land Ownership In and Around
Moose Creek, Alaska
- State and Federal Properties**
2022 Moose Creek LUCIP
Moose Creek, Alaska

Drawn By: SS	Date: 5/26/2023	
Checked By: BN	Contract: W911KB20D0014 Delivery Order: W911KB21F0112	

Appendix A:

Property Listings Table

This Attachment includes information on State and Federal properties. Information regarding private properties is not included in this LUCIP for privacy reasons.

Page intentionally left blank.

PAN (2023)	Owner1	Abbreviated Legal Description	Mailing Address		Water Right Case Number	Water Right Status	Water Right Owner	EMS Site Address	WaterWell ?	FullLegalDescription
666123	ALASKA STATE OF DNR	TAX LOT 2203, SECTION 22, T2S, R3E	3700 AIRPORT WAY	FAIRBANKS AK 99709 4609	-	-	-	-	-	No Title Search (Public Property)
666133	ALASKA STATE OF DNR	TAX LOT 2204, SECTION 22, T2S, R3E	3700 AIRPORT WAY	FAIRBANKS AK 99709 4609	-	-	-	-	-	No Title Search (Public Property)
700796	ALASKA STATE OF DNR	TAX LOT 2107, SECTION 21, T2S, R3E	3700 AIRPORT WAY	FAIRBANKS AK 99709 4609	-	-	-	-	-	No Title Search (Public Property)
700804	ALASKA STATE OF DNR	TAX LOT 2108, SECTION 21, T2S, R3E	3700 AIRPORT WAY	FAIRBANKS AK 99709 4609	-	-	-	-	-	No Title Search (Public Property)
700814	ALASKA STATE OF DNR	TAX LOT 2205, SECTION 22, T2S, R3E	3700 AIRPORT WAY	FAIRBANKS AK 99709 4609	-	-	-	-	-	No Title Search (Public Property)
700874	ALASKA STATE OF DNR	TAX LOT 2886, SECTION 28, T2S, R3E	3700 AIRPORT WAY	FAIRBANKS AK 99709 4609	-	-	-	-	-	No Title Search (Public Property)
185591	FAIRBANKS NORTH STAR BOROUGH	TL-2850 SECTION 28 T2S-R3E	PO Box 71267	FAIRBANKS AK 99707-1267	LAS 3011	Certificate Issued (36)	Fairbanks North Star Bor	3481 OLD RICHARDSON HWY, NORTH POLE, AK 99705	Yes	A portion of Lots 8, 9, 25 and 29, Section 28, Township 2 South, Range 3 East, Fairbanks Meridian, described as follows: Beginning at the Northeast corner of the Southwest 1/4 of said Section 28; proceed North 0°4'30" West 82.13 feet to the center line of the Richardson Highway; THENCE North 73°37'30" West 62.53 feet along said Highway center line; THENCE South 0°04'30" East 549.64 feet; THENCE North 89°53'30" West 490.00 feet; Thence South 0°04'30" East approximately 350.00 feet to the center line of a branch of Piledriver Slough; THENCE Southeasterly along the center line of said Slough to the East line of the Southwest ¼ of said Section 28; THENCE North 0°04'30" West along said line approximately 1420.00 feet to the POINT OF BEGINNING. Records of the Fairbanks Recording District, Fourth Judicial
183563	UNITED STATES OF AMERICA	TAX LOT 2321, SECTION 23, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
184021	UNITED STATES OF AMERICA	TAX LOT 65E&, SECTION 23, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
184314	UNITED STATES OF AMERICA	TAX LOT 2400, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
184373	UNITED STATES OF AMERICA	TAX LOT 2411, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
184403	UNITED STATES OF AMERICA	TAX LOT 2414, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
184411	UNITED STATES OF AMERICA	TAX LOT 2415, SECTION 24, T2S, R2E			-	-	-	-	-	No Title Search (Public Property)
184519	UNITED STATES OF AMERICA	TAX LOT 100-1, SECTION 26, T2S, R2E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
184926	UNITED STATES OF AMERICA	TAX LOT 100-1, SECTION 19, T2S, R3E	PO BOX 7002	ANCHORAGE AK 99510 0002	-	-	-	-	-	No Title Search (Public Property)
184934	UNITED STATES OF AMERICA	TAX LOT 711, SECTION 19, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
185370	UNITED STATES OF AMERICA	TAX LOT 100-1S, SECTION 28, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
185922	UNITED STATES OF AMERICA	TAX LOT 16W&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
185931	UNITED STATES OF AMERICA	TAX LOT 22SCE&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
185949	UNITED STATES OF AMERICA	TAX LOT 22EE&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
185957	UNITED STATES OF AMERICA	TAX LOT 22E&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
185965	UNITED STATES OF AMERICA	TAX LOT 22W&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
185973	UNITED STATES OF AMERICA	TAX LOT 22NW&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
185981	UNITED STATES OF AMERICA	TAX LOT 22NM&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
185990	UNITED STATES OF AMERICA	TAX LOT 22SM&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186007	UNITED STATES OF AMERICA	TAX LOT 15S&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186015	UNITED STATES OF AMERICA	TAX LOT 15SE&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186031	UNITED STATES OF AMERICA	TAX LOT 15E&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186040	UNITED STATES OF AMERICA	TAX LOT 16SW&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186058	UNITED STATES OF AMERICA	TAX LOT 22SC&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186082	UNITED STATES OF AMERICA	TAX LOT 22NC&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186091	UNITED STATES OF AMERICA	TAX LOT 22NCE&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186104	UNITED STATES OF AMERICA	TAX LOT 16S&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186112	UNITED STATES OF AMERICA	TAX LOT 22M&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186121	UNITED STATES OF AMERICA	TAX LOT 16NE&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
186171	UNITED STATES OF AMERICA	TAX LOT 100NE, SECTION 30, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
531944	UNITED STATES OF AMERICA	TAX LOT 2883, SECTION 28, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
615675	UNITED STATES OF AMERICA	TAX LOT 2601, SECTION 26, T2S, R2E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
615753	UNITED STATES OF AMERICA	TAX LOT 1, SECTION 26, T2S, R2E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
615763	UNITED STATES OF AMERICA	TAX LOT 2, SECTION 26, T2S, R2E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
621290	UNITED STATES OF AMERICA	TAX LOT 23109, SECTION 23, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
621308	UNITED STATES OF AMERICA	TAX LOT 2424, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
621318	UNITED STATES OF AMERICA	TAX LOT 2425, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
621328	UNITED STATES OF AMERICA	TAX LOT 2426, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
621398	UNITED STATES OF AMERICA	TAX LOT 2430, SECTION 24, T2S, R2E			-	-	-	-	-	No Title Search (Public Property)
621406	UNITED STATES OF AMERICA	TAX LOT 2431, SECTION 24, T2S, R2E			-	-	-	-	-	No Title Search (Public Property)
621416	UNITED STATES OF AMERICA	TAX LOT 2432, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
621426	UNITED STATES OF AMERICA	TAX LOT 2433, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
621436	UNITED STATES OF AMERICA	TAX LOT 2434, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
621446	UNITED STATES OF AMERICA	TAX LOT 2435, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
621446	UNITED STATES OF AMERICA	TAX LOT 2435, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
621456	UNITED STATES OF AMERICA	TAX LOT 2436, SECTION 24, T2S, R2E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
646181	UNITED STATES OF AMERICA	TAX LOT A105E, SECTION 19, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3844	-	-	-	-	-	No Title Search (Public Property)
646435	UNITED STATES OF AMERICA	TAX LOT 8W&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
646445	UNITED STATES OF AMERICA	TAX LOT 15W&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
646455	UNITED STATES OF AMERICA	TAX LOT 16NW&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
646465	UNITED STATES OF AMERICA	TAX LOT 22SW&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
646543	UNITED STATES OF AMERICA	TAX LOT 20, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
646553	UNITED STATES OF AMERICA	TAX LOT 19S&, SECTION 29, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)
648931	UNITED STATES OF AMERICA	TAX LOT 61S, SECTION 29, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
648981	UNITED STATES OF AMERICA	TAX LOT 24SW&, SECTION 28, T2S, R3E	1150 UNIVERSITY AVE	FAIRBANKS AK 99709 3899	-	-	-	-	-	No Title Search (Public Property)

700451	UNITED STATES OF AMERICA	TAX LOT 1911, SECTION 19, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	3250 RICHARDSON HWY, NORTH POLE, AK 99705	-	No Title Search (Public Property)
700461	UNITED STATES OF AMERICA	TAX LOT 1912, SECTION 19, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700471	UNITED STATES OF AMERICA	TAX LOT 1913, SECTION 19, T2S, R3E	100 OGLETHORPE AVE W	SAVANNAH, GA 31401-3604	-	-	-	-	-	No Title Search (Public Property)
700471	UNITED STATES OF AMERICA	TAX LOT 1913, SECTION 19, T2S, R3E	100 OGLETHORPE AVE W	SAVANNAH, GA 31401-3604	-	-	-	-	-	No Title Search (Public Property)
700471	UNITED STATES OF AMERICA	TAX LOT 1913, SECTION 19, T2S, R3E	100 OGLETHORPE AVE W	SAVANNAH, GA 31401-3604	-	-	-	-	-	No Title Search (Public Property)
700471	UNITED STATES OF AMERICA	TAX LOT 1913, SECTION 19, T2S, R3E	100 OGLETHORPE AVE W	SAVANNAH, GA 31401-3604	-	-	-	-	-	No Title Search (Public Property)
700481	UNITED STATES OF AMERICA	TAX LOT 709, SECTION 19, T2S, R3E	100 OGLETHORPE AVE W	SAVANNAH, GA 31401-3604	-	-	-	-	-	No Title Search (Public Property)
700481	UNITED STATES OF AMERICA	TAX LOT 709, SECTION 19, T2S, R3E	100 OGLETHORPE AVE W	SAVANNAH, GA 31401-3604	-	-	-	-	-	No Title Search (Public Property)
700491	UNITED STATES OF AMERICA	TAX LOT 710, SECTION 19, T2S, R3E	PO BOX 7002	ANCHORAGE, AK 99510-0002	-	-	-	-	-	No Title Search (Public Property)
700500	UNITED STATES OF AMERICA	TAX LOT 712, SECTION 19, T2S, R3E	PO BOX 7002	ANCHORAGE, AK 99510-0002	-	-	-	-	-	No Title Search (Public Property)
700726	UNITED STATES OF AMERICA	TAX LOT 100-1, SECTION 20, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700746	UNITED STATES OF AMERICA	TAX LOT 713, SECTION 20, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700766	UNITED STATES OF AMERICA	TAX LOT 100-1S, SECTION 21, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700776	UNITED STATES OF AMERICA	TAX LOT 713, SECTION 21, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700884	UNITED STATES OF AMERICA	TAX LOT 615, SECTION 28, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700894	UNITED STATES OF AMERICA	TAX LOT 100NW, SECTION 29, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700902	UNITED STATES OF AMERICA	TAX LOT 100SW, SECTION 29, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700912	UNITED STATES OF AMERICA	TAX LOT 100SE, SECTION 29, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700932	UNITED STATES OF AMERICA	TAX LOT 100SW, SECTION 30, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
700932	UNITED STATES OF AMERICA	TAX LOT 100SW, SECTION 30, T2S, R3E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)
701046	UNITED STATES OF AMERICA	TAX LOT 100-1, SECTION 25, T2S, R2E	PO BOX 6898	JBER AK 99506 0898	-	-	-	-	-	No Title Search (Public Property)

Appendix B:

PFAS Timeline

Page intentionally left blank.

Perfluorooctanoic acid (PFOA) & Perfluorooctane sulfonate (PFOS) Timeline

Eielson Air Force Base, Alaska

Concern over possible releases of per- and polyfluorinated alkyl substances were brought to the attention of Eielson Air Force Base (EAFB) by ADEC and EPA in mid-2012. Initial efforts on Eielson began in 2014 when a nation-wide contract was awarded and managed out of the Air Force Civil Engineering (AFCEC) San Antonio for sampling PFOA and PFOS at selected U.S. Air Force Facilities. The draft Unified Federal Policy Quality Assurance Project Plan (UFP-QAPP or Generic QAPP, in this case) was provided to the Alaska Department of Environmental Conservation (ADEC) and the US Environmental Protection Agency (EPA). The agencies were supportive of the work proceeding under the Generic QAPP, developed as part of this nationwide effort to conduct screening level sampling to determine the presence or absence of PFOA and PFOS in soil and groundwater rather than to characterize the nature and extent of a known contaminated site or to rule out potential areas of concern. It was understood that a more comprehensive Preliminary Assessment/Site Inspection (PA/SI) focused on PFOA and PFOS would be performed at Eielson in the future. Because PFOA and PFOS were considered emerging contaminants, this work was not completed as a Superfund or Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) contaminant, otherwise it would be addressed under the Eielson Federal Facility Agreement (FFA). Because drinking water on base and in most wells the community of Moose Creek, AK was tested at levels above the prevailing Provisional Health Advisory (PHA) for PFOS, of 0.2 ug/L in drinking water, swift action was taken by the Air Force to eliminate that exposure. Residents with levels above the PHA in Moose Creek were provided bottled water immediately (with treatment systems or storage tanks installed throughout the winter of 2015/2016), and the wells on base that tested in excess of the PHA were taken out of production. On 19 May 2016, EPA rescinded the PHA and issued a lifetime Health Advisory for PFOS and PFOA of 0.070 ug/L individually or combined. On June 15, 2022, EPA issued interim drinking water health advisories (HA) for PFOS (0.0002 ug/L) and PFOA (0.00004 ug/L) and final HAs for GenX (HFPO-DA; 0.01 ug/L) and PFBS (2 ug/L).

This timeline is intended to provide an abbreviated overview of the critical steps expedited by all parties.

17 Sep 12: Air Force Releases AFCEC Interim PFC Guidance (dated 27 Aug 12).

13 Nov 12: DEC sends a letter to the Air Force requesting that Eielson conduct sampling at WP045/SS057 and LF003 for PFOS and PFOA, as fire training was identified in these areas. DEC used EPA provisional health advisory toxicity values to calculate preliminary soil and groundwater Cleanup Levels for PFOS and PFOA.

14 Dec 12: Air Force responds to DEC letter, indicating that PFOS and PFOA was programmed for FY14, and that AFCEC will continue to proactively identify and address PFC issues in accordance with the Air Force Interim PFC Guidance.

23 Jul 14: *Final UFP Generic QAPP for Site Investigations of Fire Fighting Foam Usage at Various Air Force Bases in the United States – Addendum 10 Field Sampling Plan for Eielson Air Force Base, Fairbanks, North Star Borough, Alaska* (Document #1 in table below).

20 Jan 15: AF receives letters (dated 19 Jan) from EPA to AFCEC and 354 Bioenvironmental Engineering (BEE) requesting additional information as well as sampling the base drinking water wells for PFOA & PFOS.

23 Feb 15: Results from the 2014 site investigation provided in the Final Aqueous Film Forming Foam (AFFF) Site Investigation Report - *Final Site Investigation Report for Site Investigations of Fire Fighting Foam Usage at Various Air Force Bases in the United States for Eielson Air Force Base, Fairbanks North Star Borough, Alaska (SCF)* (Document #2 in table below).

24 Feb 15: BEE samples the output of the water treatment plant

27 Feb 15: AFCEC & BEE respond affirmatively in writing to EPA letter dated 19 Jan

10-11 Mar 15: BEE samples all production wells

6 Apr 15: BEE samples all drinking water wells (exception: Family Camp well). From this point out, PFOA/PFOS added to quarterly sampling conducted by BEE

20 Apr 15: Final work plan northern boundary sampling submitted - *Perfluorinated Compounds Investigation Work Plan, Eielson AFB* (Document #3 in table below).

20 Apr 15: Work begins (by Jacobs) at northern boundary to determine if PFCs are headed off base

29 Apr 15: Preliminary results come in for first two northern boundary temporary wells, French Creek and Garrison Sough

30 Apr 15: Northern Boundary well sampling field effort complete. Contractor demobilizing.

7 May 15: Last of the preliminary data in for the northern boundary temporary wells, French Creek and Garrison Sough. Results indicate off-base migration.

14 May 15: Notice sent to the Congressional delegation

19 May 15: Base Public Affairs sent notices to Moose Creek residents/home owners

27 May 15: Jacobs Final work plan Addendum #1 for the initial sampling in Moose Creek - *Addendum #1 to the Final Perfluorinated Compounds Investigations Work Plan (Jacobs)* (Document #4 in table below).

28 May 15: ADEC and EPA approve the final work plan Addendum #1 for the sampling in Moose Creek

29 May 15: Sampling of residential drinking water wells begins in community of Moose Creek

6 Jun 15: Preliminary results show some wells in Moose Creek exceed the PHA

6 Jun 15: Bottled water delivered to residences where the well water tested over the PHA

16 Jun 15: Town Meeting #1 at Fire Station in Moose Creek, Alaska

26 Jun 15: Contract award to install treatment systems

10 Jul 15: Draft Water Treatment Plan submitted

13 Jul 15: Draft Work Plan Addendum #2 to continue testing of private residential wells submitted

21 Jul 15: ADEC and EPA approval of Addendum #2

22 Jul 15: Town Hall Meeting #2 at Fire Station in Moose Creek, Alaska

28 Jul 15: Final Work Plan Addendum #2 submitted - ***Final Addendum #2 to the Final PFC Investigations Work Plan, Eielson AFB, AK, Perfluorinated compounds (PFCs) Moose Creek Area Drinking Water Sampling (EA)*** - (Document #5 in table below).

24 Aug 15: Water Treatment Plan interim regulatory approval received

25 Aug 15: Jacobs submits Final Addendum #3 (Downgradient locations Chena Lakes, Piledriver slough) - ***Addendum #3 to the Final Perfluorinated Compounds Investigations Work Plan (Jacobs)*** - (Document #6 in table below).

26 Aug 15: First treatment system installed in Moose Creek

26 Aug 15: Town Hall Meeting #3 at Fire Station in Moose Creek, Alaska

14 Oct 15: BEE sampled DW Wells

20 Oct 15: Final Water Treatment Plan for community of Moose Creek submitted - ***Final Moose Creek Water Treatment Work Plan Eielson Air Force Base, AK (EA)*** - (Document #7 in table below).

26 Oct 15: Town Hall Meeting #4 at Fire Station in Moose Creek, Alaska

17 Nov 15: BEE sampled DW Wells

Dec 15: Received *Final Preliminary Assessment Report for Perfluorinated Compounds at Eielson Air Force Base (HydroGeoLogic, Inc.)* as part of the nationwide effort by AFCEC - (Document #8 in table below).

25 Jan 16: Public Meeting #5 at Fire Station in Moose Creek, Alaska

14 Feb 16: BEE sampled DW Well A PFOA – 0.059ppb & PFOS – 0.17ppb; BEE communicating with EPA as they design treatment system in anticipation of lower Public Health Advisory levels on the horizon. Considering alternative water supply while coordinating w/ADEC on installation of GAC system for base DW treatment.

17 Mar 16: Received *Draft Work Plan for Perfluorinated Compounds (PFCs) Site Inspections at Eielson Air Force Base, AK (CH2M)* - Currently under review with an extension for comments by 21 Apr.

6 May 16: *Action Memorandum for a Time-Critical Removal Action of PFC-Contaminated Water at Moose Creek, Alaska* signed by AFCEC/CZ (document date 18 Nov 15) - (Document #9 in table below).

19 May 16: EPA announces new Lifetime health advisory (HA) for PFOS and PFOA in drinking water (70 PPT for either separately, or total concentration combined).

19 May 16: Public meeting #6 at Fire Station in Moose Creek, Alaska

17 Jun 16: Air Force SAF/IE issues: Policy on Testing Drinking Water for PFOS and PFOA.

28 Jun 16: Air Force submitted work plan to determine vertical extent of PFC contamination at the Moose Creek Apartments.

8 Jul 16: Air Force submitted *Final Work Plan for Perfluorinated Compounds (PFCs) Site Inspections at Eielson Air Force Base, Alaska (CH2M)* for sites identified for further action in the Preliminary Assessment - (Document #10 in table below).

9 Aug 16: Deep-well investigation commences at the Moose Apartments.

11 Aug 16: Air Force SAF/IE issues: Policy on Perfluorinated Compounds (PFCs) of Concern

22 Aug 16: Department of Defense issues update to DoD Manual 4715.20, "Defense Environmental Restoration Program Management," March 9, 2012. This update describes how to manage DERP or potential DEP sites where an emerging contaminant may have been released to the environment.

3 Nov 16: Air Force submitted *Subsurface Investigation at Moose Creek Apartments* documenting results of vertical extent of PFC contamination at Moose Creek Apartments - (Document #11 in table below).

6 Nov 16: DEC promulgates soil and groundwater cleanup levels for PFOS & PFOA.

15 Nov 16: Air Force received Approval to Construct from ADEC for GAC installation at Moose Creek Apartments.

1 Dec 16: Public meeting #7 at Fire Station in Moose Creek, Alaska

15 Jan 17: Air Force submitted *2015-2016 Field Activities Report For Four Areas: Transmitter Road, Community of Moose Creek, Western Are and Chena Floodplain (Jacobs)* - (Document #12 in table below).

17 Apr 17: Air Force submits the *Draft Interim Feasibility Study for the Community of Moose Creek, Alaska, Long-term Drinking Water Treatment Systems (Stantec)*. Report identifies seven alternatives for a long-term drinking water source at Moose Creek.

9 May 17: Air Force submits the *Draft Moose Creek Surface and Sediment Sampling Work Plan – Addendum 5*.

7 Jul 17: Air Force submitted the *Draft Site Inspection report For Aqueous Film Forming Foam Areas (CH2M)*. The report was formerly referred to as *Perfluorinated Compounds (PFCs) Site Inspections at Eielson Air Force Base, Alaska (CH2M)*.

19 Jul 17: Public meeting #8 at Fire Station in Moose Creek, Alaska

4 Aug 17: Air Force received Interim Approval to Operate GAC system at the Moose Creek Apartments.

11 Aug 17: ADEC issued fact sheet on the risks associated with aqueous film forming foam (AFFF).

25 Aug 17: Moose Creek Apartment sample results are non-detect post GAC. System officially operational and residents are off bottled water.

25 Sep 17: Air Force submitted the *Draft Eielson Air Force Base Interim Proposed Plan for Long-Term Water Supply for the Community of Moose Creek, Alaska (Stantec)* for regulatory comment.

3 Nov 17: EPA and ADEC approved the *Final Interim Feasibility Study for the Community of Moose Creek, Alaska, Long-term Drinking Water Treatment Systems* - (Document #17 in table below).

12 Jan 18: Air Force submitted *Draft Perfluorinated Compounds Eielson –Moose Creek Quality Assurance Project Plan, Eielson AFB, Alaska*.

15 Apr 18 – 15 May 18: Public comment period for Interim Proposed Plan

23 Apr 18: Public meeting #9 on Interim Proposed Plan at Fire Station in Moose Creek, Alaska

31 May 18: EPA and ADEC approved the *Final Interim Proposed Plan for Long-Term Water Supply, Community of Moose Creek, Alaska* - (Document #18 in table below).

7 Sep 18: Air Force submitted the *Draft Interim Record of Decision for Long-Term Water Supply, Community of Moose Creek, Alaska* for regulatory review

13 Sep 18: ADEC issued technical memorandum, *Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water*, to establish action levels for six PFAS compounds - (Document #20 in table below).

17 Jan 19: ADEC issued Final Approval to Operate for the Moose Creek Apartment complex GAC water treatment system.

22 Jan 19: Air Force and the City of North Pole sign a cooperative agreement administered by the U.S. Army Corps of Engineers, and awarded to PDC Engineers, for the initial routing and 15% design of the North Pole water distribution system expansion to Moose Creek.

24 Jan 19: North Pole/Moose Creek water main routing design charrette was held at North Pole City Hall.

29 April 19: Air Force and the City of North Pole sign a cooperative agreement administered by the U.S. Army Corps of Engineers, and awarded to PDC Engineers, for the 100% design and project permitting of the North Pole water distribution system expansion to Moose Creek.

10 May 19: Concept design for the expansion of the City of North Pole's water distribution system to serve the community of Moose Creek is completed.

10 Jun 19: Air Force finalized the *Interim Record of Decision for Community of Moose Creek, Alaska, Long-term Water Supply* - (Document #23 in table below).

25 Jun 19: Air Force submitted the *35% Design Moose Creek Water Expansion Project* for regulatory review.

23 Jul 19: EPA and ADEC approved the *Existing Monitoring Well Sampling Work Plan Supplemental PFOA and PFOS Site Inspection at Eielson AFB, Alaska (Abbreviated Work Plan for Expanded SI)* - (Document #24 in table below).

24 Jul 19: Public Meeting #10, Air Force hosts open house on NP/MC water expansion project at the Moose Creek Fire Station.

22 July 19: Air Force and the City of North Pole sign a cooperative agreement administered by the U.S. Army Corps of Engineers, and awarded to PDC Engineers, for the construction of the North Pole water distribution system expansion to Moose Creek, based upon the 35% design cost estimate.

23 July 19: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo establishes a PFAS Task Force to ensure a coordinated DoD-wide approach to address the growing concerns related to PFAS in the environment.

05 Sep 19: Air Force Guidance Memorandum (AFGM) 2019-32-01 is released to establish AFFF-related waste management implementation guidance in support of the SAF/IEE memorandum dated 29 Dec 2017, Managing AFFF-related perfluorooctane sulfonate and perfluorooctanoic acid (PFOS/PFOA) Waste that directs the management of PFOS/PFOA-containing waste to protect human health.

27 Sep 19: Air Force finalized the *PFAS Expanded Site Inspection for Eielson AFB and Moose Creek* - (Document #25 in table below).

7 Nov 2019: Air Force submitted the *95% Design Moose Creek Water Expansion Project* for regulatory review.

15 Oct 2019: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo provides clarifying technical guidance on the investigation of PFOS, PFOA, and PFBS, which is applicable to investigating these three types of PFAS substances at Environmental Restoration Account-funded, Base Realignment and Closure Account-funded, and Operation and Maintenance accounts for the National Guard-funded sites.

15 Oct 2019: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo establishes a new reporting requirement for funding data associated with investigating and cleaning up PFAS at Environmental Restoration Account-funded, Base Realignment and Closure Account-funded, and Operation and Maintenance accounts for the National Guard-funded sites.

23 Oct 2019: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo revises the reporting requirement established on 30 July 2019 to track cleanup activities conducted under the Defense Environmental Restoration Program and at sites funded by the Operation and Maintenance accounts for the National Guard.

13 Sep 2019: DoD releases publication addressing the DoD PFAS Task Force Operating Principles.

27 Sep 2019: EPA and ADEC approved the *Final Expanded Perfluorooctanoic Acid (PFOA) And Perfluorooctanesulfonic Acid (PFOS) Expanded Site Inspection UFP-QAPP Work Plan*.

8 Nov 2019: Air Force submitted the *Draft Expanded Site Investigation Addendum for Surface Sampling, Draft Expanded Site Investigation Addendum for Birch Lake, and Draft Work Plan for Sampling Soil in F-35 Long Term Stockpiles* for regulatory review.

22 Nov 2019: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo establishes a consistent methodology for the analysis of PFAS substances in media other than drinking water.

27 Nov 2019: The Air Force submitted the *Petition to Initiate Proceedings to Designate a Critical Water Management Area (CWMA) at Moose Creek, Alaska* to Alaska Department of Natural Resources for review.

2 Dec 2019: PDC Engineers complete and submit the 100% design documents for the North Pole water distribution system expansion to Moose Creek.

20 Dec 2019: President Trump signs the National Defense Authorization Act (NDAA) for FY2020. Section 330 of the NDAA enacts new requirements governing DoD's disposal and incineration of materials containing PFAS. The law now requires storage of PFAS wastes to meet RCRA hazardous waste standards. DoD is currently working on guidelines to address the requirements laid out in the NDAA.

06 Jan 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo requesting PFAS substances data call for installations outside the United States.

13 Jan 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo for the Environment (ENV) established new reporting requirements for AFFF usage or spills (not associated with use) at all DoD sites. Required data must be collected and reported to the ODASD for ENV annually by 15 November, starting in 2020. This memo also establishes additional reporting requirements for any AFFF usage, release, or spill that is above 10 gallons of AFFF concentrate, or 300 gallons of mixed foam, or any other situation that may require media attention. These incidents shall be reported within 24 hours to the ODASD ENV.

31 Jan 2020: CWMA petition was briefed to Alaska Department of Natural Resources Commissioner; she supports the CWMA.

03 Feb 2020: City of North Pole (through a cooperative agreement with USACE funded by the Air Force) awarded construction contract for Moose Creek Water Expansion Project to HC Contractors, Inc., a local contractor.

07 Feb 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo outlining health-related PFAS information sources disseminated to all health care providers within the DoD's Military Health System to ensure that providers receive health-related information on PFAS and are prepared to address any health and exposure concerns of the population served within the DoD's military medical treatment facilities (MTFs).

18 Feb 2020: HC Contractors issued Notice to Proceed for Moose Creek Water Expansion Project.

18 Feb 2020: CWMA boundary for Moose Creek finalized and sent to DNR for their records.

21 Feb 2020: Valuation of environmental covenants memo for Moose Creek properties developed and finalized by AFCEC, AFLOA/JACE and GCN; valuation amounts in this memo for undeveloped, single family, multiplex residential, commercial, and other miscellaneous properties, and for owners with perfected water rights, will be used in the development of the environmental covenant compensation packages for property owners.

02 March 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo identifies requirements for PFAS drinking water sampling on DoD installations where DoD is the drinking water purveyor; this memo supersedes the 10 June 2016 and 22 May 2019 Deputy Assistant Secretary of Defense memos relating to the testing of drinking water for PFAS.

08 April 2020: Moose Creek Water Expansion Project construction work begins, with land clearing and excavation work at the Moose Creek pump house site, as approved by ADEC and EPA on 06 April 2020.

10 Apr 20: EPA and ADEC approved the following Site Inspection (SI) Work Plan Addendums: *Birch Lake Surface Water, Sediment, and Soil Sampling Final Addendum to the Work Plan for Expanded PFOA and PFOS Site Investigation* and the *Eielson Surface Water and Sediment Sampling Final Addendum to the Work Plan for Expanded PFOA and PFOS Site Investigation* – (Documents #26 and #27 in table below).

18 May 2020: Full approval for the **Remedial Action Work Plan for the Moose Creek Water Expansion Project** granted by ADEC and EPA, facilitating construction work to begin inside the CERCLA area – (Document #28 in table below).

20 May 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Environment (ENV) Memo outlines a new reporting requirement requesting DoD Lead Environmental Components (LECs) to notify ODASD ENV and other impacted Services when host nations promulgate standards and/or issue health advisories or thresholds for PFAS compounds so that the DoD can understand environmental requirements outside the United States, forecast potential increased host nation enforcement actions and requirements, and determine if changes in policy are necessary.

17 June 2020: The environmental covenant compensation package prepared by the Air Force, in conjunction with input from EPA, ADEC, and ADNR, is finalized. The environmental covenant package offers eligible Moose Creek property owners (those with a well) to be connected to the City of North Pole water system at Air Force expense. The covenant package also offers compensation to property owners for agreeing to place a covenant on the property recorded in real property records restricting the use of contaminated groundwater for any purpose; for agreeing to have all wells on the property decommissioned; for providing access for Air Force monitoring of Land Use Controls restricting use of groundwater; and, for the termination of existing ADNR water right certificates of appropriation.

09 July 2020: Air Force environmental covenant compensation package mailed to Moose Creek property owners; property owners have until the suspense date of 31 October to return their signed packets to be granted full compensation for allowing an environmental covenant to be placed on their properties that restricts the future use of PFAS contaminated groundwater.

14 July 2020: Alaska Department of Natural Resources (ADNR) holds public meeting in Moose Creek to educate the public and receive feedback about the proposed critical water management area (CWMA) under consideration for Moose Creek to restrict groundwater use due to the PFOS/PFOA contamination originating from Eielson Air Force Base.

16 July 2020: ATSDR/CDC PFAS exposure assessment meeting held in Moose Creek to recruit residents interested in being part of the assessment, and to provide information about exposures in a broader community.

23 July 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo identifies requirements for monitoring of drinking water for potential PFAS impact at military installations where the DoD is not the drinking water purveyor.

4 Aug 2020: The PFAS RI Contract was awarded to BEM.

20 Aug 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Environment (ENV) Memo issues guidance for implementing Section 343 of the National Defense Authorization Act (NDAA) for Fiscal Year 2020, Provision of Water Uncontaminated with PFOA and PFOS for Agricultural Purposes. Consistent with DoD's risk-based cleanup program, DoD may exercise this authority to provide

alternative water or treat agricultural water based on meeting two criteria, and should be interpreted consistent with CERCLA and Defense Environmental Restoration Program authorities. The first criterion is a scientifically supportable determination of a need to take action due to an unacceptable risk to human health or the environment based on the site-specific exposure. The second criterion is a determination that the PFOS and/or PFOA concentrations, above the EPA or FDA levels, are from DoD activities ("contaminated with such compounds by reason of activities on a military installation").

18 Sep 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo provides guidance for implementing Sections 323 and 324 of the National Defense Authorization Act (NDAA) for fiscal year 2020, which prohibits testing and training with fluorinated aqueous film forming foams (AFFF) at all DoD installations, with the exception of the five installations outlined in the memo that have documented containment systems, processes, and procedures in place to ensure AFFF is not released into the environment.

18 Sep 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo outlines the requirements that must be met (pursuant to Section 344 of the National Defense Authorization Act (NDAA) for fiscal year 2020) for the Secretary of the Air Force to request approval to acquire real property within the vicinity of an Air Force base that has shown signs of contamination from PFOA and PFOS due to activities on the base, and which would extend the contiguous geographic footprint of the base and increase the force protection standoff near critical infrastructure and roadways.

18 Sep 2020: Office of the Deputy Assistant Secretary of Defense (ODASD) Memo outlines guidance for the DoD to enter into agreements with municipalities or municipal drinking water utilities adjacent to military installations to jointly share validated drinking water monitoring data related to per- and polyfluoroalkyl substances and other emerging contaminants of concern, pursuant to Section 331 of the National Defense Authorization Act (NDAA) for fiscal year 2020.

2 Oct 2020: EPA and ADEC approved the *Quality Assurance Project Plan Addendum for Remedial Investigation for PFAS at Various Sites – Initial Groundwater Sampling to the Final 2019 UFP-QAPP Work Plan, Expanded PFOA and PFOS Site Inspection*. Approximately 50 existing wells were sampled in October 2020 – (Document #29 in table below).

09 Oct 2020: The main distribution line and north and south distribution loops of the Moose Creek water expansion project are 100% complete; construction is starting to wind down for the season. Service lines to Moose Creek residences and businesses will be completed in 2021.

19 Oct 2020: Intensive outreach activities funded by the AF start this week to try to recruit the remaining property owners that have not yet turned in their environmental covenant package paperwork; individual appointments to discuss questions and have agreements notarized are being scheduled at the Moose Creek Fire House each Wednesday evening and on Saturday's over the next six months to allow an alternative for those property owners that can't make it to the City of North Pole Office during normal work hours.

11 Dec 2020: A second environmental covenant package is mailed to all Moose Creek property owners that have not yet turned in a signed, completed package; the suspense date for returning signed paperwork and receiving a financial consideration for the granting of an environmental covenant on one's property and/or the connection of one's home to the City of North Pole water system at AF expense (for eligible properties) is extended through 31 March 2021.

06 Jan 2021: The Department of Air Force (DAF) releases memorandum summarizing approach for response and operational actions associated with identifying PFOS and PFOS impacts to drinking water sources; the attachment that is part of this memo is the 23 Dec. 2021 Deputy Assistant Secretary of the AF for Environment, Safety, and Infrastructure (SAF/IEE) PFAS Well Response Guidance.

09 Feb 2021: Milestone reached when the Air Force reaches its 75% minimum sign-up percentage of eligible water customers that have submitted signed, completed packages for connection to the City of North Pole water system; this 75% minimum hook-up number was necessary for the water expansion project to be economically viable to the City of North Pole.

17 Feb 2021: AFCEC works with other agencies involved in the Moose Creek CERCLA response to put together an Eielson Installation Restoration Program February 2021 newsletter that is mailed to all Moose Creek property owners, as well as occupants just renting properties (Document # 30 in table below).

22 Feb 2021: The first set of 41 environmental covenants reviewed and signed off on by the DEC Contaminated Sites Program Director are recorded at the Alaska Dept. of Natural Resources Recorder's Office.

07 May 2021: The AF begins routing a strategy for coordination and approval through the AF leadership chain addressing how we plan to engage and recruit the remaining Moose Creek property owners that have not yet agreed to sign for connection to the City of North Pole water system. The strategy also documents that the AF intends to turn over ownership and liability of the government furnished equipment to those property owners that still haven't signed for connection by 31 August 2021, and the strategy outlines the advance notifications these property owners will receive before the equipment is turned over to them in November 2021.**21 May 2021:** EPA and DEC approve Appendix D (Environmental Covenant) of the **Remedial Action Work Plan for the Moose Creek Water Expansion Project** (Document #31 in table below).

24 May 2021: The Alaska Department of Natural Resources (ADNR) signs off on department order #153 for the implementation of a critical water management area (CWMA) in the community of Moose Creek, AK. ADNR mails the final department order and decision documents to property owners on this same date, and the CWMA documents are also posted at the following website: <http://dnr.alaska.gov/mlw/water/cwma/>.

24 May 2021: The AF begins routing a Moose Creek Strategy for coordination and approval through the Deputy Assistant Secretary of the AF for Environment, Safety, and Infrastructure (SAF/IEE) addressing how to engage and recruit the remaining Moose Creek property owners that have not yet signed for connection to the City of North Pole water system.

26 May 2021: The first service connection for the Moose Creek water expansion project occurs today with the 70-plex unit Moose Creek Apartments.

04 June 2021: The AF mails (certified mail return receipt requested) the first in a series of letters scheduled over the course of the last construction season to try to engage and recruit the 19 remaining eligible Moose Creek property owners that have not yet submitted signed, completed paperwork for connection to the City of North Pole Water System. As of this date, 195 of 214 (91%) eligible property owners have submitted the necessary paperwork for utility connections to take place during the 2021 construction season; the 19 of 214 (9%) property owners that have not are being targeted in this outreach effort.

11 June 2021: EPA and DEC approve the use of the **Quality Assurance Project Plan for Remedial Investigation for PFAS at Various Sites** although there were some unresolved issues and the AF acknowledged that the RI will have data gaps. The RI approach is flux based and includes groundwater transects on and off base. The primary focus on the RI is to investigate 13 PFAS source areas and 2 sub-areas (Document #32 in table below).

16 June 2021: EPA and DEC approve **2021 Quality Assurance Project Plan (QAPP) Addendum - Perfluorinated Compounds Eielson-Moose Creek Eielson Air Force Base (AFB), Alaska** to sample 40 wells located along the PFAS plume periphery and/or nested wells within the centerline of the plume. The wells will be sampled twice during 2021; the data will be used to evaluate plume characteristics and trends in individual well (Document # 33 in table below).

22 June 2021: Deputy Assistant Secretary of the AF for Environment, Safety, and Infrastructure (SAF/IEE) approves the Moose Creek Strategy for engaging/recruiting property owners that have not signed for connection to the City of North Pole water system.

14 July 2021: The Final version of the **Technical Memorandum for Birch Lake U.S. Air Force Recreation Area, Alaska Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutanesulfonic Acid (PFBS) 2021 Quality Assurance Project Plan (QAPP) Addendum - Perfluorinated Compounds Eielson-Moose Creek Eielson Air Force Base (AFB), Alaska** was submitted. Birch Lake was investigated to identify the source of PFOA and other PFAS compounds in the well water; however, the source remains to be found and further investigation will be required (Document # 34 in table below).

23 Aug 2021: AFCEC/CZOP requests approval to defer the implementation of the Moose Creek Strategy (approved on 22 June 2021) to the spring/summer of 2022 for property owners that have not yet executed a service agreement for connection to the City of North Pole water system, and for owners that are trying to meet connection criteria (permanent heat, permanent power, and a functional septic system).

15 Sept 2021: Deputy Assistant Secretary of the AF for Environment, Safety, and Infrastructure (SAF/IEE) releases memorandum “Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program,” which updates and supersedes the 15 Oct 2019 memo. Memo includes the revised reference dose for PFBS in its screening levels, and it makes clear the toxicity values in this memo are to be used in the Remedial Investigation (RI) phase to conduct site-specific risk assessments to determine remedial actions.

21 Sep 2021: AFCEC/CZOP approves deferral of implementation of Moose Creek Strategy until spring/summer of 2022; AFCEC/CZOP will continue to deliver water and/or service GAC systems for affected properties; these properties have until 01 March 2022 to turn in executed service agreements and/or to meet the criteria for connection to the City of North Pole water system.

29 Sep 2021: The last service connection for the Moose Creek water expansion project occurs for the 2021 construction season. Out of 192 properties that were eligible to be connected to water service (Water Customers), 182 environmental covenants (95%) were submitted, and 174 of these properties (91%) were connected to water service in 2021. Of the remaining 18 Water Customers that were not connected in 2021, four (2%) of the 18 have declined water service (homes are not occupied, there is no need for water service, and property owners are not willing to spend the money to meet the City of North Pole criteria for connection). The remaining 14 (7%) properties are being tracked for connection next year. Out of the 14, seven of them have not yet turned in the required paperwork for connection, five of them don't currently meet connection criteria (permanent heat, permanent electric, and a functional septic system), and two have met the criteria and turned in the paperwork, but we were unable to get them connected this year (one because it was too late in the season and the other b/c a pre-con site inspection couldn't be scheduled b/c of a COVID patient in the home).

Sep 2021: Derivation of PFAS Ecological Screening Values (ESVs) document was developed by the Argonne National Laboratories, in coordination and consultation with an Interagency Team of subject-matter experts from across the Department of Defense (DoD) services through the DoD Tri-Services Environmental Risk Assessment Work Group. Several ecological risk assessors and environmental scientists from the EPA Ecological Risk Assessment Forum and program offices provided technical input and advice throughout this effort.

07 Dec 2021: Deputy Assistant Secretary of the AF for Environment, Safety, and Infrastructure (SAF/IEE) releases memorandum “Update for Establishing a Consistent Methodology for the Analysis of Per- and Polyfluoroalkyl Substances in Media Other than Drinking Water”, which updates and supersedes the 22 Nov 2019 memo. Memo provides guidance on the use of Draft Method 1663 for analysis of PFAS in matrices other than drinking water. (As of 11 July, 2022, only five labs are ELAP certified for the new method).

22 Feb 2022: AFCEC/CZO releases IOI informing personnel of temporary moratorium on PFAS incineration as outlined in FY22 NDAA Subtitle D, Section 343. The prohibition of incineration applies not only to PFAS and PFAS-containing materials sent directly to an incinerator, but also to AFFF and PFAS materials sent to other entities, including any waste processing facility, subcontractor, or fuel blending facility, prior to incineration.

18 Mar 2022: IOI prepared by AFCEC/CZOP documenting recommendation to end water service for Moose Creek properties not submitting connection agreements is approved by AFCEC/CZ.

07 April 2022: Deputy Assistant Secretary of the AF for Environment, Safety, and Infrastructure (SAF/IEE) releases memorandum “Response and Reporting of Aqueous Film Forming Foam Usage, and Accidental Releases/Spills on Military Installations and National Guard Facilities”, which replaces and rescinds the previously adopted Assistant Secretary of Defense for Sustainment memorandum (ASD(S)) with revised guidance on reporting PFAS spills and usage.

11 April 2022: Letters notifying the three remaining property owners that have declined connecting to the CONP Water Line that water service will be terminated within 90 days are delivered via FedEx to property owners.

20 May 2022: In May 2022 EPA introduced new Screening Levels for PFOS, PFOA, PFNA, PFHxS, and HFPO-DA (GenX). The Regional Screening Levels (RSL) for PFBS, introduced in May 2021, remain unchanged.

25 May 2022: CDC and ATSDR release the PFAS exposure assessment report for Moose Creek. The full report can be found at <https://www.atsdr.cdc.gov/pfas/activities/assessments/sites/fairbanks-north-star-borough-ak.html>. The exposure assessment evaluated PFAS levels in the blood and urine of Moose Creek residents and compared them to national PFAS levels. Tap water samples from a subset of households were also analyzed for PFAS.

07 June 2022: CDC and ATSDR host a virtual information session to cover the results of the PFAS exposure assessment for the Moose Creek community.

06 July 2022: Deputy Assistant Secretary of the AF for Environment, Safety, and Infrastructure (SAF/IEE) releases memorandum “Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program” to provide clarifying technical guidance on the investigation of PFOS, PFOA, PFBS, PFNA, PFHxS, HFPO-DA (GenX), based upon revised 20 May 2022 EPA screening levels for these compounds.

11 July 2022: Deputy Assistant Secretary of the AF for Environment, Safety, and Infrastructure (SAF/IEE) releases memorandum “Payment of Operations and Maintenance (O&M) on DAF Installed Public Drinking Water Treatment Systems to Address Off-Base PFAS Impacts” to provide clarifying guidance on the use of O&M funds to address off-base PFAS impacts. Previously the AF could only pay capital costs, but once operational the utility would be responsible for operational costs. Now the AF is authorized to pay for the O&M of off-base public treatment systems impacted by PFAS originating on base.

Doc #	Date	Title	Doc Type:	Description	Authority
1	23 July 2014	Uniform Federal Policy (UFP) Generic Quality Assurance Project Plan (QAPP) for Site Investigations of Fire Fighting Foam Usage at Various Air Force Bases in the United States – Addendum 10 Field Sampling Plan for Eielson Air Force Base, Fairbanks, North Star Borough, Alaska (SES Construction & Fuel Services - SCF)	UFP Generic QAPP for Nationwide Site Investigation		CERCLA
2	23 Feb 2015	Final Site Investigation Report for Site Investigations of Fire Fighting Foam Usage at Various Air Force Bases in the United States for Eielson Air Force Base, Fairbanks North Star Borough, Alaska (SCF)	Final SI Report - Nationwide Study	Identified four sites exceeding PSL for PFOS/PFOA	CERCLA
3	20 Apr 2015	Perfluorinated Compounds Investigation Work Plan, Eielson AFB	PFC Sampling – Northern Boundary 2015	Sampling of Northern Boundary to ascertain likelihood of off-site migration	CERCLA
4	27 May 2015	Addendum #1 to the Final Perfluorinated Compounds Investigations Work Plan (Jacobs)	Addendum #1	Initial sampling of private water supplies in Moose Creek	CERCLA
5	28 July 2015	Final Addendum #2 to the Final PFC Investigations Work Plan, Eielson AFB, AK, Perfluorinated compounds (PFCs) Moose Creek Area Drinking Water Sampling (EA)	Addendum #2	Continued sampling of residential wells	CERCLA
6	25 Aug 2015	Addendum #3 to the Final Perfluorinated Compounds Investigations Work Plan (Jacobs)	Addendum #3	Flood plain monitoring well in North Pole, 2 BG wells west of Richardson Hwy, Cooling Water supply wells at Power Plant, & 2 surface H2O Piledriver Slough	CERCLA
7	20 Oct 2015	Final Moose Creek Water Treatment Work Plan Eielson Air Force Base, AK (EA)	Treatment System WP	Treatment system/storage installations & confirmation testing	CERCLA
8	15 Dec 2015	Final Preliminary Assessment Report for Perfluorinated Compounds at Eielson Air Force Base (HydroGeoLogic, Inc.)	PA - Nationwide Study	Eielson's component of the nationwide PA	CERCLA
9	6 May 2016	Action Memorandum for a Time-Critical Removal Action of PFC-Contaminated Water at Moose Creek, Alaska	TCRA Action Memo	TCRA implements emergency response action at Moose Creek	CERCLA
10	8 July 2016	Final Work Plan for Perfluorinated Compounds (PFCs) Site Inspections at Eielson Air Force Base, Alaska (CH2M)	SI – Nationwide Inspection		CERCLA

11	3 Nov 2016	Subsurface Investigation at Moose Creek Apartments Moose Creek Area Inspections, Sampling & Analysis, Treatment, and Construction. Moose Creek, Alaska	Technical Memorandum	Vertical extent of PFC contaminated GW at Moose Creek Apartments	CERCLA
12	15 Jan 2017	2015-2016 Field Activities Report For Four Areas: Transmitter Road, Community of Moose Creek, Western Are and Chena Floodplain	Summary of PFC field activities in 2015 and 2016.		CERCLA
13	9 May 2017	Foundation Characterization Report, Version 3.0, Eielson Air Force Base GAC, Eielson Air Force Base, Alaska	Construction Report	Characterizes area subject to removal for WTP TCRA	CERCLA
14	Jun 2017	Sampling and Analysis Plan for Excavation and Removal of Contaminated Soil, Eielson Air Force Base GAC, Eielson Air Force Base, Alaska (June, 2017)	SAP for TCRA at Water Treatment Plan	SAP for WTP TCRA	CERCLA
15	Sep 2017	Interim Removal Action Report Version 1.0, Eielson Air Force Base GAC, Eielson Air Force Base, Alaska (August, 2017)	Report for TCRA at Water Treatment Plan		CERCLA
16	Oct 2017	Final Moose Creek Surface and Sediment Sampling Work Plan – Addendum 5	Addendum 5 to the Perfluorinated Compounds Investigation Work Plan		CERCLA
17	3 Nov 2017	Final Interim Feasibility Study for Community of Moose Creek, Alaska, Long-Term Drinking Water Supply	Interim Feasibility Study	Identifies seven alternatives.	CERCLA
18	31 May 2018	Final Interim Proposed Plan for Long-Term Water Supply, Community of Moose Creek, Alaska	Proposed Plan	Identifies the Air Force’s preferred alternative.	CERCLA
19	May 2018	Final Site Inspection Report For Aqueous Film Forming Foam Areas	SI – Nationwide Inspection		CERCLA
20	13 Sep 2018	Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water	Technical Memorandum	Establishes action levels for PFAS compounds in water sources	ADEC
21	Oct 2018	Final Perfluorinated Compounds Eielson –Moose Creek Quality Assurance Project Plan, Eielson AFB, Alaska	UFP-QAPP	Comprehensive work plan for sampling PFAS in Moose Creek and Eielson	CERCLA
22	7 May 2019	Draft Expanded Perfluorooctanoic Acid (PFOA) And Perfluorooctanesulfonic Acid (PFOS) Site Inspection At Eielson Air Force Base And Moose Creek, Alaska	UFP QAPP	Purpose is to delineate extent of PFOS/PFOA groundwater plume in Moose Creek and Eielson AFB	CERCLA
23	10 Jun 2019	Final Interim Record of Decision for Community of Moose Creek, Alaska, Long-term Water Supply.	Interim Record of Decision	Documents selected remedy for water supply at Moose Creek	CERCLA
24	23 Jul 2019	Existing Monitoring Well Sampling Work Plan Supplemental PFOA and PFOS Site Inspection at Eielson AFB, Alaska (Abbreviated Work Plan for Expanded SI)	Work Plan	Abbreviated Work Plan to sample existing wells.	CERCLA

25	27 Sept 2019	<i>Final Expanded Perfluorooctanoic Acid (PFOA) And Perfluorooctanesulfonic Acid (PFOS) Site Inspection UFP-QAPP Work Plan At Eielson Air Force Base And Moose Creek, Alaska</i>	UFP QAPP	Purpose is to delineate extent of PFOS/PFOA groundwater plume in Moose Creek and Eielson AFB	CERCLA
26	10 Apr 2020	<i>Birch Lake Surface Water, Sediment, and Soil Sampling Final Addendum to the Work Plan for Expanded PFOA and PFOS Site Investigation, Eielson Air Force Base (AFB), Alaska</i>	Work Plan Addendum	Purpose is to delineate source of PFOA in well water	CERCLA
27	10 Apr 2020	<i>Eielson Surface Water and Sediment Sampling Final Addendum to the Work Plan for Expanded PFOA and PFOS Site Investigation, Eielson Air Force Base (AFB), Alaska</i>	Work Plan Addendum	Purpose is to delineate PFOS/PFOA contamination in surface water/ sediments in and around Eielson AFB	CERCLA
28	18 May 2020	<i>Full approval for the Remedial Action Work Plan for the Moose Creek Water Expansion Project granted by ADEC and EPA, facilitating construction work to begin inside the CERCLA area.</i>	Remedial Action Work Plan	Comprehensive work plan to meet interim remedy of supplying clean drinking water to Moose Creek residents.	CERCLA
29	2 Oct 2020	<i>Quality Assurance Project Plan Addendum for Remedial Investigation for PFAS at Various Sites – Initial Groundwater Sampling to the Final 2019 UFP-QAPP Work Plan, Expanded PFOA and PFOS Site Inspection, Eielson Air Force Base and Moose Creek, Alaska</i>	Work Plan Addendum	Purpose is to collect groundwater samples from 50 existing wells to further refine the plume and CSM prior to completing the PFAS RI Work Plan	CERCLA
30	17 Feb 2021	<i>Moose Creek Newsletter Information</i>	Newsletter	Purpose was to educate Moose Creek property owners on the roles of the different agencies involved in the CERCLA response efforts for Moose Creek, and to provide POCs for the various agencies so that property owners know whom to reach out to with specific questions.	CERCLA
31	21 May 2021	<i>Full approval for Appendix D (Environmental Covenant) of the Remedial Action Work Plan for the Moose Creek Water Expansion Project granted by ADEC and EPA.</i>	Remedial Action Work Plan	Full approval for the Moose Creek Remedial Action Work Plan on 18 May 2020 was based upon a draft version of Appendix D (Environmental Covenant) included as part of the work plan; as full approval for the final Environmental Covenant was a year later; this	CERCLA

				document serves as a stand-alone document to the Moose Creek RAWP.	
32	11 Jun 2021	Quality Assurance Project Plan for Remedial Investigation for PFAS at Various Sites	UFP QAPP	Perform flux-based RI at 13 validated sites and two sub-sites on Eielson to evaluate source strengths; transects are being installed on and off base to evaluate plume characteristics and flux.	CERCLA
33	16 Jun 2021	2021 Quality Assurance Project Plan (QAPP) Addendum Perfluorinated Compounds Eielson-Moose Creek Eielson Air Force Base (AFB), Alaska	UFP QAPP Addendum	Collect samples from 40 Wells located in the middle of the plume and along the periphery to evaluate plume stability.	CERCLA
34	14 Jul 2021	Technical Memorandum for Birch Lake U.S. Air Force Recreation Area, Alaska Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutanesulfonic Acid (PFBS) 2021 Quality Assurance Project Plan (QAPP) Addendum - Perfluorinated Compounds Eielson-Moose Creek Eielson Air Force Base (AFB), Alaska	Technical Memorandum	Summarizes SI results at Birch Lake. The source of PFOA contamination in well water was not identified.	CERCLA

Appendix C:

Critical Water Management Area

Page intentionally left blank.



MEMORANDUM

STATE OF ALASKA

Department of Natural Resources, Office of the Commissioner

DATE: April 9, 2021

TO: Department Order files and Division of Mining, Land, and Water

FROM: Corri A. Feige, Commissioner

RE: Department Order #153- Critical Water Management Area Designation, Community of Moose Creek

PURPOSE OF ORDER

In accordance with AS 46.15.020, 11 AAC 93.500 and 11 AAC 93.520 – .530, and at the request of the United States Air Force (USAF) the undersigned Commissioner of the Department of Natural Resources (DNR) hereby designates the area generally described as the community of Moose Creek, Alaska as a Critical Water Management Area (CWMA) with respect to groundwater. Pursuant to the same statute and regulations, the Commissioner additionally designates the same area as a CWMA with respect to surface water. The USAF's November 26, 2019 request letter is Attachment A to DNR's Decision in Support of CWMA Order (Decision). The Decision and all attachments can be accessed on DNR's website at <http://dnr.alaska.gov/mlw/water/cwma> or by contacting DNR at 550 W. 7th Ave, Suite 1020, Anchorage, AK 99501-3557.

This CWMA designation enables DNR to impose restrictions and take other action necessary to protect public health, safety and welfare in response to contamination migrating from Eielson Air Force Base (EAFB) into the waters within the CWMA. The contamination has rendered the waters unsafe for human consumption and household use (cooking, cleaning, bathing, washing) at all times of the year. The continued outdoor use of water (gardening, car washing, and other outdoor activities) could contribute to the further spread and discharge of contamination.

Consistent with 11 AAC 93.530, this CWMA designation restricts future water appropriations and pending applications for water rights within the CWMA. This designation does not affect water uses already established under a valid permit or certificate however, a property owner within the CWMA who continues to use water subject to a valid permit or certificate does so at the risk of exposure to or spreading of harmful contamination as described in this Order.

LEGAL DESCRIPTION

The CWMA is located as follows:

A critical water management area known as Moose Creek, located near North Pole, Alaska, and more particularly described as follows:

Township 2 South, Range 2 East, Fairbanks Meridian

Section 23: That portion of the E1/2 located Southerly of the ordinary high-water line on the Southerly bank of Chena Slough and Southeasterly of the Southerly railroad right-of-way line;

Section 24: E1/2,

That portion of the W1/2 located Southerly and Easterly of the following described line:

Beginning at the intersection of the west boundary of Section 24 with the ordinary high-water line on the Southerly bank of Chena Slough; thence Easterly along the ordinary high-water line on the Southerly bank of Chena Slough to its intersection with the Southerly railroad right-of-way line; thence Southeasterly along the Southerly railroad right-of-way line to its intersection with the Northwesterly edge of the Chena River Lakes Flood Control Dike; thence Northeasterly along the Northwesterly edge of the Chena River Lakes Flood Control Dike to its intersection with the Southwesterly right-of-way line of the Richardson Highway; thence Northwesterly along the Southwesterly right-of-way line of the Richardson Highway to the Northwest corner of Fairbanks North Star Borough (FNSB) Tax Lot TL-2429, identical with the Northeast corner of Tax Lot TL-2423 as shown in the FNSB GIS, and described in Document No. 2017-018002-0, Fairbanks Recording District; thence Northeasterly across the right-of-way of the Richardson Highway to the former Southwest corner of Lot 10, Block A, Easy Living Estates Phase Three Subdivision, Plat No. 2002-45 Fairbanks Recording District (FRD), which is now a corner on the Southerly boundary of Lot 10A, Block A, Easy Living Estates Phase Three, as shown on Plat No. 2007-26 FRD; thence Easterly along the Southerly boundaries of Lots 10A, 11, 13, 14, and 15, Block A, Easy Living Estates Phase Three Subdivision, to the Southeast corner of Lot 15, Block A, Easy Living Estates Phase Three Subdivision; thence Easterly along the Southerly boundary of Tax Lot 2413 as shown in the FNSB GIS to the North-South centerline of Section 24.

Section 25: All;

Section 26: That portion located Easterly of the ordinary high-water line on the right bank of the Tanana River;

Section 27: That portion of the SE1/4 located Easterly of the ordinary high-water line on the right bank of the Tanana River.

Township 2 South, Range 3 East, Fairbanks Meridian

Sections 19, 20, 21, 28, 29, and 30: All;

Section 22: W1/2, W1/2E1/2;

Section 27: W1/2.

This CWMA will be recorded in the Fairbanks Recorder's Office on properties within the CWMA boundaries. A map of the CWMA boundaries is Attachment B to the Decision.

DISCUSSION

Water quality monitoring performed by USAF has established that the subject waterbodies have been contaminated with per- and polyfluoroalkyl substances (PFAS), which consist of perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). Within the CWMA boundaries, PFOS and PFOA are present at levels above the U.S. Environmental Protection Agency (EPA) lifetime combined health advisory level of 70 parts per trillion. The use of the contaminated water would likely negatively affect human health, spread contamination, and threaten the public interest. The Decision further describes the threat posed by the contamination identified within proposed CWMA boundaries, and the reasons for this CWMA designation.

ORDER DETAILS

Pursuant to 11 AAC 93.500 and 11 AAC 93.520 – .530, Corri A. Feige, Commissioner of the Department of Natural Resources, hereby designates the area described above as a CWMA with respect to groundwater and surface water. This Order:

1. Applies to the groundwater and surface water within the specified area.
2. Restricts the acceptance of new water right and temporary water use authorization (TWUA) applications within the specified area as follows:
 - a. Effective 45-days after this order is signed, DNR will no longer accept new water right applications. Applications received prior to the 45-day deadline will not be adjudicated unless and until DNR revokes or amends this CWMA designation.
 - b. Effective 45-days after this order is signed, DNR will no longer accept and adjudicate new TWUA applications, except for those that seek to use water for necessary water quality monitoring, mitigation, construction dewatering, and related activities. Applications received prior to the 45-day deadline that seek to use water for purposes other than water quality monitoring, mitigation, construction dewatering, and related activities will not be adjudicated unless and until DNR revokes or amends this CWMA designation.
3. With respect to applications already accepted but not adjudicated as of the date this Order is signed, restricts the establishment of new water rights or other uses to those seeking to use water for purposes other than necessary water quality monitoring, mitigation, construction dewatering, and related activities.

4. Designates all water use quantities within the CWMA boundaries as “significant use” under 11 AAC 93.530(b)(4) and 11 AAC 93.035(b)(4), subject to the following conditions:
 - a. This “significant use” designation will take effect immediately upon the first publication and mailing of this Order in accordance with 11 AAC 93.530(a) and (b).
 - b. This significant use designation is necessary to put the public on immediate notice that all users (regardless of water volume) not already holding valid water use permits or certificates will be required to apply under 11 AAC 93.035. DNR will only accept and adjudicate applications as described in Section 2.
5. Creates the following temporary exemptions for property owners using government-furnished filtration systems while awaiting connection to the City of North Pole’s Water Utility System (CONP Water).

A property owner within the CWMA who:

- a. currently uses a government-furnished filtration system to treat contaminated well or surface water, and
 - b. has agreed to accept CONP Water, and
 - c. has signed an Environmental Covenant pursuant to AS 46.04.300 – 46.04.390, and
 - d. has (if applicable) agreed to relinquish any valid water right permits or certificates held pursuant to 11 AAC 93.120 or .130, may continue to use water for purposes and quantities consistent with the owner’s current use until the CONP Water connection is available to the property owner.
6. Advises that anyone using water within this designated area without a valid permit, certificate of appropriation, or authorization may be subject to prosecution under AS 46.15.180. If necessary DNR may pursue enforcement under AS 46.15.255 and 11 AAC 93.270 – 290.
 7. Allows the Department of Natural Resources to establish additional conditions on diversions, withdrawals, or uses of water to insure against the further deterioration of water resources or spread of contamination.

Pursuant to 11 AAC 93.920(b), the emergency use of water for protection of life or property is exempt from this Order unless DNR determines that the use should be regulated in the public interest.

Pursuant to 11 AAC 93.540 and 11 AAC 02.010, a person affected by this Order or the Decision in Support of this Order may request reconsideration. Pursuant to 11 AAC 02.040, requests for reconsideration must be received by the Commissioner’s office within 20 calendar days after the issuance of this Order and the Decision. Requests for reconsideration may be mailed or delivered to the Commissioner, Department of Natural Resources, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska,

99501; faxed to 907-269-8918, or sent by electronic mail to dnr.appeals@alaska.gov. If no request for reconsideration is filed by the deadline, this Order and the Decision become a final administrative order and decision of DNR on the 31st calendar day after issuance. An eligible person must first request reconsideration in accordance with 11 AAC 02 before appealing to superior court. A copy of 11 AAC 02 may be obtained from any regional information office of DNR.



Corri A. Feige
Commissioner, Department of Natural Resources

May 24, 2021

Date

Alaska Department of Natural Resources
Division of Mining Land and Water
Water Resources Section
550 W. 7th Avenue, Suite 1020
Anchorage, Alaska 99501

CRITICAL WATER MANAGEMENT AREA
MOOSE CREEK, ALASKA

DECISION IN SUPPORT OF CWMA ORDER

Background

On November 26, 2019, the United States Air Force (USAF) petitioned the Department of Natural Resources (DNR) to initiate proceedings to designate a Critical Water Management Area (CWMA) under 11 AAC 93.500(2) for the geographic and hydrologic area underlying the community of Moose Creek, Alaska. Attachment A. USAF amended the petition on February 19, 2020 by submitting a map that would expand the CWMA boundary based on further groundwater sampling results.¹

USAF submitted the CWMA petition in response to perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) contamination in the groundwater underlying the community of Moose Creek. USAF attributes the contamination to releases on Eielson Air Force Base (EAFB) that migrated off base to the community of Moose Creek. In January 2015, EPA requested that EAFB test the drinking water wells on base to determine if contamination was present. The requested sampling confirmed contamination of drinking water wells on base. In April 2015, USAF tested groundwater beyond the northwestern boundary of the base and identified contamination in private, off base water wells. Subsequent testing in the summer of 2020 found that surface water throughout the area was contaminated with PFOS and PFOA as well.² The surface water contamination was expected because the depth to groundwater in and around the community of Moose Creek is between 0 feet and 10 feet below ground surface (bgs), with very permeable soils consisting primarily of gravely sands and sandy gravels.³

PFOS and PFOA are fluorinated organic chemicals that are part of a larger group of chemicals referred to as perfluoroalkyl substances (PFAS). Studies indicate that PFAS can cause reproductive and developmental, liver and kidney, and immunological effects and tumors in laboratory animals.⁴ Studies also demonstrate that in humans, PFAS can cause increased cholesterol levels, low infant birth weights, effects on the immune system, cancer, and thyroid hormone disruption.⁵ The United States Environmental Protection Agency (EPA) has set the human lifetime health advisory (HA) level for PFAS

¹ That map, which is included in Attachment A, became the basis for the map of the of the CWMA boundaries shown in Attachment B.

² Boese, Michael. 2020. Air Force Civil Engineer Center, Expanded SI Update (PowerPoint). Presented August 25, 2020, Eielson RPM meeting.

³ Sundance-EA II, LLC. 2019. Expanded Perfluorooctanoic (PFOA) Acid and Perfluorooctane Sulfonate (PFOS) Site Inspection, Eielson Air Force Base and Moose Creek, Alaska, Uniform Federal Policy-Quality Assurance Project Plan Work Plan. Prepared for AFCEC CZOP. October 2019. Page 29.

⁴ <https://www.epa.gov/pfas/basic-information-pfas#health>

⁵ <https://www.epa.gov/pfas/basic-information-pfas#health>

exposure from drinking water at 70 parts per trillion (0.07µg/L).⁶ EAFB’s testing has found PFAS contamination above the EPA lifetime HA in 173 private wells and surface water sources within the community of Moose Creek.⁷ Of the contaminated wells, 29 are authorized by water right certificates. This accounts for 100% of the water right certificates within the proposed CWMA.

USAF’s CWMA petition asked DNR to impose restrictions on the use of groundwater below and surrounding the community of Moose Creek, Alaska. The petition requests DNR take the following actions in designating a CWMA: 1) prevent the use of groundwater; 2) designate all uses of water as significant, effectively setting the significant use of water quantity at 0 gallons per day; and 3) immediately deny the acceptance of any new appropriations or application for additional quantities for existing appropriators of record. Due to the direct hydraulic continuity between ground and surface water in this area and the subsequent contamination of surface water, DNR is considering surface water as part of this petition, which has been discussed and agreed to by the petitioner. The objective of this request is to cut off exposure pathways to PFAS to protect human health, safety, and welfare. Including surface water will further this objective.

USAF’s Interim Record of Decision (IROD) for Community of Moose Creek, Alaska Long-Term Water Supply was provided to DNR with the CWMA petition. This document outlines the additional actions that USAF is undertaking to ensure that human health, safety, and welfare are protected. These actions include providing access to the City of North Pole water service, well decommissioning, and other land use controls.

Statutory/Regulatory Authority to Designate CWMA

Under Alaska’s Water Use Act, specifically AS 46.15.020(a), DNR’s Commissioner “shall exercise all those powers and do all those acts necessary to carry out the provisions and objectives of this chapter.” Pursuant to 46.15.020(b)(3), the Commissioner shall cooperate with, assist, advise, and coordinate plans with federal, state, and local agencies in matters relating to the appropriation, use, conservation, quality, disposal, or control of waters of the state.

The Commissioner’s authority to designate CWMAs under the Water Use Act is described in the Alaska Administrative Code, 11 AAC 93.500 – 11 AAC 93.530. Pursuant to 11 AAC 93.500(2), the Commissioner will, in his or her discretion, initiate proceedings to designate a particular geographic or hydrologic area, including surface and groundwater, as a CWMA where:

an agency or political subdivision of the state, or an agency of the United States, petitions for the designation of the area as a critical water management area and demonstrates that a condition in (1) of this section exists.⁸

11 AAC 93.500(1) describes the conditions that may warrant the Commissioner’s establishment of a CWMA. These conditions include “an imminent water shortage...affecting a substantial number of permittees or certificate holders of record so that their ability to reasonably acquire water has been or will be affected by... and “chemical or toxic contamination rendering the water source and usable.” The

⁶ EPA. 2016. Fact Sheet PFOA & PFOS Drinking Water Health Advisories. EPA800-F-16-003

⁷ USAF.2019. Interim Record of Decision for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-2.

⁸ 11 AAC 93.500(3) describes a third circumstance where the Commissioner may initiate proceedings to designate a CWMA, however that provision does not apply here.

USAF, which is an agency of the United States, made a petition under 11 AAC 93.500(2). The criteria under 11 AAC 93.500(1) are met because: 1) chemical or toxic contamination has rendered the water source unusable, and 2) a substantial number of permittees or certificate holders of record are affected by this contamination.

The fact that either a water shortage or chemical or toxic contamination, in combination or separately, may warrant a CWMA designation upon government agency petition is reflected in 11 AAC 93.520(3), which directs the Commissioner to “predict the likelihood of an imminent or continued water shortage or contamination problem”. The DNR Commissioner has relied upon AS 46.15.020(a) and AS 46.15.020(b)(3), and has applied 11 AAC 93.500 – 11 AAC 93.530, in evaluating the propriety of a CWMA designation to restrict water use in the Moose Creek area.

The Commissioner notes that while 11 AAC 93.530(b)(1) empowers DNR to restrict or deny applications for additional quantities for existing appropriators of record, the regulations governing CWMA designations do not empower the Commissioner to reduce use quantities with respect to current uses that are subject to a valid, existing permit or certificate. This Decision and the Department Order that this Decision supports, do not impose reductions on such uses. However, a property owner within the CWMA who continues to consume or use water pursuant to a valid permit or certificate, does so at the risk of exposure to harmful contamination as described below.

The Commissioner is aware that USAF has agreed to compensate property owners who relinquish or abandon their existing water use permits, certificates, or applications in exchange for access to North Pole water. USAF has also agreed to compensate property owners who currently use well water without the need for a permit, and who agree to decommission their water wells and accept North Pole water. DNR understands that these actions are part of USAF’s IROD and is designed to guard against contamination exposure while maximizing protection of public health, safety, and welfare.

Public Notice and Consultation

Pursuant to 11 AAC 93.510, DNR published public notice of the proposed CWMA in the Fairbanks News Miner on June 15, June 22, June 29, and July 6, 2020. The notice included a description of the proposal and affected area, a request for comments, and the date, time, and location of a public hearing. The affidavit of publication is Attachment C to this Decision.

DNR reviewed water right records and property ownership records made available through the Fairbanks North Star Borough Assessor’s Office to notify appropriators and property owners within the proposed CWMA. Additionally, notices were sent to Department of Fish and Game, Department of Environmental Conservation (DEC), US Bureau of Land Management, the Army Corps of Engineers, USAF, and Fairbanks North Star Borough. The notices described the proposed CWMA, solicited comments, and advertised the date, time, and location of a public hearing. The notice letters were sent on June 12, 2020 via certified mail with electronic return receipts.

DNR held a public hearing on July 14, 2020 at 6:00 pm at the Hotel North Pole. The meeting included a presentation followed by a question and answer session and an opportunity to provide oral comment. Oral comments were recorded, and comment forms were also provided to collect written comments. A total of 16 individuals attended the meeting.

The comment period ended August 13, 2020. Five comments were received during the comment period. A record of comments received and DNR's responses are provided in Attachment D.

DNR Analysis of Moose Creek CWMA Petition

DNR evaluated USAF's CWMA petition. Additionally, DNR reviewed information provided in the USAF's IROD and water quality sampling data provided by the USAF. DNR's objectives were to: a) assess the USAF's characterization of the level and extent of contamination and the requested boundaries; b) evaluated the basis for the CWMA designation in accordance with 11 AAC 93.520; and c) prepare an Order that describes the conditions of the CWMA designation in accordance with 11 AAC 93.530.

A. Assessment of USAF's Characterization of Contamination Levels, Geographic Extent, and Affected Water Bodies.

The current EPA lifetime HA level for exposure to PFOS and PFOA from drinking water is 0.07µg/L. All water wells within the Moose Creek subdivision were sampled for contamination. Of those 174 wells, 170 had contamination that exceeded 0.07µg/L.⁹ Based on June 2016 data the maximum concentration levels for PFOS and PFOA within these community wells were 1.5 µg/L and 0.14 µg/L respectively.¹⁰ Sampling found contamination was present above the HA at a depth of approximately 180 feet bgs.¹¹

The contamination occurs in the alluvial aquifer below EAFB and the community of Moose Creek. The aquifer is confined on the north, east, and south by permafrost and unconfined to the west. The Tanana River lies to the southwest and the City of North Pole is northwest of the known area of contamination.

Groundwater flow within the Moose Creek and EAFB area approximates the Piledriver Slough flow direction, with water moving from the southeast to the northwest.¹² The USAF has not yet developed a fate and transport model for the Moose Creek PFAS plume, so they are unable to predict the long-term geographic extent of contamination at this time.

In addition to groundwater sampling, USAF conducted surface water sampling within the affected area during 2020 to determine if surface water has been contaminated. Preliminary results indicate that several surface waterbodies within the proposed CWMA have PFAS contamination that exceeds the lifetime HA. This was anticipated given the direct hydraulic continuity between surface and groundwater in this location.

B. Explanation of Decision to Designate CWMA:

USAF, working in conjunction with EPA and DEC, has identified chemical or toxic contamination in the form of PFOS and PFOA in the groundwater and surface water within the proposed Moose Creek CWMA. USAF has petitioned DNR to create a CWMA for groundwater. 11 AAC 93.500(2). DNR is required by law to cooperate with, assist, and coordinate plans with USAF, EPA, and DEC in matters relating to water appropriation, use, and quality. AS 46.15.020(b)(3). In this instance, cooperation, assistance, and coordination with these agencies warrant the inclusion of the Moose Creek community's

⁹ USAF.2019. IROD for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-5.

¹⁰ USAF.2019. IROD for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-5.

¹¹ USAF.2019. IROD for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-5.

¹² USAF.2019. IROD for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-5.

surface waters in the CWMA designation. The creation of the Moose Creek CWMA with respect to groundwater and surface water is appropriate under the circumstances.

Pursuant to 11 AAC 93.520(1), the Commissioner’s decision to designate a CWMA will, as appropriate, “state the reasons for the designation...”

- As previously explained in this Decision, the purpose for the Moose Creek CWMA is to protect public health, safety and welfare, by placing restrictions on water use contaminated by PFOS and PFOA. This contamination exceeds lifetime HA levels set by the EPA, and ingestion of and exposure to this water could negatively affect the health of those exposed. Designation of the CWMA would limit ingestion of and exposure to these chemicals.
- The contamination has rendered the water source unusable. The water within the proposed CWMA boundary is unsafe to drink or use for household use. This water is also unsuitable for land application or other uses that could lead to contact with the soil because of the risk of spreading the contamination.
- All permittees and certificate holders of record within the proposed boundary are affected by this contamination, as well as 141 well owners that use water without a permit or certificate.
- USAF will supply an alternate source of water to impacted water users.
- Although the USAF’s application specifies groundwater, surface water contamination in the proposed CWMA, identified by USAF in 2020 shows the need to include surface waters in the Moose Creek CWMA designation. The inclusion of surface waters in the designation will enhance cooperation between DNR, DEC, USAF, and EPA with respect to ongoing monitoring, testing, and characterization.

Pursuant to 11 AAC 93.520(2), the Commissioner’s decision will, as appropriate, “define the boundaries of the area...”

- The CWMA boundaries are defined in Attachment B, the map of the CWMA. Attachment B is based on the map that USAF submitted to DNR in support of its CWMA petition amendment on February 19, 2020, included in Attachment A.
- Utilizing Attachment A, DNR has verified the legal description of the CWMA boundaries. The legal description is included in the CWMA order.

Under 11 AAC 93.520(3), the Commissioner’s Decision will, as appropriate, predict the likelihood of an “imminent or continued... contamination problem.”

- The USAF’s CWMA petition, IROD, and water quality sampling data, discussed above, indicate a present and imminent danger caused by water contamination. The data demonstrate that the hazard will not abate or be otherwise resolved anytime in the foreseeable future.
- PFASs are persistent chemicals, which do not readily break down in the environment. While USAF is developing a long-term remediation plan under CERCLA, contamination will likely persist in the waters within the proposed CWMA for the foreseeable future.

Under 11 AAC 93.520(4), the Commissioner’s decision to designate a CWMA will, as appropriate, “state how additional appropriations would affect the rights of permittees or certificate holders of record, or the public interest under AS 46.15.080.”

- The proposed CWMA will prohibit, rather than create, additional water use permits and certificates. The objective is to restrict the use of contaminated water.
- Because the CWMA designation will prohibit the issuance of new water use permits and certificates, a public interest determination of the type described in AS 46.15.080 is not appropriate to this Decision. Nevertheless, the Commissioner notes that, as described above, the CWMA will benefit the public by protecting public health and preventing the further spread of contamination.

Under 11 AAC 93.520(5), the Commissioner’s decision to designate a CWMA will, as appropriate, “state whether, after a specific date, applications for water rights will be accepted or adjudicated.

- Because of the persistence of these chemicals in the environment, DNR is unable to determine a specific date that applications will be accepted or adjudicated.
- The efforts to investigate and cleanup PFAS contamination at EAFB will be overseen by EPA and DEC under CERCLA. The CERCLA process will ensure long-term clean-up. However, the timeline for clean-up of source sites has not been identified at this time, nor has the impact of this clean-up on water quality.
- The CWMA will remain in effect until contamination is reduced to an acceptable level under EPA lifetime HA or as determined by the State of Alaska.

Moose Creek CWMA Petition Decision

Findings of Fact: The groundwater under and the surface water within the community of Moose Creek is contaminated with PFOS and PFOA at levels that exceed the EPA lifetime HA. Use of this water would likely contribute to the spread of contamination and could negatively affect public health. The designation of a CWMA is in the public interest. The requirements in accordance with 11 AAC 93.500 – 11 AAC 93.530 have been followed in order to designate the CWMA proposed in USAF’s petition.

Decision: DNR hereby determines that the area generally described as Moose Creek, Alaska is a CWMA.

The boundaries of the CWMA are described as a critical water management area known as Moose Creek, located near North Pole, Alaska, and more particularly described as follows:

Township 2 South, Range 2 East, Fairbanks Meridian

Section 23: That portion of the E1/2 located Southerly of the ordinary high-water line on the Southerly bank of Chena Slough and Southeasterly of the Southerly railroad right-of-way line;

Section 24: E1/2,

That portion of the W1/2 located Southerly and Easterly of the following described line:

Beginning at the intersection of the west boundary of Section 24 with the ordinary high-water line on the Southerly bank of Chena Slough; thence Easterly along the ordinary high-water line on the Southerly bank of Chena Slough to its intersection with the Southerly railroad right-of-way line; thence Southeasterly along the Southerly railroad right-of-way line to its intersection with the Northwesterly edge of the Chena River Lakes Flood Control Dike; thence Northeasterly along the Northwesterly edge of the Chena River Lakes Flood Control Dike to its intersection with the Southwesterly right-of-way line of the Richardson Highway; thence

Northwesterly along the Southwesterly right-of-way line of the Richardson Highway to the Northwest corner of Fairbanks North Star Borough (FNSB) Tax Lot TL-2429, identical with the Northeast corner of Tax Lot TL-2423 as shown in the FNSB GIS, and described in Document No. 2017-018002-0, Fairbanks Recording District; thence Northeasterly across the right-of-way of the Richardson Highway to the former Southwest corner of Lot 10, Block A, Easy Living Estates Phase Three Subdivision, Plat No. 2002-45 Fairbanks Recording District (FRD), which is now a corner on the Southerly boundary of Lot 10A, Block A, Easy Living Estates Phase Three, as shown on Plat No. 2007-26 FRD; thence Easterly along the Southerly boundaries of Lots 10A, 11, 13, 14, and 15, Block A, Easy Living Estates Phase Three Subdivision, to the Southeast corner of Lot 15, Block A, Easy Living Estates Phase Three Subdivision; thence Easterly along the Southerly boundary of Tax Lot 2413 as shown in the FNSB GIS to the North-South centerline of Section 24.

Section 25: All;

Section 26: That portion located Easterly of the ordinary high-water line on the right bank of the Tanana River;

Section 27: That portion of the SE1/4 located Easterly of the ordinary high-water line on the right bank of the Tanana River.

Township 2 South, Range 3 East, Fairbanks Meridian

Sections 19, 20, 21, 28, 29, and 30: All;

Section 22: W1/2, W1/2E1/2;

Section 27: W1/2.

A map is provided in Attachment B.

Pursuant to Chapter 46.15.020 Alaska Statutes and 11 AAC 93.520, DNR should designate this area as a Critical Water Management Area with respect to groundwater and surface water within the above described boundary.




May 24, 2021

Tom Barrett, Chief of Water Resources

Date

Approved by:



May 24, 2021

Corri A. Feige, Commissioner of Department of Natural Resources

Date

Alaska Department of Natural Resources
Division of Mining Land and Water
Water Resources Section
550 W. 7th Avenue, Suite 1020
Anchorage, Alaska 99501

CRITICAL WATER MANAGEMENT AREA
MOOSE CREEK, ALASKA

CWMA Petition,
Boundary Map (11/27/2019), and
Revision Boundary Map (2/19/2020)
Attachment A



DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

NOV 26 2019

Mr. Jeffery P. Domm
Director, Environmental Management
Air Force Civil Engineer Center
2261 Hughes Ave, Ste 155
Lackland AFB TX 78236-9853

Commissioner Corri A. Feige
Department of Natural Resources
550 W. 7th Avenue, Suite 1400
Anchorage AK 99501

SUBJECT: Petition to Initiate Proceedings to Designate a Critical Water Management Area (CWMA), at Moose Creek, Alaska

Dear Commissioner Feige,

The United States Air Force (USAF) hereby requests the Department of Natural Resources to initiate proceedings to designate and enforce a critical water management area (CWMA) under 11 AAC 93.500(2) for the geographic or hydrologic area underlying the community of Moose Creek, AK.

The Moose Creek area is situated adjacent to the northern boundary of Eielson Air Force Base (EAFB), which is included in the Superfund Enterprise Management System (SEMS) under U.S. Environmental Protection Agency (EPA) Identification Number AK1570028646. Per- and polyfluoroalkyl substances (PFAS), perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) attributed to releases from sources within EAFB have migrated off base to the community of Moose Creek and have impacted private groundwater wells within the community. The PFOS and PFOA are chemicals of concern that pose a human health concern such that there exists an imminent water shortage in the area affecting approximately 600 residents and 24 permittees or certificate holders of record so that their ability to reasonably acquire potable drinking water has been affected.

The USAF, in conjunction with the United States Environmental Protection Agency (EPA) and the Alaska Department of Environmental Conservation (ADEC), have selected a long-term solution that provides safe, potable drinking water to the community of Moose Creek. The selected remedy is documented in the Final Interim Record of Decision (June 2019) and is included as Attachment 1 to this request.

The following are the major components of the selected remedy:

- A new water main will be installed to connect the City of North Pole Water Treatment Plant 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.
- Land use controls (LUCs) are required to prohibit the use of contaminated groundwater. The USAF shall petition the AK DNR to designate a CWMA to prevent the use of contaminated groundwater. Also, environmental covenants will be established and recorded with all impacted real properties in accordance with the Alaska Uniform Environmental Covenants Act (UECA) to prohibit current and future use of the contaminated groundwater.

The preliminary proposed boundary for the CWMA is included as Attachment 2. The USAF is conducting an Expanded Site Inspection to determine the full extent of PFOS/PFOA contaminated groundwater. And based upon the data obtained, the USAF may need to revise the preliminary boundary prior to publication of the public notice and public hearing as additional information becomes available. To prevent the use of groundwater, the USAF requests that DNR designate all uses of groundwater as significant, effectively setting a significant use of groundwater quantities at 0 gallons/day within the proposed CWMA boundary.

The USAF requests the AK DNR to immediately deny the acceptance of any new groundwater appropriations, or applications for additional quantities for existing appropriations of record.

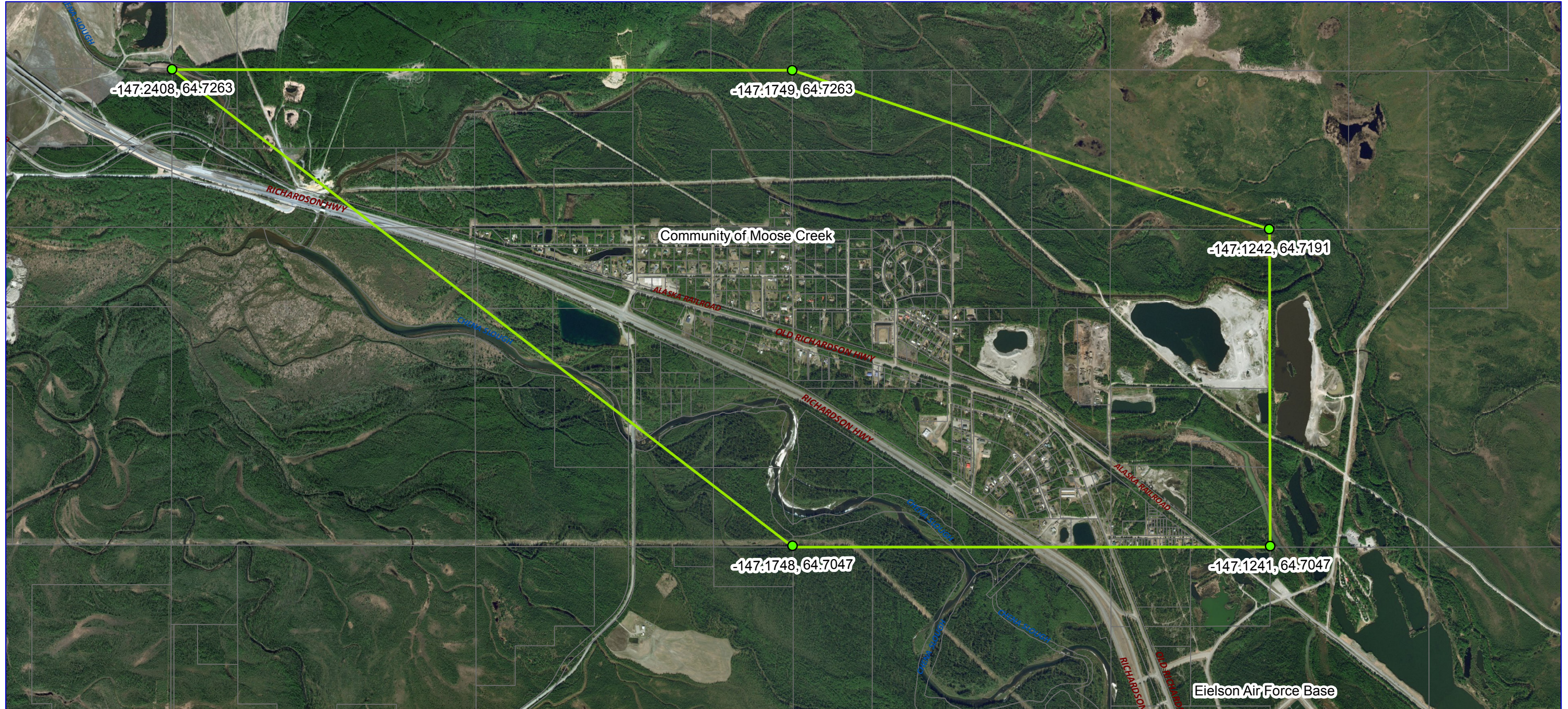
The procedural basis for establishing the CWMA as established in 11 AAC 93.500 – 11 AAC 93.520 and the rationale contained therein is included in Attachment 3.

My POC for this petition is Mr. Kevin Thomas at (907) 552-4112 or kevin.thomas.1@us.af.mil

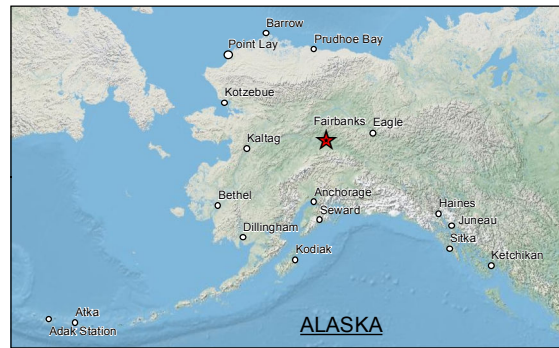

JEFFERY P. DOMM, GS-15, DAF

Attachments:

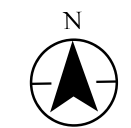
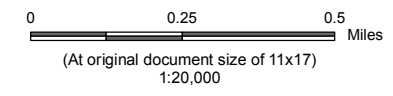
1. Interim Record of Decision for a Long-Term Drinking Water Supply for the Community of Moose Creek
2. Preliminary Boundary for the Critical Water Management Area
3. Basis of Establishment of Critical Water Management Area



Revised: 2019-10-22 By: lycoper
V:\1857\active\185751263\03_data\gis\mxd\FBX_Parcel_Map_2018_Moose_Creek.mxd



- Legend**
- Parcel Data
 - Critical Water Management Area Boundary



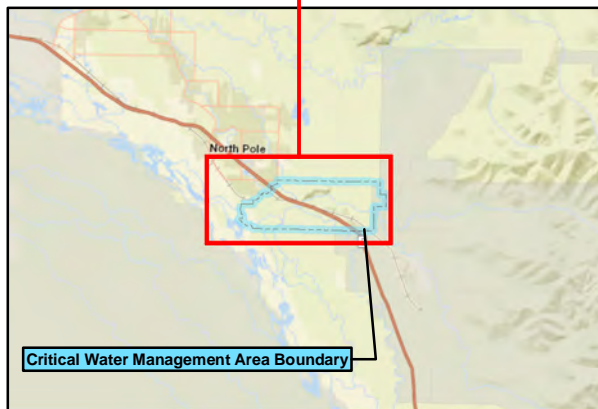
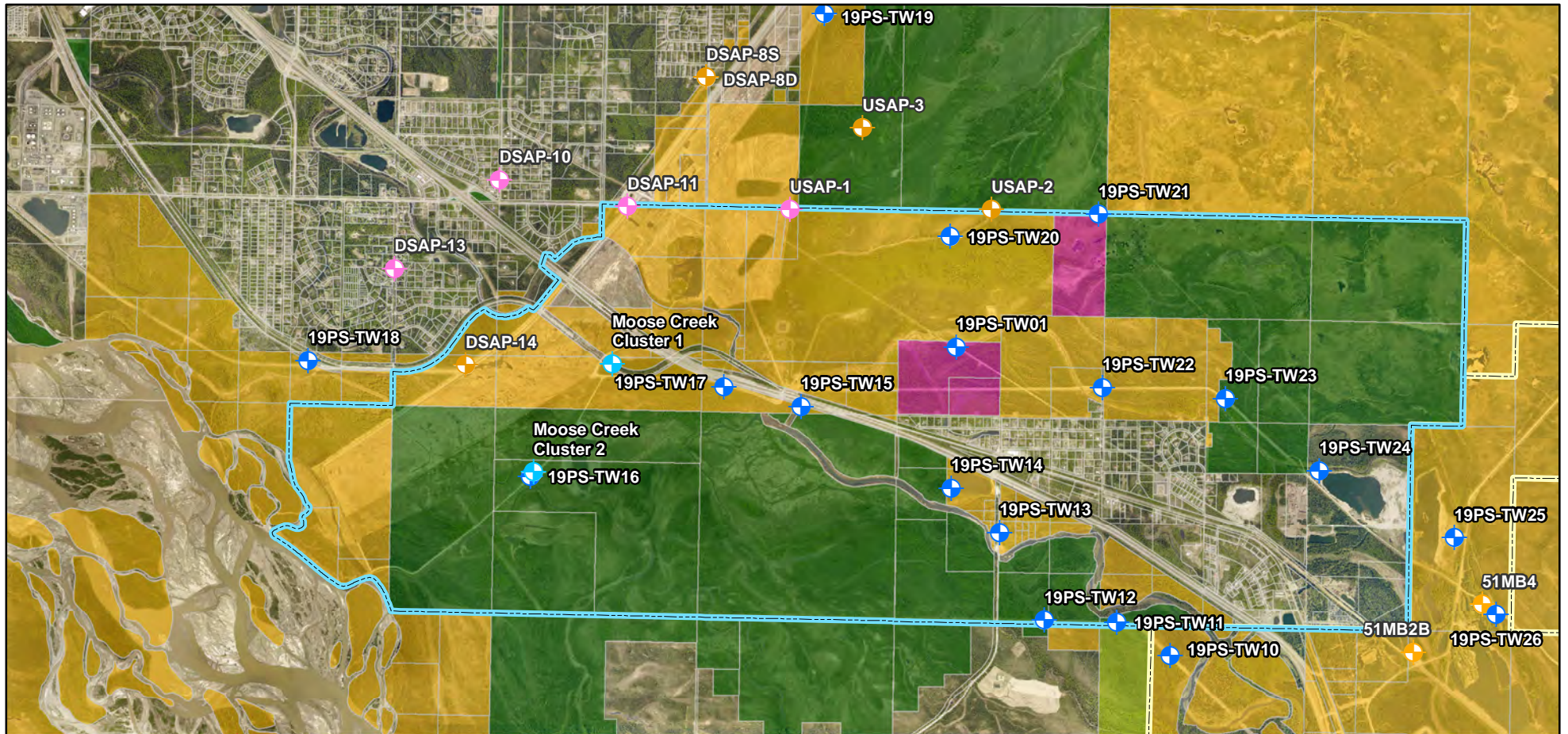
Project Location Prepared by RJC on 2019-09-30
 Township 1S, 2S Range 1E, 2E Technical Review by NR on 2019-09-30
 of Fairbanks, Alaska Meridian

Client/Project Moose Creek REVA
 Air Force Civil Engineering Center (AFCEC)
 Critical Water Management Area (CWMA) - Moose Creek

Figure No.
1

Title
Moose Creek - Critical Water Management Area (CWMA)

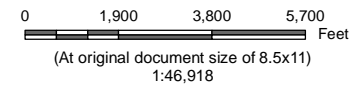
Notes
 1. Coordinate System: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
 2. Data Sources:
 3. Background: Copyright © 2013 National Geographic Society, i-cubed
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



- Proposed Well Cluster by Sundance-EA
- Proposed Temporary Well Locations
- Sampled Phase I
- Not Sampled in Phase I
- CWMA Boundary Rev. 2/18/2020
- Eielson AFB Installation Boundary
- Parcels

Ownership

- State (DNR)
- State (MHTA)
- Federal
- University of Alaska



Project
 Revised Critical Water Management
 Area (CWMA) - Moose Creek

Figure
Vicinity Map

Notes
 1. Coordinate System: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
 2. Data Sources: Fairbanks North Star Borough, AK Department of Natural Resources, USAF Wells Sampling Logs
 3. Imagery: 2017 Fairbanks North Star Borough

Alaska Department of Natural Resources
Division of Mining Land and Water
Water Resources Section
550 W. 7th Avenue, Suite 1020
Anchorage, Alaska 99501

CRITICAL WATER MANAGEMENT AREA
MOOSE CREEK, ALASKA

Map of CWMA Boundary
Attachment B

Critical Water Management Area (CWMA) Boundary

North Pole

Tanana River

Eielson AFB



Created on 5/27/2020 by M. O'Brien, ADNR/DMLW - Water Section
Source: Esri, Maxar, GeoEye,
Earthstar Geographics,

Alaska Department of Natural Resources
Division of Mining Land and Water
Water Resources Section
550 W. 7th Avenue, Suite 1020
Anchorage, Alaska 99501

CRITICAL WATER MANAGEMENT AREA
MOOSE CREEK, ALASKA

Affidavit of Publication
Attachment C

Affidavit of Publication

UNITED STATES OF AMERICA
STATE OF ALASKA
FOURTH DISTRICT

} SS.

Before me, the undersigned, a notary public, this day personally appeared, Richard Harris who, being first duly sworn, according to law, says that he is the Publisher of the Fairbanks Daily News-Miner, a newspaper (i) published in newspaper format, (ii) distributed daily more than 50 weeks per year, (iii) with a total circulation of more than 500, (iv) holding, a second class mailing permit from the United States Postal Service, (v) not published primarily to distribute advertising, (vi) not intended for a particular professional or occupational group. The advertisement which is attached is a true copy of the advertisement published in said paper on the following day(s):

06/15/2020, 06/22/2020, 06/29/2020, 07/06/2020

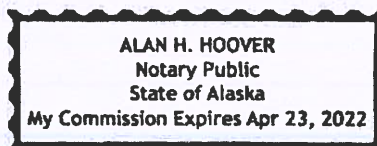
and that the rate charged thereon is not excess of the rate charged private individuals, with the usual discounts.



Publisher
Subscribed to and sworn to me this 29th day of June, 2020



Alan Hoover, Notary Public in and for the State Alaska.
My commission expires: April 23, 2022
AP106000-605500-9072698600
ST OF AK/DNR/DIV OF MINING, LAND & WATER
550 W 7TH AVE STE 1070
ANCHORAGE, AK 99501



(605500)

**Notice of Proposed Designation of Critical Water Management Area
Moose Creek, Alaska**

Please take notice that pursuant to 11 AAC 93.500(2), the United States Air Force (USAF) has petitioned the Commissioner of the Department of Natural Resources (DNR) to designate a Critical Water Management Area (CWMA) for the groundwater aquifer within the petitioned boundary lines around the community of Moose Creek, Alaska, which is located northwest of Eielson Air Force Base. Since the receipt of this petition on November 26, 2019, DNR has suspended the adjudication of water right applications for water sources within the proposed CWMA area.

The USAF's CWMA petition follows its discovery of per- and polyfluoroalkyl substances (PFAS), perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) contamination in the groundwater underlying and surrounding the community of Moose Creek, Alaska. This contamination has been found in water wells throughout the community of Moose Creek at concentration levels above the Environmental Protection Agency's (EPA) lifetime health advisory levels (HA). The consumption of water with contaminants that exceed EPA's HA for drinking water poses a risk to human health. Additionally, other water withdrawals, within the boundary line, from future or existing wells or from surface water bodies hydrologically connected with the aquifer would likely spread the contamination and increase the risk of exposure to the contamination.

Pursuant to AS 46.15 and the 11 AAC 93 regulations promulgated thereunder, notice is hereby given that DNR proposes to issue a Department Order formalizing a decision to designate a CWMA with respect to the groundwater aquifer and surface water bodies within the below described CWMA boundary. The Department Order may provide for the following actions:

1. Prohibit the acceptance of new water right applications, temporary water use applications, construction of new wells, and the issuance of new water right permits or certificates and temporary water use authorizations, and continue the suspension of application adjudication until such time as DNR revokes or amends the designation of the CWMA. The Department Order would specify when DNR will no longer accept applications for new or existing water uses, and for additional water quantities for existing appropriators.
2. Designate the use of any amount of water as significant and remove the application exemption under 11 AAC 93.035 for groundwater and surface water sources within the CWMA boundary.
3. Prosecution under AS 46.15.180 of anyone using groundwater or surface water within this designated area without a valid permit or certificate of appropriation, and immediate service of a cease and desist order pursuant to 11 AAC 93.290(a)(4), if necessary to prevent further violation, a court order would be obtained pursuant to 11 AAC 93.290 authorizing seizure or removal of structures or works of appropriation.
4. Establish additional conditions of water withdrawal, diversion, impoundment or use upon existing appropriators to protect against further deterioration of this public resource.
5. Any other action set forth in 11 AAC 93.530(b).

The legal description of the proposed CWMA boundary is:

Township 2 South, Range 2 East, Fairbanks Meridian

Section 23: That portion of the E1/2 located Southerly of the ordinary high-water line on the Southerly bank of Chena Slough and Southeasterly of the Southerly railroad right-of-way line;

Section 24: E1/2,

That portion of the W1/2 located Southerly and Easterly of the following described line:

Beginning at the intersection of the west boundary of Section 24 with the ordinary high-water line on the Southerly bank of Chena Slough; thence Easterly along the ordinary high-water line on the Southerly bank of Chena Slough to its intersection with the Southerly railroad right-of-way line; thence Southeasterly along the Southerly railroad right-of-way line to its intersection with the Northwesterly edge of the Chena River Lakes Flood Control Dike; thence Northeasterly along the Northwesterly edge of the Chena River Lakes Flood Control Dike to its intersection with the Southwesterly right-of-way line of the Richardson Highway; thence Northwesterly along the Southwesterly right-of-way line of the Richardson Highway to the Northwest corner of Fairbanks North Star Borough (FNSB) Tax Lot TL-2429, identical with the Northeast corner of Tax Lot TL-2423 as shown in the FNSB GIS, and described in Document No. 2017-018002-0, Fairbanks Recording District; thence Northeasterly across the right-of-way of the Richardson Highway to the former Southwest corner of Lot 10, Block A, Easy Living Estates Phase Three Subdivision, Plat No. 2002-45 Fairbanks Recording District (FRD), which is now a corner on the Southerly boundary of Lot 10A, Block A, Easy Living Estates Phase Three, as shown on Plat No. 2007-26 FRD; thence Easterly along the Southerly boundaries of Lots 10A, 11, 13, 14, and 15, Block A, Easy Living Estates Phase Three Subdivision, to the Southeast corner of Lot 15, Block A, Easy Living Estates Phase Three Subdivision; thence Easterly along the Southerly boundary of Tax Lot 2413 as shown in the FNSB GIS to the North-South centerline of Section 24.

Section 25: All;

Section 26: That portion located Easterly of the ordinary high-water line on the right bank of the Tanana River;

Section 27: That portion of the SE1/4 located Easterly of the ordinary high-water line on the right bank of the Tanana River.

Township 2 South, Range 3 East, Fairbanks Meridian

Sections 19, 20, 21, 28, 29, and 30: All;

Section 22: W1/2, W1/2E1/2;

Section 27: W1/2.

For a map of the proposed CWMA boundary visit <http://dnr.alaska.gov/mlw/water/CWMA> or if you have questions regarding the petition or proposed CWMA designation, please contact DNR at (907) 269-0899 or meghan.obrien2@alaska.gov.

A public meeting and hearing will be held July 14, 2020 from 6:00 pm to 8:00 pm at the Hotel North Pole Meeting Room, 449 North Santa Clause Lane, North Pole, Alaska. A presentation followed by a question and answer session will be held from 6:00 pm to 7:00 pm. Public testimony on the proposed CWMA designation will be taken from 7:00 pm to 8:00 pm. Attendance is subject to Health Mandates requirements and to Health Alerts recommendations then in effect as posted at covid19.alaska.gov.

Information presented at the public meeting will be made available on DNR's website at dnr.alaska.gov/mlw/water/CWMA.

Public comment on the proposed CWMA may be made in writing until 5:00 pm on August 13, 2020. Comments can be sent to MooseCreekCWMA@alaska.gov or DNR Water Section, 550 West 7th Ave, Suite 1020, Anchorage, Alaska 99501-3514.

DNR complies with Title II of the American with Disabilities Act of 1990. The State is prepared to accommodate individuals with disabilities by providing aids when requested. Individuals with audio impairments who wish to respond to this notice by telephone may call the DNR's Public Information Center in Anchorage between the hours of 10:00 AM and 5:00 PM, M-F at TDD # 269-8411.

DNR reserves the right to waive technical defects in this publication

Publish dates: June 15, June 22, June 29, July 6

Alaska Department of Natural Resources
Division of Mining Land and Water
Water Resources Section
550 W. 7th Avenue, Suite 1020
Anchorage, Alaska 99501

CRITICAL WATER MANAGEMENT AREA
MOOSE CREEK, ALASKA

Comments and Responses
Attachment D

Background

The proposed Critical Water Management Area (CWMA) for Moose Creek, Alaska, was noticed in the Fairbanks Daily Miner on June 15, June 22, June 29, and July 6, 2020. Notice was also sent to each property owner and appropriator of record within the proposed CWMA via certified mail with electronic return receipt. The notice included a description of the proposed designation, advertised a public meeting and hearing, and provided information on how to comment.

The public meeting and hearing was held on July 14, 2020 at Hotel North Pole meeting room, North Pole, Alaska. The purpose of the meeting and hearing was to provide information on the proposed CWMA designation and solicit comments. Sixteen members of the public attended the meeting. Two people provided comments that were recorded and transcribed by DNR. DNR provided comment cards, but no written comments were received at the meeting.

Per 11 AAC 93.510(3) the comment period was held open 30-days after the public meeting and hearing. The comment period closed on August 13, 2020 at 5:00pm. A total of five comment emails and oral comments were received during the comment period. Copies of comment emails and transcriptions of oral comments are provided in this attachment.

The following table provides a list of those who commented on the proposed Moose Creek CWMA designation, comment letter/transcription number, and the page number where the comment letter/transcription can be found. Comment letters are followed by DNR's Response to Comments (Table A2-2). Individual commenters are referred to by their initials and email addresses and mailing addresses have been block from the comment letters as a courtesy to respect commenters' privacy.

Table A2 – 1. List of Commenters

Letter/ Transcription Number	Commenter Name	Submission Type	Comment Page Number
1	Alaska Department of Fish and Game	Email	D-2
2	K.S. and C.S. – Moose Creek Residents	Email	D-3
3	L.L. – Moose Creek Residents	Email	D-4 to D-5
4	M.S. – Estate Representative	Public Hearing (Transcribed)	D-6
5	M.H. – Moose Creek Resident	Public Hearing (Transcribed)	D-7

Comment Letter/Transcription 1. ADF&G

From: [Brase, Audra L \(DFG\)](#)
To: [Creek CWMA, DNR Moose q \(DNR sponsored\)](#)
Cc: [Scannell, Heather L \(DFG\)](#); [Klein, Joseph P \(DFG\)](#); [Carter, Marla M \(DFG\)](#); [Ott, Alvin G \(DFG\)](#)
Subject: ADF&G Comments - Moose Creek CWMA
Date: Wednesday, July 1, 2020 10:36:02 AM

1-1 ADF&G has reviewed the proposed Critical Water Management Area (CWMA) designation in the vicinity of Moose Creek. ADF&G has no objections to the designation and asks to be notified when/if the final determination goes into effect as it may impact the waters ADF&G stocks with fish (Z Pit), public use of fish in a portion of Piledriver Slough, and/or ADF&G authorizations for withdrawals of surface waters for various uses including dust control.

1-2 We would encourage communication between the USAF and ADF&G to determine if there are any concerns for fish species in the portion of Piledriver Slough within the proposed CWMA, as this drainage is a popular area for local anglers.

Thank you for the opportunity to review and comment.

*Audra Brase
Regional Supervisor
ADF&G Habitat - Fairbanks
907-459-7282*

Comment Letter/Transcription 2. K.S. and C.S., Moose Creek Residents

From:
To: [Creek CWMA, DNR Moose q \(DNR sponsored\)](#)
Subject: DNR Web Site Comment: Question
Date: Friday, July 17, 2020 6:12:05 AM

IP Address From: 204.89.222.126
Date/Time Sent: 6:04:40 AM AKDT

Concerning a web page at:
<http://dnr.alaska.gov/mlw/water/cwma/>

Message:

- 2-1 *Throughout all of this mess, where is the representation for the residents of Moose Creek?
- 2-2 *Who advocates for us and our interests?
- 2-3 *Why are we not invited or notified of these meetings with EAFB, DNR and the City of North Pole?
- 2-4 *Why were we never invited to be involved in the decision making that effects our lives and our futures?
- 2-5 *Will we have to pay for our water whether it be the from the City of North Pole or delivery when Eielson is able to wash their hands of us pesky Moose Creek residents? If so, how do you justify that?

Comment Letter/Transcription 3. L.L., Moose Creek Resident

From: [redacted]
To: [Creek CWMA, DNR Moose q \(DNR sponsored\)](#)
Subject: public comment on proposed CWMA in Moose Creek
Date: Wednesday, July 22, 2020 12:57:02 PM

Hello,

Thank you for taking the time to review my public comments on this issue. I really wanted to attend the public meeting July 16th, but as I was having symptoms of Covid-19 I couldn't responsibly attend that night.

My name is [redacted] and I will be directly impacted by the CWMA decision.

My main concern is that granting the Air Force at Eielson this decision will functionally remove accountability and incentive for them to actually fix or clean up the mess they made of our region's groundwater in any meaningful long-term way.

The active duty Air Force operates in some aspects with a very short-term mindset. For example, the residents of Moose Creek have experienced this when the Air Force limited their commitments to help with water contamination (ex: testing, supplying bottled water, maintaining GAC filters) to the current fiscal year, never promising to do more than what they had funding for in the current fiscal year. The short-term mindset is also a part of active-duty culture, where personnel stay at one duty station (like Eielson AFB) for roughly 3-6 years (based on standard practice of keeping moving personnel from base to base at regular intervals). I mention this not to malign any individuals at Eielson who oversee this water contamination issue, but to simply point out a fundamental difference in outlook. Many Moose Creek residents have lived here for decades, and as committed Alaskans, deliberately chose this out-of-the-way location to enjoy life in Alaska with all its freedoms. The people at Eielson who oversee clean-up efforts of our water are here for a comparatively short season. They address our issues for a few years, and then hand the mess off to someone else, who later hands the problem off again, and so on. It has been this way for years.

The sulfolane contamination issue in North Pole (from the local refinery), while not an apples to apples comparison, has an interesting contrasting point. North Pole residents who are impacted by the contamination plume are NOT being pressed to decommission their wells because the source of contamination has been stopped, the plume is expected to move past their properties after so many years, and they will be allowed to use their water again once the contamination plume has passed. I don't know all the details, but friends who live there are not faced with the same pressure to sign over water rights and cap their wells, because there is an end point to the impact of that environmental contamination.

3-1

3-2 | My concern about this CWMA and the impact of local long-term residents losing their water rights, is that whatever good intentions in the moment, whatever clean-up efforts are mandated by state or federal regulations, the practical impact will be an endless handing off of the PFOS/PFOA problem on the Air Force's to the next incoming personnel, with no real, actual, long-term cleaning up of our water.

3-3 | This is especially concerning since I've heard that the current firefighting foams used at Eielson, while not technically PFOS/PFOA based, are also environmentally problematic due to having very similar chemical traits. Similar to the BPA debacle in consumer plastics...plastics manufacturers quickly swapped out a known chemical "villian" for various new, untested, unknown chemicals which share enough traits with BPA to perform the same chemical functions in plastic products, but without the stigma OR ability for consumers to even know what new chemical is being used OR what impact it might have. That is an unresolved question in Moose Creek... what new chemicals are the new fire-fighting foams based on? How many concerning chemical traits do they share with PFOS/PFOA? Will they move just easily through our groundwater? Will they persist just as stubbornly in our environment? Will they accumulate in our bodies the same way? How many years will pass before the EPA and science even catches up to the current chemicals entering our water? What will the scope of impact look like then?

3-4 | The issue of the CWMA isn't going to answer those questions, but it does impact whether the current Air Force personnel will be motivated to address those questions. If our water rights are taken away long term, then the functional result is that the Air Force can do as it pleases long term, just as long as it carefully piles up contaminated soil (only worrying about known contaminants) for the next incoming personnel to deal with.

3-5 | In all likelihood, when science eventually catches up again with chemical manufacturers, we Alaskans might expect the same bland shrug of the shoulders from the Air Force at Eielson AFB, a sort of "well, we didn't know firefighting foam was that bad, but we'll try to help" with the unspoken, "it's not going to be my problem much longer anyways." Or down the road, with a CWMA in place already, would we get even that? More likely, the bland shrug and a "thankfully there's a CWMA already in place, not much else we can do at this point."

The bottom line is this...as an Alaskan and Moose Creek resident I desire accountability from the Air Force to actually clean up their mess. The Air Force wouldn't be asking for a CWMA if it didn't function in some way to their advantage, which in this area of water contamination, is not to Alaska's advantage.

Thank you again for your time and consideration of these thoughts.

Sincerely,

Comment Letter/Transcription 4. M.S., Estate Representative

Transcription of oral comments provided at public meeting and hearing, July 14, 2020. Original recording can be requested from DNR.

[Redacted]
[Redacted]
[Redacted]
[Redacted]

My name is [Redacted]

4-1 [Redacted] in Moose Creek, Alaska. And we would like to have a citation for water appropriation permits, whether their Alaska Statute or whether it's via the Alaska DEC. And we would also like
4-2 to be kept informed, once they are developed, the guidelines for reapplying for water use once the Critical Water Management Area is declared all clear.

Comment Letter/Transcription 5. M.H., Moose Creek Resident

Transcription of oral comments provided at public meeting and hearing, July 14, 2020. Original recording can be requested from DNR.

[Redacted]
[Redacted]
[Redacted]

5-1

My name is [Redacted] in Moose Creek, and I'm not sure exactly how to phrase this. People had at one particular time had mentioned about using mortality table to pay us for our water rights. I use a certain amount of water per period, and they would go ahead and calculate that using mortality tables and the cost of the water, and then come up with a final number with that, which I think would be a lot more advantageous and settling to myself, since I haven't been able, I haven't had to pay for water since I moved in the house 30 years ago. And now, now I've having to pay for the water, I'd rather be paid for the amount of water I have remaining, you know, theoretically in my life. I think it would go down simpler and it would be a lot more easy to, to swallow if I had that kind of compensation as opposed to being thrown a bone and saying now you get to pay for the water anyway. So that's a thought, maybe to go back and just recalculate it using my usage, my current age, the mortality tables, do the math and figure out what the bill would be for buying my water rights that way.

Table A2 – 2. Response to Comments

Comment Letter/Transcription No. 1 – Alaska Department of Fish and Game (ADF&G)	
1-1	Department of Natural Resources (DNR) will provide notice to ADF&G regarding the final determination on the Moose Creek Critical Water Management Area (CWMA).
1-2	DNR recognizes ADF&G’s concern regarding the impacts of contamination on fish within Piledriver Slough. DNR will forward your comments to the United States Airforce (USAF) to help facilitate communication between the two agencies regarding contamination and monitoring efforts.
Comment Letter/Transcription No. 2 – K.S. and C.S.	
2-1	<p>The public meeting and hearing held July 14, 2020 and public comment period is your chance to let DNR know your thoughts about the proposed CWMA designation and how you believe you will be affected. Most individuals choose to represent themselves in the public comment process. Although seeking outside representation is an option, DNR does not provide outside representation for individuals commenting on proposed CWMAs.</p> <p>Your comment will be sent to USAF in case it is more broadly directed at the PFAS contamination, contaminate monitoring, or Interim Record of Decision (IROD) process.</p> <p>Your comment will also be sent to the City of North Pole in case it is more broadly directed at the Environmental Covenant Package they sent in July 2020.</p>
2-2	<p>There are several ways to advocate for your interest during the CWMA process. You can advocate for yourself, as you have done by participating in the public hearing and meeting and by submitting comments. You can also contact your local, state, and federal representatives, who are responsible for advocating for the best interest of their constituents through the legislative process. You may also hire an attorney or another outside advocate to represent you during the CWMA process. DNR does not provide outside representation for individuals for activities related to the CWMA process.</p>
2-3	<p>The USAF hosts a monthly meeting for the project managers coordinating Eielson Airforce Base (EAFB) Remediation. These are technical meetings that cover all remediation efforts at Eielson Airforce Base. The PFOS/PFOA portion of the meeting is an opportunity for project managers to provide updates on items such as sampling plans, hydrogeologic modeling, and construction timelines. This portion of the meeting is generally attending by Alaska Department of Environmental Contamination (ADEC), Environmental Protection Agency (EPA), USAF, United States Army Corps of Engineers (USACE), DNR, City of North Pole, and USAF consultants and contractors.</p> <p>Your comment will be sent to USAF, who hosts the meeting.</p>
2-4	DNR has invited participation in the decision-making process through holding a public meeting and hearing and inviting the public to provide input on the proposed CWMA designation through the public comment process.
2-5	In the CWMA petition, USAF stated they would provide access to alternative water supplies for Moose Creek Residents to cut off the PFOS/PFOA exposure pathway. It

	<p>is our understanding from the IROD that USAF is providing payment for participation in their program to help offset the cost of water service. However, it is also our understanding that this will not cover water use in perpetuity.</p> <p>We will send your comment to USAF and City of North Pole because they are in a better position to discuss future water service costs. They can also advise you on their future planned actions regarding Moose Creek.</p>
Comment Letter/Transcription No. 3 – L.L.	
3-1	<p>The efforts to investigate and cleanup PFAS contamination at Eielson will be overseen by EPA and DEC. The 12 source areas at Eielson Air Force Base will be investigated in a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulated remedial investigation (RI). The RI will be completed to delineate the nature and extent of contamination, and to assess the site risks in a risk assessment (RA). A feasibility study (FS) will be developed from the information collected during the RI-RA, and remedial alternatives will be developed to identify cleanup approaches, monitoring plans and land use controls for the sites. The Air Force will select a remedy and identify it to the public in a CERCLA Proposed Plan (PP). The public will have a chance to ask questions and comment on the proposed plan. All public comments for the proposed plan will be appended to a responsiveness section in a CERCLA Record of Decision (ROD).</p> <p>While not specific to groundwater remediation, the CERCLA process will ensure long-term clean-up actions occur regardless of EAFB staff turnover.</p> <p>We will send your comment to USAF so they can respond to your concern regarding long-term commitments.</p>
3-2	<p>Those with valid certificates of appropriation are not required to forfeit those under the proposed CWMA. It is our understanding that the USAF is offering to pay certificate holders and applicants to voluntarily relinquish their water rights/applications. However, that would be a contractual agreement between you and the USAF and is a separate process for the CWMA.</p> <p>Please see response 3-1 for information about long-term clean up and remediation requirements.</p>
3-3	<p>We will forward your comment to USAF so they can address what firefighting products they are currently using and address questions regarding the safety of those chemicals.</p>
3-4	<p>Please see response 3-2 and 3-1 for information about water rights and clean up and remediation requirements.</p>
3-5	<p>The purpose of the CWMA is to cut off an exposure pathway to a chemical with negative human health impacts. However, cutting off the exposure pathway is an interim step in dealing with the contamination issue.</p> <p>Please see response 3-1 for information about clean up and remediation requirements.</p>

Comment Letter/Transcription No. 4 – M.S.	
4-1	The Alaska water code, which provides for water rights management in Alaska is Alaska Statute 46.15. Please contact us if you have any specific questions about water rights in Alaska.
4-2	If the CWMA is designated, we would notify all landowners within the area of any proposed revocation or amendment to the CWMA. If the CWMA is designated, new water right applications for domestic use would only be accepted when the CWMA is revoked. Revocation would occur once there is no longer a risk to human health from using the ground and surface water within the CWMA boundary.
Comment Letter/Transcription No. 5 – M.H.	
5-1	We will forward your comment to USAF and City of North Pole, as they are in a better position to discuss future water service costs and their covenant package.

Appendix D:

Interim Record of Decision

Page intentionally left blank.



UNITED STATES AIR FORCE

Eielson Air Force Base, Alaska

**Interim Record of Decision for
Community of Moose Creek, Alaska,
Long-Term Water Supply**

FINAL

APRIL 2019

Table of Contents

PART 1	DECLARATION.....	1-1
1.1	SITE NAME AND LOCATION	1-1
1.2	STATEMENT OF BASIS AND PURPOSE	1-1
1.3	ASSESSMENT OF THE SITE	1-1
1.4	DESCRIPTION OF THE SELECTED REMEDY	1-2
1.5	STATUTORY DETERMINATIONS	1-2
1.6	DATA CERTIFICATION CHECKLIST.....	1-5
1.7	AUTHORIZING SIGNATURES	1-7
PART 2	DECISION SUMMARY	2-1
2.1	SITE NAME, LOCATION, AND DESCRIPTION	2-1
2.2	SITE HISTORY AND ENFORCEMENT ACTIVITIES.....	2-1
2.3	COMMUNITY PARTICIPATION	2-3
2.4	SCOPE AND ROLE OF THE RESPONSE ACTION.....	2-3
2.5	SITE CHARACTERISTICS.....	2-4
2.5.1	Environmental Setting.....	2-4
2.5.2	Site Hydrogeology	2-4
2.5.3	Nature and Extent of Contamination	2-5
2.6	CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES.....	2-6
2.6.1	Land Use	2-6
2.6.2	Ground and Surface Water Beneficial Uses.....	2-6
2.7	SUMMARY OF SITE RISKS	2-6
2.7.1	Human Health Risk Assessment	2-6
2.7.2	Summary of Ecological Risk Assessment	2-13
2.7.3	Basis for Action	2-13
2.8	REMEDIAL ACTION OBJECTIVES	2-14
2.9	DESCRIPTION OF ALTERNATIVES.....	2-14
2.9.1	Description of Remedy Components.....	2-15
2.9.2	Common Elements and Distinguishing Features of Each Alternative.....	2-26
2.9.3	Expected Outcomes of Each Alternative.....	2-29
2.10	SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES	2-29
2.10.1	Overall Protection of Human Health and the Environment.....	2-31
2.10.2	Compliance with Applicable or Relevant and Appropriate Requirements	2-31
2.10.3	Long-Term Effectiveness and Permanence	2-32
2.10.4	Reduction of Toxicity, Mobility, or Volume through Treatment	2-35
2.10.5	Short-Term Effectiveness	2-35
2.10.6	Implementability	2-35
2.10.7	Cost	2-36
2.10.8	State/Support Agency Acceptance	2-36
2.10.9	Community Acceptance	2-36
2.11	PRINCIPAL THREAT WASTE	2-37
2.12	SELECTED REMEDY	2-37
2.12.1	Summary of the Rationale for the Selected Remedy.....	2-37
2.12.2	Description of the Selected Remedy.....	2-37
2.12.3	Summary of the Estimated Remedy Costs.....	2-43
2.12.4	Expected Outcomes of the Selected Remedy	2-43

2.13	STATUTORY DETERMINATIONS	2-45
2.14	DOCUMENTATION OF SIGNIFICANT CHANGES	2-45
PART 3	RESPONSIVENESS SUMMARY.....	3-1
3.1	BACKGROUND AND COMMUNITY INVOLVEMENT	3-1
3.2	SUMMARY OF PUBLIC COMMENTS RECEIVED DURING PUBLIC COMMENT PERIODS AND AGENCY RESPONSES	3-1
3.2.1	Summary and Response to Local Community Concerns	3-1
3.2.2	Comprehensive Response to Specific Legal and Technical Questions	3-4
3.3	REMAINING CONCERNS	3-6

LIST OF TABLES

Table 2-1	Drinking Water Cleanup Levels	2-14
Table 2-2	Summary of Remedial Alternatives.....	2-15
Table 2-3	Potable Water Supply Alternatives Comparative Evaluation	2-30
Table 2-4	Description of ARARs for the Selected Remedy.....	2-33
Table 2-5	Cost Estimate Summary for the Selected Remedy.....	2-44

LIST OF FIGURES

Figure 1-1	Community of Moose Creek Location and Vicinity Map	1-3
Figure 2-1	Community of Moose Creek Vicinity Groundwater Flow	2-7
Figure 2-2	Community of Moose Creek PFOA and PFOS Results up to 30 June 2016	2-9
Figure 2-3	Community of Moose Creek PFOS Results up to 30 June 2016.....	2-11
Figure 2-4	Community of Moose Creek North Pole Municipality Water Supply Main	2-17
Figure 2-5	Community of Moose Creek Local Distribution System Concept	2-19
Figure 2-6	Community of Moose Creek Eielson AFB Water Supply Main	2-23
Figure 2-7	Community of Moose Creek Community Deep Well Concept.....	2-27
Figure 2-8	Community of Moose Creek Land Use Control	2-39

LIST OF APPENDICES

Appendix A	References
Appendix B	Public Notice of Availability
Appendix C	PFOS and PFAS Sample Results for Moose Creek

LIST OF ACRONYMS AND ABBREVIATIONS

%	percent
°F	degrees Fahrenheit
µg/L	micrograms per liter
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
AFFF	aqueous film-forming foam
ARARs	applicable or relevant and appropriate requirements
bgs	Below ground surface
CCL	Contaminant Candidate List
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWMA	Critical Water Management Area
DoD	Department of Defense
EAFB	Eielson Air Force Base
EPA	U.S. Environmental Protection Agency
GAC	granular activated carbon
HA	health advisory
IC	Institutional Controls
IFS	Interim Feasibility Study
IPP	Interim Proposed Plan
I-ROD	Interim Record of Decision
IRP	Installation Restoration Program
HA	health advisory
LUC	land use control
NCP	National Contingency Plan
NPL	National Priorities List
NPV	net present value
PFAS	per- and polyfluoroalkyl substances
PFC	perfluorinated compound
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PHA	provisional health advisory
PTW	principal threat waste
RAO	remedial action objective
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SEMS	Superfund Enterprise Management System
TBC	To Be Considered
TCRA	time-critical removal action
UECA	Uniform Environmental Covenants Act
USAF	U.S. Air Force

USC United States Code
UU/UE Unrestricted Use and Unlimited Exposure
WTP Water Treatment Plant

PART 1 DECLARATION

1.1 SITE NAME AND LOCATION

The community of Moose Creek, Alaska, is located approximately 120 miles south of the Arctic Circle, 21 miles southeast of Fairbanks, and 7 miles southeast of the City of North Pole, as illustrated on **Figure 1-1**. The Moose Creek community is situated adjacent to the northern boundary of Eielson Air Force Base (EAFB), which is included in the Superfund Enterprise Management System (SEMS) under U.S. Environmental Protection Agency (EPA) Identification Number AK1570028646. Contaminants originating from sources within EAFB have migrated off-base and are impacting the groundwater that the community of Moose Creek uses as its domestic water source.

1.2 STATEMENT OF BASIS AND PURPOSE

This Interim Record of Decision (I-ROD) presents the selected interim remedy for the community of Moose Creek, Alaska. This interim action is limited in scope and addresses only provision of an alternative drinking water supply to the community of Moose Creek. Remediation of the contaminated groundwater will also be addressed in a Final Record of Decision (ROD). The selected interim action is required to protect human health in the short-term while a final remedial solution is being developed. This I-ROD will be followed by a Final ROD.

The interim remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record file for the community of Moose Creek and EAFB, and the references cited in this I-ROD are listed in **Appendix A**. The State of Alaska concurs that, when properly implemented, the interim remedy will comply with State Law.

1.3 ASSESSMENT OF THE SITE

The per- and polyfluoroalkyl substances (PFAS), perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) have migrated from contaminant sources on EAFB to the community of Moose Creek's groundwater, which is used to supply the community's drinking water. Detected concentrations of PFOS and PFOA in the Moose Creek community's groundwater exceed the EPA's 2016 lifetime drinking water health advisory (HA) for PFOS (USEPA, 2016a) and for combined PFOS+PFOA (USEPA, 2016a, 2016b), as well as the State of Alaska's promulgated groundwater cleanup levels for PFOS and PFOA (ADEC, 2018). PFOS and PFOA are not CERCLA-listed hazardous substances, but in some circumstances could be responded to as CERCLA pollutants or contaminants; therefore, the U.S. Air Force (USAF) is following the CERCLA process to address potential risks from exposure to these PFASs (USAF, 2016). The interim response action selected in this I-ROD is necessary to protect public health or welfare from actual or threatened releases of pollutants or contaminants from EAFB which may present an imminent and substantial endangerment to public health or welfare of the community of Moose Creek.

1.4 DESCRIPTION OF THE SELECTED REMEDY

The selected interim remedy is limited in scope and addresses only the provision of an alternative domestic water supply to the community of Moose Creek. The selected interim action is designed to protect human health in the short-term while a comprehensive final remedial solution, which will be documented in a Final ROD, is being developed.

The selected interim remedy is to provide potable water supplied by the City of North Pole Water Treatment Plant (WTP) to the community of Moose Creek. This interim remedy does not address principal threat waste (PTW). 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 ground water.

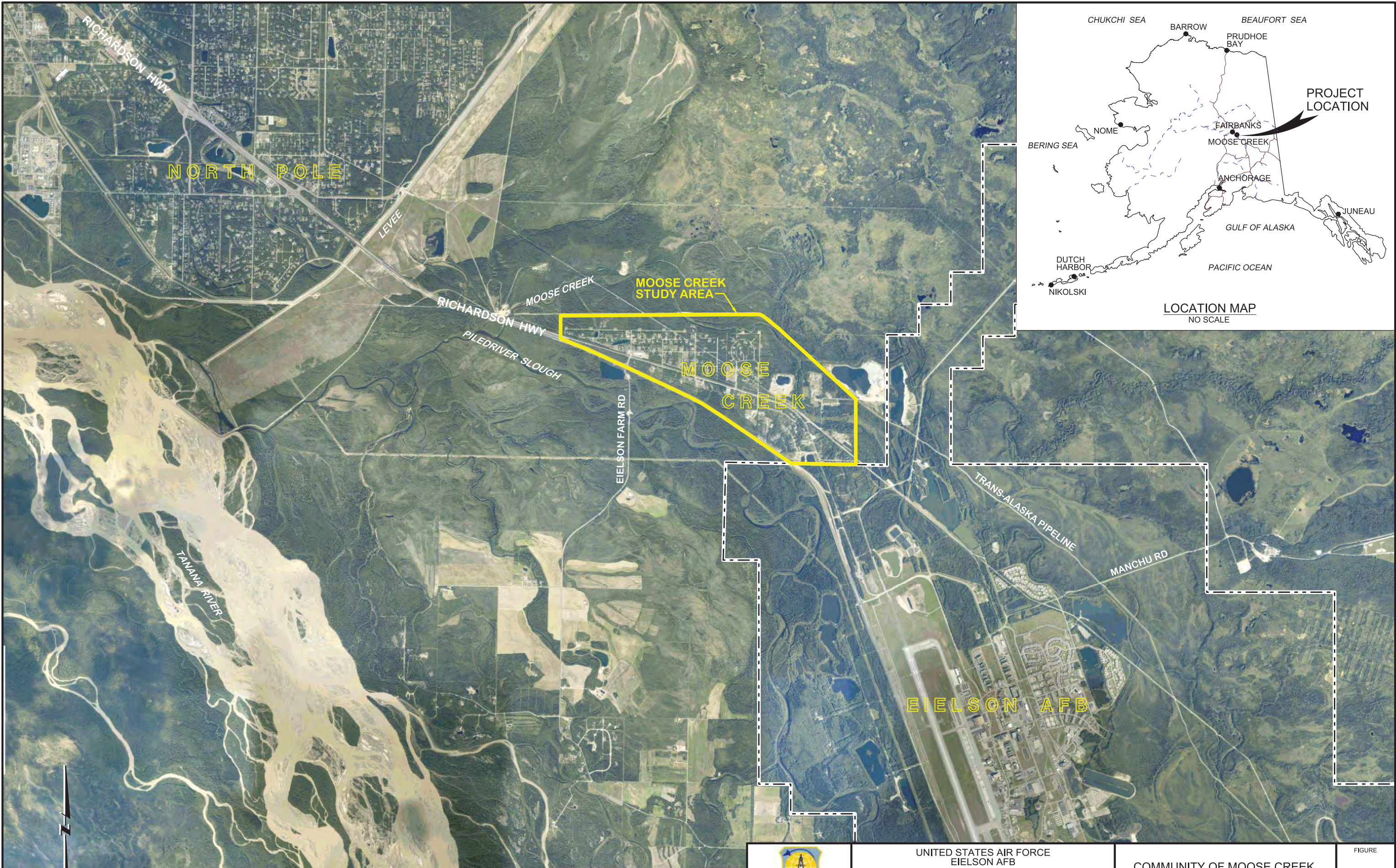
Following are the major components of the selected remedy:

- A new water main will be installed 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.
- Land use controls (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/LUCs, and 4) place a covenant on the property to prohibit future well installation/ 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 would stop.

1.5 STATUTORY DETERMINATIONS

This interim action is: protective of human health and the environment for the exposure pathway addressed by this action and is intended to provide adequate protection until a Final ROD is signed; complies with those federal and state requirements that are applicable or relevant and appropriate for this limited-scope action; and is cost-effective. This action is an interim solution only and is not intended to utilize alternative treatment or resource recovery technologies to the maximum extent practicable for the community of Moose Creek.

FILE: C:\D\CAD\Proj\FCECC\2018 Eielson-Moose Creek ROD_185750715\2-fma-August 6 2018\Fig 1-1 Location and Vicinity Map.dgn
TIME: 06-AUG-2018 15:47



UNITED STATES AIR FORCE
EIELSON AFB
INTERIM RECORD OF DECISION FOR
COMMUNITY OF MOOSE CREEK, ALASKA,
LONG-TERM WATER SUPPLY

COMMUNITY OF MOOSE CREEK
LOCATION AND VICINITY MAP

FIGURE
1-1
185750715,
100.69030401

(This page intentionally left blank.)

Because this action does not constitute the final remedy for the community of Moose Creek, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed by the final response action.

Subsequent actions are planned to address fully the threats posed to human health and the environment by conditions at the community of Moose Creek, but it is anticipated that this interim action will remain to be incorporated into the final action. Because this remedy will result in contaminants remaining on-site above health-based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health within 5 years after commencement of the remedial action and be conducted every 5 years thereafter. Because this is an I-ROD, review of this site and remedy will be ongoing as the USAF continues to develop remedial alternatives for the community of Moose Creek.

1.6 DATA CERTIFICATION CHECKLIST

The following information is included in Part 2, the Decision Summary section of this I-ROD, starting on Page 2-1:

- Chemicals of concern and their respective concentrations – Section 2.7.1.1 (Page 2-6).
- Baseline risk represented by the chemicals of concern – Section 2.7 (Page 2-6).
- Cleanup levels established for chemicals of concern and the basis for these levels – Section 2.8, Table 2-1 (Page 2-14).
- How source materials constituting principal threats are addressed – Section 2.11 (Page 2-37).
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and I-ROD – Section 2.6 (Page 2-6).
- Potential land and ground water use controls that will be required as a result of the selected remedy – Section 2.12.2 (Page 2-37).
- Estimated capital, annual operation and maintenance, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected – Section 2.12.3 (Page 2-43).
- Key factors that led to selecting the remedy – Section 2.12.1 (Page 2-37).

Additional information can be found in the Administrative Record file for the community of Moose Creek and EAFB.

(This page intentionally left blank.)

1.7 AUTHORIZING SIGNATURES

Lead Agency Selection

This signature documents the U.S. Air Force's selection of the remedy contained in the Interim Record of Decision for the community of Moose Creek, Alaska, Long Term Water Supply.

SUZANNE W. BILBREY, P.E., GS-15

Date

Director, Environmental Management Directorate

(This page intentionally left blank.)

U.S. EPA Concurrence Page

This signature sheet documents the U.S. Environmental Protection Agency's concurrence of the remedy contained in the Interim Record of Decision for the community of Moose Creek, Alaska, Long Term Water Supply.

SHERYL BILBREY

Date

Director
United States Environmental Protection Agency, Region 10
Office of Environmental Cleanup

(This page intentionally left blank.)

ADEC Concurrence Page

The State of Alaska Department of Environmental Conservation agrees that, if properly implemented, the selected remedies for the Community of Moose Creek, Alaska Long Term Water Supply will comply with State law. This decision will be reviewed and may be modified in the future if information becomes available that indicates the presence of contaminants or exposures that may cause unacceptable risk to human health.

JOHN HALVERSON

Date

Environmental Program Manager,
Alaska Department of Environmental Conservation

(This page intentionally left blank.)

PART 2 DECISION SUMMARY

The Decision Summary (Part 2) of the I-ROD provides an overview of the site characteristics, alternatives evaluated, and the analysis of those options. This part of the I-ROD also identifies the selected interim remedy and explains how the remedy fulfills statutory and regulatory requirements.

2.1 SITE NAME, LOCATION, AND DESCRIPTION

The community of Moose Creek, Alaska, is located approximately 120 miles south of the Arctic Circle, 21 miles southeast of Fairbanks, and 7 miles southeast of the City of North Pole, as illustrated on Figure 1-1. Moose Creek is located within the Fairbanks North Star Borough of central Alaska. The Moose Creek community is situated adjacent to the northern boundary of EAFB, which is included in SEMS under Identification Number AK1570028646. Contaminants originating from sources within EAFB have migrated off-base and are impacting the groundwater that the community of Moose Creek uses as its drinking water source (USAF, 2017b). The Moose Creek community is the only populated area outside of EAFB currently affected by PFOS/PFOA contamination from the base.

The community of Moose Creek stretches from approximately 1 to 3 miles downgradient of EAFB. Approximately 750 people live in the community of Moose Creek, and land use includes residential and industrial activities (USAF, 2017b). There are over 170 water wells identified within the community of Moose Creek.

EAFB is an active military installation that has been used for military operations since its establishment in 1944. The base is in the Tanana River Valley along the northern bank of the river on a low, relatively flat, floodplain terrace approximately 2 miles from the active river channel. EAFB participates in the Installation Restoration Program (IRP), a program established in 1978 under which the U.S. Department of Defense (DoD) seeks to identify, investigate, and clean up contamination from hazardous materials and pollutants or contaminants. A wide variety of source areas have been identified at EAFB, including: closed and active unlined landfills, drum storage area(s), fuel spill areas, fire training areas, and other disposal or spill areas (USAF, 2017a). EAFB was listed on the National Priorities List (NPL) in 1989 (54 Federal Register [FR] 48184) by the EPA due to historical contamination at the base. The listing designated the facility as a federal Superfund site subject to the remedial response requirements of CERCLA, as amended by SARA (USAF, 2017b). The USAF is the lead agency, the EPA is the lead regulatory agency, and the Alaska Department of Environmental Conservation (ADEC) is the support regulatory agency.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

There have been no enforcement activities related to the PFOS and PFOA contamination of the community of Moose Creek's drinking water supply.

The community of Moose Creek is located adjacent to EAFB, which has used aqueous film-forming foam (AFFF) firefighting agents containing PFAS, which are also known as perfluorinated compounds (PFCs), in both training exercises and to extinguish petroleum fires on the base. AFFF formulations may contain PFOS, as well as some PFAS-based AFFF constituents

that may further degrade into PFOA. Releases of AFFF to the environment have occurred during fire training, equipment maintenance, and storage at EAFB (USAF, 2018).

PFOS and PFOA were first included on the EPA's Drinking Water Contaminant Candidate List (CCL) in 2009 and remains on the final version of the CCL (CCL 4), which was released in November 2016 (USEPA, 2016c). The CCL is a list of contaminants, referred to as "emerging contaminants", that are: currently not subject to any proposed or promulgated national primary drinking water regulations, are known or anticipated to occur in public water systems, and may require regulation under the Safe Drinking Water Act (SDWA). The EPA selects candidates for the CCL based on the best available information and data on health effects and the occurrence of unregulated contaminants. Inclusion of PFOS and PFOA on the CCL indicates EPA's concern that these compounds have the potential to present health risks through drinking water exposure.

In 2014, the USAF conducted screening level site investigations at EAFB to determine the presence of PFOS and PFOA and their relative concentrations. The site investigation report associated with that work was finalized in February 2015 (USACE, 2015a) and documented both PFOA and PFOS at concentrations in groundwater above their respective EPA provisional health advisory (PHA) levels that were in place at that time (USEPA, 2009).

In January 2015, the EPA Region 10 requested that EAFB test the drinking water wells on base to determine if PFOS or PFOA were present. PFOS and PFOA are not identified under CERCLA as hazardous substances, but are determined to be pollutants or contaminants; therefore, the USAF conducted site inspections into these emerging contaminants following the CERCLA process. Sampling by the USAF confirmed both chemicals in EAFB drinking water wells, with PFOS exceeding the PHA level that was in place at the time (USAF, 2018). Since PFOS and PFOA are water soluble, an additional site inspection was conducted to determine whether contaminants had migrated in groundwater towards the northern base boundary and to the nearby community of Moose Creek. In April 2015, the USAF tested the groundwater at the northern base boundary, which abuts the community of Moose Creek, and identified PFOS levels exceeding the PHA near the base boundary (USACE, 2015a).

As a result of the identification of elevated PFOS concentrations in groundwater near the northern EAFB boundary, the USAF coordinated with the community of Moose Creek to test private drinking water wells, starting in May 2015 (USACE, 2015b). This testing has shown that the majority of private drinking water wells in the community of Moose Creek have water that exceeds the current EPA HA for PFOS (USEPA, 2016a), issued in May 2016, which is more stringent than the prior PHA for PFOS and PFOA (USEPA, 2009).

The USAF conducted an emergency removal action to provide bottled drinking water to the community of Moose Creek. The emergency action was followed by a time-critical removal action (TCRA) to mitigate the health threat posed by the PFOS and PFOA in the drinking water (AFCEC, 2015). This TCRA included the delivery of bottled water and installation of potable water tanks or GAC filter systems at the affected private properties. As of April 2018, the USAF is monitoring 174 properties in the Community of Moose Creek, of which 170 have well water above the EPA HA. The USAF has installed 164 systems at properties in the Moose Creek community: 98 storage tanks, 64 GAC filter systems and two 5-gallon carboys. A further six properties are having bottled water delivered.

The USAF continues to perform periodic resampling of wells in the community of Moose Creek. The periodic resampling is designed to establish a baseline and evaluate concentration trends, to ensure that all drinking water well locations with PFOS and PFOA above the current drinking water HA levels are identified (USAF, 2017b).

2.3 COMMUNITY PARTICIPATION

The Interim Feasibility Study (IFS) for the community of Moose Creek drinking water supply was presented to the community during a 19 July 2017 public meeting. At the meeting, comment cards were distributed to the attendees and written comments were provided to the USAF.

The Interim Proposed Plan (IPP) for the community of Moose Creek drinking water supply was released for public comment in April 2018, with the public comment period extending from 15 April 2018 to 15 May 2018. A notice was placed in the Fairbanks Daily News-Miner inviting public comment on the IPP and announcing a public meeting (**Appendix B**). The public meeting to discuss the IPP was held on 23 April 2018. Written comments were received regarding the IPP, and comments were recorded during the April 2018 public meeting. The USAF's responses to comments received on the IFS and IPP are included in the Responsiveness Summary, which is Part 3 of this I-ROD. The IFS and IPP can be found in the Administrative Record file for EAFB.

Since the discovery of PFOS and PFOA in the community of Moose Creek's groundwater, the USAF has held public meetings to update the residents on the status and progress of their response action. Meetings were held on the following dates: 15 June 2015; 22 July 2015; 26 August 2015; 26 October 2015; 14 December 2015; 25 January 2016; 18 April 2016; 1 December 2016; 19 July 2017; and 23 April 2018. In addition, the following public outreach actions were conducted:

- A letter and fact sheet were mailed to the potentially affected property owners in May 2015, along with a survey form to determine the number of private wells that could be affected by the PFOS and PFOA contamination.
- A website was developed (<http://www.eielson.af.mil/Info/Environmental/>).
- The following electronic document repositories were developed:
 - <http://alaskacollection.library.uaf.edu/eafbsc/cd0/Moose%20Creek%20PFCs%20Contamination%20Information%20Repository/>.
 - <http://afcec.publicadmin-record.us.af.mil/>
- The following Physical document repository was developed:
 - Elmer E. Rasmuson Library,
 - University of Alaska Fairbanks,
 - 310 Tanana Drive,
 - Fairbanks,
 - Alaska 99775

2.4 SCOPE AND ROLE OF THE RESPONSE ACTION

The USAF initiated an emergency action and TCRA response to minimize exposure to PFOS and PFOA contaminated water within the community of Moose Creek in 2015. The USAF issued a

policy memorandum on 11 August 2016 stating that any PFOA/PFOS releases that pose unacceptable risk, including migration off-base, would be addressed in accordance with CERCLA and the NCP (USAF, 2016). Where drinking water samples indicate unacceptable risk to human health, as defined by exceeding the EPA's HA for PFOS and PFOA, the USAF will take appropriate mitigation action for all public and private water sources reasonably believed to be contaminated by USAF actions (USAF, 2016).

This response action is designed to identify an alternative potable water supply for the community of Moose Creek following EPA Guidance (USEPA, 1988), while comprehensive PFAS source investigations and remedial actions are undertaken at EAFB. The selected remedy is part of the USAF response to the presence of PFOS/PFOA in the groundwater domestic water source resulting from its past use at EAFB. The USAF will be conducting a further Remedial Investigation (RI) that will sample groundwater to determine the full nature and extent of PFOS and PFOA contamination. The findings of that investigation and resulting decisions will be discussed with the public in a separate Feasibility Study, Proposed Plan, and ROD. The remedy selected in this I-ROD will allow a solution to be developed and implemented before the RI is complete. A final remedy will be selected using the CERCLA process upon completion of the RI. The interim action selected in this I-ROD will neither be inconsistent with nor preclude implementation of the final remedy.

2.5 SITE CHARACTERISTICS

The following subsections provide an overview of the Moose Creek community, including the current understanding of the nature and extent of contamination. An RI is being conducted at EAFB to provide a basis for determining which EAFB PFOS and PFOA contaminant releases are migrating to the community of Moose Creek (USAF, 2017b).

2.5.1 Environmental Setting

The community of Moose Creek is in the Tanana River Valley along the river's northern bank on a low, relatively flat, floodplain terrace approximately 2 miles from the active river channel. The climate is typical of interior Alaska and is characterized by large diurnal and annual temperature variations, low precipitation, and low humidity. Moist maritime air masses are blocked in the south by the Alaska Range and in the north by the Brooks Range, creating a semiarid climate. Large annual variations in temperature and solar radiation occur because of the high latitude. Average temperatures range between 44 and 61 degrees Fahrenheit (°F) during the summer season and between -15°F and -10°F during the winter season. Extreme temperatures recorded between 1944 and 1984 at EAFB were 93°F for July and -63°F for January. Annual precipitation in this area averages 14 inches, which includes 72 inches of snow. Average monthly precipitation ranges from 0.5 to 2.5 inches, with rainfall generally highest in July and August. The evaporation rate is approximately 14 inches per year, which equals the mean annual precipitation.

2.5.2 Site Hydrogeology

The community of Moose Creek is located within an area regionally characterized by discontinuous permafrost; therefore, permafrost may be present in the subsurface. Data regarding the distribution of permafrost within the community is limited and what is available is biased to

the shallow subsurface, between 40 and 100 feet below ground level. Residential well logs on file at the Alaska Department of Natural Resources (ADNR) do not document the presence of permafrost in the community. Two deeper boring wells installed during a USAF environmental investigation did not encounter permafrost (USAF, 2018).

PFOS and PFOA have been identified in groundwater within the community of Moose Creek, which is adjacent to the northern EAFB boundary. Groundwater flow at EAFB has been identified in previous studies (USAF, 2017a) and approximately follows the Piledriver Slough flow direction from southeast to northwest (**Figure 2-1**). The delineation results of the Moose Creek community water well sampling program have identified a contaminant distribution pattern that is consistent with the groundwater flow direction, indicating that PFOS/PFOA releases occurred at EAFB and migrated off-base (USAF, 2017b). Drinking water in the community has historically been supplied by shallow wells located on the individual properties (USAF, 2018).

2.5.3 Nature and Extent of Contamination

The complete extent of the contamination resulting from the use of AFFF at EAFB has not yet been fully characterized. However, the USAF sampled all community of Moose Creek domestic water wells for PFOS and PFOA in 2016 to identify the extent of well contamination by PFOS or PFOA, that had migrated off-base (USAF, 2018). The 2016 survey dataset is the latest full dataset for all the wells showing PFAS contamination in the community of Moose Creek (Appendix C). Once the groundwater at a property has been identified as exceeding the LHA, arrangements are made to install a drinking water treatment system. The current sampling program is for post treatment drinking water compliance and not groundwater characterization. Therefore, a more recent groundwater dataset is not available that covers the whole area. The sampling program confirmed that most private domestic wells in the community of Moose Creek have water that exceeds the HA for PFOS+PFOA of 0.070 micrograms per liter ($\mu\text{g/L}$) (USEPA, 2016a, 2016b), as graphically shown on **Figure 2-2**. In November 2016, ADEC promulgated a groundwater cleanup level of 0.40 $\mu\text{g/L}$ for PFOS and PFOA (ADEC, 2018b). **Figure 2-3** depicts the PFOS levels graphically in the private domestic water wells in the Moose Creek community. This indicates that most wells exceed the ADEC groundwater cleanup level for PFOS. The PFOA levels are not shown on Figure 2-3, but are below the ADEC cleanup levels.

The data available in June 2016 (EA, 2016) identified maximum PFOS and PFOA concentrations of 1.5 $\mu\text{g/L}$ and 0.14 $\mu\text{g/L}$, respectively, in groundwater samples collected from community of Moose Creek domestic water wells prior to treatment. There were 170 properties inspected that had groundwater data reported above the EPA HA level of 0.070 $\mu\text{g/L}$ for either PFOA or PFOS or the cumulative PFOA and PFOS (EA, 2016). There were four properties that had wells with groundwater below the EPA HA.

The private wells in the community of Moose Creek are typically 50 feet deep. A deep well was drilled and found that PFOS/PFOA contaminated groundwater was present to a depth of approximately 180 feet below ground surface (bgs). The groundwater below this depth, and down to 274 feet bgs was found to be below the EPA HA.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

2.6.1 Land Use

Approximately 750 people live in the community of Moose Creek, and land use includes residential and industrial activities. The community is adjacent to EAFB, an active military installation, and was originally settled because of the growth of EAFB and the nearby City of North Pole. The community of Moose Creek is a primarily residential community and future land use is expected to remain primarily residential in nature (USAF, 2017b).

2.6.2 Ground and Surface Water Beneficial Uses

Groundwater in Moose Creek is primarily used for drinking and irrigation but there are other industrial and commercial uses of groundwater in the vicinity. Surface water uses in the study area will be covered in the Full ROD.

2.7 SUMMARY OF SITE RISKS

2.7.1 Human Health Risk Assessment

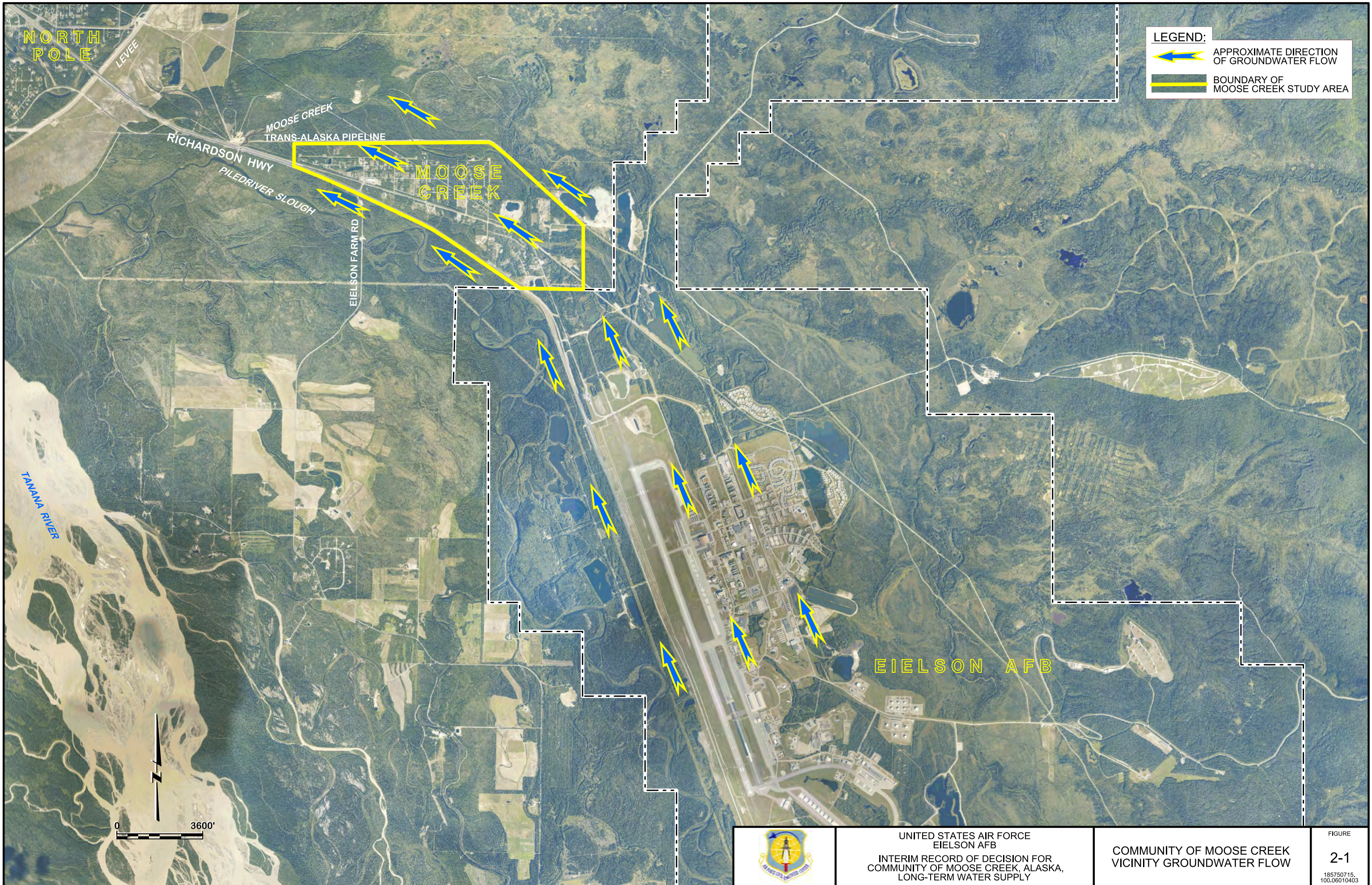
PFAS are a class of emerging contaminants, which means they have been identified as being a potential environmental or public health risk. Neither PFOS nor PFOA are listed CERCLA hazardous substances (40 Code of Federal Regulations [CFR] Part 302, Table 302.4). Both the USAF and regulators have determined that PFOS and PFOA are 'pollutants or contaminants' as defined by CERCLA (42 United States Code [USC] § 9601(33)). As an emerging contaminant the human and ecological effects from PFOS and PFOA continue to be studied (USAF, 2018). The EPA and Agency for Toxic Substances and Disease Registry (ATSDR) have reviewed the large toxicity databases for both PFOS and PFOA and have summarized the adverse effects to animals and humans following exposure. The EPA Office of Water concluded there is ample evidence of adverse effects, particularly in animals.

2.7.1.1 Identification of Chemicals of Concern

The chemicals of concern are PFOS and PFOA migrating offsite from EAFB in groundwater, due to historical use of PFAS-containing materials at Eielson AFB. The EPA has established a 0.070 µg/L drinking water HA for PFOS (USEPA, 2016a) and PFOA (USEPA, 2016b). For this I-ROD, the USAF has defined the exceedance of the EPA's HA for PFOS or for PFOS and PFOA in drinking water as presenting an unacceptable level of risk to human health.

The data available in June 2016 identified maximum PFOS and PFOA concentrations of 1.5 µg/L and 0.14 µg/L, respectively, in groundwater samples collected from Moose Creek community drinking water wells, prior to treatment (EA, 2016). Currently, 170 properties had groundwater data reported above the EPA HA level.

FILE: C:\D\CAD\Proj\Stantec\Cadno Baker JV\2018-2019 Eielson_Moose Creek ROD_185750715\3-dfinal-March 2019\Fig 2-1 Moose Creek Vicinity Groundwater Flow.dgn
TIME: 28-MAR-2019 15:53



UNITED STATES AIR FORCE
EIELSON AFB
INTERIM RECORD OF DECISION FOR
COMMUNITY OF MOOSE CREEK, ALASKA,
LONG-TERM WATER SUPPLY

COMMUNITY OF MOOSE CREEK
VICINITY GROUNDWATER FLOW

FIGURE

2-1

185750715,
100.06010403

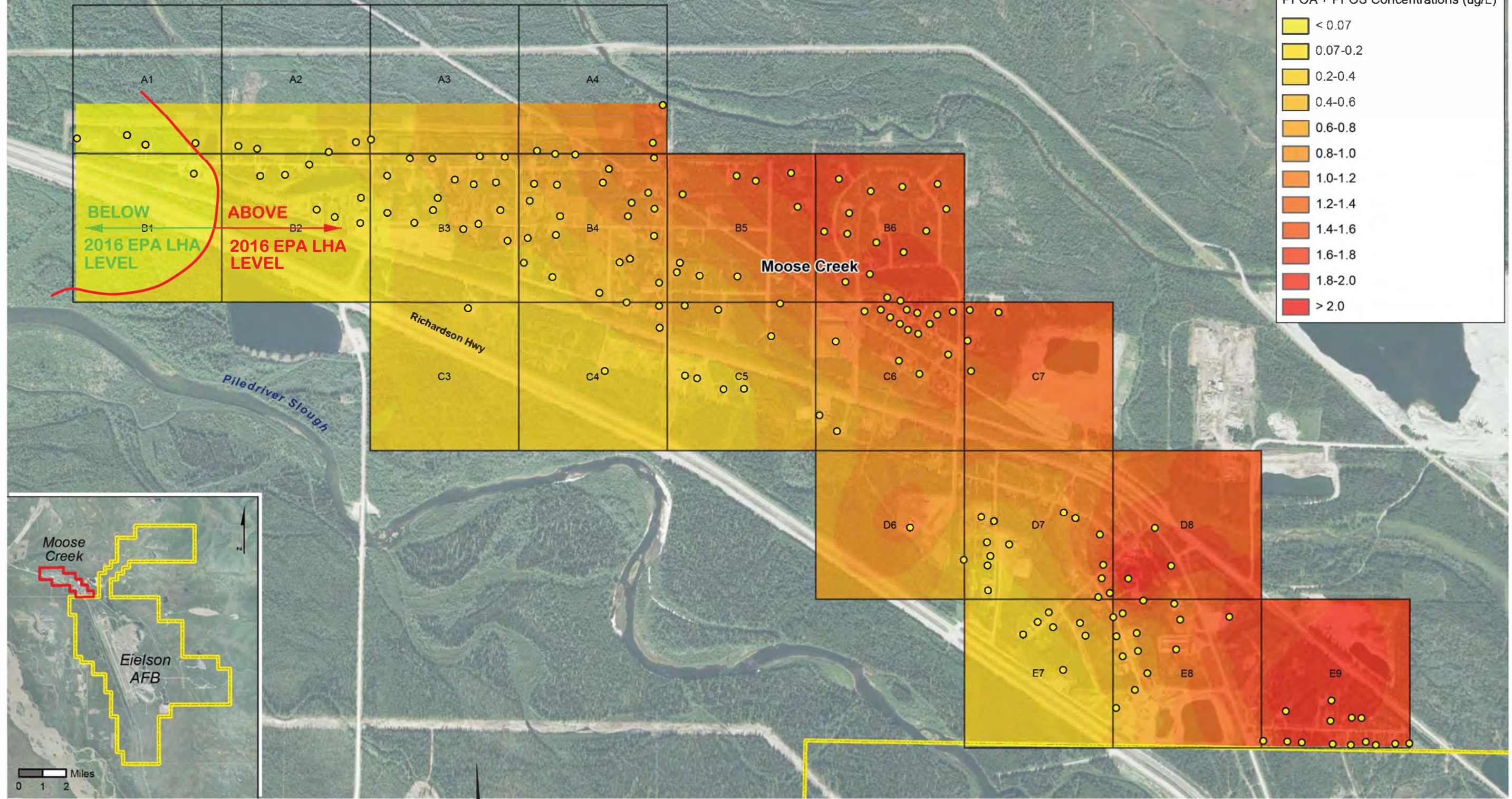
(This page intentionally left blank.)

Note:
Concentrations above 0.07 ug/L exceed the EPA Lifetime Health Advisory (LHA) level (EPA 2016).

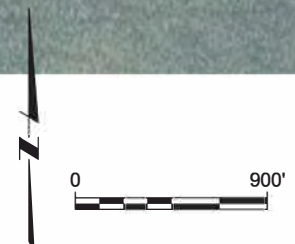
Data Sources:
Jacobs 2015; EA 2016; Imagery: Alaska Mapped, Geographic Information Network of Alaska 2007

Legend

- Sample Location
 - Sampling Grid
- 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



Source:
EA Engineering Science, and Technology, Inc., PBC
2nd Quarter Report (2016) on Moose Creek Area Inspections,
Sampling & Analysis, Treatment, and Construction
Moose Creek Area
Figure 4- Moose Creek Cumulative PFOA+PFOS Results through 30 June 2016



UNITED STATES AIR FORCE
EIELSON AFB
INTERIM RECORD OF DECISION FOR
COMMUNITY OF MOOSE CREEK, ALASKA,
LONG-TERM WATER SUPPLY

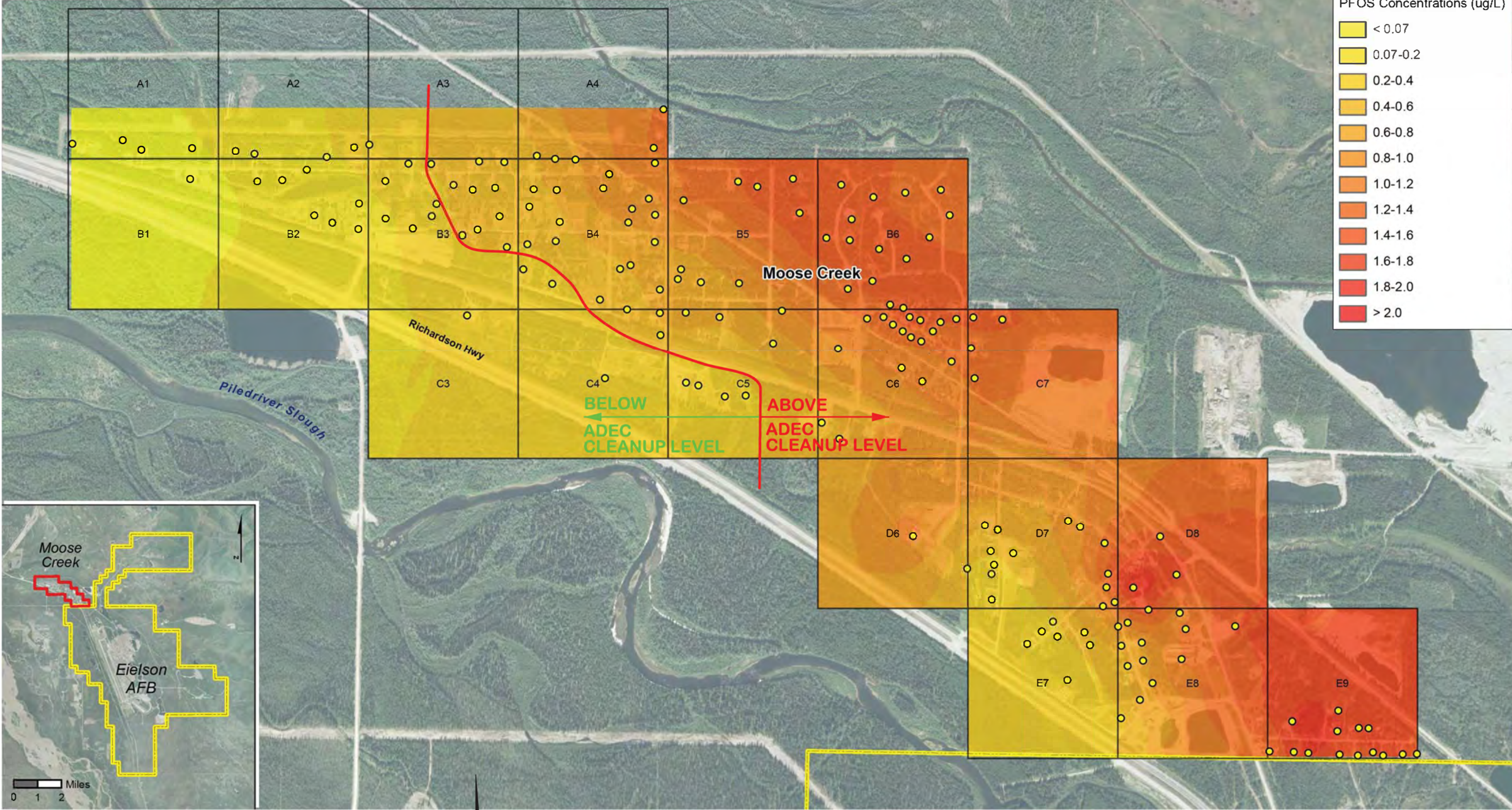
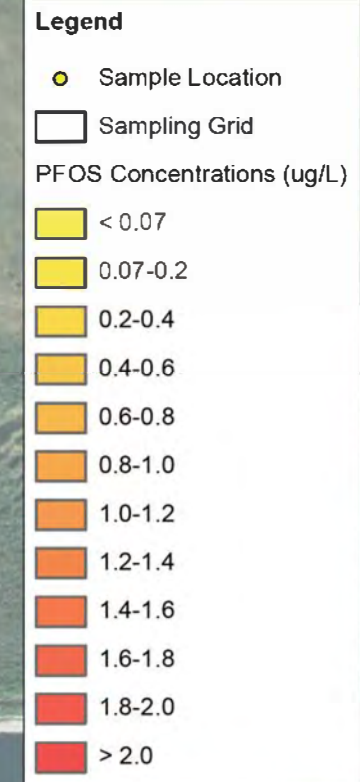
COMMUNITY OF MOOSE CREEK
PFOA AND PFOS RESULTS
UP TO 30 JUNE 2016

FILE: C:\D\CAD\proj\AFCEC\2016 Eielson-Moose Creek ROD_185750715\CE-final-August 6 2016\Fig 2-2 Moose Creek_PFOA-PFOS results.dgn
TIME: 06-AUG-2016 15:20

(This page intentionally left blank.)

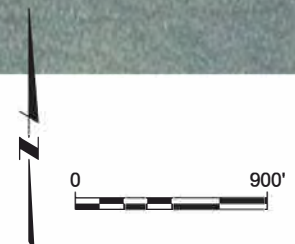
Note:
Concentrations above 0.4 ug/L exceed the groundwater cleanup level (ADEC).

Data Sources:
Jacobs 2015; EA 2016; Imagery: Alaska Mapped, Geographic Information Network of Alaska 2007



FILE: C:\D\CAD\proj\W\F\CEC\2016 Eielson-Moose Creek ROD_185750715\CE-final-August 6 2016\Fig 2-3 Moose Creek PFOS results.dgn
TIME: 06-AUG-2018 15:22

Source:
EA Engineering Science, and Technology, Inc., PBC
2nd Quarter Report (2016) on Moose Creek Area Inspections,
Sampling & Analysis, Treatment, and Construction
Moose Creek Area
Figure 3- Moose Creek PFOS Results through 30 June 2016



UNITED STATES AIR FORCE
EIELSON AFB
INTERIM RECORD OF DECISION FOR
COMMUNITY OF MOOSE CREEK, ALASKA,
LONG-TERM WATER SUPPLY

COMMUNITY OF MOOSE CREEK
PFOS RESULTS
UP TO 30 JUNE 2016

FIGURE
2-3
185750715.
100.06010403

(This page intentionally left blank.)

Neither PFOS nor PFOA is a listed CERCLA hazardous substance (Title 40 CFR Part 302, Table 302.4). Both the USAF and regulators have determined that PFOS and PFOA are “pollutants or contaminants”, as defined by CERCLA (42 USC § 9601(33)). ADEC has listed both PFOS and PFOA as hazardous substances under 18 Alaska Administrative Code (AAC) 75, and each has a groundwater cleanup level of 0.40 µg/L (ADEC, 2018). This standard prevents the use of water above the ADEC cleanup level without treatment.

2.7.1.2 Exposure Assessment

Based on the current sampling data and the limited scope of this I-ROD, the route of exposure in the community of Moose Creek is the ingestion of groundwater. Potentially exposed populations are Moose Creek community residents or businesses that use groundwater as a drinking water source. However, the USAF undertook emergency and TCRA responses in the community, providing bottled water and then installing GAC filter systems and a tanked water delivery system to mitigate human health risks (USAF, 2018). Exposure pathways for dermal contact and ingestion of plants irrigated with contaminated water will be discussed in the Final ROD.

ADEC regulations prohibit the discharge of contaminated groundwater to the environment (ADEC, 2018). This limits the use of groundwater within the Moose Creek community, because the PFOS and PFOA contaminated water cannot be used for activities such as watering a garden or washing a car (USAF, 2018).

2.7.1.3 Toxicity Assessment

The health effects associated with exposures to PFOS and PFOA include: developmental effects to fetuses during pregnancy or to breastfed infants (low birth weight, accelerated puberty, skeletal variations); kidney toxicity; immune effects (reduced antibody production in response to vaccination); thyroid disease; and increased cholesterol (USEPA, 2016d). There is limited evidence of an association between exposure to PFOA and an increased risk of kidney and testicular cancer, but under EPA’s Guidelines for Carcinogen Risk Assessment, both PFOA and PFOS are considered as having “Suggestive Evidence of Carcinogenic Potential” (USEPA, 2016a, 2016b).

2.7.2 Summary of Ecological Risk Assessment

The ecological risk profile of PFOS and PFOAs is not yet known, and there is insufficient impact data available currently to perform a quantitative ecological risk assessment.

2.7.3 Basis for Action

The response action selected in this I-ROD is necessary to protect public health or welfare from actual or threatened releases of pollutants, or contaminants that may present an imminent and substantial endangerment to public health or welfare. Both the USAF and regulators have determined that PFOS and PFOA are “pollutants or contaminants”, as defined by CERCLA (42 USC § 9601(33)). The State of Alaska includes PFOS and PFOA as hazardous substances under 18 AAC 75 (ADEC, 2018)

2.8 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) provide a general description of what the cleanup will accomplish and serve as the design basis for the remedial alternatives evaluated in this I-ROD (USEPA, 1999). RAOs are media-specific or site-specific goals for protecting human health and the environment that are established based on the nature and extent of the contamination, the resources that are currently and potentially threatened, and the potential for human and environmental exposure.

PFOS and PFOA are present in the Moose Creek community’s groundwater at concentrations that exceed both the 2016 EPA HA values developed by the EPA and the ADEC groundwater cleanup levels for PFOS and PFOA. In the absence of promulgated standards for PFOS and PFOA in drinking water, interim RAOs established in this I-ROD to protect human health are based on the 2016 EPA HA values issued by the EPA and the 2018 Action levels developed by ADEC, as well as any environmental impacts from the use of domestic water. Final RAOs and cleanup goals will be established in the Final ROD for the community of Moose Creek.

The interim RAO for the Moose Creek community is to protect human health by preventing human ingestion of PFAS-contaminated groundwater that exceeds the 2016 EPA HA value of 0.070 µg/L and the 2018 Action levels developed by ADEC. Because of the limited scope of this I-ROD, no ecological RAOs were developed. The cleanup levels are summarized in **Table 2-1**.

Table 2-1 Drinking Water Cleanup Levels

Media	Parameter	Clean-Up Level	Basis
Drinking Water	PFOS	0.070 µg/L	EPA HA
	PFOA	0.070 µg/L	EPA HA
	PFOS+PFOA	0.070 µg/L	EPA HA

Key:

µg/L – micrograms per liter

EPA – U.S. Environmental Protection Agency

EPA HA – EPA Drinking water lifetime health advisory (USEPA, 2016b or 2016c).

PFOA – perfluorooctanoic acid

PFOS – perfluorooctane sulfonate

2.9 DESCRIPTION OF ALTERNATIVES

In the IFS, seven alternatives were developed to meet the interim RAOs (USAF, 2017b). The remedial alternatives are listed in **Table 2-2** and are described in Section 2.9.1. All identified alternatives, except the baseline (no action) alternative, include the implementation of LUCs to prohibit future well installation and use of untreated contaminated groundwater (USAF, 2018).

Table 2-2 Summary of Remedial Alternatives

Alternative	Name	Description
Baseline	No Action	No further action will be taken.
1	North Pole Water Line	Water supply from the North Pole WTP and local distribution system within Moose Creek.
2	EAFB Water Line	Water supply from the EAFB WTP and local distribution system within Moose Creek.
3	Individual Water Tanks	Install water tanks at each of the properties in the community of Moose Creek, and potable water delivery by road tanker.
4	Individual Deep Wells	Install new 250-foot deep wells at each property.
5	Community Deep Well	Water supply from a new deep well in Moose Creek and local distribution system within Moose Creek.
6	Individual GAC Systems	Install GAC water treatment at each of the properties in the community of Moose Creek to treat water from existing shallow wells.
7	Status Quo	Retain the solution implemented as part of the TCRA, which is a composite implementation of Alternatives 3 and 6.

Key:

EAFB – Eielson Air Force Base

GAC – granular activated carbon

TCRA – time critical removal action

WTP – water treatment plant

2.9.1 Description of Remedy Components

All the Remedial Alternatives developed for evaluation must meet the key Applicable or Relevant and Appropriate Requirements (ARARs) which are substantive provisions of any promulgated Federal or more stringent State environmental standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements for a CERCLA site. The full list of ARARs were defined in the IFS and those that apply to the proposed alternative are discussed in Section 2.10.2; however, the following are identified as the key ARARs that apply to all Alternatives:

- Drinking water protection – No federal promulgated standards exist for PFAS; however; the EPA has established drinking water HA levels in EPA-822-R-16-004 (USEPA 2016a) and EPA-822-R-16-005 (USEPA 2016b) for PFOS and PFOA, respectively., also SDWA (40 CFR 141).
- Groundwater human health protection – ADEC 18 AAC 75.345(b) Table C. This prevents the discharge of water above stated concentrations without treatment into the environment, this would be for non-potable uses at the properties and their septic tank leach fields.

2.9.1.1 Baseline – No Action

The baseline alternative is included, as required by the CERCLA process. For this alternative, it is assumed no further work will be conducted to maintain the water treatment systems installed as part of the TCRA. This will mean:

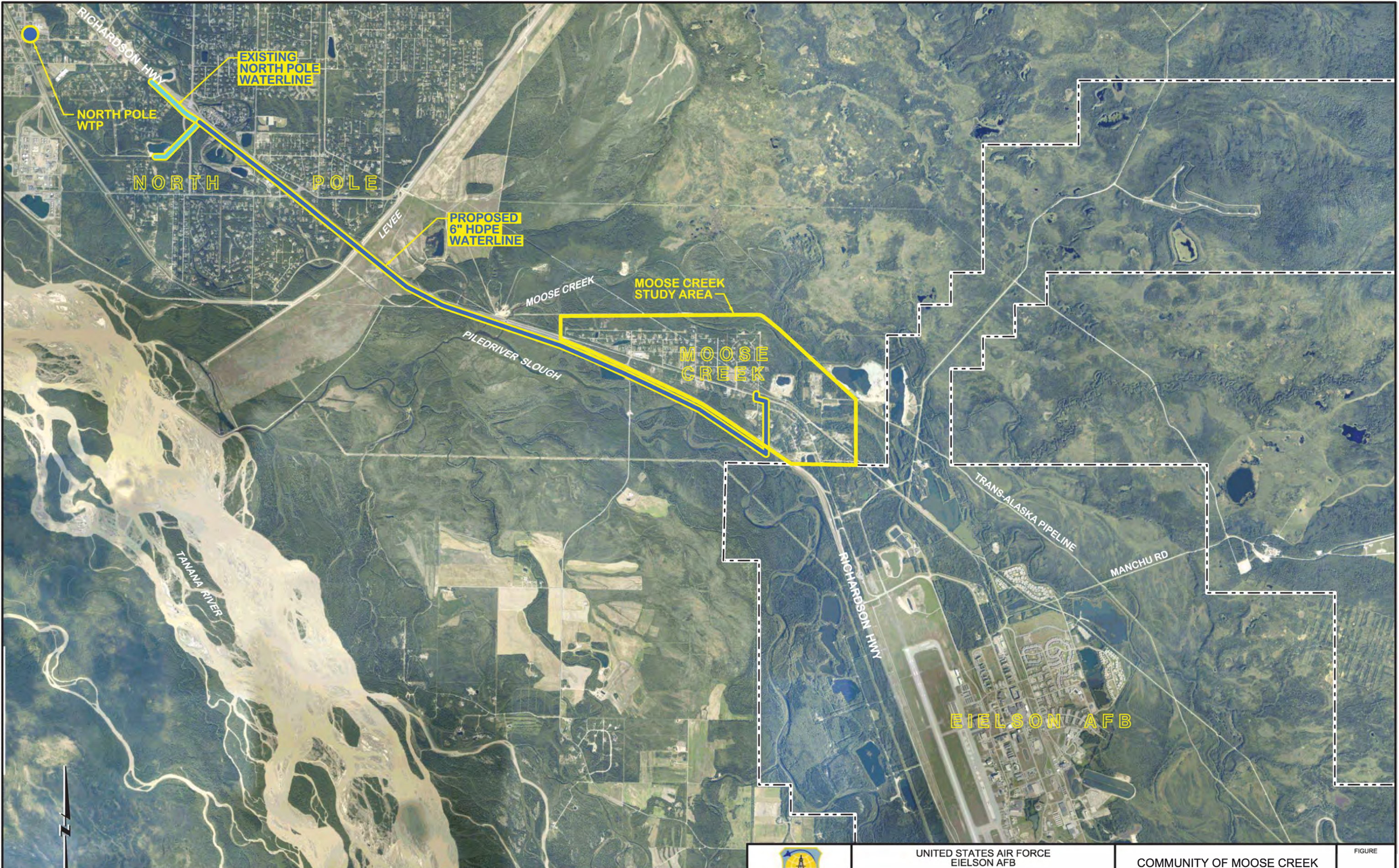
- The currently installed GAC systems would eventually fail to operate and water tanks and 5-gallon carboys at properties will no longer be filled.
- Residents would be required to find alternative drinking water sources or, potentially, this would mean that no safe water was available at the properties for either potable or outdoor use.

This does not meet protection of human health or either of the key ARAR requirements. It is the only remedial alternative included in the evaluation that does not meet the key ARAR requirements.

2.9.1.2 Alternative 1 – North Pole Water Line

Under Alternative 1 (North Pole Water Line), potable water would be supplied to the Moose Creek community by the North Pole WTP. Components included in this alternative are as follows:

- A new water main would carry water from the North Pole WTP to the community, as illustrated on **Figure 2-4**. The North Pole water supply is located approximately 5 miles downgradient of Moose Creek and has been shown to be free of PFOS and PFOA at concentrations above the HA (USAF, 2018). Routine sampling indicates that the North Pole water supply meets all Federal and State requirements. In addition, sulfolane has not been detected in the North Pole water supply (City of North Pole, 2016).
- A local distribution system would be constructed. **Figure 2-5** shows the proposed local distribution system, holding tank, and circulation pumping station. The new holding tank would allow balancing of local demands on the existing North Pole WTP. The local distribution system would need to be pressurized and circulated with heat input to prevent freezing during winter. Local connections would be made to properties in the community of Moose Creek.
- The new system would be maintained and operated by the North Pole Municipality, which would collect water use charges from property owners and operate and maintain the system for the residents of Moose Creek.
- LUCs would be required to prohibit the use of contaminated groundwater. The LUCs will include a CWMA. This will be drafted to legally prohibit the use of groundwater and the installation of new water wells within the CWMA designated zone. The UECA will require the recording of environmental covenants on all impacted real properties.
- The CWMA would require existing wells in the community of Moose Creek to be decommissioned by the USAF to prohibit the continued use of groundwater within the CWMA. In addition, the previously installed water tanks, GAC systems, and 5-gallon carboys would be removed, and tanker and bottled water delivery would stop.



0 3600'



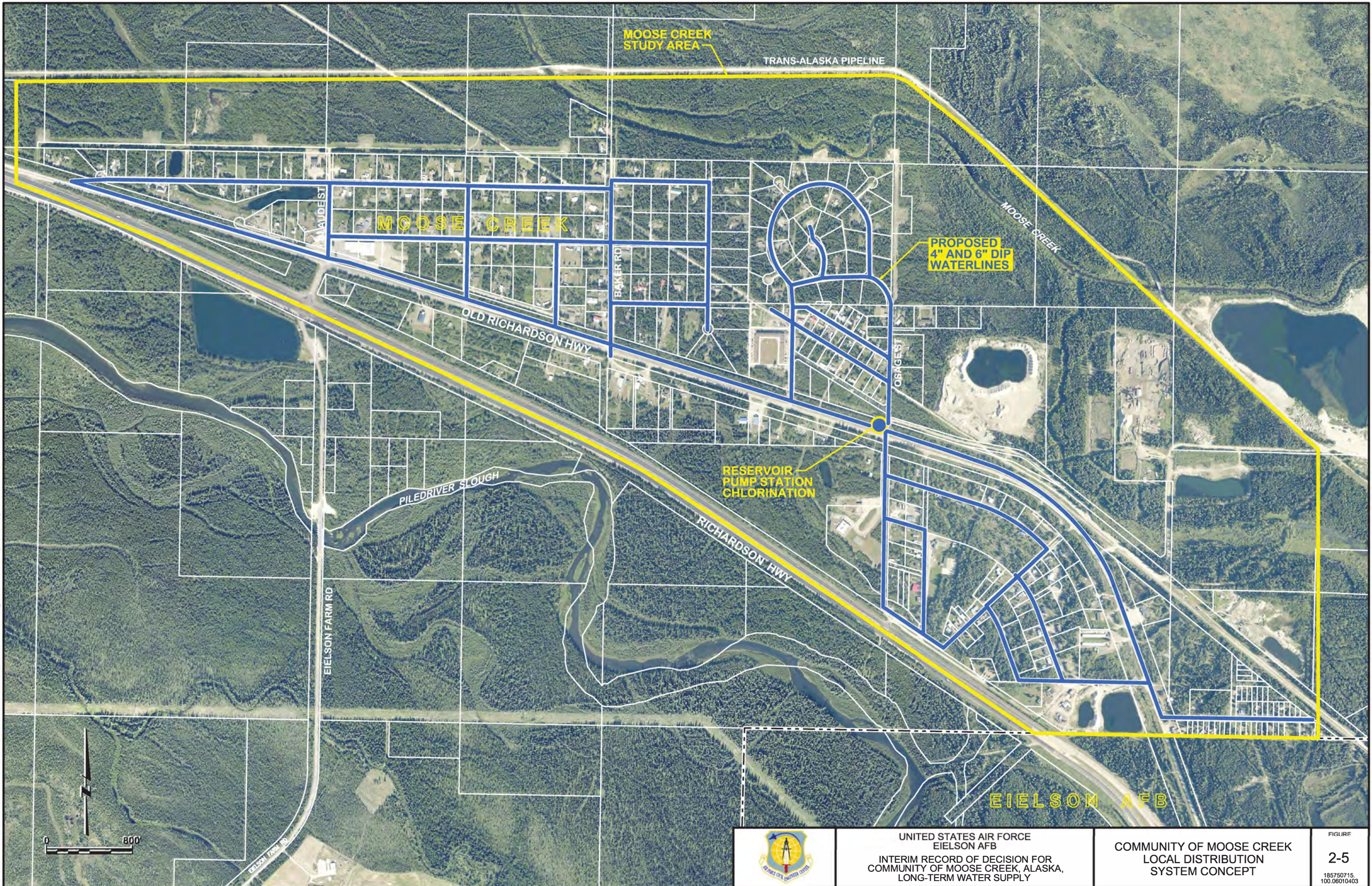
UNITED STATES AIR FORCE
 EIELSON AFB
 INTERIM RECORD OF DECISION FOR
 COMMUNITY OF MOOSE CREEK, ALASKA,
 LONG-TERM WATER SUPPLY

COMMUNITY OF MOOSE CREEK
 NORTH POLE MUNICIPALITY
 WATER SUPPLY MAIN

FIGURE
 2-4
 185750715,
 100.06010403

(This page left intentionally left blank.)

FILE: C:\D\CAD\Proj\AFCEC\2018 Eielson-Moose Creek ROD_185750715-2-Final-August 6 2018\Fig 2-5 Moose Creek Local Distribution System Concept.dgn
TIME: 06-AUG-2018 15:26



UNITED STATES AIR FORCE
EIELSON AFB
INTERIM RECORD OF DECISION FOR
COMMUNITY OF MOOSE CREEK, ALASKA,
LONG-TERM WATER SUPPLY

COMMUNITY OF MOOSE CREEK
LOCAL DISTRIBUTION
SYSTEM CONCEPT

FIGURE
2-5
185750715.
100.06010403

(This page left intentionally left blank.)

It is estimated that this alternative would take 2 to 3 years to implement, with a total lifetime net present value (NPV) of \$39,604,000. The 30-year operating costs, used to compare alternatives, is based on the design standard of 90 gallons per person per day. Current household use is estimated to be less than this amount (ADEC, 2017), resulting in an estimated cost of between \$40 to \$85 per month per household.

2.9.1.3 Alternative 2 – EAFB Water Line

Under Alternative 2 (EAFB Water Line), potable water would be supplied to the Moose Creek community by the USAF from the EAFB WTP. Components included in this alternative are as follows:

- A new water main would carry water from the EAFB WTP to the Moose Creek community, as illustrated on **Figure 2-6**, where it would be distributed via a local distribution system.
- As with Alternative 1, a local distribution system would be constructed. Figure 2-5 shows the proposed local distribution system, holding tank, and circulation pumping station. The new holding tank would allow balancing of local demands on the existing EAFB WTP. The local distribution system would need to be pressurized and circulated with heat input to prevent freezing during winter. Local connections would be made to properties in the community of Moose Creek.
- A new operating authority would collect water charges from property owners and operate and maintain the system for the residents of Moose Creek.
- LUCs would be required to prohibit the use of contaminated groundwater. The LUCs will include a CWMA. This will be drafted to legally prohibit the use of groundwater and the installation of new water wells within the CWMA designated zone. The UECA will require the recording of environmental covenants on all impacted real properties.
- The CWMA would require existing wells in the community of Moose Creek to be decommissioned by the USAF to prohibit the continued use of groundwater within the CWMA. In addition, the previously installed water tanks, GAC systems, and 5-gallon carboys would be removed, and tanker and bottled water delivery would stop.

It is estimated that this alternative would take 2 to 3 years to implement, with a total lifetime NPV of \$36,119,000. The 30-year operating costs, used to compare alternatives, is based on the design standard of 90 gallons per person per day. Current household use is estimated to be less than this amount (ADEC, 2017), resulting in an estimated cost of between \$40 to \$85 per month per household.

2.9.1.4 Alternative 3 – Individual Water Tanks

Under Alternative 3 (Individual Water Tanks), water tanks would be installed within the community of Moose Creek. Currently, 98 properties have water tanks and installed. Components included in this alternative are as follows:

- The 64 GAC water filters and two 5-gallon carboys currently in place would be removed and water tanks would be installed at those residences, an additional 36 properties have been allowed for residences without one of these systems and future population growth.

- Because ADEC regulations prohibit the discharge of contaminated groundwater to the environment, the existing 98 water tanks at each property would be required to have sufficient capacity and ability to supply both potable and non-potable water to its respective property.
- The USAF would continue to monitor and maintain the tanks and supply water to the community of Moose Creek. Water deliveries would be by road tanker when the water tank level dropped sufficiently to allow a delivery.
- LUCs would be required to prohibit the use of contaminated groundwater. The LUCs will include a CWMA. This will be drafted to legally prohibit the use of groundwater and the installation of new water wells within the CWMA designated zone. The UECA will require the recording of environmental covenants on all impacted real properties.
- The CWMA would require existing wells in the community of Moose Creek to be decommissioned by the USAF to prohibit the continued use of groundwater within the CWMA. In addition, the previously installed GAC systems and 5-gallon carboys will be removed, and tanker and bottled water delivery would stop.

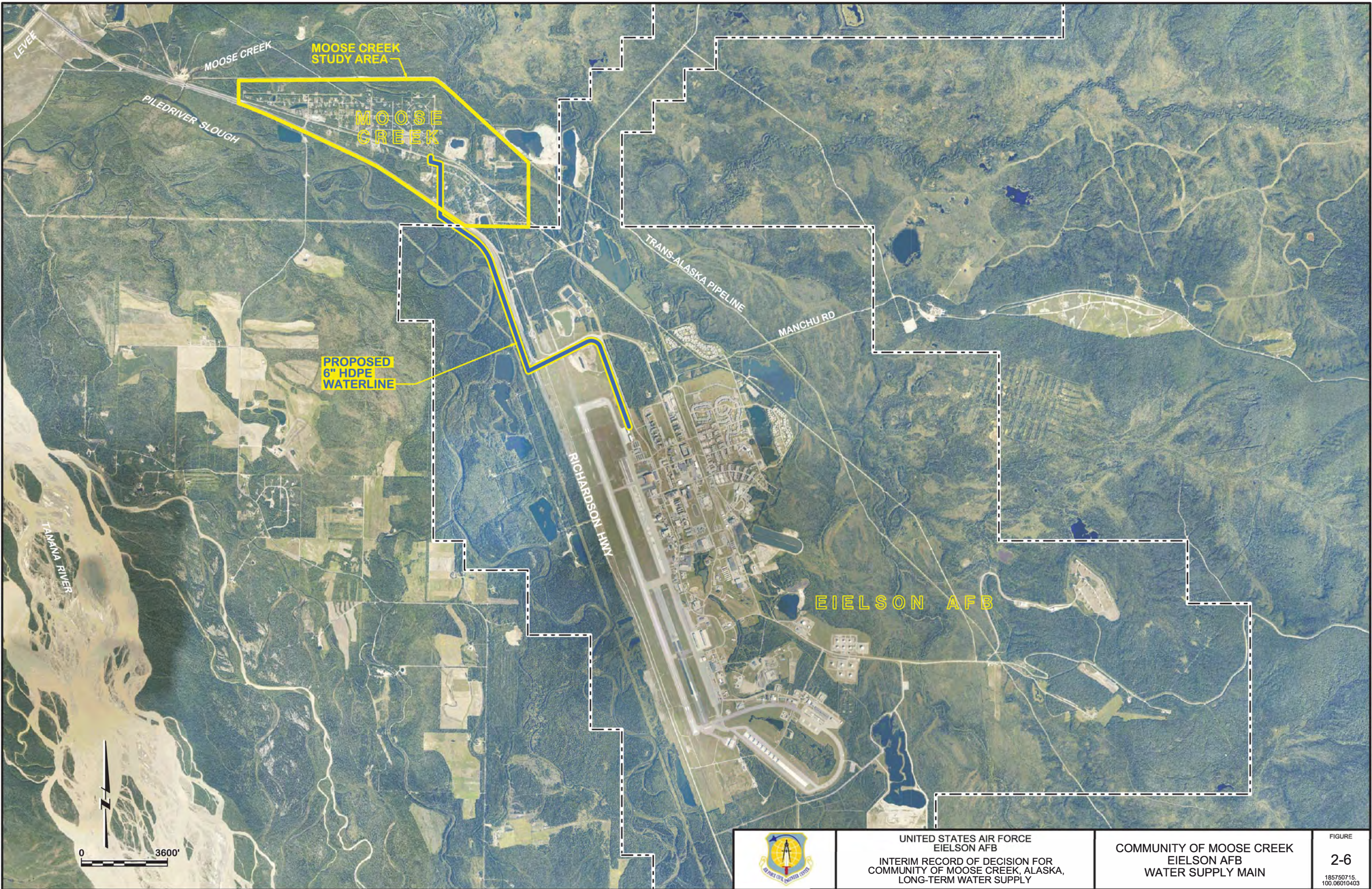
It is estimated that this alternative would take 1 to 2 years to implement, with a total lifetime NPV of \$41,760,000.

2.9.1.5 Alternative 4 – Individual Deep Wells

Under Alternative 4 (Individual Deep Wells), a deep well would be installed at each property to replace the existing shallow well. Currently, all residences in the community of Moose Creek have wells that are approximately 50 feet deep. A test well has shown that groundwater below 200 feet is uncontaminated with PFOS or PFOA. Components included in this alternative are as follows:

- The USAF would install a 250-foot deep well at each affected property. A new pump would be required, but all other piping could be reused to supply potable and non-potable uses. Iron and manganese removal is not included for wells serving individual properties.
- The property owners would be responsible for monitoring and maintaining the new wells and associated pumps and systems once installation is complete.
- LUCs would be required to prohibit the use of contaminated groundwater. The LUCs will include a CWMA. This will be drafted to legally prohibit the use of groundwater and the installation of new water wells within the CWMA designated zone. The UECA will require the recording of environmental covenants on all impacted real properties.
- The CWMA would require existing shallow wells in the community of Moose Creek to be decommissioned by the USAF to prevent continued use of shallow groundwater within the CWMA. In addition, the previously installed water tanks, GAC systems, and 5-gallon carboys would be removed, and tanker and bottled water delivery would stop.

It is estimated that this alternative would take 1 to 2 years to implement, with a total lifetime NPV of \$32,626,000.



UNITED STATES AIR FORCE
EIELSON AFB
INTERIM RECORD OF DECISION FOR
COMMUNITY OF MOOSE CREEK, ALASKA,
LONG-TERM WATER SUPPLY

COMMUNITY OF MOOSE CREEK
EIELSON AFB
WATER SUPPLY MAIN

FIGURE
2-6
185750715.
100.06010403

(This page left intentionally left blank.)

2.9.1.6 Alternative 5 – Community Deep Well

Under Alternative 5 (Community Deep Well), a deep well would be provided to supply water from below the PFOS and PFOA plume to the community of Moose Creek. A test well has shown that groundwater below 200 feet is uncontaminated with PFOS and PFOAs. Components included in this alternative are as follows:

- The USAF would install a 250-foot deep well, as shown on **Figure 2-7**. The water from the new well would be treated to remove manganese and iron and discharged into a local supply reservoir.
- As with Alternatives 1 and 2, a local distribution system would be constructed. The local distribution system would need to be pressurized and circulated with heat input to prevent freezing during winter. Local connections would be made to properties in the community of Moose Creek.
- A new operating authority would collect water use charges from property owners and operate and maintain the system for the residents of Moose Creek.
- LUCs would be required to prohibit the use of contaminated groundwater. The LUCs will include a CWMA. This will be drafted to legally prohibit the use of groundwater and the installation of new water wells within the CWMA designated zone. The UECA will require the recording of environmental covenants on all impacted real properties.
- The CWMA would require existing shallow wells in the community of Moose Creek would be decommissioned by the USAF to prohibit the continued use of contaminated groundwater within the area. In addition, the previously installed water tanks, GAC systems, and 5-gallon carboys would be removed, and tanker and bottled water delivery would stop.

It is estimated that this alternative would take 2 to 3 years to implement, with a total lifetime NPV of \$37,905,000. The 30-year operating costs, used to compare alternatives, is based on the design standard of 90 gallons per person per day. Current household use is estimated to be less than this amount (ADEC, 2017), resulting in an estimated cost of between \$45 to \$95 per month per household.

2.9.1.7 Alternative 6 – Individual GAC Systems

Under Alternative 6 (Individual GAC Systems), GAC water filters would be installed within the community of Moose Creek. Currently, 64 properties have GAC water filters installed. Components included in this alternative are as follows:

- The 98 previously installed water tanks and two 5-gallon carboys would be removed and GAC water filters would be installed at those residences. An additional 36 properties have been allowed for residences without one of these systems and future population growth, and tanker and bottled water delivery would stop.
- Because ADEC regulations prohibit the discharge of contaminated groundwater to the environment, the water distribution system at each property would require modification to ensure both potable and non-potable water is treated.

- The USAF would continue to monitor and sample water and be responsible for maintenance of installed systems.
- LUCs would be required to prohibit the use of contaminated groundwater. The LUCs will include a CWMA. This will be drafted to legally prohibit the use of groundwater and the installation of new water wells within the CWMA designated zone. The UECA will require the recording of environmental covenants on all impacted real properties.
- The CWMA would require any existing wells in the community of Moose Creek without installed GAC filters to be decommissioned by the USAF to prevent continued use of untreated water within the CWMA.

It is estimated that this alternative would take 1 to 2 years to implement, with a total lifetime NPV of \$67,423,000.

2.9.1.8 Alternative 7 – Status Quo

Under Alternative 7 (Status Quo), there would be no change to the solution implemented at each residence as part of the TCRA. Currently, 64 properties have GAC water filters installed, 98 have water tanks, two have 5-gallon carboys, and six receive bottled water deliveries. Components included in this alternative are as follows:

- The 98 water tanks currently in place and the 64 installed GAC water filters would remain. An additional 36 properties have been allowed for residences without one of the systems and for future population growth.
- Because ADEC regulations prohibit the discharge of contaminated groundwater to the environment, the existing systems would require modification to ensure that only delivered water or GAC-treated water would be used for both potable and non-potable uses.
- The USAF would continue to monitor and sample water and be responsible for maintenance of installed systems.
- LUCs would be required to prohibit the use of contaminated groundwater. The LUCs will include a CWMA. This will be drafted to legally prohibit the use of groundwater and the installation of new water wells within the CWMA designated zone. The UECA will require the recording of environmental covenants on all impacted real properties.
- The CWMA would require any existing wells at residences without GAC treatment in the community of Moose Creek to be decommissioned by the USAF to prevent the continued use of contaminated groundwater within the CWMA.
- It is estimated that this alternative would take 1 year to implement, with a total lifetime NPV of \$49,638,000.

2.9.2 Common Elements and Distinguishing Features of Each Alternative

There are several common elements among the identified alternatives. The following elements are included in all identified alternatives except the baseline (no action) alternative:

- Implementation of LUCs in the form of a CWMA and compliance with UECA to prohibit the use of untreated, contaminated groundwater.

(This page left intentionally left blank.)

- Elimination of the human health threat posed by PFOS and PFOA in domestic water.

In addition, all alternatives except the baseline (no action) alternative would comply with Federal and State requirements that are applicable or relevant and appropriate. The identified alternatives also have the following distinguishing features:

- Alternatives 1 and 2 use existing, known water sources that comply with all drinking water requirements.
- Alternatives 1, 2, and 5 require construction of a distribution system to transport water to individual residences.
- Alternatives 3 and 7 require frequent water deliveries by a road tanker, whereas all other alternatives rely on distribution systems or wells to provide potable and non-potable water.
- Alternatives 4 and 5 require the installation of new, deep wells.
- Alternatives 6 and 7 require frequent maintenance and water testing.

2.9.3 Expected Outcomes of Each Alternative

The expected outcome of all alternatives except the baseline (no action) alternative would be a potable water supply for the community of Moose Creek. The Final ROD will evaluate additional outcomes and determine a timeframe to achieve cleanup levels.

2.10 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This section of the I-ROD summarizes the comparative analysis of alternatives that was presented in the detailed analysis section of the IFS (USAF, 2017b). The seven alternatives were evaluated individually and against each other based on nine criteria identified in CERCLA Section 121(b) and the NCP Section 300.430(f)(5)(i). These criteria provide grounds for comparison of the relative performance of the alternatives and identify their advantages and disadvantages. Evaluating against the nine criteria provides sufficient information to adequately compare the alternatives and to eventually select the most appropriate approach for a site.

The nine criteria are divided into three groups: threshold criteria, balancing criteria, and modifying criteria. *Threshold* criteria must be achieved by an alternative for it to be eligible for further consideration and analyses. *Balancing* and *modifying* criteria are then used to establish the rationale for choosing the most appropriate alternative. The results of this evaluation are used to identify a selected remedy. The relative performance of each alternative, when compared to the nine criteria, and how it compares to the other alternatives under consideration are discussed in the following subsections and summarized in **Table 2-3**. Because the baseline (no action) alternative fails to meet both threshold criteria, this alternative was eliminated from evaluation under the primary balancing and modifying criteria.

Table 2-3 Potable Water Supply Alternatives Comparative Evaluation

Criteria	Alternative							
	Baseline	1	2	3	4	5	6	7
	No Action	North Pole Water Line	EAFB Water Line	Individual Water Tanks	Individual Deep Wells	Community Deep Well	Individual GAC Systems	Status Quo
Threshold Criteria								
Protection of Human Health & Environment	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Compliance with ARARs/TBCs	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Primary Balancing Criteria								
Long-term Effectiveness & Permanence	Low	High	High	Medium	Medium	Medium	Medium	Medium
Reduction in Toxicity, Mobility, or Volume through Treatment	None	None	Low	None	None	None	Low	Low
Short-term Effectiveness	Low	Medium	Medium	High	Medium	Medium	High	High
Implementability	High	Medium	Medium	High	Medium	High	Medium	High
Estimated Costs								
Capital Costs	\$0	\$25,168,000	\$21,683,000	\$2,146,000	\$26,905,000	\$22,025,000	\$1,753,000	\$904,000
NPV of Recurring Cost of 0.7%	\$0	\$14,436,000	\$14,436,000	\$39,614,000	\$5,721,000	\$15,880,000	\$65,670,000	\$48,734,000
Total NPV at 0.7%	\$0	\$39,604,000	\$36,119,000	\$41,760,000	\$32,626,000	\$37,905,000	\$67,423,000	\$49,638,000

Key:

% – percent

ARARs – applicable or relevant and appropriate requirements

EAFB – Eielson Air Force Base

GAC – granulated activated carbon

NPV – net present value

TBCs – to be considered

2.10.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment is the first threshold criterion. However, this interim action is limited in scope and addresses only contaminated groundwater that serves as the Moose Creek community's domestic water source. The selected interim action is required to protect human health and the environmental impacts from the use of domestic water in the short-term, while a final remedial solution is being developed. Protection of the environment will be addressed in the Final ROD.

This criterion addresses whether each alternative provides adequate protection of human health and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls (ICs).

All the alternatives, except for the baseline (no action) alternative, would provide adequate protection of human health by eliminating, reducing, or controlling risk through provision of water, treatment and/or LUCs. Alternatives 1, 2, 3, 4, 5, and elements of Alternative 7 eliminate risk of exposure to PFOS and PFOA by providing water from uncontaminated water supplies and implementing LUCs. Alternative 6 and elements of Alternative 7 control risk through treatment of PFOS and PFOA contaminated groundwater and LUCs. Therefore, Alternatives 1 through 7 **pass** this criterion.

2.10.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations, which are collectively referred to as "applicable or relevant and appropriate requirements (ARARs)," unless such ARARs are waived under CERCLA section 121(d)(4). Criteria to be considered (TBC) are non-promulgated advisories or guidance issued by Federal or State government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

ARARs fall into three categories: chemical-specific, location-specific, and action-specific. *Chemical-specific* ARARs are health-based or risk-management-based numbers that provide concentration limits for the occurrence of a chemical in the environment at agreed-upon points of compliance. *Location-specific* ARARs restrict activities in certain sensitive environments. *Action-specific* ARARs are activity or technology-based controls or restrictions for particular treatment and disposal activities related to the management of hazardous wastes.

Table 2-4 summarizes the ARARs for the selected remedy at the community of Moose Creek, as defined in the IFS, and describes how the selected remedy addresses each one at agreed-upon points of compliance.

Compliance with ARARs addresses whether an alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site. Compliance with ARARs is the second threshold criterion. This criterion identifies whether a remedy will meet all the ARARs or provide the basis for invoking a waiver.

All alternatives, except for the baseline (no action) alternative, meet the Federal and State ARARs. Therefore, Alternatives 1 through 7 **Pass** this criterion.

2.10.3 Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence criterion is one of the primary balancing criteria. This criterion refers to the expected residual risk and evaluates the ability of a remedy to maintain reliable protection of human health over time, once cleanup levels have been met. This criterion also includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternatives 1 and 2 use existing, known water sources that comply with all drinking water requirements, and the water would be distributed to the residents by a permanent, piped system. As a result, these alternatives are rated **High**.

Alternative 3 requires a high level of frequent water deliveries. Frequent water tank deliveries will cause additional wear and tear on roads. If further residential construction occurs in the Moose Creek community, these issues will increase. As a result, this alternative is rated **Medium**.

Alternatives 4 and 5 require new deep wells. There is concern that PFOS and PFOA could be drawn down to the lower aquifer, resulting in similar contamination issues as experienced by the current shallow wells. Alternative 5 would also result in an isolated residential water supply system, close to an existing system, which is unlikely to present as reliable a water supply option as Alternatives 1 and 2. As a result, these alternatives are rated **Medium**.

Alternatives 6 and 7 require high levels of frequent maintenance and testing. ADEC regulations prohibit the discharge of contaminated groundwater to the environment, so existing systems would require modification to ensure that only delivered water or GAC-treated water is used for both potable and non-potable uses. Preventing discharges would be difficult with the numerous separate systems in the individual properties in Moose Creek. As a result, these alternatives are rated **Medium**.

Table 2-4 Description of ARARs for the Selected Remedy

Source	Standard, Requirement, Criterion, Limitation	Description of Standard	Status	Selected Remedy ¹ Points of Compliance
Chemical-Specific ARAR				
EPA Drinking Water Health Advisory for PFOS	EPA-822-F-16-004. May 2016.	Establishes lifetime HA levels for PFOS in drinking water at 70 ppt.	TBC	The selected remedy will supply potable drinking water in compliance with HAs for PFOS
EPA Drinking Water Health Advisory for PFOA	EPA-822-F-16-005. May 2016.	Establishes lifetime HA levels for PFOS in drinking water at 70 ppt.	TBC	The selected remedy will supply potable drinking water in compliance with HAs for PFOA
ADEC, Oil and Other Hazardous Substances Pollution Control	18 AAC 75 .345(b) Table C	Provides for the reporting, investigation, and cleanup of hazardous substances, the regulation for PFOS and PFOA in groundwater at 0.4 µg/L	Applicable	The selected remedy will supply water in compliance with groundwater protection requirements.
Location-Specific ARAR				
None				
Action-Specific ARAR				
Safe Drinking Water Act (42 USC 3), National Primary Drinking Water Standards,	40 CFR 141 .1 to .861	Establishes drinking water standards for public water systems. However, no numeric value for PFOS or PFOA cleanup level have been established.	Relevant & Appropriate	The selected remedy will supply potable drinking water in compliance with public water systems.
National Oil and Hazardous Substances Pollution Contingency Plan, Remedial investigation/feasibility study and selection of remedy	40 CFR 300 .430(e)(2)(i)(B) & (C)	Establishes non-zero MCLGs quality goals. However, no value has been established for PFOS and PFOA.	Relevant & Appropriate	(1) If the MCLGs are above zero, then the MCLGs are ARAR; (2) If the MCLGs are zero, then use the MCLs for those contaminants.
Alaska Drinking Water Standards	18 AAC 80 .200 -235	Public Water System Review and Approval Requirements	Applicable	Extending the existing public water distribution system will require ADEC review and approval.

Table 2-4 (Cont.) Description of ARARs for the Selected Remedy

Key:

1 – The selected interim remedy is to supply potable water from North Pole municipality water treatment plant via new water main. At the community of Moose Creek, a water reservoir and pumping station will supply water to a local distribution system supplying water to each property. North Pole Municipality will operate the new water supply system for the community.

µg/L – micrograms per liter

AAC – Alaska Administrative Code

ADEC – Alaska Department of Environmental Conservation

ARAR – Applicable or Relevant and Appropriate Requirements

CFR – Code of Federal Regulations

EPA – U.S. Environmental Protection Agency

HA – EPA drinking water lifetime health advisory

MCL – Maximum Contaminant Level

MCLG – Maximum Contaminant Level Goal

mg/kg – milligrams per kilogram

PFOA – perfluorooctanoic acid

PFOS – perfluorooctane sulfonic

ppt – part per thousand

TBC – To Be Considered

USC – United States Code

Reviews at least every 5 years, as required, would be necessary to evaluate the effectiveness of any of these alternatives, because contaminants would remain in groundwater at concentrations above human health risk-based levels.

2.10.4 Reduction of Toxicity, Mobility, or Volume through Treatment

The reduction of toxicity, mobility, or volume of contaminants through treatment criterion is one of the primary balancing criteria. This criterion refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

This action is an interim solution only and is not intended to reduce the toxicity, mobility, or volume of contaminated groundwater through treatment. The statutory preference for remedies that employ treatment to reduce toxicity, mobility, or volume as a principal element will be addressed by the final response action. However, Alternatives 2, 6, and 7 are rated **Low** because there will be some pumping and treatment of the groundwater through the use of GAC systems. Alternatives 1, 3, 4, and 5 do not provide treatment and are rated **None**.

2.10.5 Short-Term Effectiveness

The short-term effectiveness criterion is one of the primary balancing criteria. This criterion addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternatives 3, 6, and 7 have already demonstrated that, where they can be implemented, they can be done in a short time with no risk to residents, workers, or the environment. As a result, these alternatives are rated **High**.

Alternatives 1, 2, 4, and 5 require design and interaction with authorities for permits before they can be implemented. Implementation is anticipated to take up to 2 years once it commences. As a result, these alternatives are rated **Medium**.

2.10.6 Implementability

The implementability criterion is one of the primary balancing criteria. This criterion addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 3 has already been partially implemented and Alternative 7 is fully implemented, except for the LUCs. Therefore, these alternatives are rated **High**.

Alternative 5 will require a location for the deep well and storage tank to be identified. However, this should be able to be accomplished within the community boundary. As a result, this alternative is rated **High**.

Alternative 1 will require a water supply from the City of North Pole, which will have to cross the Chena Flood protection area and, therefore, requires additional engineering. Alternative 2 will

require a water supply from EAFB, which will require the USAF to take on responsibilities outside its core mission. As a result, these alternatives are rated **Medium**.

Alternatives 4 and 6 will require additional design and investigation. During the implementation of the TCRA, the GAC systems could not be easily installed at all locations. Installing deep wells at all residences could be problematic, because very little data is available on the aquifer and it may not be accessible in every location. As a result, these alternatives are rated **Medium**.

2.10.7 Cost

The cost criterion is one of the primary balancing criteria. This criterion includes an evaluation of estimated capital and annual operations and maintenance costs, as well as NPV. NPV is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent (%). To compare the Alternatives over their operating life, NPV will be used to include anticipated operating cost over a 30-year period, as recommended. The rate of return recommended for these projects is 5%. For Federally-funded projects, it is recommended that the current Real Treasury Interest Rates published in Circular A-94 (Appendix C), which is 0.7% (for 2017, 30-Year), is used.

The estimated total NPV for the alternatives ranges from \$32.6 million for Alternative 4 to \$67.4 million for Alternative 6. Alternatives 1, 2, 3, and 5 are all within a 10% range of \$40 million, the median 30-year NPV. Alternative 4 is less expensive, and Alternatives 6 and 7 are more expensive.

2.10.8 State/Support Agency Acceptance

The EPA and ADEC supplied a letter (USEPA, 2018) stating their concurrence with the Preferred Alternative identified in the IPP, of Alternative 1.

2.10.9 Community Acceptance

During the public comment period, the community of Moose Creek residents did not express strong support for any of the alternatives presented in the IPP. Several residents were interested in the USAF buying all the affected properties. Of the alternatives presented in the IPP, the highest level of support within the community appeared to be for Alternative 7 (Status Quo).

The community voiced concerns regarding the financial impact of the water utility rates associated with Alternatives 1, 2, and 5. However, a large number of people wished to discuss the details of how Alternative 1 was to be implemented, including ensuring that connections to properties were included in capital project and making good use of Borough-owned land within the community for the reservoir and pumping station. The City of North Pole passed a resolution on 17 July 2017 in support of expanding the North Pole WTP to service the community of Moose Creek (City of North Pole, 2017). In addition, the Fairbanks North Star Borough submitted a letter of support from the Mayor voicing the Borough's strong support for Alternative 1. The mayor stated that Alternative 1 provides a long-term solution of providing a clean, reliable source of water to the residents of Moose Creek, despite high estimated capital costs and the 2- to 3-year timeframe for implementation (FNSB, 2018).

2.11 PRINCIPAL THREAT WASTE

The NCP establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable (NCP §300.430(a)(1)(iii)(A)). The “principal threat” concept is applied to the characterization of “source materials” at a site. 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 ground water. This interim remedy does not address PTW. Identification of PTW and approaches to address any identified PTW will be addressed in the final ROD.

2.12 SELECTED REMEDY

The selected remedy is Alternative 1 (North Pole Water Line), which includes upgrades to the City of North Pole WTP, the installation of a new water main from the WTP to the community of Moose Creek, and a water distribution system within the community that will serve each property. Additionally, LUC’s will be put in place to prohibit current and future use of contaminated groundwater.

2.12.1 Summary of the Rationale for the Selected Remedy

Alternative 1 (North Pole Water Line) was selected over the other alternatives because it was assessed as having the highest rating for long-term effectiveness and permanence for the provision of safe drinking water. In addition, this alternative eliminates the human health risk posed by the identified contaminants in the drinking water.

Based on currently available information, the USAF believes the selected remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. However, this is only an interim solution specifically for the Moose Creek drinking water supply.

2.12.2 Description of the Selected Remedy

The selected remedy is to provide potable water supplied by the City of North Pole WTP to the community of Moose Creek. The major components of the selected remedy are discussed below.

New Water Supply to Community:

- The City of North Pole WTP will be upgraded to increase its capacity to allow it to supply the community of Moose Creek that is located approximately 5 miles downgradient. This water source is free of PFOS and PFOA at concentrations above their EPA HA’s (USAF, 2018). Routine sampling indicates that the North Pole water supply meets all Federal and State requirements for safe drinking water.
- A new water main will be installed to connect the WTP to the community of Moose Creek as illustrated on Figure 2-4. The estimated length of the new water main is 17,210 linear feet.

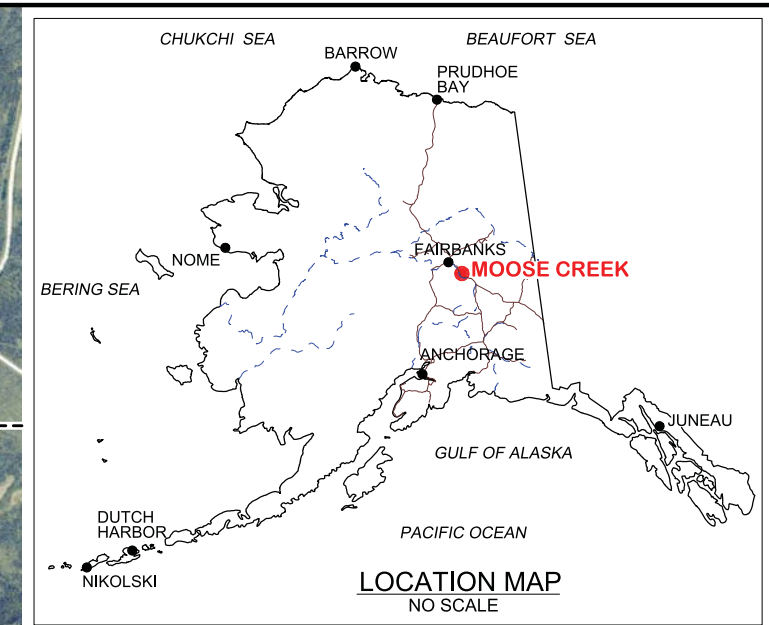
- A 230,000-gallon holding tank and circulation pumping station with water heating by a boiler and heating oil will be installed. A local distribution system will be constructed to serve the whole community.
- Connections will be made to affected properties from the local distribution system in the community of Moose Creek; however, the local distribution system will be designed to serve all properties with wells, including those that do not currently exceed the EPA HA. The estimated length of the distribution lines is 47,640 linear feet.
- 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.
- A CWMA will be implemented, so the existing water supply wells will be decommissioned by the USAF to prevent continued use of groundwater within the area. The water tanks, GAC systems, and 5-gallon water carboys previously installed by the USAF will also be removed.
- The UECA will require the recording of environmental covenants on all impacted real properties in accordance with Alaska statutory law. The USAF will negotiate these 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/LUCs, and 4) place a covenant on the property to prohibit future well installation/contaminated-groundwater use.



Land Use Controls:

LUCs will be established for the community of Moose Creek to prohibit the use of contaminated water above the EPA HA. The Air Force LUC for the Community of Moose Creek are stated below:

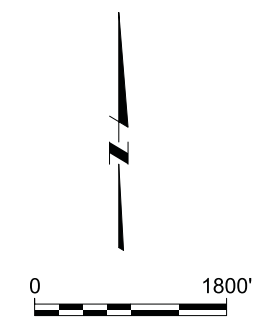
- i. Resource Uses and Risk Exposure Assumptions.**
The Community of Moose Creek is both a residential and industrial community. Groundwater in the aquifer under the area is used for both potable and other household uses, including gardening, as well as some process use at industrial sites.
- ii. Risks Necessitating the LUCs.**
The groundwater is not safe for drinking because it has become contaminated with PFOS and PFOA at levels that exceed the EPA HAs. Additionally, the groundwater is also above the ADEC groundwater clean-up levels for PFOS and PFOA. Accordingly, the base must impose LUCs to ensure the groundwater is not used for domestic water purposes until it is returned to EPA HA levels.
- iii. Performance Objectives of LUCs.**
Prevent access to or use of the groundwater, until EPA HA's are met, and groundwater quality is demonstrated to be suitable for unrestricted use and unlimited exposure (UU/UE).
- iv. Location of LUCs.**
The LUC will be applicable to the area indicated on **Figure 2-8**. The CWMA boundary will be established following further assessment and in accordance with 11 AAC 93.500.

FILE: C:\D\CAD\Proj\AFCEC\2018 Eielson-Moose Creek ROD_185750715\2-fma-August 6 2018\Fig 2-8 Moose Creek Community Land Use Controls.dgn
TIME: 04-SEP-2018 12:46



-  LAND USE CONTROL RESTRICTION
-  INSTALLATION BOUNDARY

NOTES (NOT ALL NOTES APPLY TO ALL PAGES)
1. AFB = AIR FORCE BASE
2. LUC = LAND USE CONTROL. LUC BOUNDARIES DEPICTED ON THIS FIGURE ARE PRELIMINARY PENDING FINAL ANALYSIS OF SURVEY INFORMATION. LUC BOUNDARIES WILL BE UPDATED ONCE THIS INFORMATION IS AVAILABLE.



UNITED STATES AIR FORCE
EIELSON AFB
INTERIM RECORD OF DECISION FOR
COMMUNITY OF MOOSE CREEK, ALASKA,
LONG-TERM WATER SUPPLY

COMMUNITY OF MOOSE CREEK
LAND USE CONTROL

FIGURE
2-8
185750715,
100.06010403

(This page left intentionally left blank.)

v. Duration of LUCs.

The LUCs will be maintained in place on groundwater use until EPA HA's for PFOS and PFOA are achieved.

vi. Description of LUC

The LUCs implemented at Moose Creek will prohibit the use of the contaminated groundwater.

- USAF will petition the State DNR to create a CWMA. The CWMA will be established to legally restrict the use of groundwater and prevent installation of new water wells within the CWMA designated zone. The USAF will monitor compliance with the requirements of the CWMA, and submit an annual report to ADNR and DEC. The USAF will refer instances of non-compliance to ADNR for enforcement actions pursuant to state law.
- In accordance with the UECA (AS 46 .04 et seq) the USAF shall inform affected property owners of the requirements of this act and assist them in establishing an environmental covenant on the real property. The USAF will negotiate these 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/LUCs, and 4) place a covenant on the property to prohibit future well installation/contaminated-groundwater use.

vii. General Performance Responsibility.

The USAF, EPA, ADNR, and ADEC will be responsible for enforcing the CWMA and UECA.

The USAF will be responsible for implementing, maintaining, monitoring, and reporting of LUCs as specified in the Moose Creek Land Use Control Implementation Plan and Land Use Control Management Plan. The Implementation Plan will be developed by the USAF with input from and approval by ADEC and the EPA.

viii. Specific Performance Responsibility to Bind Contractors and Tenants.

The USAF shall inform, monitor, enforce, and bind, where appropriate, real property owners, authorized lessees, tenants, contractors, and other authorized occupants of the site regarding the LUCs affecting the site.

ix. Specific Performance Responsibility for Transferring Sites.

Not Applicable to these LUCs, no land covered is owned by the USAF.

x. Corrective Measures Requirement.

Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs will be addressed by the USAF as soon as practicable, but in no case will the process be initiated later than 10 days after the USAF becomes aware of the breach.

xi. Notification Requirement.

The USAF will notify the EPA, ADEC and ADNR as soon as practicable, but no longer than 10 days after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The USAF will notify the EPA and ADEC regarding the actions the USAF took or may

take to address the breach within 10 days of sending the EPA and ADEC notification of the breach.

xii. Notification to EPA and the State Regarding Land Use Changes

In conformance with the Alaska UECA, an environmental covenant entered into in accordance with AS 46.04.300 – 46.04.390 shall require notification of the USAF 45 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

xiii. Notification of Transfers.

The USAF must provide notice to the EPA, ADNR and ADEC at least 30 days prior to any transfer or sale of covered land so that EPA, ADNR, and ADEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify EPA, ADNR, and ADEC at least 30 days prior to any transfer or sale, then the facility will notify EPA, ADNR, and ADEC as soon as possible but no later than 60 days prior to the transfer or sale of any covered land.

xiv. Concurrence Language.

EAFB shall not modify or terminate LUCs, implementation actions, or land use that are associated with the selected remedy without the approval of the EPA and the opportunity for concurrence by ADEC. EAFB shall seek prior concurrence of the EPA and the State before any anticipated action that may disrupt the effectiveness of the LUCs, or any action that may alter or negate the need for LUCs.

xv. Monitoring and Reporting Language.

Monitoring of the environmental use restrictions and controls will be conducted annually by the USAF. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and provided to the EPA and ADEC. The annual monitoring reports will be used in preparation of the Five-Year Review to evaluate the effectiveness of the remedy.

The annual monitoring report, submitted to the regulatory agencies by the USAF, will evaluate the status of the LUCs and how any LUC deficiencies or inconsistent uses have been addressed. The annual evaluation will address whether the use restrictions and controls referenced above were communicated in the deed(s), whether the owners and state and local agencies were notified of the use restrictions and controls affecting the property, and whether use of the property has conformed to such restrictions and controls.

xvi. Mechanism for Achieving LUC Performance Objectives

The internal procedures that EAFB will use to implement the LUCs include, but are not limited to, the following:

- Develop and document a Moose Creek Land Use Control Implementation Plan.
- Develop and document a Moose Creek Land Use Control Management Plan.

The USAF will notify the EPA and ADEC in advance of any changes to internal procedures associated with the selected remedy that might affect the LUCs.

Monitoring of Remedy Implementation

Because the selected remedy will result in contaminants remaining on-site above human health risk-based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health within 5 years after commencement of the interim remedial action and every 5 years thereafter until the site can support unlimited use and unrestricted exposures (UU/UE).

2.12.3 Summary of the Estimated Remedy Costs

The estimated remedy costs are detailed in the IFS and summarized in **Table 2-5**. This cost is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Difference, or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.12.4 Expected Outcomes of the Selected Remedy

The selected remedy will eliminate human exposure to PFOS and PFOA by providing an alternative drinking water source to the Moose Creek community and decommissioning existing wells, thereby eliminating access to contaminated groundwater. In addition, LUC's will be established to prohibit future groundwater exposures. The selected remedy will, therefore, achieve the interim RAOs identified in this I-ROD for the community of Moose Creek. The Final ROD will evaluate additional outcomes and determine a timeframe to achieve cleanup levels.

Table 2-5 Cost Estimate Summary for the Selected Remedy

Potable Water Supply Component	Unit Cost	Units	Quantity	Cost
Capital Costs				
Upgrade City of North Pole WTP	\$280,000	lump sum	1	\$280,000
New Water Transmission Main	\$100	per linear foot	17,210	\$1,721,000
New Water Transmission Main (Directionally Drilled Section)	\$141	per linear foot	12,800	\$1,808,640
New Local Distribution Mains	\$160	per linear foot	47,640	\$7,622,400
New Local Service Connections	\$3,200	per property	200	\$640,000
New Local Storage Tank	\$1,020,000	lump sum	1	\$1,020,000
New Distribution Pump Station	\$880,000	lump sum	1	\$880,000
Abandon/ Dispose: GAC/ Tank/ Well	\$4,100	per property	200	\$820,000
Land Use Controls	\$100,000	lump sum	1	\$100,000
CAPITAL SUBTOTAL				\$14,892,040
Engineering / Permitting / Survey / ROW	20%			\$2,978,408
Construction Administration	10%			\$1,489,204
Contingency	30%			\$5,807,896
CAPITAL TOTAL				\$25,167,548
Operation and Maintenance				
Cost of Water (North Pole)	\$0.01955	per gallon	27,375	\$535,181
Net Present Value				
NPV of Recurring Costs (30-year)	0.7%			\$14,436,325
Summary				
Capital	Total			\$25,168,000
NPV of Recurring Costs (30-year)	0.7% *			\$14,436,000
NPV (30-year)	0.7% *			\$39,604,000

Key:

% – percent

GAC – granular activated carbon

NPV – net present value

* - Real Interest Rate, 30 year (OMB Circular A-94 Appendix C, revised November 2016)

ROW – right of way

WTP – water treatment plant

2.13 STATUTORY DETERMINATIONS

This interim action is: protective of human health and the environment for the exposure pathway addressed by this action and is intended to provide adequate protection until a Final ROD is signed; complies with those federal and state requirements that are applicable or relevant and appropriate for this limited-scope action; and is cost-effective. This action is an interim solution only and is not intended to utilize alternative treatment or resource recovery technologies to the maximum extent practicable for the community of Moose Creek. Because this action does not constitute the final remedy for the community of Moose Creek, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed by the final response action. Subsequent actions are planned to address fully the threats posed to human health and the environment by conditions at the community of Moose Creek and will address the preference for treatment in the Final ROD, but it is anticipated that this interim action will remain to be incorporated into the final action. This is an I-ROD, so review of this site and the remedy will be ongoing as the USAF continues to develop remedial alternatives for the community of Moose Creek.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

There were no significant changes from the Proposed Plan (USAF, 2018).

(This page left intentionally left blank.)

PART 3 RESPONSIVENESS SUMMARY

This section provides a summary of the public participation activities and comments received following the publication of the IFS and IPP for the Long-Term Water Supply to the community of Moose Creek, Alaska, and the USAF response to comments received.

3.1 BACKGROUND AND COMMUNITY INVOLVEMENT

The USAF conducted several public meetings with the community of Moose Creek since the discovery of PFOS and PFOA in the groundwater that supplies the community's drinking water wells. These have been held on the following dates: 15 June 2015; 22 July 2015; 26 August 2015; 26 October 2015; 14 December 2015; 25 January 2016; 18 April 2016; 1 December 2016; 19 July 2017; and 23 April 2018. These meetings were used to inform the community of the discovery of contaminated groundwater and then update the residents on progress of the temporary solution being implemented under the TCRA.

There were two public comment periods during the development of the alternatives for Long-Term Water Supply to the community of Moose Creek, Alaska. The first was in July 2017 for the Draft IFS and the second was in April and May 2018 for the IPP, to allow public comment on the options identified in these documents.

At the time of the first public comment period, on the Draft IFS, the USAF had not identified a preferred alternative for supply of the long-term drinking water to the community of Moose Creek. The alternatives being investigated were presented at a public meeting on 19 July 2017. Comments were invited either by email or by mail using comment cards sent to Moose Creek residents. A second public comment period was held between 15 April and 15 May 2018 on the IPP. A public meeting was held on 23 April 2018 and, at this meeting, the USAF presented the preferred option for discussion. Questions raised at that meeting were recorded and further comments were received by email or mail. The questions and concerns raised are detailed in the following subsections.

3.2 SUMMARY OF PUBLIC COMMENTS RECEIVED DURING PUBLIC COMMENT PERIODS AND AGENCY RESPONSES

The first part of this section addresses those community concerns and comments that are non-technical in nature. Responses to specific legal and technical questions are provided in the second part. Comments in each part are categorized by relevant topics.

3.2.1 Summary and Response to Local Community Concerns

Interim Feasibility Study – Public Comments Received

A consultation period was held following publication of the IFS:

1. Some residents responded to the IFS by stating that the USAF created the situation where the groundwater was no longer fit to be drunk; therefore, why do the residents have to bear the cost for buying water that was previously free from their own wells? Their

preferred option would be purchase of their properties, which would be an additional Alternative 8.

USAF Response: The USAF may provide alternate water supplies as an interim remedy until the existing water supply is cleaned up or as a final remedy to permanently replace the existing water supply. At Moose Creek the alternate water supply is considered a final remedy with regard to the drinking and household water pathway, even though further remedial action may be needed as to the aquifer. Per Department of Defense policy, the USAF's responsibility for the alternate water supply ends upon completion of construction of the water system. The USAF does not have the authority to use the Environmental Restoration Account to fund water systems unless the operation of an aquifer treatment system is also selected in the decision document as a component of a response action to restore the groundwater. Only FEMA has the authority to "buy out" affected property owners, the Air Force can only purchase property on the open market in order to affect a remedy, so it was not possible to include this as an alternative.

2. Some residents responded to the IFS by stating that of the options presented they preferred to keep their existing system, either the water tank or GAC treatment of well water, so would prefer the Status Quo alternative.

USAF Response: Residents opinions would be considered in the community acceptance section of the alternative's evaluation, and any residents preferences would be considered at this time.

3. Some residents responded to the IFS by raising the issue of how and when the groundwater became contaminated, and if there were any health impacts, they had been a resident of Moose Creek for 30 years.

USAF Response: The USAF is currently identifying the sources of contamination and by testing the groundwater establishing its extent. If residents have any concerns due to the groundwater contamination, they can contact USAF at EAFB.

Interim Proposed Plan – Public Meeting and Written Comments Received

Remedial Alternative Selection Process

Information on Implementation of Preferred Alternative:

1. A resident asked if the USAF could confirm that the cost of removing the existing temporary water tanks and GAC filters would be borne by the USAF. If the resident requested, could they be left installed?

USAF Response: The temporary equipment (water tanks and GAC filters) are the property of the USAF and would be removed once no longer required. It would not be possible to leave them after the permanent solution was implemented.

2. A number of residents asked if the connection from the local distribution system to the property was included in the USAF costs, or if this was to be borne by the residents. This cost could be substantial and should be included in USAF costs. Also, does this apply to currently vacant lots?

USAF Response: The cost of the connection is included in the project costs to be covered by the USAF and will not be borne by the residents. Connections will be supplied to current properties or properties under construction.

3. For the alternatives that require a water storage tank and pump station, Fairbanks North Star Borough owns land within Moose Creek that is currently available (an old school and near the Fire Station). Have you looked at using this land for this equipment?

USAF Response: Although land for the equipment has been located, no specific site has been identified at this stage of the study. These options are very good and will be looked at in the further design stages.

4. After the project to supply drinking water has been implemented, can I still use my existing well to water the garden?

USAF Response: No, the State of Alaska has restrictions on releases of contaminated water. As a result, the USAF is considering only options that would provide an adequate supply of water to Moose Creek community residents for drinking water, as well as household uses (car washing, gardening, etc.).

5. There is a separate project to supply natural gas to the community of Moose Creek. This will involve laying gas pipes down many of the same roads that will require water pipes. Have you coordinated with gas supply company this would benefit the residents by coordinating the construction?

USAF Response: The USAF is aware of the project but has not yet looked into coordinating construction activities, as the selected alternative is unknown at this time.

6. When the water supplies are installed to each property will each apartment have their own water meter?

USAF Response: Usually water meters are installed at a convenient location agreed between the property owner and the water supplier. Each property will require to be inspected to determine where the water meter would be installed. Where multiple apartments are connected to a single water meter, the apartment owner will normally include the water cost in the fees.

7. A resident stated he had been told that the water aquifer that supplied North Pole was contaminated and a new water main was being built from Fairbanks to supply North Pole with water from there. This would mean water was being pumped from Fairbanks to supply Moose Creek which would affect the selected option.

USAF Response: We have spoken to North Pole utilities and this is not the case. They have no plans to get water supplied from Fairbanks to pump to Moose Creek, and routine sampling indicates that the North Pole water supply meets all Federal and State requirements.

Public Participation Process:

1. At the public meeting for the IPP, it was stated that the same questions are being asked that were asked at the meeting to discuss the IFS. What happened to those comments and the comments returned in writing as required by the USAF, have they been ignored?

USAF Response: All comments received from the public have been collected and will be included in the I-ROD at the end of this study. For the IFS, approximately 12 comments were received about the alternatives, from the 170 properties who received comment cards.

2. It was asked why hold a public consultation, if the USAF had already made up its mind and selected their preferred alternative.

USAF Response: The preferred alternative is only that. Following public consultations of this option, it is possible that a different alternative may be selected.

3. A resident stated that, in 2017, North Pole passed a motion supporting Alternative 1. How did they know this was going to be the selected option when the residents of Moose Creek did not?

USAF Response: The motion passed by North Pole was to confirm that, if requested, they would be willing to supply water to Moose Creek, which is currently outside their supply boundary. This motion was necessary to demonstrate that this alternative would be viable if selected.

3.2.2 Comprehensive Response to Specific Legal and Technical Questions

Remedial Alternative Selection Process:

1. A number of residents expressed interest in the option of having their current shallow wells replaced with deep wells. However, there was also concern that this may simply result in the contaminated water being pulled down to the deeper level after a period of time.

USAF Response: The USAF agreed that pursuing this alternative had risks due to limited data being available about the deeper aquifer. Only one well had been installed during the study period and it was also not certain deep wells could be installed at all properties. These risks had been included in the alternatives section process.

2. A resident asked when will the groundwater contamination be cleaned up. It states in the IFS an assumption of 30 years for the operating cost, would cleaning up the groundwater affect the selected alternative?

USAF Response: The USAF is currently identifying the sources of contamination and by testing the groundwater establishing its extent. Once that has been done, a feasibility study for cleaning up the contamination will be conducted and then a Final ROD, which includes an estimated timeframe to achieve cleanup goals, will be prepared. At this point, it is not possible to say when the groundwater will be cleaned up.

3. Has the alternative of drilling a slightly deeper well and then putting GAC on the water been investigated?

USAF Response: The water would still require treatment with GAC, so this option is the same as Alternative 6.

4. Has the alternative of tankering water to the proposed Moose Creek reservoir but still building the local water distribution system been investigated. This would save the cost of building the new main across the Chena Flood area.

USAF Response: This alternative would result in a capital cost similar to that for Alternative 2 (EAFB water supply) but with the additional high operating cost of water

tankering in Alternative 3. It would have the benefit of reducing the road wear around the community of Moose Creek. The Total NPV for this alternative would, however, be high.

Cost to be Borne by Residents:

1. A number of residents stated that since the USAF created the situation where the groundwater was no longer fit to be drunk why do the residents have to bear the cost for buying water that was previously free from their own wells? This should apply to all eight alternatives evaluated.

USAF Response: The USAF may provide alternate water supplies as an interim remedy until the existing water supply is cleaned up or as a final remedy to permanently replace the existing water supply. At Moose Creek the alternate water supply is considered a final remedy with regard to the drinking and household water pathway, even though further remedial action may be needed as to the aquifer. Per Department of Defense policy, the USAF's responsibility for the alternate water supply ends upon completion of construction of the water system. The USAF does not have the authority to use the Environmental Restoration Account to fund water systems unless the operation of an aquifer treatment system is also selected in the decision document as a component of a response action to restore the groundwater. In this IROD, a public water supply system will provide potable water to the Community, and no remedy to restore the aquifer is selected in the decision document as a component of the response action. In the comparisons of costs, the wells previously operated by residents had costs associated with them for periodic maintenance (or replacement) for: pumps, tanks, piping, and other equipment; and electricity costs that should be acknowledged. Responsibility for operation and maintenance of the system transfers to the operator of the water supply system, in this instance the City of North Pole, which can charge for use of the water. Once the Final ROD is available, if any of the costs associate with water treatment are for removal of PFAS these conclusions will be revised.

2. A number of residents stated that they had been impacted by groundwater contamination. This affected both property values and personnel health and would they be able to claim compensation.

USAF Response: Any residents could contact the USAF at EAFB and EAFB personnel would go through the process of what steps you would need to file a claim(s).

3. In the cost table to compare the alternatives, for Alternative 1 there is \$14M operating cost for 30 years. Who is paying this cost?

USAF Response: That cost is the operating cost for the water supply. It is effectively what the water customers are paying over 30 years.

Information on Implementation of Preferred Alternative

1. North Pole currently has communities within their boundaries that are not supplied by their existing WTP. Also, due to contamination from Flint Hills, another large community is being put onto their water system.

USAF Response: The USAF can't comment on the water supply requirement for the whole of North Pole. The City was approached about being able to supply water to the community of Moose Creek and confirmed that there was sufficient water available; however,

treatment (to remove iron and manganese) and pumping would be required to be supplied by the USAF under this project.

2. The design for the preferred alternative shows chlorination of the water. When I contacted North Pole they said they did not chlorinate their water so why is it needed for Moose Creek? The addition of chlorine will affect the performance of the septic tanks since none of the properties are connected to sewers

USAF Response: Chlorination is not required for the community of Moose Creek water supply; however, in discussions it was stated it may be required under some circumstances. It is now understood that, for the design proposed, chlorination is not required. The option to add chlorine was left in the design but is unlikely to be implemented. It should be added that chlorinated water being discharged into a septic tank is not an unusual situation and does not affect their performance.

3. It was asked why the design water consumption of 90 gallons/ person/ day is higher than the water usage used to calculate the average water bill of \$40-85/ month.

USAF Response: The design value is based on a possible future requirement and allows for an increase in water consumption per head of population. The existing value was based on typical water usage for existing North Pole customers and is, therefore, lower.

3.3 REMAINING CONCERNS

Issues and concerns that the USAF was unable to address during the planning activities include the following:

- **How will the LUC be implemented?** The USAF is unable to fully identify how the LUC will be implemented in the community of Moose Creek. Discussions are still on-going with regulatory and state agencies about the process.
- **How long will the groundwater be affected?** The USAF is still conducting investigations on the PFOS and PFOA groundwater contamination and identifying source areas. It is not possible at this early stage of the process to establish how long it will take until groundwater concentrations of PFOS and PFOA are below EPA HA levels.

APPENDIX A

References

REFERENCES

- Alaska Department of Environmental Conservation (ADEC), 2017. Public Water vs. Private Well Water, A Comparison (North Pole, Alaska). December.
- ADEC, 2018. 18 AAC 75 Oil and Other Hazardous Substances Pollution Control. October.
- Air Force Civil Engineer Center (AFCEC), 2015a. Final Action Memorandum for a Time-Critical Removal Action of PFC-Contaminated Water at Moose Creek, Alaska. 18 November.
- City of North Pole, 2016. Drinking Water Quality Report, North Pole Utilities, PWSID 310675. Available at: http://www.northpolealaska.com/sites/default/files/fileattachments/utilities/page/3701/2016_water_quality_report.pdf.
- City of North Pole, 2017. Resolution 17-15, A Resolution Stating Positions in Regards to the Moose Creek Feasibility Study dated June 2017, Sponsored by Mayor Bryce Ward. Introduced and Adopted 17 July.
- EA Engineering, Science, and Technology, Inc. (EA), 2016. 2nd Quarter Report (2016) on Moose Creek Area Inspections, Sampling & Analysis, Treatment, and Construction. Moose Creek, Alaska. Contract No. W911KB-14-D-0019, Task Order No. 0004. August.
- Fairbanks North Star Borough (FNSB), 2018. Fairbanks North Star Borough Comments, Interim Proposed Plan for the Long Term Water Supply, Community of Moose Creek, Alaska. 4 May.
- U.S. Army Corps of Engineers (USACE), 2015a. Final Site Investigation Report for Site Investigations of Fire Fighting Foam Usage at Various Air Force Bases in the United States for Eielson Air Force Base. February.
- USACE, 2015b. Final Addendum #2 to the Perfluorinated Compounds (PFCs) Investigation Work Plan at Eielson Air Force Base, Alaska. Prepared by EA Engineering. July.
- USAF, 2016. Memorandum: SAF/IE Policy on Perfluorinated Compounds (PFCs) of Concern, Department of the Air Force. August.
- USAF, 2017a. Final Installation-wide Monitoring Program 2015 Groundwater Monitoring Report, Eielson Air Force Base, Alaska, February.
- USAF, 2017b. Eielson Air Force Base Final Interim Feasibility Study for Community of Moose Creek, Alaska, Long-Term Drinking Water Supply. October.
- USAF, 2018. Eielson Air Force Base Interim Proposed Plan for Long Term Water Supply, Community of Moose Creek, Alaska. April.
- USEPA, 1988. Guidance Document for Providing Alternate Water Supplies. EPA 540/G-87/006. February.
- USEPA, 1999. A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, Document EPA-540-R-98-031. July.
- USEPA, 2009. Provisional Health Advisory for PFOA and PFOS. January.

USEPA, 2016a. Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS), Document EPA-822-R-16-004. May.

USEPA, 2016b. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), Document EPA-822-R-16-005. May.

USEPA, 2016c. Contaminant Candidate List 4 – CCL 4. November.

USEPA, 2016d. Fact Sheet: PFOA & PFOS Drinking Water Health Advisories. Document EPA-800-F-16-003. November.

USEPA, 2018. EPA and DEC Approval of the Final Interim Proposed Plan for Long term Water Supply, Community of Moose Creek, Alaska April 2018.

APPENDIX B

Public Notice of Availability

AFFIDAVIT OF PUBLICATION

**UNITED STATES OF AMERICA
STATE OF ALASKA
FOURTH DISTRICT** } **SS.**

Before me, the undersigned, a notary public, this day personally appeared Jenny Nance, who, being first duly sworn, according to law, says that he/she is an Advertising Clerk of the Fairbanks Daily News-Miner, a newspaper (i) published in newspaper format, (ii) distributed daily more than 50 weeks per year, (iii) with a total circulation of more than 500 and more than 10% of the population of the Fourth Judicial District, (iv) holding a second class mailing permit from the United States Postal Service, (v) not published primarily to distribute advertising, and (vi) not intended for a particular professional or occupational group. The advertisement which is attached is a true copy of the advertisement published in said paper on the following day(s):

April 15, 18, 2018

Contracts & Procurement

Ad # 45416

Acct # 8630

and that the rate charged thereon is not excess of the rate charged private individuals, with the usual discounts.

Jenny Nance

Subscribed and sworn to before me on this 18 day
of April, 2018

M. Burnell

Notary Public in and for the State Alaska.

**NOTARY PUBLIC
M. BURNELL
STATE OF ALASKA
My commission Expires December 7, 2021**

My commission expires Dec 7, 2021

**THE UNITED STATES AIR FORCE
INVITES PUBLIC COMMENT
AND ANNOUNCES A PUBLIC MEETING**

For the Interim Proposed Plan for Long Term Water Supply
for the Community of Moose Creek, Alaska
Eielson AFB, Alaska

The U.S. Air Force invites public comment on the Interim Proposed Plan (IPP) for the Long Term Water Supply for the Community of Moose Creek, Alaska. Groundwater in the area has become contaminated with perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) as the result of past firefighting and training activities at Eielson AFB.

An open house with a public comment session will be held April 23, 2018, from 6:00 to 8:00 p.m. at the Moose Creek Fire Station, 3481 Old Richardson Hwy, North Pole, AK 99507.

The US Air Force, U.S. Environmental Protection Agency, and Alaska Department of Environmental Conservation (the Agencies) considered a variety of alternatives including:

- No action,
- Potable water supply from North Pole, with local distribution system,
- Potable water supply Eielson AFB, with local distribution system
- Deep Well to supply community water treatment plant, with local distribution system
- Installation of potable water tanks, at each property
- Installation of deep well, at each property
- Installation of granulated activated carbon, at each property
- Continuation of existing temporary water supply as the long term water Supply

The agencies have identified the preferred alternative, as supply of potable water from North Pole with a local distribution system to each property, as the alternative that will protect human health and the environment and provide long term effective supply of safe potable water to the community of Moose Creek. The preferred alternative is a preliminary determination, other alternatives could be selected based upon public comment, new information, or a reevaluation of existing information. The public is encouraged to comment on all the alternatives described in the Interim Proposed Plan. The Agencies will not select the final action until all public comments obtained during the public comment period have been evaluated.

The public comment period will begin April 15, 2018 and end on May 15, 2018. Written comments about the alternatives presented in the IPP should be sent to the base public affairs officer (address provided below) by May 15, 2018. These will be included in the Interim record of decision that will also be placed in the information repository at completion of the decision process.

The IPP and the documents used to prepare the IPP are located in the information repository at Eielson AFB listed below and can also be found at the internet address: <http://alaskacollection.library.uaf.edu/ea/bsc/cd0/Moose%20Creek%20PFCs%20Contamination%20Information%20Repository/>

Documents can be found at:
2310 Central Avenue
Suite 213
Eielson AFB, 99702
Telephone: (907) 377-1666

For more information, contact:
354th Fighter Wing Public Affairs
354 Broadway Street, Unit 15A
Eielson Air Force Base, Alaska, 99702-1895
Telephone: (907) 377-2116
Email: 354fw.pa.publicaffairs@us.af.mil

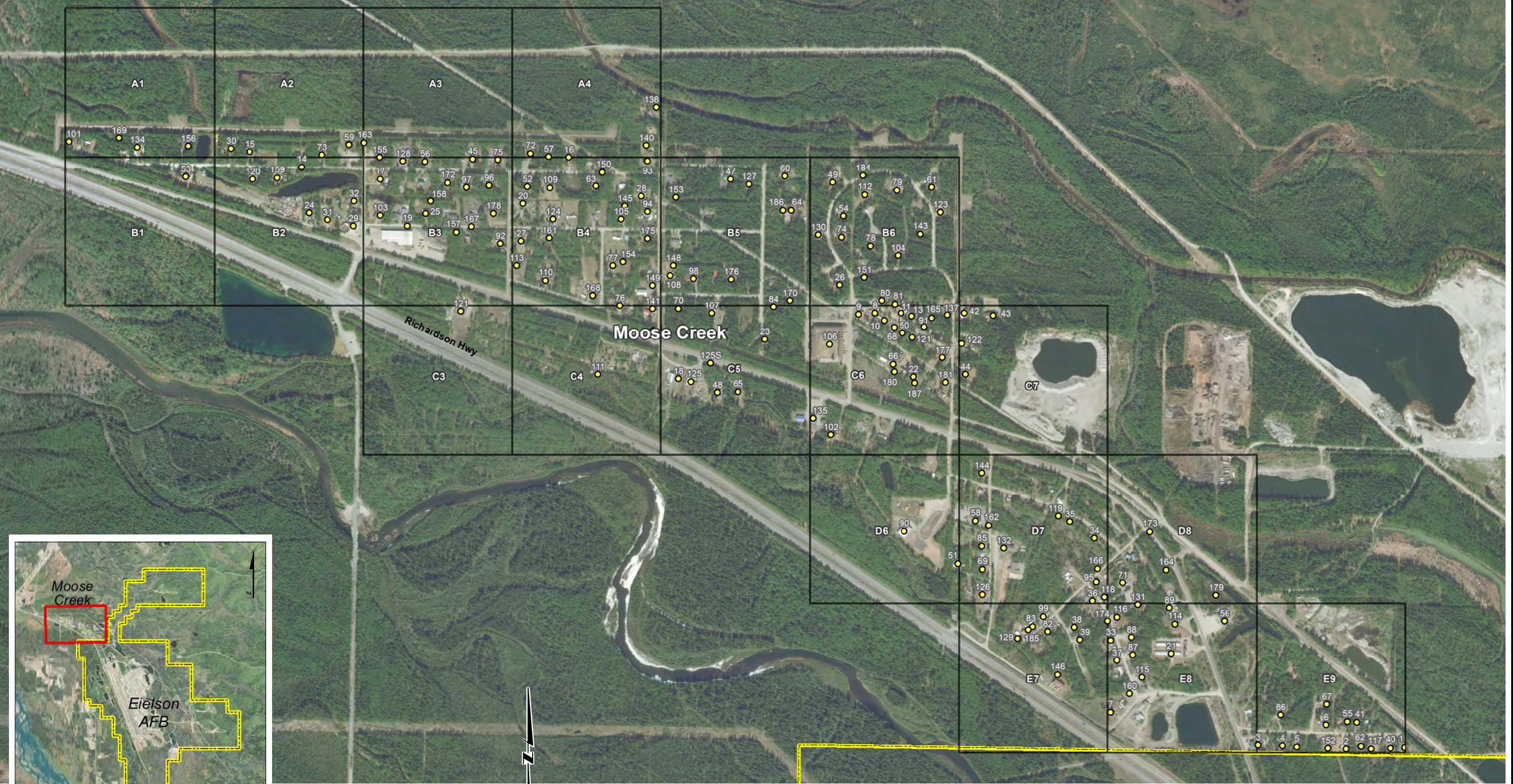
E00045416

APPENDIX C

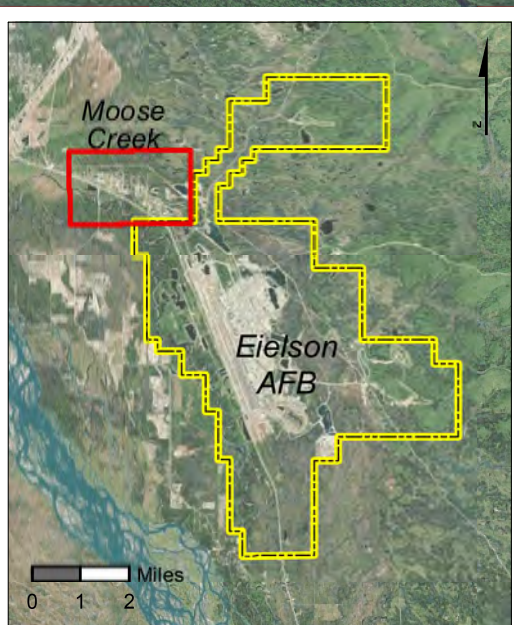
*PFOS and PFAS Sample Results for Moose
Creek*

Data Sources
Jacobs 2015; EA 2017; Imagery: Esri, Digital Globe 2010

Legend
□ Sampling Grid
● Well Location (Property ID#)



FILE: C:\D\CAD\Proj\Stantec\Candice Baker JV2018-2019\Eielson_Moose Creek_POD_185750715\3-final-March-2019\Appendix C-1.dgn
TIME: 28-MAR-2019 15:33



UNITED STATES AIR FORCE
EIELSON AFB
INTERIM RECORD OF DECISION FOR
COMMUNITY OF MOOSE CREEK, ALASKA,
LONG-TERM WATER SUPPLY

COMMUNITY OF MOOSE CREEK
PFAS SAMPLE WELL LOCATIONS

FIGURE
C-1
185750715.
100.06010403

Table C-1 – Community of Moose Creek – Wells Sampling Results

Property Number	PFOA (µg/L)	PFOS (µg/L)	Combined PFAS/PFOA (µg/L)
1	0.130	1.400	1.530
2	0.100	1.270	1.370
3	0.075	0.988	1.063
4	0.113	1.790	1.903
5	0.146	2.090	2.236
6	0.132	2.090	2.222
7	0.020	0.092	0.112
8	0.101	1.390	1.491
9	0.101	1.100	1.201
10	0.094	1.370	1.464
11	0.098	1.700	1.798
13	0.108	1.720	1.828
14	0.015	0.142	0.157
15	0.015	0.098	0.113
16	0.046	0.746	0.792
17	0.022	0.295	0.317
18	0.011	0.200	0.211
19	0.015	0.166	0.181
20	0.027	0.420	0.447
21	0.098	1.380	1.478
22	0.097	0.957	1.054
23	0.050	0.683	0.733
24	0.009	0.080	0.089
25	0.022	0.330	0.352
26	0.076	0.970	1.046
27	0.022	0.354	0.376
28	0.051	0.797	0.848
29	0.016	0.120	0.136
30	0.014	0.093	0.106
31	0.011	0.121	0.132
32	0.020	0.065	0.085
33	0.043	0.526	0.569
34	0.094	1.230	1.324
35	0.073	0.900	0.973
36	0.070	0.929	0.999
37	0.048	0.585	0.633
38	0.053	0.747	0.800
39	0.039	0.428	0.467

Table C-1 – Community of Moose Creek – Wells Sampling Results (Continued)

Property Number	PFOA (µg/L)	PFOS (µg/L)	Combined PFAS/PFOA (µg/L)
40	0.129	1.790	1.919
41	0.138	1.710	1.848
42	0.138	1.490	1.628
43	0.127	1.430	1.557
44	0.094	1.220	1.314
45	0.043	0.551	0.594
47	0.078	1.280	1.358
48	0.014	0.191	0.205
49	0.124	1.600	1.724
50	0.087	1.210	1.297
51	0.023	0.250	0.273
52	0.045	0.627	0.672
53	0.005	0.065	0.070
54	0.069	1.160	1.229
55	0.143	1.700	1.843
56	0.037	0.411	0.448
56	0.118	1.700	1.818
57	0.051	0.733	0.784
58	0.043	0.454	0.497
59	0.023	0.290	0.313
60	0.093	1.620	1.713
61	0.153	1.270	1.423
62	0.146	1.680	1.826
63	0.065	0.949	1.014
64	0.094	1.510	1.604
65	0.020	0.288	0.308
66	0.283	0.891	1.174
67	0.138	1.660	1.798
68	0.098	1.360	1.458
69	0.023	0.299	0.322
70	0.048	0.851	0.899
71	0.140	3.100	3.240
72	0.036	0.485	0.521
73	0.020	0.214	0.234
74	0.091	1.500	1.591
75	0.037	0.610	0.647
76	0.026	0.364	0.390
77	0.027	0.430	0.457
78	0.108	1.420	1.528

Table C-1 – Community of Moose Creek – Wells Sampling Results (Continued)

Property Number	PFOA (µg/L)	PFOS (µg/L)	Combined PFAS/PFOA (µg/L)
79	0.159	1.300	1.459
80	0.096	1.320	1.416
81	0.102	1.460	1.562
82	0.034	0.284	0.318
83	0.029	0.285	0.314
84	0.110	1.000	1.110
85	0.045	0.315	0.360
86	0.170	2.000	2.170
87	0.043	0.552	0.595
88	0.046	0.612	0.658
89	0.010	0.218	0.228
90	0.099	1.400	1.499
91	0.086	1.270	1.356
92	0.025	0.366	0.391
93	0.073	0.940	1.013
94	0.059	0.820	0.879
95	0.073	0.958	1.031
96	0.031	0.442	0.473
97	0.031	0.472	0.503
98	0.035	0.572	0.607
99	0.052	0.570	0.622
100	0.038	0.307	0.345
101	0.011	0.042	0.053
102	0.034	0.474	0.508
103	0.014	0.163	0.177
104	0.125	1.790	1.915
105	0.049	0.754	0.803
106	0.079	0.960	1.039
107	0.046	0.611	0.657
108	0.032	0.533	0.565
109	0.038	0.582	0.620
110	0.020	0.276	0.296
111	0.012	0.189	0.201
112	0.140	1.100	1.240
113	0.016	0.248	0.264
114	0.098	1.550	1.648
115	0.067	0.921	0.988
116	0.106	1.320	1.426
117	0.139	1.550	1.689

Table C-1 – Community of Moose Creek – Wells Sampling Results (Continued)

Property Number	PFOA (µg/L)	PFOS (µg/L)	Combined PFAS/PFOA (µg/L)
118	0.067	0.949	1.016
119	0.070	0.878	0.948
120	0.011	0.093	0.104
121	0.015	0.180	0.195
121	0.090	1.200	1.290
122	0.108	1.390	1.498
123	0.163	1.290	1.453
124	0.048	0.620	0.668
125	0.016	0.140	0.156
126	0.022	0.285	0.307
127	0.088	1.660	1.748
128	0.032	0.453	0.485
129	0.024	0.244	0.268
130	0.096	1.740	1.836
131	0.124	1.860	1.984
132	0.042	0.478	0.520
134	0.009	0.037	0.046
135	0.031	0.440	0.471
136	0.086	1.280	1.366
137	0.112	1.400	1.512
140	0.073	1.400	1.473
141	0.036	0.670	0.706
142	0.029	0.570	0.599
143	0.150	1.300	1.450
144	0.051	1.100	1.151
145	0.069	1.100	1.169
146	0.019	0.110	0.129
148	0.048	0.830	0.878
149	0.046	0.750	0.796
150	0.062	0.990	1.052
151	0.110	1.700	1.810
152	0.130	1.500	1.630
153	0.070	1.400	1.470
154	0.041	0.700	0.741
156	0.013	0.070	0.083
157	0.025	0.450	0.475
158	0.027	0.350	0.377
159	0.017	0.059	0.076
160	0.055	0.860	0.915

Table C-1 – Community of Moose Creek – Wells Sampling Results (Continued)

Property Number	PFOA (µg/L)	PFOS (µg/L)	Combined PFAS/PFOA (µg/L)
161	0.036	0.620	0.656
162	0.066	0.870	0.936
163	0.019	0.130	0.149
164	0.110	1.900	2.010
165	0.150	1.400	1.550
166	0.095	1.600	1.695
167	0.026	0.550	0.576
168	0.037	0.500	0.537
169	0.009	0.044	0.053
172	0.039	0.400	0.439
173	0.160	1.300	1.460
174	0.062	0.720	0.782
175	0.059	0.730	0.789
176	0.099	0.740	0.839
177	0.120	1.200	1.320
178	0.036	0.690	0.726
185	0.042	0.580	0.622

Appendix E:

Environmental Covenant Template

Page intentionally left blank.

This instrument was prepared by:

William Butler
Director of City Services
City of North Pole
125 Snowman Lane
North Pole, AK 99705

Please return this instrument to:

William Butler
Director of City Services
City of North Pole
125 Snowman Lane
North Pole, AK 99705

**(FAIRBANKS RECORDING DISTRICT)
ENVIRONMENTAL COVENANT AND RIGHT OF ACCESS**

This Environmental Covenant and Right of Access (“**Environmental Covenant**”) is made this ___ day of _____, 20__, by and among «Owner1», (together with its successors and/or assigns, the “**Grantor**”), whose address is «Mailing_Address», «Mailing_CityStateZip», and the Holder(s)/Grantee(s) further identified in paragraph 2 below, pursuant to the Uniform Environmental Covenants Act, AS 46.04.300 – 46.04.390 (“**UECA**”) for the purpose of subjecting the Property (as defined below) to the Activity and Use Limitations described herein.

1. Property. Grantor is the owner of that certain real property subject to this Environmental Covenant (the “**Property**”) located at 4434 LAUESEN AVE, NORTH POLE, AK 99705, which is depicted and described in Appendix A.

2. Holder (and Grantee for the purposes of indexing). «Owner1» is a Holder (“**Holder**”) (and Grantee for the purposes of indexing pursuant to AS 46.04.320(a) of UECA), of this Environmental Covenant as that term is defined in AS 46.04.300(b).

3. Environmental Response Project and Administrative Record.

A. This Environmental Covenant is a component of an environmental response project as defined in AS 46.04.300(a) and .390(3) of UECA.

B. The Property is a parcel within the environmental response project for the community of Moose Creek, Alaska where a response action is being performed by the United States Air Force (“**USAF**”) pursuant to Sections 104 and 120 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9604 and 9620. The Activity and Use Limitations are required as part of the environmental response

project to prohibit the use of, and protect against exposure to, contaminated groundwater and have been approved by the USAF, the United States Environmental Protection Agency (“USEPA”), and the State of Alaska Department of Environmental Conservation (“ADEC”).

C. Grantor wishes to cooperate fully with USEPA, ADEC and the USAF in the implementation, operation, and maintenance of all CERCLA response actions on the Property.

D. The Administrative Record for the environmental response project that impacts the Property may be accessed online at <https://ar.afcec-cloud.af.mil/> under the installation name Eielson Air Force Base, AK; and the release/cleanup are documented in the ADEC contaminated sites database at <https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/Search/> under Hazard ID number 26773.

4. Grant of Covenant. Covenant Runs with the Land. Now, therefore, for good and valuable consideration, the receipt of which is hereby acknowledged, Grantor creates this Environmental Covenant pursuant to the UECA so that the Activity and Use Limitations, Rights of Access, and other affirmative obligations and conditions set forth herein shall “run with the land” in accordance with AS 46.04.310(a) of UECA and shall be binding on Grantor, its heirs, successors and assigns, and on all present and subsequent owners, and current and future occupants, lessees or other persons holding or acquiring an interest in the Property.

5. Activity and Use Limitations. The following Activity and Use Limitations apply to the Property:

A. Restricted Access and Use of Groundwater – Except as provided in Section 5.D below or required as part of a USEPA, ADEC, or USAF approved response activity, any drilling, boring, or other construction or use of a well for the purpose of extracting water for any purpose other than groundwater quality monitoring or groundwater remediation, including but not limited to, domestic, potable, or industrial uses is prohibited on the Property.

B. Restricted Use of Groundwater – Contaminated water may not be pumped, drained, dewatered, used for irrigation, dust control, or any other purpose on or off the site without prior ADEC approval of exemption from this Activity and Use Limitation, and may be subject to treatment, monitoring, or disposal requirements including obtaining any applicable permits.

C. Remedial Measures and Equipment Preservation – Except as specifically authorized in writing by ADEC, all uses and development of the Property shall preserve the integrity of any remedial measures, remedial equipment, and groundwater monitoring wells or systems.

D. During the period commencing on the Effective Date of this Environmental Covenant and terminating on the first to occur of: (a) the date the City of North Pole, Alaska (the “City”) begins providing potable water through the City water system to the Property, or (b) such

date as the completion of the Agreement Between Owner and Contractor for Construction Contract (Stipulated Price) (the “**Project**”), by and between City and HC Contractors executed February 7, 2020, (the “**Transition Period**”), the extraction of groundwater by the Owner shall be allowed, so long as the groundwater is treated through an acceptable filtration system. Upon termination of the Transition Period, no extraction or use of the groundwater shall be permitted.

6. Right of Access. Grantor hereby consents to officers, employees, contractors, and authorized representatives of ADEC, USEPA and the USAF entering and having continued access at reasonable times to the Property for the following purposes:

A. Implementing, operating and maintaining the environmental response project referenced in paragraph 3 above;

B. Monitoring and conducting periodic reviews of the environmental response project referenced in paragraph 3 above including without limitation, sampling of air, water, groundwater, sediments and soils;

C. Verifying any data or information submitted to USEPA, ADEC, or the USAF; and

D. Verifying that no action is being taken on the Property in violation of the terms of this Environmental Covenant, the environmental response project referenced in paragraph 3 above, or of any federal or state environmental laws or regulations;

Nothing in this Environmental Covenant shall limit or otherwise affect USEPA, ADEC and the USAF’s rights of entry and access or USEPA’s, ADEC’s and the USAF’s authority to take response actions under CERCLA, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 Code of Federal Regulations (C.F.R.) Part 300 – 399)), or other federal and state law.

7. Reserved Rights of Grantor. Grantor hereby reserves unto itself, its successors and assigns, including heirs, lessees and occupants, all rights and privileges in and to the use of the Property that are not incompatible with the Activity and Use Limitations identified herein.

8. No Public Access and Use: No right of access or use by the general public to any portion of the Property is conveyed by this Environmental Covenant.

9. Future Conveyances, Notice and Reservation:

A. Grantor shall include in any future instrument conveying any interest in any portion of the Property, including but not limited to deeds, leases and mortgages, a notice and reservation which is in substantially the following form:

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL COVENANT AND RIGHT OF ACCESS DATED _____, 20____, RECORDED IN THE PUBLIC LAND RECORDS ON _____, 20____, IN BOOK _____, PAGE _____, OF THE _____ RECORDING DISTRICT [(S) REPEAT AS NECESSARY], ALASKA, IN FAVOR OF HOLDER, AND ENFORCEABLE BY, THE STATE OF ALASKA, THE USAF AND USEPA.

B. Grantor shall provide written notice to ADEC, USEPA, and the USAF within 30 days prior to any conveyance of fee title to the Property or any portion of the Property. The notice shall identify the name and contact information of the intended new owner in fee, and the portion of the Property to be conveyed to that owner.

C. Grantor shall notify ADEC at least 45 days prior to Grantor's petitioning for or filing of any document initiating a rezoning of the Property; or any proposed land use changes or applications for building permits that are inconsistent with the provisions herein.

10. Reporting.

Grantor shall report to ADEC every Five (5) years to document the status of compliance with the Activity and Use Limitations required by this Environmental Covenant. Such reports and any other communications shall be transmitted to ADEC via the email address or mailing address listed at paragraph 16.

11. Enforcement and Compliance.

A. Civil Action for Injunction or Equitable Relief. This Environmental Covenant may be enforced through a civil action for injunctive or other equitable relief for any violation of any term or condition of this Environmental Covenant, including violation of the Activity and Use Limitations under Paragraph 6 and denial of Right of Access under Paragraph 7. Such an action may be brought individually or jointly by any party listed in AS 36.04.335(b) of UECA, and specifically by:

- i. ADEC;
- ii. USEPA; or,
- iii. the USAF.

B. Other Authorities Not Affected. No Waiver of Enforcement. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Nothing in this Environmental Covenant affects USEPA, ADEC, or the USAF's authority to take or require performance of response actions to address releases or threatened releases of hazardous substances, pollutants, or contaminants at or from the Property, or to enforce a consent order, consent decree, or other settlement agreement entered into by USEPA, ADEC, or the USAF. Enforcement of the terms of this Environmental Covenant shall be at the discretion of the parties authorized to enforce; and any forbearance, delay or omission to exercise its rights under this Environmental Covenant in the event of a breach of any term of this Environmental Covenant shall not be deemed to be a waiver of such term or of any subsequent breach of the same or any other term, or of any of the rights of a party.

C. Former Owners and Interest Holders Subject to Enforcement. A fee owner, or other person that holds any right, title or interest in or to the Property remains subject to enforcement with respect to any violation of this Environmental Covenant by the owner or other person which occurred during the time when the owner or other person was bound by this Environmental Covenant regardless of whether the owner or other person has subsequently conveyed the fee title, or other right, title or interest, to another person.

12. Waiver of certain defenses: This Environmental Covenant may not be extinguished, limited, or impaired through issuance of a tax deed, foreclosure of a tax lien, or application of the doctrine of adverse possession, prescription, abandonment, waiver, lack of enforcement, or acquiescence, or similar doctrine as set forth in AS 46.04.325(f) of UECA.

13. Representations and Warranties: Grantor hereby represents and warrants to ADEC, USEPA, and the USAF that, at the time of execution of this Environmental Covenant, Grantor is lawfully seized in fee simple of the Property, Grantor has a good and lawful right and power to bind the Property as provided in this Environmental Covenant.

14. Amendment or Termination. This Environmental Covenant may be amended or terminated by consent if the amendment or termination is signed by ADEC, USEPA, USAF, and the owner in fee of the Property, after written notice of any proposed amendment or termination is provided to ADEC, USEPA and USAF. All other signers of this Environmental Covenant waive the right to consent to an amendment or termination of this Environmental Covenant. Additionally, this covenant can be amended or terminated as provided by AS 46.04.325 and AS 46.04.330.

15. Notices: Any notice, demand, request, consent, approval, or communication that a party desires or is required to give to another party shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor:
«Owner1»
«Mailing_Address»
«Mailing_CityStateZip»

To State of Alaska, Department of Environmental Conservation
Division of Spill Prevention and Response:

CS.Submittals@alaska.gov
or
Institutional Controls Unit
Contaminated Sites Program
Department of Environmental Conservation
P.O. Box 111800
Juneau, Alaska 99811-1800

[add third party beneficiary contact information if applicable]

To U.S. Environmental Protection Agency:

Director, Superfund and Emergency Management Division
United States Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

To United States Air Force:

Attn: Environmental Restoration Project Manager, AFCEC/CZOP
10471 20th Street, Suite 345
JBER, AK 99506

16. Recording and Notice of Environmental Covenant, Amendments and Termination.

A. The Original Environmental Covenant. An Environmental Covenant must be recorded in the Fairbanks Recorder's Office, Department of Natural Resources, State of Alaska. Within 30 days after ADEC signs and delivers this Environmental Covenant to Grantor, Grantor shall record this Environmental Covenant in the Recorder's Office, Department of Natural Resources, State of Alaska.

B. Termination, Amendment or Modification. Within 30 days after ADEC signs and delivers to owner in fee any termination, amendment or modification of this Environmental Covenant, the owner shall record the amendment, modification, or notice of termination of this Environmental Covenant in the recorder's office of the Borough in which the Property is located.

C. Providing Notice of Covenant, Termination, Amendment or Modification. Within 30 days after recording this Environmental Covenant, Grantor shall transmit a copy of the Environmental Covenant in recorded form to:

- i. ADEC;
- ii. USEPA;
- iii. USAF;
- iv. each person holding a recorded interest in the groundwater of the Property identified in Appendix B;
- v. each person in possession of the Property; and
- vi. each political subdivision in which the Property is located.

Within 30 days after recording a termination, amendment or modification of this Environmental Covenant, the owner in fee shall transmit a copy of the document in recorded form to the persons listed in items i. to vi. above.

17. General Provisions:

A. Controlling law: This Environmental Covenant shall be construed according to and governed by the laws of the State of Alaska and the United States of America.

B. Liberal construction: Any general rule of construction to the contrary notwithstanding, this Environmental Covenant shall be liberally construed in favor of the establishment of Activity and Use Limitations that run with the land to affect the purpose of this Environmental Covenant and the policy and purpose of the environmental response project and its authorizing laws. If any provision of this Environmental Covenant is found to be ambiguous, an interpretation consistent with the purpose of this Environmental Covenant that would render the provision valid shall be favored over any interpretation that would render it invalid.

C. No Forfeiture: Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

D. Joint Obligation: If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

E. Captions: The captions in this Environmental Covenant have been inserted solely for convenience of reference and are not a part of this Environmental Covenant and shall have no effect upon construction or interpretation.

18. Effective Date. This Environmental Covenant is effective on the date of recording in the public lands record.

19. List of Appendices:

Appendix A – Legal Description and map of the Property

Appendix B – List of Recorded Groundwater Interests Impacted by the Environmental Covenant

[Signature Pages to follow]

All Property Owners must complete and sign a separate signature page in front of a Notary Public.

IN WITNESS WHEREOF, THIS INSTRUMENT HAS BEEN EXECUTED ON THE DATES INDICATED BELOW:

FOR THE GRANTOR:

By: _____ (signature)

Name of signer: _____ (print)

State of Alaska)
) SS.
Borough of Fairbanks North Star)

On _____, 20 _____, this instrument was acknowledged before me by,

_____.

_____ (signature)

Notary Public

My Commissioner Expires _____

If you are submitting the Environmental Covenant on behalf of an organization, complete and sign this page in front of a Notary Public.

THE UNDERSIGNED REPRESENTATIVE OF THE GRANTOR REPRESENTS AND CERTIFIES THAT HE/SHE IS AUTHORIZED TO EXECUTE THIS ENVIRONMENTAL COVENANT.

FOR THE GRANTOR:

Organization: _____ (print)

By: _____ (signature)

Name: _____ (print)

Title: _____ (print)

State of Alaska)
) SS.
Borough of Fairbanks North Star)

On _____, 20 _____, this instrument was acknowledged before me by,

on behalf of _____

_____(signature)

Notary Public

My Commissioner Expires _____

FOR THE ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

By _____ (signature)

Denise Koch,
Director of the Division of Spill Prevention and Response
Department of Environmental Conservation

State of Alaska)
)SS.
Borough of Juneau)

This instrument was acknowledged before me on _____, 20____, by Denise Koch, the Director of Spill Prevention and Response for the Department of Environmental Conservation, a state agency, on behalf of the State of Alaska.

_____ (signature)
Notary Public
My Commission Expires _____

Appendix A – Legal Description and Map of the Property

Full Legal Description:

«FullLegalDescription»

**Appendix B – List of Recorded Groundwater Interests Impacted by the
Environmental Covenant**

None.

Appendix F:

Mailing Questionnaire

Page intentionally left blank.

Moose Creek Land-Use Control Questionnaire for Private Properties

If Air Force does not receive assessment questions back, and property owner cannot be reached by phone, a visual inspection of the property will need to be conducted.

Mailing Date: _____

Response Requested by Date: _____

Parcel#/Parcel Accounting Number (PAN): _____

Physical Address: _____

Mailing Address: _____

Owner Name(s): _____

Description	Yes	No	Comments
Has the land-use changed in the past 5 years? If you answered yes, please describe in as much detail in the Comments Box.			

<p>Has any excavation and/or construction work occurred in which the groundwater table was accessed in the past 5 years? If you answered yes, please describe in as much detail in the Comments Box.</p>			
<p>Has the property changed ownership over the past five years? If you answered yes, please describe in as much detail in the Comments Box.</p>			
<p>Have any water wells been installed in the past 5 years? If you answered yes, please describe in as much detail in the Comments Box.</p>			

Please provide current phone number, e-mail, and mailing address	
---	--

Appendix G:

Inspection Book

Page intentionally left blank.

Site Description

Describe the property here. Include Property Account Number (PAN) with the abbreviated legal description and whether the property is developed or undeveloped.

Site-Specific Restrictions	Notes: Does the inspection show compliance with restrictions? (Indicate yes/no/partially)
The installation or use of drinking water wells is restricted.	

Site Inspection Requirements

The Site Inspection requires the completion of the table above, documentation using photographs and GPS as needed, and completion of the following Checklists:

- Annual LUC– General Information;
- Administrative Controls Checklist;
- Private Property Review.

Site Reporting Requirements

Include the inspection checklists and any noted deficiencies in the Annual Moose Creek IC/LUC Inspection Report.

Site Photograph(s)

Document site conditions photographically.

Site Map/Image

Include image/map to show route taken during the inspection

Annual Land Use Control (LUC) / Interim Controls Inspection Checklist – General Information

Moose Creek, Alaska – Federal and State Properties

Site ID: _____ Date _____

Inspection Team (and affiliation): _____

Active (Sites with LUCs in place, under investigation, undergoing remedial action or monitoring, etc.)

Inactive (Sites with no further action, investigation, or LUCs required.)

Date of previous inspection _____

Weather Conditions _____

Time field inspection started: _____ AM PM Time field inspection ended: _____ AM PM

Air Force RPM

Name: _____

Department: _____

Address: _____

Phone Number: _____

Source of LUCs/Interim Controls: ROD/DD(LUCs) Other (list) (Interim Controls)

Document Title: _____

Agency Oversight: EPA ADEC

Agency Contact/Affiliation: _____

Other Stakeholders (list): _____

Overall summary for types of LUCs/Interim Controls in Place (each type has a specific checklist):

- Administrative
- Access Restrictions
- Soil
- Landfill Cover
- Engineering
- Streambeds/Sediments
- Groundwater

Overall Assessment (to be completed last)

Are current controls meeting the LUC/Interim Controls objectives (e.g., prevent the use of groundwater)? Yes No

Briefly summarize key areas requiring improvement and any additional controls necessary to meet LUC/Interim Control objectives:

Were actions/violations identified during the previous inspection (or Five-Year Review) completed/corrected?

Yes No NA

Briefly describe any actions/violations and refer to specific checklists for additional details:

Describe the site conditions and route taken for the inspection (include image/map to show route taken during the inspection):

and



Administrative Controls Checklist
Moose Creek, Alaska – Federal and State Properties

Site ID: _____ Name _____ Date _____

Inspection Team (and affiliation): _____

1. Are the Institutional Control boundaries included in the base GIS layers?

Yes No N/A

2. Based on maps in the latest approved site document (e.g., PA/SI, RI/FS, Action Memorandum, ROD, etc.) are the IC boundaries in GIS still accurate?

Yes No N/A

3. Attach a map of current LUC boundaries, including any recent or pending changes.

Notes: _____

4. Have there been any changes to land ownership or tenants? (or are any anticipated)

Yes No

If yes, have new land owners/tenants been notified of LUCs?

How was this information obtained? _____

5. Has land use at or surrounding the site changed since the previous LUC inspection? (or are any changes anticipated?) Describe how this information was obtained (field inspection, imagery, etc.).

Yes No

If yes, explain: _____

6. Are there any updates required to the GIS?

Yes No

Have the appropriate agencies been notified?

Yes No

Is approval of the change required?

Yes No

If required, has approval been received?

Yes No

Notes: _____

Moose Creek, Alaska – Private Property Review

Date: _____

Date of Last Review: _____

Inspector: _____

How were changes to property ownership evaluated?

Summary of Findings:

Number of Undeveloped Properties	
Number of Developed Properties	
Number of Undeveloped Properties with Changed Ownership	
Number of Developed Properties with Changed Ownership	

Has communication been established with these identified properties? _____

How has communication been established? (List dates of sent letters and number of phone calls if applicable.)

How many properties have responded concerning an Environmental Covenant? _____

How many agreed to an EC?	
How many did not agree to an EC?	
How many did not respond to any communication attempts?	

Have ECs been drafted? How many? _____

Have ECs been finalized? How many? _____

Appendix H:

Record of Telephone Conversation Log

Page intentionally left blank.

Appendix I:

Review Comments

Page intentionally left blank.



THE STATE
of **ALASKA**
GOVERNOR MIKE DUNLEAVY

Department of Environmental Conservation

DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites Program

610 University Ave
Fairbanks, Alaska, 99709-3643
Main: 907.451.2180
Fax: 907.451.5105
www.dec.alaska.gov

February 16, 2024

File No: 107.38.006, 107.38.150

Kristina Smith
Installation Restoration Program
AFCEC CZOP
2310 Central Avenue, Suite 213
Eielson AFB, AK 99702


Re: DEC Approval for the *Final Moose Creek Land Use Controls Implementation Plan, Eielson Air Force Base, Alaska, Revision 01, Version Date: January 2024*

Dear Ms. Smith:

The Alaska Department of Environmental Conservation (DEC) has completed a backcheck review of the above referenced document and the responses to DEC comments. The United States Air Force (USAF) developed this Land Use Control Implementation Plan (LUCIP) for the restriction of groundwater use in Moose Creek, Alaska. This document describes the procedures for implementing the institutional controls required by the Interim Record of Decision (IROD), dated June 2019 (Air Force Civil Engineer Center [AFCEC], 2019). The LUCIP identifies land use controls (LUCs) on non-USAF-owned properties to restrict the use of groundwater within the Community of Moose Creek, located along the northern border of Eielson Air Force Base.

DECs final comment was addressed in the updated version of the document. Therefore, DEC approves the document. Please attach this approval letter to the final document. If you have any questions, please do not hesitate to contact the DEC project manager at (907) 451-2156, or by email at axl.levan@alaska.gov.

Sincerely,


Digitally signed
by Axl
Date:
2024.02.16
10:56:27 -09'00'

Axl LeVan
Remedial Project Manager

cc via email: Joe Price, AFCEC
Mike Boese, AFCEC
Nicole Drenning, AFCEC
Will Mangini, AFCEC

Erin Gleason, EPA
Sarah Bernhardt, DEC
Alyssa Millard, DNR

Enclosure: DEC Comment Matrix

**DEC Comments on Draft Land Use Controls Implementation Plan
Moose Creek, Alaska
January 2023**

Reviewer: Alaska Department of Environmental Conservation

Comment	Page	Section	Comment	Response
1		General	<p>The Land Use Controls Implementation Plan (LUCIP) describes the procedures for implementing the institutional controls (ICs) required by the Interim Record of Decision (IROD). Per the June 2019 IROD included in Appendix D, land use controls (LUCs) will be required to prohibit the use of contaminated groundwater and 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 CWMA and the Moose Creek Groundwater Control Land Use Area boundaries are shown in Figure 3. Based on the IROD, the CWMA and LUC area boundaries should be the same.</p> <p>The first sentence of the LUCIP in Section 1.0 states “The United States Air Force (USAF) developed this Land Use Control Implementation Plan (LUCIP) for the restriction of groundwater use in Moose Creek, Alaska (Figure 1).” Note Figure 1 includes only the Moose Creek Groundwater Control Land Use Area. Please clarify the area in which the LUCIP applies. Is it the CWMA boundary or the Moose Creek Groundwater Control Land Use Area?</p>	<p>The outline for the Moose Creek Groundwater Control Land Use Area has been removed to eliminate confusion. That was the study area to develop an emergency response to property owners affected by groundwater contamination. LUCs apply to the entire area within the CWMA, and that area is captured within that footprint. The boundaries have been updated on each of the figures and reference to the Moose Creek Groundwater Land Use Area has been removed.</p> <p>6/30/2023 DEC Accepts Response</p>
2		General	<p>Multiple terms have been used in the LUCIP to reference the Community of Moose Creek including “Community of Moose Creek,” “Moose Creek,” “Moose Creek area,” “Moose Creek community”, “Moose Creek</p>	<p>Concur. The text has been amended. The phrase “community of Moose Creek” is used throughout the text to designate the residential area</p>

			community”, and “Site”. Please use a consistent designation for the Community of Moose Creek. In addition, please define the Community of Moose Creek boundary on a support figure. Is it the same as the Moose Creek Groundwater Control Land Use Area shown on Figures 1 through 3?	within the CWMA boundary and impacted by this LUCIP. 6/30/2023 DEC Accepts Response
3	2-4	2.4	The text states “The USAF will be conducting a further Remedial Investigation (RI) that will sample groundwater to determine the full nature and extent of PFOS and PFOA contamination.” However, the Final Moose Creek IROD states: “Exposure pathways for dermal contact and ingestion of plants irrigated with contaminated water will be discussed in the Final ROD.” Please add soil will be sampled/ evaluated in the RI and risk assessment	Concur. A bullet has been added to section 2.4: <ul style="list-style-type: none"> ● <i>A remedial investigation of soil and groundwater contamination which began in August of 2020 is ongoing.</i> 6/30/2023 DEC Accepts Response
4	1	1.0	The text states “The IROD introduces land use controls (LUCs) on non-USAF-owned properties to restrict the use of groundwater within the Community of Moose Creek.” The IROD states on page 1-2, paragraph 3, third bullet “Land use controls (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.” Please clarify that the LUCs are to restrict the use of groundwater within the CWMA	Concur. The text has been amended as follows: <i>‘The selected remedy identified in the IROD introduces land use controls (LUCs) on non-USAF-owned properties within the designated Critical Water Management Area (CWMA) boundary to restrict the use of groundwater within the Community of Moose Creek, located along the northern border of Eielson Air Force Base (EAFB)....’</i> 6/30/2023 DEC Accepts Response
5	3 & 6	2.0 & 2.6	The text states “Routes of exposure in the Moose Creek area are ingestion of groundwater. Groundwater is the only pathway of concern at this time.” Please add: Other potential exposure pathways are being evaluated in the Moose Creek area under the ongoing PFAS Remedial Investigation.	Concur. The text of section 2.0 has been amended as recommended. Section 2.6 does not address PFAS exposure pathways under investigation. 6/30/2023 DEC Accepts Response

6	4	2.1	<p>The text states “A listing of private properties and their associated legal descriptions are not included in this LUCIP because such listing may contain Personally Identifiable Information that is protected from public release in accordance with the Freedom of Information Act (5 U.S.C. § 552(b)(6)) and US Department of Defense policy.”</p> <p>The DoD policy seems to be shifting for this. Does this statement still represent current interpretation of the law, or should the LUCIP be revised given changes in what is/is not allowed</p>	<p>Exemption 6 of the FOIA applies as the information likely pertains to a particular individual and consists of personally identifying information. The statement still represents AF’s current understanding of the law.</p> <p>6/30/2023 DEC Accepts Response</p>
7	4	2.2	<p>The text states “The ADNR is the owner of seven individual parcels within Moose Creek. Figure 3 includes the area of the state-owned property within Moose Creek.”</p> <p>Figure 3 shows six individual state-owned parcels within the CWMA and one state owned parcel to the south of the CWMA. Only two of the state-owned parcels are within the Moose Creek Groundwater Control Use Area. Please clarify</p>	<p>There are six state-owned properties within the CWMA. The text has been updated accordingly.</p> <p>6/30/2023 DEC Accepts Response</p>
8	4	2.3	<p>The text states “There are 85 individual parcels in Moose Creek that are owned by the United States Federal Government. Figure 3 includes the area of federally owned properties within Moose Creek.”</p> <p>Please clarify that the federal-owned land parcels referenced are within the CWMA. In addition, ownership of land along the central north boundary of the CWMA is not identified. Please clarify.</p>	<p>There are actually 98 federally owned properties within the CWMA. The text has been updated accordingly.</p> <p>USA lands are a mix of Dept. of Defense organizations. The major facility in that area is the Chena River Lakes Flood Control Project. This is a US Army Corps of Engineers facility. Ownership also exists by Eielson Air Force base. A detailed delineation between different Department of Defense organizations was not made.</p> <p>6/30/2023 DEC Accepts Response</p>
9	5	2.5	<p>For clarity, what is the end date for the “actions to date” section.?</p>	<p>The text has been amended to reflect that the actions to date include actions completed at the time of publication of the LUCIP.</p>

				6/30/2023 DEC Accepts Response
10	6	2.5	First bullet. Text states “Of the remaining 14 Water Customers, four have not returned paperwork for connection, seven returned ECs but declined water service, three do not yet meet the functional septic system and permanent electricity and heat requirement, and five were unable to be connected in 2021, but are scheduled for connection in 2022 (RESPEC 2022).” The sentence lists 19 Water Customers. Please clarify	<p>Out of a total of 192 properties that were eligible to be connected to water service, 185 environmental covenants (96%) were submitted and 178 of these properties (93%) were connected to water service by the end of 2022. There were just fourteen eligible properties (7% of the 192 total) not connected to water service at the completion of 2022. The owners of seven properties declined water service as they did not want to spend the money to meet the connection criteria because their homes are unoccupied and there is no need for water service. To meet the connection criteria, homes needed to have permanent heat, permanent electric, and a functional septic system. Four properties were not connected to municipal water because the owners refused to submit service connection paperwork. Three homes turned in service connection paperwork but were unable to meet connection criteria.</p> <p>Section 2.5 has been updated to reflect this information.</p> <p>6/30/2023 DEC Accepts Response</p>
11	6	2.5	Second bullet. Text states “179 properties have had wells decommissioned by the USAF with decommissioning documented with ADEC and ADNR.” On page 4 in the fourth bullet, the text indicates 181 PANS have had wells decommissioned. Please clarify	<p>Concur. The text has been amended to clarify that the decommissioning of 179 was documented with the ADEC and the ADNR. The decommissioning of the two remaining wells was not documented.</p> <p>6/30/2023 DEC Accepts Response</p>
12	6	2.5	Did any of the State or Federal properties have drinking water wells which were decommissioned and/or connected to the City of North Pole water supply? LUCIP does not provide any information. Please clarify	<p>No state or federal properties had drinking water wells decommissioned. The only water wells known to exist are 2 that are tested quarterly and are both located at the USACE Chena Floodplain Office. Bottled water</p>

				<p>is also being provided to this location.</p> <p>An additional bullet has been added to section 2.5 to add this information.</p> <p>6/30/2023 DEC Accepts Response</p>
13	6	2.6	<p>Bullets: Which wells will have periodic re-sampling? Please specify frequency of sampling Please clarify second bullet statement “that are within the area thought to be at risk of PFAS.” The entire Community of Moose Creek is within the CWMA; therefore, all wells should be within an area indicated to have risk. Is this meant to indicate areas further downgradient in the distal portion of the plume? Please clarify.</p>	<p>The bullets have been revised for clarification.</p> <p>First Bullet: Two wells, located at the USACE Chena Floodplain Office are tested quarterly to verify current PFAS levels are below HA levels.</p> <p>Second Bullet: Private wells located within the downgradient distal portion of the plume, which have not been previously sampled for PFAS, may be sampled at the owner’s request. With changing regulations, the Air Force may also request to sample private wells in the area.</p> <p>6/30/2023 DEC Accepts Response</p> <p>AF Initiated Change Bullets in section 2.6 were modified to better reflect what ongoing actions are currently occurring. The second and third bullet were changed to the following:</p> <p>“Evaluation of the distal end of the plume is ongoing through a semi-annual monitoring program.</p> <p>Continuing to provide tank and bottled water in limited circumstances.”</p>

				9/27/2023 DEC Accepts Response
14	7	3.2	Text states: "Groundwater in Moose Creek poses an unacceptable risk to human health if used for drinking water. Therefore, LUCs have been incorporated as a component of the selected groundwater remedy for the Site." Please add text to clarify that the remedy is an interim remedy from the IROD. The groundwater may also pose a risk if used on lawns or gardens, etc. And Text states: "The performance objective of the LUCs is to prevent access to or use of the groundwater, until EPA HAs are met and groundwater quality is demonstrated to be suitable for UU/UE." Please add: For the purposes of the IROD remedy; to the beginning of the sentence	<p>Concur. The text has been amended as recommended with the exception of language regarding risk to human health of water used for gardening and lawns which goes beyond the scope of the IROD. 3.2 now reads: <i>"Groundwater in the community of Moose Creek poses an unacceptable risk to human health if used for drinking water. Therefore, LUCs have been incorporated as a component of the selected groundwater remedy for the site as an interim remedy from the IROD.</i></p> <p><i>For the purposes of the IROD remedy, the performance objective of the LUCs is to prevent access to or use of the groundwater, until EPA HAs are met and groundwater quality is demonstrated to be suitable for UU/UE."</i></p> <p>6/30/2023 DEC Accepts Response</p>
15	7	3.3	The statements in section 3.3 are in future tense. However, section 3.0 says the section describes current elements. Please make the Description of LUCs reflect current status	<p>Concur. Language has been updated to reflect current status.</p> <p>6/30/2023 DEC Accepts Response</p>
16	7	3.4	There does not seem to be any indication that properties without covenants, whether private, state, or federal, are still being worked to get covenants in place. Please include a statement that USAF is still working to establish appropriate covenants on some private, state, and federal properties.	<p>Concur. Text has been amended to include a bullet:</p> <ul style="list-style-type: none"> • <i>Continue efforts to establish covenants for all private, state, or federal properties which do not currently have a covenant in place.</i> <p>6/30/2023 DEC Accepts Response</p>

				<p>AF Clarifying Response Based on recent and ongoing attorney discussions, the bullet has been changed to the following:</p> <p>“Continued efforts to establish covenants for all private and state properties which do not currently have a covenant in place.”</p> <p>There is a legal impediment to placing covenants on a federal property, so the reference to federal needed to be removed.</p> <p>9/27/2023 DEC Clarification It should be clarified that a Notice of Activity and Use Limitations (NAUL) will be established on the Federal Properties.</p> <p>01/24/2024 AF Response A statement has been added to the same bullet stating the following:</p> <p>“Where applicable, a Notice of Activity and Use Limitations (NAUL) will be established on the Federal Properties.”</p> <p>2/9/2024 DEC Accepts Response</p>
17	7 & 13	3.4 & 5.2	The “periodic mailing and use survey” does not meet the commitment of annual monitoring as specified in the IROD. Section 5.2 of this LUCIP specifies “The field inspections assess the condition of state-owned properties with LUCs. Field inspections will be conducted annually, at a minimum, as determined by the IROD.” Please revise as needed. Reconcile the inspection of private properties with the IROD requirement.	<p>The efforts put in place requires notification to the drillers about restricted drilling in the area, AF believes this will mitigate the likelihood of finding unauthorized wells, which is our primary concern regarding activities that are in violation of the activity and use limitations of the environmental covenant.</p> <p>07/05/2023 DEC Clarification requested – It is unclear which</p>

			<p>downgradient wells in the distal portion of the plume have environmental covenants but have not been previously sampled for PFAS. 9/27/2023 DEC withdraws this request. It was intended for comment 13 and has been addressed.</p> <p>9/20/2023 AF Response: AF requests clarification on this comment as the clarification requested doesn't match the original comment provided and appears to be more in line with comment 13.</p> <p>Original AF Response There is always the small chance that a property owner may try to put in their own well without going through a commercial driller, but individuals that would attempt this with the awareness of the CWMA and EC restrictions are likely the same property owners that would be resistant to allowing an inspection on their properties.</p> <p>Given the safety hazards of performing such inspections in MC, the AF believes that the surveys are a much less invasive and preferred means of assessing whether the activity and use limitations of the ECs are still in place on properties.</p> <p>07/05/2023 DEC Clarification DEC does not agree that the proposed survey meets the IROD requirement for monitoring. The proposed Drillers survey will not conclusively determine "whether use of the property has conformed to applicable restrictions and controls".</p>
--	--	--	--

				<p>It is not clear the extent of Field Inspections that would be undertaken per section 5.2 of this LUCIP.</p> <p>09/20/2023 AF Response DEC’s disagreement is noted. Should the driller’s survey prove ineffective, future iterations of this LUCIP can include improvements to assessing well monitoring needs.</p> <p>In response to additional comments from DNR and EPA, the field survey form has been revised.</p> <p>9/27/2023 DEC Accepts Response</p>
18	9	4.1	<p>Text states: “The CWMA designation enables the ADNR to impose restrictions and take other action necessary to protect public health, safety, and welfare in response to PFAS in the waters of Moose Creek.” Please provide examples of the types of restrictions ADNR may impose.</p> <p>The text states “Accordingly, the base must impose LUCs.” Please clarify “base.”</p>	<p>Concur. The text has been updated to clarify that restrictions authorized by the CWMA designation pertain to groundwater use.</p> <p>The text has been updated to clarify that the LUCs are implemented by the USAF in accordance with the selected remedy in the IROD.</p> <p>6/30/2023 DEC Accepts Response</p>
19	9	4.2	<p>The text states “The Air Force contractor will contact each property owner with a recorded EC to ensure that the terms of the EC have not been violated.”</p> <p>The reference to the “Air Force contractor” is used throughout this LUCIP. However, it is the USAF's responsibility to complete these tasks, whether through a contractor or in-house. Revise reference to USAF throughout.</p>	<p>Concur. The text has been updated as recommended.</p> <p>6/30/2023 DEC Accepts Response</p>
20	10	4.2, App F	<p>First bullet. The text states “The survey will specify that the property owner must return within 30 days from receipt”. The Mailing</p>	<p>Concur with qualification. In order to accommodate property owners who may be traveling, the response time has been</p>

			Questionnaire specifies a “Mailing Date:” and a “Response Requested by Date:.” Please revise text to “The survey will specify a requested response date which will be 30 days from the mailing date”	increased to 60 days. The text has been updated to read: <i>“The survey will specify a requested response date which will be 60 days from the mailing date.”</i> 6/30/2023 DEC Accepts Response
21	10	4.2	Second bullet. A Record of Telephone Communication Form will be filled out to record phone conversations with property owners. Please include a copy of the Record of Telephone Communication Form as an appendix to the LUCIP.	A Record of Telephone Communication Form has been included as appendix H. Regulatory Comments are now in Appendix I. 6/30/2023 DEC Accepts Response
22	10	4.2	Third bullet. The text states “For any properties that the contractor is still unable to make contact with the property owner for, the contractor shall then utilize high resolution aerial imagery to try to verify that there has been no violation of the ECs on the property. A report summarizing the findings of these aerial imagery investigations will be shared electronically with the Air Force after completion for each property.” The public outreach will be conducted on an annual basis. Will new high resolution aerial imagery be available annually to verify there have been no EC violations on properties where the owner does not return the Mailing Questionnaire? Are visual observations from public access right-of-way considered an option or in addition to the review of aerial imagery?	Aerial imagery might be used as a last resort, but it’s recognized that it may not be able to uncover unknown wells due to such things as vegetation cover. The use of aerial imagery will be evaluated if previous attempts to determine compliance with the LUCs prove to be ineffective. 6/30/2023 DEC Clarification Are visual observations from public access right-of-way considered an option or in addition to the review of aerial imagery? 09/20/2023 AF Response Right-of-way has been considered and may be used if the other proposed methods prove to be ineffective in determining compliance with LUCs. This would be discussed and documented in future updates to the LUCIP. 9/27/2023 DEC Accepts Response
23	10	4.4	The text states “Annually, beginning in 2023, the USAF will contact local drilling companies via mail to	Drilling companies have not been officially notified, but they are aware of the restrictions.

			reiterate the Moose Creek restrictions and to determine if any drilling activities were conducted in the prior five years in the community.” To clarify, have drilling companies been contacted previously? Or would 2023 be the first time contacting the companies? If the outreach to drilling companies is conducted annually, should the request be for any drilling activities conducted in the prior year in the community? Please clarify	Official notification will be made at the start of the first round of inspections. The text will be updated to: “Annually, beginning in 2023, the USAF will notify all FNSB drilling companies via mail of the restrictions placed on the installing of drinking water wells within the Moose Creek CWMA and will confirm if new wells were installed in within the CWMA boundary. 6/30/2023 DEC Accepts Response
24	10, 11	4.4	The LUCIP provides a list of drilling companies which will be contacted by mail annually. Please provide the current addresses of the drilling companies. In addition, the Alaska Department of Natural Resources (ADNR) Well Log Tracking System (WELTS) is also a valuable resource that should be reviewed. People could install their own wells and report them too	Concur. The text has been amended as follows “ <i>The USAF will review the Well Log Tracking System annually to confirm whether any new wells have been installed in within the CWMA boundary.</i> ” 6/30/2023 DEC Accepts Response
25	13	5.2	The text states “An inspection book for the state properties is provided as Appendix G. This book includes a site-specific description, site maps, inspection checklist, and lists the current site restrictions, and reporting requirements.” Please clarify the following regarding the inspection book. - One state property (PAN 185001) is listed in the Appendix G Inspection Book. Are there other state properties that will be field inspected annually? If so, please provide information regarding the state properties. Please also provide information regarding the federal properties as discussed in Section 6.2. - Site maps are not included in the Inspection Book. Please provide. - It appears the Checklists from the EAFB LUCIP have been used. Please edit the	The sentence listed in the inspection book concerning the one state property was deleted as it should not have been on that page. All State and Federal properties to be inspected are found in Appendix A. Appendix G is just for the checklists that will be used to inspect the various locations and were developed from Eielson’s main LUCIP in order to ensure cohesion between the two plans and reports. Items not pertinent to the Moose Creek LUCIP have been removed so the checklists are more site specific. The figures shown in this plan should be considered the site maps for reference of where inspections will occur.

			Checklists to be for the Moose Creek LUCIP	6/30/2023 DEC Accepts Response
26	17	7	The text states “The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and provided to the EPA and ADEC.” The annual monitoring report should not be included as a section of another environmental report. Please delete “or as a section of another environmental report, if appropriate,” Please specify which report is referenced. Is this the Eielson LUCIP referenced?	<p>Concur. The text has been updated as recommended.</p> <p>The Eielson LUCIP and the Eielson LUC/IC report are both referenced in this section. The Moose Creek LUCIP and the Moose Creek LUC/IC report, while it will be presented as standalone, will also be included as an appendix within the Eielson LUC/IC report to maintain program continuity.</p> <p>6/30/2023 DEC Accepts Response</p>
27	17	7.1	Field inspections and completion of the Inspection Book checklists for state and federal properties should be included as an annual monitoring activity in Section 7.1.	<p>Concur. The text has been amended to include a bullet addressing this:</p> <ul style="list-style-type: none"> • <i>field inspections and completion of inspection checklists for state and federal properties will be conducted annually.</i> <p>6/30/2023 DEC Accepts Response</p>
28	17	7.2	The annual LUC compliance review includes the Public Outreach to Private Property Owners (Section 4.2), the Foreclosure/Records Search (Section 4.3), the Outreach to Drilling Companies (Section 4.4), and On-Going Actions (Section 2.6). Results of these LUC monitoring and maintenance activities should be included in the annual monitoring report. Please clarify	<p>Concur. The text has been amended to include items from the selected remedy and the implementation discussion. The first sentence of the paragraph in question reads: “<i>An annual LUC compliance review, including outreach to private property owners, foreclosure/records search, outreach to drilling companies, review of aerial imagery, analytical sampling of drinking water wells, maintenance of government-supplied filtration and water supplies, and monitoring of state and federal properties utilizing the Annual Checklist presented in Appendix G, will be documented in the annual report and will be</i></p>

				<p><i>provided by the USAF to the EPA, ADEC, and ADNR.</i></p> <p>6/30/2023 DEC Accepts Response</p> <p>09/20/2023 AF Initiated Change The phrase “maintenance of government-supplied filtration and water supplies” has been removed from the first paragraph as it does not accurately reflect the requirements of the remedy.</p> <p>9/27/2023 DEC Accepts Response</p>
29	18	7.2.2	The text states “Property owners and resident addresses within the area of LUCs will receive notification of the availability of the annual reports.” How will the property owners be notified? Please clarify.	<p>While making the annual request to verify no wells have been installed on private properties, a reminder will be included on how residents can access annual reports through AFCEC’s online public AR.</p> <p>6/30/2023 DEC Accepts with Clarification Text now states: ‘Property owners and resident addresses within the area of LUCs will receive notification of the availability of the annual reports via mail.’”</p>
30	21	9.0	Text states: “In the event the IROD needs to be revised, a note to the file,” Please revise to memo for the record	<p>Concur. The phrase ‘note to the file’ has been changed to ‘memo to the site file.’</p> <p>6/30/2023 DEC Accepts Response</p>
31	25	11.0	DEC has soil and groundwater cleanup levels for PFOS and PFOA. Please add a reference to: Alaska Department of Environmental Conservation, 18 AAC 75: Oil and Other Hazardous Substances Pollution Control, November 18, 2021	<p>Concur. The references and text have been updated to reflect state cleanup levels. A reference to 18AAC 75 and to the 2019 DEC Technical Memorandum have been added.</p> <p>6/30/2023 DEC Accepts Response</p>
32	App D		The IROD RTCs are not needed in this document.	<p>IROD RTCs will be removed.</p> <p>6/30/2023 DEC Clarification The RTCs are still present.</p>

			<p>09/20/2023 USAF Response RTCs will be removed in final version</p> <p>9/27/2023 DEC Accepts Response</p>
33	App F	Mailing Questionnaire. Per Section 4.2, the Mailing Questionnaire will be sent to private property owners annually beginning in 2023. The questions presented in the Mailing Questionnaire inquire about changes/activities “in the past 5 years”. If the Mailing Questionnaire is distributed annually, should the questions request information about changes/activities in the past 1 year? Please clarify	<p>The questionnaire will inquire about activities and changes in the last five years and in the last year.</p> <p>6/30/2023 DEC Accepts Response</p>
34	Figure 2	The Legend references Blue and Pink Shading and indicates “Parcels not on List.” Please add clarification/note to indicate which list the parcels are not on	<p>Previous Figure 2 contained this note - Note: * List refers to original list of Moose Creek Area private properties provided to Bethel by Air Force - "PII_CUI_Protect Appropriately_Moose Creek Property Database_22Y02M10D_V2-Excel". This figure will be used in the draft final as the note was lost in the revision process.</p> <p>6/30/2023 DEC Accepts Response</p>
35	Figure C-1	Please provide a note on the figure to indicate that the well numbers correspond to the Wells Sampling Results presented in Table C-1, if that is the case.	<p>The figure referenced is part of the IROD, a completed and approved document. The requested change cannot be made to the IROD at this time.</p> <p>6/30/2023 DEC Accepts Response</p>
36	Table C-1	The table confirms there are properties within Moose Creek that have DW that exceeds the HA but gives no indication whether covenants/well decommissioning have been achieved. This table is of limited use. Can it be updated to provide additional content?	<p>This table is part of the IROD, a completed and approved document. The requested change cannot be made to the IROD at this time.</p> <p>6/30/2023 DEC Accepts Response</p>
End of comments			

From: Gleason, Erin (she/her/hers) <Gleason.Erin@epa.gov>
Sent: Wednesday, February 21, 2024 5:08 PM
To: SMITH, KRISTINA A CIV USAF PACAF 354 CES/CZOP <kristina.smith.10@us.af.mil>; BOESE, MICHAEL L CIV USAF AFMC PACAF/AFCEC CZOP <michael.boese.1@us.af.mil>
Cc: Axl LeVan (axl.levan@alaska.gov) <axl.levan@alaska.gov>; Bernhardt, Sarah P (DEC) <sarah.bernhardt@alaska.gov>; Alyssa Millard (alyssa.millard@alaska.gov) <alyssa.millard@alaska.gov>
Subject: [Non-DoD Source] RE: Eielson Moose Creek LUCIP

Hello Kris,

EPA has reviewed the USAF response to comment from 12/20/2023 and the final version of the Moose Creek LUCIP. All EPA comments have been resolved and EPA approves of the LUCIP. Attached is the final comment table showing EPA concurrence on comment #18. Please retain a copy of this email for your records.

Thank you,

Erin Gleason
Phone: 907-271-1209

Date Received: January 13th, 2023

Document: Draft Land Use Control Implementation Plan, Moose Creek Alaska

Reviewers: Erin Gleason, Richard Mednick

Comment #	Page	Section	EPA Comment (January 13 th , 2023)	USAF Response (May 30 th , 2023)	EPA Response (July 25 th , 2023)	USAF Response (September 20, 2023)
1	General	General	Please explain somewhere in the document where the LUCIP will be made available by USAF for public and EPA review.	The process by which the public can access the plans and report are described in section 7.2.2.	Accept	
2	General	General	Please use the words "community of Moose Creek" when referring to the town to differentiate from the water body Moose Creek. There are some areas of the document where it is not clear if it is referring to the community or water body.	Concur. Text has been amended to include <i>'the community of'</i> where appropriate to differentiate the community of Moose Creek from the water body with the same name.	Accept	
3	General	General	EPA notes that the words domestic water, drinking water, groundwater, and water are used throughout the report and at times seem interchangeable. EPA anticipates that drinking water and groundwater are	Concur. The text has been amended to exclude the phrase <i>'domestic water'</i> . <i>'Drinking water and groundwater are used to differentiate the</i>	Accept	

			the appropriate terms. Please review the entire report to ensure the appropriate name is used throughout.	water source and its domestic use.		
4	7	Section 3.2	Why have ADEC regulatory requirements for PFOS and PFOA in groundwater not been included here?	The ADEC regulatory position has been included in section 2.0. Paragraph 5 on page 3 has been amended to read ' <i>On October 2, 2019, the Alaska Department of Environmental Conservation updated their Technical Memorandum Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water to bring state action levels into alignment with the federal action levels.</i> '	Noted	
5	7	Section 3.3	The CWMA has already been established. Need to update the tense here and in other sections as well.	Concur. The text has been amended to reflect the establishment of the CWMA.	Accept	
6	10	Section 4.3	Please explain what happens during the gap of	The CWMA's application to the	Thank you for adding this information.	

			<p>time when the lack of having in place a subordination agreement could mean that a mortgage holder who becomes an owner could take actions which do not comport with the environmental covenants.</p>	<p>property is not extinguished in a foreclosure by a lender. If the property owner drills on their own, they are in violation of the CWMA's restriction on the extraction of groundwater. The existence or non-existence of an environmental covenant on the property does not change that.</p> <p>The section has been updated with the following text: <i>"During the time of transition of property owners, the CWMA will still apply with or without an EC in place. Groundwater use will still be prohibited."</i></p>	<p>All properties within the CWMA need to have notice of the CWMA recorded so that it appears in the chain of title.</p> <p>In the event a property gets sold and it does not have an environmental covenant, the USAF needs to ensure that new owners are informed of the restriction on groundwater extraction and use. In addition, the new owner may be amenable to signing and recording an environmental covenant. USAF must develop a program to track properties in Moose Creek that are being sold and for the the new property</p>	<p>Noted: DNR has determined how to link the CWMA in property searches and this change has been implemented to address this concern.</p> <p>Concur: A new section (4.4) has been added to address the need to track properties that change owners. This includes 36 properties (18 developed and 18 non-developed).</p> <p>EPA RESPONSE (11/16/23): Accept</p>
--	--	--	---	--	--	--

					owners to inquire about filing environmental covenants. This tracking should include the 14 occupied properties without environmental covenants and the 18 vacant lots without environmental covenants.	
7	11	Section 2.0	The U.S. Center for Disease Control, agency for toxic substance and disease registry, has shown that PFAS <u>does</u> impact human health. Please revise the last sentence of paragraph four to reflect the current human health effects of PFAS. In particular, delete the word “could potentially”.	The text has been amended to read ‘ <i>The use of the contaminated water may negatively affect human health,</i> ’ to reflect the current statement by the CDC ATSDR which states ‘ <i>Research involving humans suggests that high levels of certain PFAS ‘may’ lead to the following...’</i> The revised text reflects the published assessments that the CDC has provided to date as shown in	Accept	

				reports and the CDC ASTDR website. Reference added.		
8	12	Section 2.1	Please explain in advance of this page about the connections to the North Pole water supply (perhaps have sections 2.4 and 2.5 come before 2.1) as otherwise these provisions have no context.	<p>Concur. The text has been amended to include a description of the water supply provision prescribed in the IROD. The following clause has been added to section 1:</p> <p>The selected remedy introduced in the IROD introduces land use controls (LUCs) on non-USAF-owned properties within the designated Critical Water Management Area CWMA to restrict the use of groundwater within the Community of Moose Creek, located along the northern border of Eielson Air Force Base (EAFB), and <i>implements a provision to provide potable water supplied by the City of North</i></p>	Accept	

				<i>Pole Water Treatment Plant.”</i>		
9	12	Section 2.1	Please explain what “paperwork” means in order to understand what “returned paperwork” means.	Concur. Text has been amended to clarify ‘paperwork’ as Environmental Covenant (EC) paperwork.	Accept	
10	12	Section 2.1	Please explain what “special circumstances” means.	<p>In this particular case, the special circumstance showed it was cost prohibitive to extend the water line to the property. As an example, U.S. Ecology (now known as Republic Services) was not offered the opportunity to connect to the CONP. AF has and will continue to supply a clean source of drinking water to this property by other means, such as by tank water delivery.</p> <p>For the 3rd bullet under 2.1, the last sentence is modified</p>	Accept	AF Initiated Change: The following changes were made

				to say, "One PAN was a special circumstance, in which the distance to connect was cost prohibitive, and therefore was not given the opportunity to sign an EC."		to the end of the 3 rd bullet: "and therefore was not given opportunity to connect to municipal water." Discussion of the EC is misleading as the reason for not connecting was cost prohibitive and not EC related. EPA RESPONSE (11/16/23): Noted
11	12-14	Section 2.1 bullets, and p. 6, Section 2.5 bullets	Please explain the result of these actions in terms of what properties/persons are/will be protected from exposure to PFAS in groundwater by the efforts of USAF and what properties/persons are/will be unprotected.	Concur with qualification. Section 2.1 describes private properties within the CWMA and is not intended to describe the effectiveness of the IROD. The text in section 2.5 has been amended as follows. <i>"The decommissioning of wells will prevent access to drinking water that are impacted by PFAS, protecting property owners, residents, and visitors from exposure. The provision of</i>	Accept	

				<p><i>connection to the North Pole WTP will ensure that these properties have access to safe drinking water. The selected remedy ensures the remedial action objective of protecting human health by preventing human ingestion of PFAS-impacted groundwater that exceeds the 2016 EPA HA value.”</i></p>		
12	13	Section 2.5	<p>Please include the eligibility criteria that was used to determine if properties would be connected to the City of North Pole water system</p>	<p>The term ‘eligible’ has been removed as it implies criteria which must be met. The text for bullet one of Section 2.5 has been modified to: <i>“The USAF is in the process of connecting developed properties with wells at no cost to the property owners. The USAF will take appropriate mitigation action for all public and private water sources reasonably believed to be</i></p>	<p>Disagree- In your own response to comment for #14 you use the word eligible. There were certain criteria that USAF required people to meet before the were considered eligible for connection. Please explain the eligibility criteria used by USAF and how that application of that criteria affected the connections to the public water supply.</p>	<p>See comment 14 and revised second bullet in Section 2.5.</p>

				<i>contaminated by USAF actions (USAF, 2016)"</i>		
13	13	Section 5.2, 2 nd to last full paragraph	The text should state "compliance with LUCIP and IROD."	Concur. The text has been amended to state: <i>"to ensure compliance with the LUCIP and IROD."</i>	Accept	
14	14	Section 2.5	Please explain what "returned paperwork" means. Need to explain what "do not meet functional septic system and permanent heat and electric requirement" means and why this is important. Actions taken in 2022 need to be included/updated here.	A return of EC paperwork was not required to be connected to CONP water. There were some properties that did not sign ECs that signed for connection to CONP water. Properties choosing to connect to CONP water needed to submit the necessary utility connection paperwork for the connection to occur. Owners eligible for municipal water connection had the option to sign just for connection to CONP water, and not for the granting of ECs on their properties.	Disagree- Please include the definitions you have outlined in this RTC for permanent electric, permanent heat, and operational septic in the LUCIP. Also include an explanation of why having these features is important/necessary and a requirement for connection. It remains unclear as to what "paperwork" refers to and USAF needs to explain that term means in order to clarify what is needed as a pre-condition to connection to the public water system.	Connection criteria included in 2 nd bullet of Section 2.5. EPA RESPONSE (11/16/23): Accept

				<p>Permanent electric refers to being connected to the local electric utility (GVEA), with a permanent metered electrical connection. Any deviations to the GVEA requirement (e.g., solar panels, windmill, etc. had to be checked out and approved by the CONP and RESPEC).</p> <p>Permanent heat refers to a "permanent operating" heat source running throughout the heating system. A wood stove, pellet stove, or other heat source that must be manually fed with fuel to provide heat is not considered to be a "permanent operating" heat source. An operational septic system is a functional one permanently</p>	<p>USAF must continue to fund and provide the 14 eligible residences that have not connected to municipal water with bottled/tank water. This is a requirement of the Action Memo for Moose Creek and is part of USAF satisfying its liability under CERCLA 107 and 120.</p> <p>The lone exception that EPA would find acceptable is when providing the bottled/tank water would be a danger to USAF personnel or its contractors because of the threatening behavior of the property owner or occupant.</p>	<p>Further discussion may be required due to ongoing attorney discussions. This document addresses the implementation of Land Use Controls included in the LUC component of the remedy. Provision of water is not a LUC.</p> <p>EPA RESPONSE (11/16/23):</p>
--	--	--	--	--	--	--

				<p>connected to a habitable structure.</p> <p>Bullets have been updated with the following text in 2.5:</p> <p>Out of a total of 192 properties that were eligible to be connected to water service, 185 environmental covenants (96%) were submitted and 178 of these properties (93%) were connected to water service by the end of 2022. There were just fourteen eligible properties (7% of the 192 total) not connected to water service at the completion of 2022. The owners of seven properties declined water service as they did not want to spend the money to meet the connection criteria because their homes are unoccupied and</p>		
--	--	--	--	---	--	--

				<p>there is no need for water service. To meet the connection criteria, homes needed to have permanent heat, permanent electric, and a functional septic system. Four properties were not connected to municipal water because the owners refused to submit service connection paperwork. Three homes turned in service connection paperwork but were unable to meet connection criteria.</p> <p>Over the course of 2021 and 2022, 246 wells in total were decommissioned on 183 off-base properties in Moose Creek out of 189 properties total (97% of all properties had wells decommissioned). Decommissioning of</p>		
--	--	--	--	--	--	--

				wells in Moose Creek is now complete for all properties that the owners gave the Air Force permission to decommission the wells for, and for all wells that the Air Force could locate.		
15	15	last full paragraph Section 6.2.	The text should state "compliance with LUCIP and IROD."	Concur. Text has been amended to include: <i>"to ensure compliance with the LUCIP and IROD"</i>	Accept	
16	17	Section 4.2	Please include more context for the "Mailing Questionnaire". This is the first section that it is mentioned and explanation would be helpful.	Concur. The text has been amended as follows: <i>"The Air Force will contact each property owner with a recorded EC to ensure that the terms of the EC have not been violated. The first means of contact will be via a Mailing Questionnaire, consisting of survey questions that the Air Force, will develop. The questions will include whether there have been any</i>	Accept	

				<i>changes in land use and whether ECs, if present, are still in place.”</i>		
17	18	Section 4.2	Property owners may not respond within 30 days due to travel, unforeseen hospitalization, etc. A longer response period may help with the response rate.	Concur. The text has been amended to specify that surveys must be returned within 60 days from receipt.	Accept	
18	18	Section 4.2	Aerial imagery may not show violations of the environmental covenants (EC) on the property. If aerial imagery does not show any EC violations, would it be possible to inspect the property?	<p>The efforts put in place requires notification to the drillers about restricted drilling in the area, AF believes this will mitigate the likelihood of finding unauthorized wells, which is our primary concern regarding activities that are in violation of the activity and use limitations of the environmental covenant.</p> <p>There is always the small chance that a property owner may try to put in their own</p>	USAF must verify the environmental covenant and CWMA have not been violated. In the event that property owners do not respond to the mail-in questionnaire, USAF is still responsible for verifying. Using aerial imagery and expecting local drilling companies to self report is not sufficient. USAF must visit the property and attempt to verify with the property owners. USAF should verify by mail in questionnaire or property visit	EPA’s disagreement with the proposed AF approach is noted. Should the current proposed process prove ineffective, modification of the LUCIP would be proposed to include more direct methods of approach. This would be discussed and documented in future updates to the LUCIP. Properties without environmental covenants is covered under the

				<p>well without going through a commercial driller, but individuals that would attempt this with the awareness of the CWMA and EC restrictions are likely the same property owners that would be resistant to allowing an inspection on their properties. Given the safety hazards of performing such inspections in MC, the AF believes that the surveys are a much less invasive and preferred means of assessing whether the activity and use limitations of the ECs are still in place on properties.</p> <p>Aerial imagery might be used as a last resort, but its recognized that it may not be able to uncover unknown wells due to such things as vegetation cover or</p>	<p>annually. This verification includes the 14 occupied properties without the environmental covenant and the 18 vacant properties without environmental covenants.</p>	<p>response provided under comment 6.</p> <p>EPA Response (11/16/2023): Disagree. USAF cannot assess if the properties have conformed to the restrictions and controls detailed in the Land Use Control (LUC) without a field inspection on non-responsive properties. As part of the LUCIP, field inspections of all properties that are non-responsive to questionnaire and phone call must be conducted. Inspection should occur during snow free conditions and daylight hours.</p> <p>AF Response (12/20/2023): Based on the meeting held on 20 November 2023, AF</p>
--	--	--	--	---	---	--

				decorative well covers.		<p>agrees to add a statement to the mail questionnaire that a visual inspection will be conducted should the assessment not be completed by the property owner. Should the assessment and phone call fail to make positive connection, a visual inspection will be conducted. If a visual inspection cannot be conducted, a reason as to why will be documented and a summary will be provided in the Field Inspection Report.</p> <p>Please see section 4.2, bullet 3 as well as Appendix F for edits. Also note, the word survey has been corrected to assessment throughout the document.</p>
--	--	--	--	-------------------------	--	--

						EPA Response (2/21/2024): Accept.
19	18	Section 4.2	How will coordinating with FNSB yield phone numbers for property owners? Are you looking it up in the tax database? Please be more specific.	<p>Text has been modified to include an online search for the property owner if available databases do not produce a phone number.</p> <p>The FNSB database has parcels with owner names and physical and mailing addresses only. The original source for the phone numbers and e-mails was the database Northwind-EA maintained for O&M of the water treatment systems. Phone numbers and e-mails will be updated and maintained if homeowners are willing to share their contact information.</p>	Accept	
20	18	Section 4.4	Please include definition of "local drilling companies". Is local a certain mileage	All Fairbanks-North Star Borough Drilling companies will be	Accept	

			from the site? All FNSB companies?	contacted. The text has been amended to clarify.		
21	21	Section 9.0	Eliminate “note to the file” as a possible way to revise the IROD (only an amendment or ESD are possible).	Concur. The phrase ‘ <i>note to the file</i> ’ has been changed to ‘ <i>memo to the site file.</i> ’	Accept	
22	21	Section 5.1	Does “water” mean all kinds of water or just groundwater? Please be more precise.	Concur. The text has been amended to specify groundwater usage.	Accept	
23	21	Section 5.2	Will field inspections also include surface water or are they only groundwater?	Field inspections will only concern groundwater as the IROD addresses groundwater contamination.	Accept. Please ensure you specify groundwater in section 5.2	Verified in text, only groundwater is referenced.
24	41	Figure 3	There are three circular anomalies depicted in dark blue, which is the same color as the PFAS plume boundary. EPA anticipates these are errors and not additional PFAS plumes. Please review and revise Figure 3.	Those circles were in the 2021 Atlas and are part of the PFAS plume.	Noted. Why are we using the 2021 PFAS data and not the most recent for this figure?	This is the latest plume figure with the latest data. 2022 data is still under review. EPA RESPONSE (11/16/23): Noted
25	91	Map of CWMA boundary,	Page 91 appears to have been saved incorrectly in the PDF. EPA can see two polygons and the header	It appears that it was saved incorrectly. The correct figure will be	Accept	

		attachment B, Appendix C	for Critical Water Management Area (CWMA) boundary, but the font is shadowed. Please revise.	included in the Draft Final.		
26	243	Questionnaire	Please add the sentence "has the land-use change in the last year?" to the first question box. It will be helpful to see if the land has changed in the last year, in addition to the total five years.	This question has been added.	Accept	
27	248	LUC General Information Sheet	What are 103/332 records? If applicable to this work, please define elsewhere in the document. If not applicable, please remove from the LUC General Information Sheet.	103/332 records are Eielson specific processes for work orders on base. These numbers or references to these records have been removed as they will not be applicable to properties off base.	Accept	
28	250	Control Checklist	Fences, roads, gates, and signed are not institutional controls being implemented for the Moose Creek properties. As such, please delete/strike out those sections of the checklist.	Those items will be removed from the checklist. The last page of the checklist was removed.	Accept	

Comments submitted by: Alyssa Millard

Name(s)	Statewide Abatement of Impaired Land (SAIL) and Water Sections
Agency/Organization	Alaska Department of Natural Resources-Division of Mining, Land and Water
Document Reviewed	Draft Land Use Controls Implementation Plan Version Dated November 2022 Moose Creek, Alaska

No.	Agency	Office	Document Section	Page No.	Wording Change/Comment	
1.	ADNR	SAIL	1.0	1	This plan is a part of the EAFB LUCIP, updated annually. As landowners and land managers of the state parcels in the CWMA please include the DNR SAIL section on reviews each year. As designators of the CWMA please include the DNR Water Section on reviews each year.	Concur. The DNR Water Section and SAIL will be part of the annual LUCIP review process. ADNR agree
2.	ADNR	Water	2/3	5-	Please check tense on these chapters globally. Some actions were already taken and should be mentioned in past tense (Section 2.4 for example). Has the water main and local distribution system been installed?	Concur. The text has been updated to reflect that the actions have been completed. The water main and local distribution system have been installed. ADNR agree
3.	ADNR	SAIL	2.2	4	Please work with DNR-SAIL to determine the best way to assign covenants to the state parcels. For example, should we use the smallest tax parcel or attached the covenant to the patent. Suggest changing the follow sentence until discussions occur: “The ADNR is the owner of seven individual parcels within Moose Creek.” Additionally, why is parcel (PAN 701036) south of the CWMA boundary included in	Concur. Text has been revised as recommended. Parcel 701036 will not be included in the LUC plan. Response: First comment not addressed. See additional notes below the table. Appendix A: Property Listing Table lists 7 parcels but figure 3 shows 6 parcels.

No.	Agency	Office	Document Section	Page No.	Wording Change/Comment	
					<p>this LUC plan? Has contamination been documented on this parcel? Referencing Appendix A, I don't see this parcel listed.</p> <p>If it should not be included remove it from the Figure 3 map.</p>	<p>09/20/2023 AF Response: How DNR wishes to assign covenants to the state parcels, will be up to DNR. AF is available to consult with as DNR is working through the process.</p> <p>Table list will be corrected to only show the 6 parcels as highlighted on the figure.</p> <p>10/10/2023 DNR agree</p>
4.	ADNR	SAIL	3.3	7	<p>We suggest changing the verb tense to accurately reflect that the CWMA has been issued. Please review the entire document and update the tense for items that have been addressed or are ongoing.</p>	<p>Concur. The text has been revised as recommended. ADNR agree</p>
5.	ADNR	SAIL	4.1/5.1/6.1	9/13/15	<p>Why would these sections be different? Shouldn't each of these sections have the same text that is in section 4.1? Please review the document and resolve inconsistencies.</p> <p>5.1 and 6.1 are the state land and federal land Prohibitions and Restrictions Sections. They both state "<i>The CWMA provided in Error! Reference source not found. details prohibitions and restrictions to water usage established by the ADNR.</i>"</p> <p>I don't have Appendix C. Are there different restrictions on federal and state land?</p>	<p>This report was designed for the end user in mind, so each property type was broken out individually to make it clear as to what applies to each. Private properties have different restrictions when compared to Federal and State, such as the requirement of an Environmental Covenant (EC).</p> <p>Please explain comment further-what restrictions would a private parcel have that a state or federal parcel would not. Both should point to the restrictions established in the CWMA.</p> <p>09/20/2023 AF Response – The Air Force can only speak to the land use control restrictions for the private properties as the restrictions are clearly identified in the</p>

No.	Agency	Office	Document Section	Page No.	Wording Change/Comment	
						<p>ECs for the private properties that signed for them. As the state is working on their ECs for the state parcels within the Moose Creek CWMA, we won't know the full extent of the land use control restrictions on the state properties until the state finalizes their ECs for these parcels. Assuming they will all be the same as the private would be premature. Regarding federal properties within the MC CWMA, the Air Force does not have the authority to impose Notice of Activity and Use Limitations (NAULs) on other federal parcels, and so any land use control restrictions on these parcels are up to the federal property owner to implement, not the Air Force. As the MC LUCIP is a living document, updates can be made as we learn more about the land use control restrictions that the owners of the state and federal parcels within the MC CWMA decide to implement. Keeping these items called out separately for the time being makes it easier to address changes and updates to each property type especially if they turn out to be drastically different from each other.</p> <p>10/10/2023 DNR agree</p>
6.	ADNR	Water	4.1	9	Suggested change to first sentence: <i>The CWMA designation establishes restrictions on the future use of groundwater and surface water from within the defined area to protect public health, safety, and welfare in response</i>	Concur. The text has been revised as recommended with the exception that the area is designated as <i>the community of Moose Creek</i> in order to avoid confusion with the water body. ADNR agree

No.	Agency	Office	Document Section	Page No.	Wording Change/Comment	
					<i>to PFAS in the waters of the Moose Creek area.</i>	
7.	ADNR	SAIL	5.2	13	<p><i>Comments:</i> Please provide additional details about how and when field inspections will be completed:</p> <ul style="list-style-type: none"> -The parcel boundaries should be evaluated for current and new access routes each year. -Will field inspections be aerial, by foot, or a combination. How much area will be covered? This section does not explain where field inspections will occur. -When will field inspections occur-what season? Winter would be inappropriate. Aerial surveys during the summer may limit what is visible on the ground. <p>It may be appropriate to create a state or undeveloped parcel specific inspection book.</p> <p><i>Sentence edits:</i></p> <p>1 Checklists should only be modified according to USAF, regulators and ADNR review and input.</p> <p>2 If activities on the state parcels are inconsistent with the LUC ADNR needs to be notified immediately.</p> <p>3 USAF will ensure that the appropriate personnel undertake the necessary measures to ensure compliance with the LUCIP in coordination with ADNR following proper permitting.</p> <p>4 The USAF will provide notice of any IC/LUC changes to the EPA, ADEC, and ADNR for their review and approval...</p>	<p>1. Concur, parcel boundaries will be evaluated for current and new access routes each year.</p> <p><i>Please see additions to the field inspection checklist in separate document.</i></p> <p>09/20/2023 AF Response – See updated checklist 10/10/2023 DNR agree</p> <p>2. Aerial imagery could be used to help identify new trails or roads that could be used to install new wells on State property. Field inspections would then occur by foot on existing, established, or new roadways, right of ways, or trails.</p> <p><i>Can this be added? How can we ensure this is done consistently across years?</i></p> <p>09/20/2023 AF Response – See updated checklist 10/10/2023 DNR agree</p> <p>3. Field inspections will occur on a yearly basis and may be performed at any time during the summer months, or what would typically be considered a construction field season for Alaska (May-October).</p> <p>ADNR agree 10/10/2023 DNR agree</p> <p>4. A checklist for inspection of undeveloped parcel’s was added to the inspection report.</p> <p><i>Is this the state and federal checklist? Shouldn’t there also be a vacant/undeveloped parcel checklist?</i></p>

No.	Agency	Office	Document Section	Page No.	Wording Change/Comment	
						<p>09/20/2023 AF Response – See updated checklist 10/10/2023 DNR agree</p> <p>Sentence Edits: 1Concur. Text has been revised as recommended. ADNR agree</p> <p>2Concur. The text has been revised as follows: <i>“The USAF Remedial Project Manager (RPM) will be responsible for notification of the ADNR of any activity that is inconsistent with the LUC objectives or use restrictions or any other action that may interfere with the effectiveness of the LUCs.”</i> ADNR agree</p> <p>3 Concur. Text has been revised as follows: <i>“USAF will ensure that the appropriate personnel undertake the necessary measures to ensure compliance with the LUCIP and IROD in coordination with ADNR and following proper permitting.</i> ADNR agree</p> <p>09/20/2023 AF Initiated Change: During follow-up review, corrections were found to still be needed to be able to best reflect current regulation and policy. As such, “...and following proper permitting” has been removed from the sentence. CERCLA response actions are exempt by law when it comes to obtaining Federal, State, or</p>

No.	Agency	Office	Document Section	Page No.	Wording Change/Comment	
						<p>local permits related to cleanup activities completed on site.</p> <p>10/10/2023 DNR agree</p> <p>4 Concur with qualification. Text has been revised as follows: <i>"The USAF will provide notice of any IC/LUC changes to the EPA, ADEC, and ADNR for review."</i> The IROD does not give ADNR approval authority for changes to the LUC component of the remedy. ADNR agree</p>
8.	DNR	SAIL	7.0	Page 17 line 7	<p>...provided to the EPA, ADEC, and ADNR. This includes the DNR SAIL section and DNR Water section</p>	<p>Concur. Text has been revised as recommended.</p> <p>ADNR agree</p>
9.	DNR	SAIL	7.0	17 line 9	<p>The annual monitoring report, submitted to the regulatory agencies and ADNR by the USAF, ...</p>	<p>Concur. Text has been revised as recommended. ADNR agree</p>
10.	DNR	SAIL	7.2.1	17	<p>Is the annual monitoring report different from the field report and different from the annual report/annual LUC compliance review. These reports are not clear throughout the document please use the same term for each report or provide a table explaining the name of the report, purpose, frequency, and who the report should be submitted to, etc.</p>	<p>The field inspection report, a compilation of site inspection checklists and dailies, is included in the Annual LUC Report. Sections that refer to a field inspection report will be updated to clarify that these reports are included in the annual LUC Report. ADNR agree</p>
11.	DNR	SAIL	7.2.1	17	<p>Appendix G here is called Annual Checklist and Annual Review Checklist but an inspection book in other sections and on the</p>	<p>Appendix G has been renamed Inspection Book and references within the text have been updated accordingly.</p>

No.	Agency	Office	Document Section	Page No.	Wording Change/Comment	
					<p>Appendix G page, please make this consistent.</p> <p>If the text “annual checklist” should not capitalized please correct.</p>	ADNR agree
12.	DNR	SAIL	9.0	21	<p>The USAF will decide whether to modify or discontinue a LUC with the review and approval of EPA, ADEC, and ADNR.</p>	<p>Non-concur. In accordance with the interim Record of Decision (IROD), ADNR does not have the authority to approve or disapprove changes to the LUC component of the selected IROD remedy.</p> <p>Stated in the IROD, under the Land Use Control section, item number vii: “The USAF will be responsible for implementing, maintaining, monitoring, and reporting of LUCs as specified in the Moose Creek Land Use Control Implementation Plan and Land Use Control Management Plan. The Implementation Plan will be developed by the USAF with input from and approval by ADEC and the EPA.</p> <p>Followed by item number xiv: “EAFB shall not modify or terminate LUCs, implementation actions, or land use that are associated with the selected remedy without the approval of the EPA and the opportunity for concurrence by ADEC. EAFB shall seek prior concurrence of the EPA and the State before any anticipated action that may disrupt the effectiveness of the LUCs, or any action that may alter or negate the need for LUCs.”</p>

No.	Agency	Office	Document Section	Page No.	Wording Change/Comment	
						ADNR agree. As discussed in person: ADNR will review the LUC but will not be a signatory on the LUC.
13.	DNR	SAIL	10	23	<p>Please update this section to include ADNR in all reporting.</p> <p>Why is State of Alaska used in this section instead of ADNR?</p> <p>Text states: <i>“Should the USAF become aware that a land use within the LUC boundary is in violation of one or more terms of the LUCs, the USAF will also work cooperatively with EPA and the State of Alaska to re-establish compliance”</i></p>	<p>Concur. ADNR has been included in notification of discovery of activities inconsistent with LUC objectives etc., and how USAF will address.</p> <p>State of Alaska has been corrected to ADEC and ADNR to be consistent throughout the report.</p> <p>ADNR agree</p>
14.	DNR	SAIL	Figures		<p>The figures contain a red outlined polygon labeled “Moose Creek Groundwater Control Land Use Area” wouldn’t this LUCIP plan apply to the entire CWMA polygon? If so the use of the red outlined polygon is misleading and confusing for Figures 1-3.</p>	<p>The outline for the Moose Creek Groundwater Control Land Use Area has been removed to eliminate confusion. That particular boundary was the study area to develop an emergency response to property owners affected by groundwater contamination. LUCs apply to the entire area within the CWMA, and that area is captured within that footprint. The boundaries have been updated on each of the figures and reference to the Moose Creek Groundwater Land Use Area has been removed.</p> <p>ADNR agree</p>
15.	DNR	SAIL	Appendix G		<p>The field report should contain additional entries such as describing any limitations to your observations, description of the</p>	<p>Additional entries will be included in the field report.</p> <p>What additional entries were included?</p>

No.	Agency	Office	Document Section	Page No.	Wording Change/Comment	
					route/area inspection including a map showing the route/areas visited.	Should this information go on the field inspection check list? Suggestions in separate document. 09/20/2023 AF Response – See updated checklist 10/10/2023 DNR agree
16.	DNR	SAIL	Appendix H		ADNR is not a regulator please update the title of this section (see comment #1).	Title changed to “review comments”. This is now Appendix I. ADNR agree
17.	ADNR	SAIL			General comment: are there plans for any monitoring wells or surface water sampling on the state parcels? Monitoring wells will require an authorization with ADNR.	The need for monitoring wells or surface water sampling will be determined as AF proceeds through the CERCLA process. If a need is identified for monitoring wells or surface water sampling on state parcels, stakeholders will be informed before anything is actually installed or sampled. ADNR agree
18.	ADNR	SAIL			General comment: will USAF place signage along access points to identify LUCs in place, and to alert the public? There are access routes to the state parcels via easements and other trails. Signs should be erected and maintained by USAF at all access locations currently available and any that are created in the future. If access is currently blocked or restricted, please describe blockages observed during field inspections in the field report.	Since LUCs only address groundwater, no signs are proposed to be used at access points. Signage is more likely to be used if there are also controls in place that restricts digging or a risk to human health has been identified in surface soils. Air Force believes that signs to identify groundwater contamination are not needed at this current time since no wells should be installed on properties in public locations. ADNR agree

----- END OF COMMENTS -----

Additional comments on FINAL

ADNR	SAIL	1.0	2	<p>Appendix I hasn't been updated to Review Comments on this page.</p> <p>AF Response – comments are not included until the final version 10/10/2023 DNR agree</p>
------	------	-----	---	---

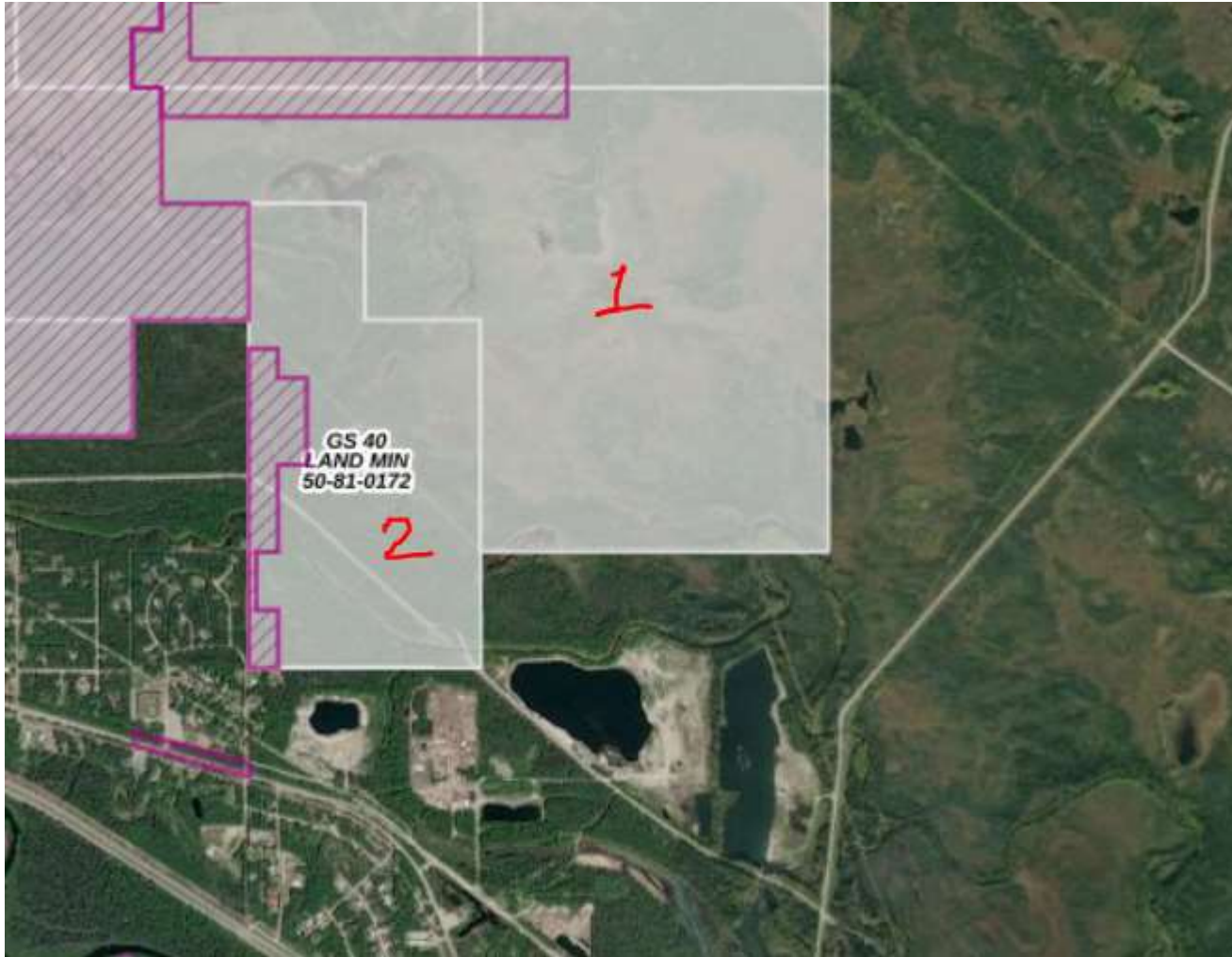
Additional information for comment #3

Two Parcel options based on the patent:

Red label #1 GS 40 Patent 1232752

Red label #2 GS 40 Patent 50-81-0172

State parcels are in grey, pink/purple are lands that have been conveyed out of state ownership.



Versus the tax parcel as found in the LUCIP:

PAN (new)	Owner1	Abbreviated Legal Description
185001	ALASKA STATE OF DNR	TL-2101 SEC 21 T2S-R3E
185027	ALASKA STATE OF DNR	TL-2103 SECTION 21 T2S-R3E PATENT 50-81-0172
185035	ALASKA STATE OF DNR	TL-2201 SECTION 22 T2S-R3E SERVICE AREA SPLIT - NOW KNOWN AS TL 2203 & 2204 2S 3E
185043	ALASKA STATE OF DNR	TL-2200 SECTION 22 T2S-R3E
185451	ALASKA STATE OF DNR	TL-2836 SEC 28 T2S-R3E PATENT 50-81-0712
531928	ALASKA STATE OF DNR	TL 2105 SECTION 21 2S 3E CORRECTIVE DEED 005147 1244-887 3-19-2001 Previously assessed as 2S 3E 21 2102
531936	ALASKA STATE OF DNR	TL 2882 SEC 28 2S 3E CORRECTIVE DEED 005147 1244-887 3-19-2001 Previously assessed as 2S 3E 21 2102