APPENDIX D

ENVIRONMENTAL WORK PLAN

Project No. 0610004/Z618720000
Airport Way (West) Improvements &
Project No. 0002449/NFHWY00447
Airport Way West Bicycle/Pedestrian Facility

ENVIRONMENTAL WORK PLAN

AIRPORT WAY WEST IMPROVEMENTS
FAIRBANKS, ALASKA

ADEC FILE NO.: VARIOUS
ADEC HAZARD IDENTIFICATION NO.: VARIOUS

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
ADEC	Alaska Department of Environmental Conservation
ARFF	Aircraft Rescue and Firefighting Building
AWWI	Airport Way West Improvement
bgs	below ground surface
COPC	contaminant of potential concern
DNR	Department of Natural Resources (Alaska)
DOT&PF	Department of Transportation and Public Facilities (Alaska)
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
eV	electron volt
FAI	Fairbanks International Airport
GAC	granular activated carbon
GRO	gasoline-range organics
HDPE	high density polyethylene
IATA	International Air Transport Association
IC	institutional controls
IDW	investigation derived waste
MeOH	methanol
MS	matrix spike
MSD	matrix spike duplicate
ng/L	nanogram per liter
NTU	nephelometric turbidity units
oz	ounce
PAH	polycyclic aromatic hydrocarbons
PFAS	per and polyfluoroalkyl substances
PFBS	Perfluorobutane sulfonic acid
PFHpA	Perfluoroheptanoic acid
PFHxS	Perfluorohexane sulfonic acid
PFNA	Perfluorononanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
PID	Photoionization detector
ppm	parts per million
QEP	qualified environmental professional
R&M	R&M Consultants, Inc.
SWPPP	stormwater pollution prevention plan
TCE	trichloroethene
TLC	teflon lined cap
TLS	teflon lined septa cap
TWUA	temporary water use authorization
USDOT	U.S. Department of Transportation
VOC	volatile organic compound

1.0 INTRODUCTION

The Alaska Department of Transportation (DOT&PF) retained R&M Consultants, Inc. (R&M) under Professional Service Agreement Number 025-5-1-051, to produce an Environmental Work Plan (Work Plan) to manage disturbance of potentially contaminated soil and groundwater during construction of improvements as part of the Airport Way West Improvement (AWWI) project in Fairbanks, Alaska. This Work Plan has been developed in accordance with Alaska Department of Environment Conservation (ADEC) Field Sampling Guidance (ADEC, 2022) procedures and 18 Alaska Administrative Code (AAC) 75 regulations (ADEC, 2021). The site location and vicinity, project work areas, improvement types, and known contaminated sites are shown on **Drawings A-01 through A-04** in **Appendix A.**

This project will include various civil construction activities necessary to upgrade transportation and drainage infrastructure along portions of Airport Way, Dale Road, Old Airport Road, Hoselton Road, Wien Lake Road West, Wien Lake Road North, and a pedestrian pathway running parallel to a portion of Airport Way as shown on **Drawing A-02.** Construction activities are expected to include new embankment construction, embankment reconstruction, shoulder improvements, deep utility excavations (e.g. storm drains and water lines), and stockpile areas as shown on **Drawing A-03.**

1.1 FIELD OBSERVATION OBJECTIVES

Objectives for ADEC qualified environmental professional (QEP) field observation include:

1. Observe soil disturbing activities
   - Utility installation
   - Shoulder grading
   - Embankment construction
   - General excavation
   - Stockpiling
2. Observe management of groundwater removed by dewatering activities from excavations
   - Pump and treat
   - Pump, store, and treat
3. Observe reuse or disposal of existing asphalt removed during construction

1.2 QUALIFIED ENVIRONMENTAL PROFESSIONAL REQUIREMENT

To document that soil disturbing, asphalt reuse, and dewatering activities associated with this project are conducted in accordance with this Work Plan, a QEP shall be on site for observation and documentation when earth disturbing activities associated with native or existing fill materials on the AWWI project occur. Additionally, a QEP shall observe and document storage and reuse or disposal of reclaimed existing asphalt. An environmental consultant will be identified by the construction contractor to provide a QEP and shall be approved by DOT&PF prior to beginning the project.

1.3 TENTATIVE SCHEDULE

A schedule has not yet been set as a construction contractor has not been selected by DOT&PF as of January 2022.

1.4 BACKGROUND AND PREVIOUS INVESTIGATIONS

Investigation has occurred in numerous locations around and on this project area including engineering, soils, and environmental studies. The most recent environmental investigation covering a regional scale encompassing the project area occurred in 2018 to investigate per and polyfluoroalkyl substances (PFAS) in groundwater associated with the Fairbanks International Airport (FAI). This investigation identified four main PFAS groundwater contaminated zones originating along the length of the main runway 2L-20R and migrating to the northwest towards the Chena River (R&M, 2019). This investigation considered PFAS components perfluorobutane sulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), perfluorooctane sulfonate (PFOS), and perfluorooctanoic acid (PFOA). PFBS was considered separately **(Drawing A-10)** from a summation of the other five analytes **(Drawing A-16)** by the 2018 investigation. For analysis under this Work Plan 10 percent of the ADEC PFOS/PFOA cleanup level will be considered relative to the PFAS summation.

PFAS related groundwater impacts exceeding ADEC cleanup levels appear limited to Wien Lake Road and the western halves of Dale Road, Airport Way, and Old Airport Road improvements. PFAS summation results in groundwater above 10 percent of the ADEC cleanup levels and nearest to the Aircraft Rescue and Firefighting Building (ARFF) and Inspection Source Areas **(Drawing A-17)** appears to have an eastern boundary at approximately King Road. PFAS summation results in groundwater in the pathway; Hoselton Road; and eastern halves of Dale Road, Airport Way, and Old Airport Road improvements appeared to be above 10 percent of the ADEC cleanup level and associated with smaller groundwater plumes associated with the Hangar Fire, Engine Fire, and Deicing Source Areas **(Drawing A-17)**. **Drawings A-10, A-16, and A-17** from the 2018 PFAS investigation at FAI are included as reference to PFAS and general groundwater impact areas near this project area (R&M, 2019).

1.4.1 PROJECT CONTAMINANTS OF POTENTIAL CONCERN

Relevant COPC for activities described by this Work Plan include the following:

- Gasoline-range organics (GRO)
- Diesel-range organics (DRO)
- Petroleum hydrocarbon associated volatile organic compounds (VOC)
- Trichloroethene (TCE), which is a chlorinated VOC
- Polycyclic aromatic hydrocarbons (PAH)
- PFAS
  - Perfluorobutane sulfonic acid (PFBS)
  - Perfluoroheptanoic acid (PFHpA)
  - Perfluorohexane sulfonic acid (PFHxS)
  - Perfluorononanoic acid (PFNA)
  - Perfluorooctane sulfonate (PFOS)
  - Perfluorooctanoic acid (PFOA)

1.4.2 ADJACENT ADEC CONTAMINATED SITES DATABASE

Review of the ADEC Contaminated Sites Database resulted in identification of 16 active or cleanup complete – with institutional controls (IC) facilities at or immediately adjacent to project improvements that may impact construction of proposed project improvements. Identified ADEC listed sites are categorized based on the interpreted risk posed to the AWWI project during

construction based on proximity, ADEC project descriptions in the ADEC contaminated sites database, cleanup status, and QEP professional judgment.

TABLE 2-1: SUMMARIZED SITE DETAILS

Hazard ID	ADEC Site Status	ADEC Site Name	COPC	Associated Project Area
24150	Cleanup Complete - ICs	FIA - Brooks Fuel USTs 1-4	GRO/VOC	Old Airport Road
24292	Cleanup Complete - ICs	FIA - Empire Airlines (#4)	GRO/VOC	Old Airport Road
24401	Active	FIA - Everts Air Fuel, Blk 3, Lot 1	GRO/DRO/VOC/PAH	Old Airport Road
23131	Active	FIA - Hotfoot - Blk 3 Lots 15a & b	GRO/DRO/VOC/PAH	Old Airport Road
27024	Cleanup Complete - ICs	FAA - FIA Headquarters Bldg 202 Former Tank 4-E-3	DRO/RRO/PAH/VOC	West Airport Way
24438	Active	FIA - Everts Air Fuel, Blk 3, Lot 11	GRO/DRO/VOC	Old Airport Road
24997	Cleanup Complete - ICs	FIA - BLOCK 3 LOT 2 Omni Logistics	DRO/VOC/PAH/TCE	Old Airport Road
24805	Cleanup Complete - ICs	FIA - Avis Rent-A-Car	GRO/VOC	Wien Lake Road
4105	Active	USPS Former Air Cargo HOT	GRO/DRO/VOC/PAH	Old Airport Road
4314	Active	FIA - Block 3 Lot 12 - Saupe Enterprises	GRO/DRO/VOC	Old Airport Road
25539	Active	FIA - Arctic Circle Air, Block 3 Lot 4B	GRO/DRO/VOC/PAH	Old Airport Road
25912	Cleanup Complete - ICs	FAA - FIA - Headquarters Facility Bldgs 300 and 207 Floor Drains	VOC/SVOC	West Airport Way
26277	Active	FIA – Sitewide PFAS	PFAS	All Segments
26777	Active	FIA - Block 3 Lot 2 Former American Mechanical	DRO/VOC/PAH	Old Airport Road
26870	Active	FIA - Brooks Fuel Surface Releases	GRO/DRO/VOC/PAH	Old Airport Road
27673	Active	ADOT&PF - 5894 Airport Way	GRO/DRO/VOC	West Airport Way

NOTES:
For definitions, see the Acronyms and Abbreviations table.
Blue highlighted sites are considered to represent low risk to the AWWI project.
Yellow highlighted sites are considered to represent moderate risk to the AWWI project.
Red highlighted sites are considered to represent elevated risk to the AWWI project.

Of the 16 identified active sites, one is the listing for site wide PFAS (File Number 100.38.277, Hazard ID 26277) which is the focus of this investigation, one has chlorinated solvents identified as COPC, and 15 are associated with past fuel use or releases.

Blue highlighted sites are considered low risk. Yellow highlighted sites are considered moderate risk. Red highlighted sites are considered an elevated risk. The approximate locations of the ADEC listed sites are shown on **Drawing A-04.**

1.5 PROJECT AREA DESCRIPTIONS

Project areas are split by two dividing lines. The first division runs along King Road and a line running southeast from the intersection of King Road and Dale Road. The second division runs along Pikes Landing Road and continues projecting to the east **(Drawings A-02 through A-04).** The area west of the first line is named **PFAS Area A** and the area between the King Road line and the Pikes Landing Road line is named **PFAS Area B**. The area east of the Pikes Landing Road line is considered **Unrestricted Area C**

PFAS Area A is considered to have a high likelihood of encountering PFAS contamination above 10 percent of the groundwater or migration to groundwater cleanup level based on the 2018 investigation results (R&M, 2019). Portions of this area along Old Airport Road may be affected by the other COPCS listed in **Section 1.4.1** due to existing ADEC contaminated sites.

PFAS Area B. is considered to have low likelihood of encountering PFAS contamination above 10 percent of the groundwater or migration to groundwater cleanup level based on the 2018 investigation results (R&M, 2019). The seven project areas are described below. Portions of this area along Old Airport Road and at the eastern end of Dale Road may be affected by the other COPCS listed in **Section 1.4.1** due to existing ADEC contaminated sites.

Unrestricted Area C is not considered to be impacted by areas of known contamination based on 2018 investigation results (R&M, 2019) and review of the ADEC Contaminated Sites Database **(Drawing A-04).**

1.5.1 AIRPORT WAY

Project work along Airport Way **(PFAS Area A** and **PFAS Area B)** is anticipated to include asphalt reclamation, minor grading, and repaving. Shoulders will be re-established by spreading a thin layer of fill material over existing road embankments. Ground disturbance is anticipated to be minimal. As asphalt reclamation will not encounter groundwater and will have minimal ground disturbance, PFAS related contamination is not likely to be encountered.

1.5.2 WIEN LAKE ROAD NORTH AND WEST

This area is located west of King Road and site work is anticipated to include asphalt reclamation and repaving **(PFAS Area A)**. Shoulders will be re-established by spreading a thin layer of fill material over existing road embankments. Ground disturbance is anticipated to be minimal. As asphalt reclamation will not encounter groundwater and will have minimal ground disturbance, PFAS related contamination is not likely to be encountered. The area overlies known groundwater plumes of PFAS contamination above 10 percent of the cleanup level.

Groundwater in this area is very shallow and if ground disturbing activities occur, PFAS contamination is likely to be encountered.

1.5.3 OLD AIRPORT ROAD

This area includes asphalt reclamation, repaving, and drainage ditch improvements. The western half of the Old Airport Road improvements **(PFAS Area A)** include asphalt reclamation and drainage ditch improvements that may encounter petroleum hydrocarbon or PFAS contamination exceeding a cleanup level. Impacts from PFAS are only anticipated in the event groundwater is encountered. The western half of the area overlies known groundwater plumes of PFAS contamination above 10 percent of the cleanup level. The eastern half of Old Airport Road **(PFAS Area B)** is not in an area of known PFAS or fuel contamination, but given the preliminary and regional level of data available PFAS contamination may be present.

1.5.4 DALE ROAD

Project work on Dale Road includes new construction with minimal excavation. The western half of the area overlies known groundwater plumes of PFAS contamination above 10 percent of the cleanup level **(PFAS Area A)**. Ground disturbing activities are more likely to encounter soil or groundwater contamination on the western half of the area. The eastern half of Dale Road is not in an area of known PFAS or fuel contamination, but given the preliminary and regional level of data available PFAS contamination may be present **(PFAS Area B)**.

1.5.5 HOSELTON ROAD

This area includes new road embankment construction with significant earth disturbing activities. PFAS contamination have not been identified in soil or groundwater in this area, but given the preliminary and regional level of data available PFAS contamination may be present in in the western half of the improvement area **(PFAS Area B).** The eastern half of the area is not in an area of known contamination exceeding an ADEC cleanup level **(Unrestricted Area C).**

1.5.6 DALE TO HOSELTON ROAD PATHWAY

This area includes new trail embankment construction with significant earth disturbing activities. PFAS contamination have not been identified in soil or groundwater in this area, but given the preliminary and regional level of data available PFAS contamination may be present **(PFAS Area B)**.

1.5.7 DEEP UTILITY EXCAVATIONS

These excavations are planned in four locations: near the intersection of Hoselton and Airport Way, excavation crossing Dale Road and Airport Way between Discovery Drive and King Road, and two locations on Old Airport Road southeast of the North Terminal Pond. Excavation near the intersection of Hoselton and Airport Way is outside areas of known soil or groundwater contamination and is not expected to encounter PFAS contamination **(Unrestricted Area C)**. The other three areas may encounter PFAS contamination in groundwater or in soil near the groundwater interface **(PFAS Area B)**.

1.6 PROJECT AREA DESCRIPTION

The project area is located in Fairbanks, Alaska on the north side of FAI. The site vicinity is shown on **Drawing A-01,** project areas on **Drawing A-02,** improvement types on **Drawing A-03**, and environmental risks from existing ADEC contaminated sites on **Drawing A-04.**

1.6.1 TOPOGRAPHY

The project area is relatively flat located on abandoned channels and deposits of the Chena and Tanana River floodplains. There are elevation differences and slopes, largely associated with existing road embankments.

1.6.2 SURFACE DRAINAGE

Numerous ponds formed by construction activities are present in the project area and are presumed to represent the groundwater table elevation in the unconfined aquifer present in the alluvial floodplain deposits. Notable ponds from construction or grading related activity include the drainage ponds located northwest of the passenger terminal.

The Chena River is located to the north and west and the Tanana River is located to the south of FAI. **Drawing A-01** shows the locations of major surface water bodies.

1.6.3 GENERAL GEOLOGY

This project is within the Tanana-Kuskokwim Lowland physiographic province (Wahrhaftig, 1965). The idealized soil column in undisturbed areas around FAI consist of fine sand and silt over-bank deposits overlying generally cleaner and coarser channel deposits of sand and gravel with cobbles (Péwé and Bell, 1976). The thickness of the finer-grained surface deposits typically increases with distance from the active Chena and Tanana River channels. In the Fairbanks area, these alluvial deposits are reported to extend to depths of approximately 400 to 600 feet.

The shallow soil column across most of the airport area has been altered during past construction projects and developments. Reworked and variable surface materials are now present in many of these areas and range from elevated engineered fills to fine-grained organic rich soils used to backfill drainage channels, wetlands, and old borrow pits.

Permafrost occurs sporadically within the Tanana floodplain and has been encountered at FAI during past geotechnical investigations. The area has been mapped as being generally underlain by numerous isolated masses of permafrost (Ferrains, 1965). Permafrost, when present, is typically found under wetter areas covered with relatively dense vegetation. It generally occurs as segregated ice in the soil pore spaces or as coatings around soil particles, rather than large ice masses (Péwé, 1982). Otherwise permafrost has not been reported in the FAI area under the active river channels and surfaces disturbed or reworked for the existing airport facilities and pavements.

1.6.4 GROUNDWATER CONDITIONS

Based on the presence of the Chena and Tanana Rivers, the assumed moderate to high permeability of alluvial soils, and the relatively flat topography of the project area, groundwater flow is expected to be relatively complex due to interaction between groundwater flow interactions between the Tanana and Chena Rivers (USGS, 1996 and R&M, 2019).

Generally, groundwater is expected to flow northwest towards the Chena River with more complex localized flow directions depending on season, river stage, and interactions between the Chena and Tanana Rivers. Further away from the Chena River is expected to see groundwater flow parallel to the Tanana River. Most locations along the west side of the airport are expected to exhibit groundwater flow towards the west or northwest.

1.6.5 CLIMATE

Based on climate data (1949 to 2012) recorded at the Fairbanks International Airport, Alaska (502968) weather station, the mean annual air temperature was 27 degrees Fahrenheit (°F), with minimum and maximum monthly averages of approximately -10 °F (January) and 62 °F (July), respectively. The area received an average of 10.5 inches of precipitation per year, with a maximum monthly mean of approximately 1.9 inches in July (WRCC, 2021).

2.0 CONSTRUCTION PRACTICE RECOMMENDATIONS

Contractor construction practices are expected to follow contractor means and methods as agreed to by DOT&PF as part of the separate construction contract. The following suggestions are provided to assist with method selection to minimize generation of contaminated soil or groundwater materials during project execution that may result in significantly increased project costs due to the potential need for contaminated material remediation, storage, transport, and disposal.

Project areas are split into improvement types as the extent of excavation into potentially contaminated soil or groundwater varies significantly across the planned improvement types. The project area is divided into three main areas based on historic PFAS sampling data: **PFAS Area A, PFAS Area B,** and **Unrestricted Area C. PFAS Area A** is expected to encounter near surface soil or groundwater impacts from PFAS at greater than 10 percent of the ADEC cleanup level. **PFAS Area B** is not expected to encounter surface soil or groundwater impacts from PFAS at greater than 10 percent of the ADEC cleanup level. **Unrestricted Area C** is considered to be unaffected by known contamination and should not be considered restricted unless signs of contamination are found by the contractor during construction. Portions of **PFAS Area A and PFAS Area B** may be affected by the other COPCS listed in **Section 1.4.1** due to existing ADEC contaminated sites as described in **Section 1.5.**

Work within PFAS Area A and PFAS Area B require monitoring by an ADEC QEP meeting the requirements of 18 AAC 75 and compliance with this Work Plan. QEP field practices are outlined in Sections 3.0 and 4.0 .

General construction method recommendations are provided in **Sections 2.1 through 2.7** and can be summarized as follows:

- **PFAS Area A** material should remain in **PFAS Area A (Section 2.1.1).**
- **PFAS Area B** material should remain in **PFAS Area A** or **PFAS Area B (Section 2.1.2).**
- **Unrestricted Area C** material may be reused as unrestricted fill materials for reuse on the project or offsite disposal **(Section 2.1.3).**
- Material within 200 feet of a known ADEC Contaminated Site must be field screened to determine reuse potential **(Sections 2.1.4 and 3.1).**

2.1 CONSTRUCTION WITH EXCAVATION

Where possible, excavations to construct new embankment should reuse soils as a cap on structural embankments, or in general grading of the project area. Excavated soils shall be field screened for signs of contamination by the DOT&PF designated QEP on the Old Airport Road and Wien Lake Road West portions of the project **(Drawing A-02)** due to adjacent contaminated sites as detailed in **Section 1.4.2.**

2.1.1 PFAS AREA A

Excavation of existing soils to construct the structural sections for new embankments should be considered contaminated with PFAS within this area as shown in **Drawing A-04.** Excavated soil or removed asphalt should be stockpiled for characterization and disposal if they cannot be reused within this area.

As this project area is not within a known PFAS source area and previous groundwater data indicate contamination levels below the groundwater cleanup level in this project area, soils are considered acceptable for reuse within this area.

2.1.2 PFAS AREA B

Excavated soil from this area are considered non-contaminated by PFAS above 10 percent of the cleanup level in this area **(Drawing A-04)** and may be reused within **PFAS Area A** or **PFAS Area B** if field screening in accordance with **Section 2.1.4** does not indicate the presence of petroleum hydrocarbon contamination.

2.1.3 UNRESTRICTED AREA C

Soil excavated from this area are considered non-contaminated. There are also no known contaminated sites associated with this location **(Drawing A-04)**. Soil from this location may be reused on site in any area or exported as unrestricted fill if no signs of contamination are found by the contractor.

2.1.4 AREAS WITHIN 200 FEET OF A KNOWN CONTAMINATED SITE

The areas of the project within 200 feet of a known ADEC contaminated site as shown on **Drawing A-04** should be managed as described in **Sections 2.1.1 through Section 2.1.3.** Additionally, excavated soils in these areas shall be field screened for signs of contamination by the DOT&PF designated QEP in accordance with **Section 3.1.**

2.2 CONSTRUCTION WITH MINIMAL EXCAVATION

The same procedures as presented in **Section 2.1** should be followed.

2.3 DRAINAGE DITCH IMPROVEMENTS

The shoulders on a section of Old Airport Way within **PFAS Area A** are being expanded to improve traffic safety and drainage. This work is expected to include limited grading of existing material and placement of imported fill to increase the size of the existing embankment. The shoulders will be paved following earthwork activities.

2.3.1 PFAS AREA A

Excess soil from **PFAS Area A** may be used to build up shoulders as shown in the typical sections in the plan set in **PFAS Area A**.

2.3.2 PFAS AREA B

Excess soil from **PFAS Area B** may be used to build up shoulders as shown in the typical sections in the plan set in **PFAS Area A** or **PFAS Area B**.

2.4 ASPHALT PAVEMENT RECLAMATION AND SHOULDER GRADING

Asphalt reclamation products should be reused within the project area. Export off the project area will require prior approval from ADEC except for material generated within **Unrestricted Area C.**

2.5 DEEP UTILITY EXCAVATIONS

There are four deep excavation areas to allow for storm drain upgrades.

2.5.1 HOSELTON ROAD AND AIRPORT WAY INTERSECTION

This excavation is within **Unrestricted Area C** and soils are considered non-contaminated by PFAS. There are also no known contaminated sites associated with this location **(Drawing A-04)**. Soil from this location may be reused on site or exported as unrestricted fill if no signs of contamination are found by the contractor

2.5.2 EXCAVATION CROSSING DALE ROAD AND AIRPORT WAY

This excavation is within **PFAS Area A** and soils and groundwater should be considered contaminated with PFAS **(Drawing A-04)**. Soil excavated from **PFAS Area A** should be stockpiled for characterization and disposal if they cannot be reused within the project area covered by **PFAS Area A**. As the project area is not within a known PFAS source area and previous groundwater data indicate contamination levels below the groundwater cleanup level in the project area, soils are considered acceptable for reuse within the project area covered by **PFAS Area A.**

2.5.3 CROSSING OLD AIRPORT ROAD TO NORTH TERMINAL POND

See **Section 2.5.2.**

2.5.4 OLD AIRPORT ROAD SHOULDER DRAINAGE

See **Section 2.5.2.**

2.6 STOCKPILING ACTIVITIES

Stockpiled soil should be handled based on the area from which it originates as outlined below. These practices should follow this plan and any project Storm Water Pollution Prevention Plan (SWPPP) requirements, whichever are more stringent. Stockpiling decisions should be based on **Sections 2.1** through **2.5 and Section 3.1.** If stockpiling occurs, it should follow the guidance provided in **Sections 2.6.1** and **2.6.2.**

2.6.1 PFAS AREAS A &B

Stockpiled soil or asphalt from these areas may be contaminated and should be stockpiled as outlined below:

- Minimum 10-mil polyethylene bottom liner with berms to prevent water ingress or egress to/from the stockpiled material.
- Minimum 6-mil reinforced polyethylene top cover to prevent movement of material by wind or water.
- Top cover shall overlap the berm to prevent water ingress.
- Top cover shall be secured against removal by wind (e.g. sandbags and ropes).
- Covered at the end of each workday.
- Stockpiles shall meet the minimum requirements in 18 AAC 75 (ADEC, 2022).

2.6.2 UNRESTRICTED AREA C

Stockpiled soil or asphalt from this area are not considered contaminated and may follow typical construction practices as guided by contract.

2.6.3 STOCKPILE DISPOSAL

DOT&PF and ADEC shall be consulted regarding disposal decisions prior to performing any action. An ADEC Approval to Transport Form shall be submitted by the QEP to ADEC for approval prior to any transport or disposal occurs.

2.7 DEWATERING ACTIVITIES

Groundwater removal from excavations or trenches shall also be guided based on the area from which it originates as outlined below. These practices should follow this plan and any project SWPPP requirements, whichever are more stringent.

2.7.1 PFAS AREAS A &B

Groundwater removed from excavations in this area have the potential to be contaminated with PFAS and petroleum hydrocarbons exceeding an ADEC groundwater cleanup level. Waters in this area are considered to be within 1,500 feet of a known active or closed with institutional controls ADEC contaminated site and are subject to coverage by an ADEC Dewatering Permit and an Alaska Department of Natural Resources (DNR) Temporary Water Use Authorization (TWUA). They are not eligible for coverage under the ADEC Construction General Permit.

These waters must be stored and treated as outlined in **Section 4.0** before release in accordance with the ADEC Dewatering Permit and **Section 4.0.**

2.7.2 UNRESTRICTED AREA C

Groundwater removed from excavations in this area are expected to be limited to the deep utility excavation at Hoselton Road and Airport Way (**Section 2.5.1)**, which is located more than 1,500 feet from known PFAS contamination in groundwater and more than 1,500 feet from a known active or closed with institutional controls ADEC contaminated site. Waters removed from this area are considered unregulated and are not subject to an ADEC Dewatering Permit. Actions in this area should follow the project SWPPP, construction general permit coverage, and a DNR TWUA, as applicable.

3.0 QEP FIELD METHODS

Field activities will be guided by this Work Plan and ADEC Field Sampling Guidance (ADEC, 2022). These practices only apply to **PFAS Area A** and **PFOS/PFOS Area B.**

3.1 SOIL FIELD SCREENING

Field screening is not effective for PFAS related contaminants and is only designed for use in areas where petroleum hydrocarbon contamination may be encountered associated with known ADEC contaminated sites as discussed in **Section 1.4.2. Section 2.1.4** details areas where field screening is required.

Field screening includes visual, olfactory, and photoionization detector (PID) screening methods of soil samples collected during construction earth disturbing activities. Field screening will be conducted using the heated headspace method with a PID in accordance with ADEC Field Sampling Guidance (ADEC, 2022). Visual and olfactory screening signs of contamination include discoloration of soil, sheen on groundwater or pore water, and unusual odors (i.e. petroleum or solvent).

PID and visual/olfactory field screening will be used to indicate if excavated soil is contaminated as shown in **Table 3-1**. Soil will be reused as backfill in the area it was removed from at approximately the same depth (e.g. soil from 1 to 2 feet below ground surface (bgs) will be replaced at approximately 1 to 2 feet bgs). If soil appears to be grossly contaminated with free product or exceeds screening levels in **Table 3-1** for gross contamination it will be stockpiled for characterization and disposal in accordance with **Section 3.5.**

Bag blank PID readings may be used to adjust PID field screening readings based on the professional judgment of the QEP to prevent skewed results for investigation derived waste (IDW) segregation. Adjustments will be documented in the field notebook.

TABLE 3-1: PID FIELD SCREENING DECISION POINTS FOR AREAS SUBJECT TO SECTION 2.1.4

Field Screening Criteria	Waste Handling Classification
PID reading less than 5 ppm	Presumed Non-Contaminated
PID reading greater than or equal to 5 ppm but less than 25 ppm	Potentially Contaminated, reuse on site allowed within the project area it was generated **(Section 1.5)** at least 6 inches below finished grade.
PID reading greater than or equal to 25 ppm but less than 300 ppm	Suspected Contamination, reuse on site allowed in the approximate location where it was generated, at least 1 foot below finished grade, or beneath a paved surface.
Odor or visual signs of contamination	
PID reading greater than or equal to 300 ppm	Gross Contamination, reuse on site allowed in the approximate location where it was generated below a paved surface.
Visual signs of contamination indicate the presence of free product	

NOTES:
For definitions, see the Acronyms and Abbreviations table.

Field screening samples will be collected at the locations and rates shown in **Table 3-2.**

TABLE 3-2: PID SOIL FIELD SCREENING LOCATIONS AND RATES

Location Type	Horizontal Location Rate	Vertical Screening Location
Linear Trench Sections	Minimum 50-foot intervals	Minimum of 1 based on visual or olfactory observations
Linear Trench Sections with Visual or Olfactory Signs of Contamination	Minimum 25-foot intervals	0 to 1 foot bgs
		Upper half of trench
		Lower half of trench
Trench Turning Points	At any turn in the trench	Minimum of 1 based on visual or olfactory observations
Trench Turning Points with Visual or Olfactory Signs of Contamination		0 to 1 foot bgs
		Upper half of trench
		Lower half of trench

3.2 CHEMICAL LABORATORY SOIL OR ASPHALT SAMPLING

Chemical laboratory sampling is only proposed in support of soils or asphalt materials that were required to be stockpiled by **Section 2.6.1.** Proposed analytical methods are presented in **Table 3-4**. The laboratory used will be ADEC-approved for the listed analytical methods and will be selected by the construction contractor's environmental consultant. Stockpile sampling will follow ADEC Field Sampling Guidance for excavated soils as adapted and detailed in **Table 3-3.**

TABLE 3-3: EXCAVATED SOIL (STOCKPILED) SAMPLING GUIDELINES

Volume of Stockpile (cubic yards)	Field Screening Samples	Chemical Laboratory Samples
0 to 10	5	1
11 to 50	5	2
51 to 100	1 per 10 cubic yards	3
101 to 500	1 per 10 cubic yards	3 for the first 100 cubic yards, 1 per each additional 200 cubic yards
501 to 1000*	1 per 20 cubic yards	
More than 1000*	1 per 30 cubic yards	

NOTES:
For definitions, see the Acronyms and Abbreviations table.
*Proposed field screening quantities for volumes above 500 cubic yards are lower than ADEC Field Sampling Guidance, but the guidance document allows for suggested alterations to the specified rate for volumes exceeding 100 cubic yards (ADEC, 2022).

3.2.1 LABORATORY ANALYTICAL METHODS

Soil samples will be analyzed for an analytical suite based on the COPC identified for the potentially associated sites. The specific analytical suite is detailed in **Table 3-4** for soils stockpiled for disposal from areas where field screening occurred in accordance with **Sections 2.1.4 and 3.1.** Sample collection procedures will follow ADEC Field Screening Guidance (ADEC, 2022).

Soils stockpiled from project areas where field screening is not specified by **Section 2.1.4** only need to be tested for PFAS in accordance with the method specified in **Table 3-3.**

If any asphalt is stockpiled for disposal from **PFAS Area A and PFAS Area B**, it should be tested for PFAS in accordance with the method specified in **Table 3-4.**

TABLE 3-4: CHEMICAL SAMPLE QUANTITIES

Analytical Suite	Analytical Methods
GRO	AK 101
DRO	AK 102
VOC	SW 8260
PAH	SW 8270D SIM
PFAS	EPA 537.1

NOTES:
For definitions, see the Acronyms and Abbreviations table.
Quality control samples are discussed in **Section 6.0.**

3.2.2 QUALITY CONTROL SAMPLES

Field duplicates will be collected at a minimum rate of 10 percent of primary samples to evaluate the precision of the sampling and analytical processes. Duplicate samples will be collected either simultaneously or sequentially from the same sampling location using identical methods. Each duplicate will be a blind sample, meaning it will be given a unique sample number, different from that of the associated primary sample. Care must be taken in collecting duplicates to allow evaluation of the repeatability of sample results for the matrix being sampled. The field team will record the sample number and site identification in the field logbook.

Trip blanks will accompany samples that include analyses for volatile compounds. They will be analyzed to evaluate potential cross-contamination during the sample shipping and analysis process. Trip blanks are prepared using analyte-free media at the laboratory. One trip blank will be submitted per cooler containing samples for volatiles (VOC or GRO) analysis.

Laboratory quality control samples will include second-source calibration verification, continuing calibration verification, instrument tuning, method blanks, laboratory control samples, laboratory control sample duplicates, matrix spike/matrix spike duplicate (MS/MSD), and laboratory duplicate samples. Surrogate spikes will also be used to evaluate accuracy and matrix effects for organic analyses. In the case of PFAS analysis, isotope dilution analytes will be used instead of surrogates. The required frequency of the laboratory quality control samples is detailed in the individual analytical methods and in the laboratory's standard operating procedures and quality assurance plan.

3.3 WORK PLAN DEVIATIONS AND MODIFICATIONS

Deviations from this Work Plan shall be documented by the QEP in the field logbook and communicated to ADEC for approval prior to performing those actions.

3.4 DOCUMENTATION

Documentation of environmental field activities will occur in accordance with 18 AAC 75 (ADEC, 2021), ADEC Field Sampling Guidance (ADEC, 2022), and this section.

3.4.1 LOGBOOKS

The QEP will maintain accurate written records of field activities. Information will be documented in a bound, pre-paginated field logbook with indelible ink.

3.4.2 PHOTOGRAPHS

Photographic documentation will be recorded of site conditions and any visual signs of contamination.

3.4.3 CHAIN-OF-CUSTODY FORMS

A chain-of-custody form will be completed and will accompany every sample and shipment to the laboratory to establish the documentation necessary to trace sample possession from time of collection. The form will contain the following information:

- Project name
- Location Identification
- Sample Number
- Name of collector, sampler and/or recorder, as applicable
- Date and time of collection
- Sample matrix (e.g. soil)
- Preservation, if any
- Analyses requested
- Cooler name/number
- Signature blocks for release and acceptance of samples
- Signatures of persons involved in chain of possessions and inclusive dates of possession
- Any comments to identify special conditions or requests

The original chain-of-custody forms will be sent with the samples and copies will be retained for the project files. The laboratory portion of each form must be completed by personnel at the analytical laboratory and will contain the following information:

- Name of person receiving the samples
- Laboratory sample number
- Date of sample receipt
- Sample condition and temperature

3.4.4 SAMPLE LABELS AND IDENTIFICATION

For purposes of sample tracking, each sample will be given a unique, alpha-numeric sample identification code. Duplicate samples will be given a sample identification code as if another primary sample to allow blind submittal to the laboratory. The status as a duplicate will only be recorded in the field logbook.

Sample labels are required for, and will be affixed to, each sample collected. Sample labels should be written using indelible ink.

3.4.5 DOCUMENTATION CONTROL

The project manager will maintain project files. Project personnel will manage documentation so that official and original documents are placed in the official project file. Field logbooks will be maintained by field personnel and stored in the main project file following field activities. Copies of the field logbooks will be provided in the final report.

4.0 SURFACE AND GROUNDWATER DEWATERING ACTIVITIES

Authorization to discharge water under the Alaska Excavation Dewatering General Permit (Permit No. AKG002000) will be requested through a Notice of Intent (NOI) to ADEC to obtain approval to operate under the General Permit. Monitoring and sampling requirements for dewatering under the permit are detailed below.

4.1 SCREENING LOGIC AND CRITERIA

Water screening and handling will be conducted and monitored by an ADEC QEP. The following sections detail screening logic for water and the methods for handling water in the event construction excavation activities require dewatering for deeper utility installations.

Water will be screened primarily based on the presence or absence of sheen as described in 18 AAC 70, Water Quality Standards (ADEC, 2020) and where the area is in regards to known PFAS contamination in the region. The appearance of sheen can be highly variable based on concentration and the presence of organic sheen can provide a false positive for petroleum contamination (Ecology, 2011 and MPCA, 2008). PFAS cannot be observed in the field using typical field screening practices.

4.2 PFAS DETERMINATION

As field screening methods are not available for detection of PFAS, determination will be based on results of the 2018 PFAS investigation at FAI (R&M, 2019). The project area has been segmented into three areas based on data from the 2018 investigation: **PFAS Area A, PFAS Area B, and Unrestricted Area C** as described in **Section 1.5.**

Dewatering that may encounter PFAS contamination of groundwater exceeding the ADEC cleanup level of 400 nanograms per Liter (ng/L) is considered unlikely as the highest concentration of PFAS detected in **PFAS Area A** or **PFAS Area B** in a location upgradient of planned construction activities was 45 ng/L on the south side of the North Terminal Pond. If no signs of petroleum contamination are observed, water may be returned to the same area it was removed if measures are taken to remove the risk of sediment transport (i.e. settlement tank to remove entrained sediment prior to disposal), and prevent erosion using energy dissipation best management practices (BMP).

4.3 OILY SHEEN DETERMINATION

The primary visual parameter is sheen, which may be petroleum or biologic in nature. Based on ADEC Listing Methodology for Determining Water Quality Impairments from Petroleum Hydrocarbons, Oils and Grease Guidance, Appendix A – Visible Oil Sheen Standard Operating Procedure (ADEC, 2015). This document notes that biogenic sheens are often present in ditches, wetlands, and in other stagnant water bodies. These sheens are often bacterial (iron and manganese reducing) in nature and can produce reddish or blackish precipitates in some waters.

Two tests are proposed by the guidance to differentiate between biogenic and petroleum sheen, the stick test and the jar shake test. A stick test uses a stick or stone to break up the sheen. The jar shake test requires collecting water with sufficient sheen in a jar and shaking. Classification based on these tests are provided in **Table 4-6**.

4.3.1 STICK TEST

Use a stick or a rock/rocks to break up the observed sheen. Observe the reaction of the sheen to disturbance and record the results in accordance with **Table 4-1**. If the reaction is not clear, perform the jar shake test.

4.3.2 JAR SHAKE TEST

Collect water with sheen in a clean 8-ounce glass jar by scooping the sheen with the jar. Multiple scoops are allowed and may be necessary. The approximate surface area of sheen collected should be estimated and recorded. The jar is then sealed and vigorously shaken. After allowing the water to stop moving (minimum of 30 seconds), remove the lid and observe the condition in accordance with **Table 4-1.**

TABLE 4-1: SHEEN SOURCE DETERMINATION

Sheen Appearance	Test Type	Test Result	Sheen Classification
Complete surface covered by iridescent or silvery sheen or Partial surface coverage (including spotty) by iridescent or silvery sheen	Stick Test	Breaks into platelets that stay separate and do not re-coalesce (brittle)	Biogenic
		Breaks into platelets that entirely dissipate (brittle)	
		Swirling action and quickly re-coalesces on the surface	**Petroleum**
		Result is not clear (may occur for light sheens with limited coverage)	Indeterminate
	Jar Shake Test	Sheen is dispersed or dissipated	Biogenic
		Sheen re-coalesces on the surface	**Petroleum**
		Result is not clear (may occur for light sheens with limited coverage)	Indeterminate

4.3.3 PETROLEUM SHEEN DESCRIPTORS

The Washington State Department of Ecology provides a detailed description of petroleum sheens that is valuable in recognizing the presence of slight or moderate sheens that can be relatively dull and intermittent. A heavy sheen is typically easier to identify due to color and associated odor. Description of various sheen magnitudes are reproduced below to assist with describing petroleum sheens to provide additional characterization sensitivity (Ecology, 2011).

TABLE 4-2: OILY SHEEN DETERMINATION CRITERIA

Sheen Descriptors	Identification Criteria[1]
No Sheen	No visible sheen on the water surface.
Slight Sheen	Light, colorless, dull sheen, spread is irregular, not rapid. Natural organic oils or iron bacteria may produce a slight sheen.
Moderate Sheen	Pronounced sheen over limited area; probably has some color/iridescence; spread is irregular, may be rapid; sheen does not spread over entire water surface.
Heavy Sheen	Heavy sheen with pronounced color/iridescence; spread is rapid; the entire water surface is covered with sheen.

4.4 WATER SCREENING CRITERIA AND DECISION MATRIX

Sheen will be described as indicated in Table 4-2. Water handling options are described in the subsequent section. Screening criteria for groundwater will be performed in relation to soil screening as outlined below, refer to the following section on water handling for specifics.

Areas shown on Drawing A-04 located as PFAS Area A and PFAS Area B with no signs of petroleum contamination:

- Handling Options: Manage in Place, Upland Discharge, or Discharge Back to Source.

PFAS Area A or PFAS Area B, soil screening results exceed the 50 parts per million (ppm) action level:

- Water presents a petroleum sheen
  - Handling Options: Manage in Place or granular activated carbon (GAC) Treatment and Upland Discharge
- Water does not present a petroleum sheen
  - Handling Options: Manage in Place or Upland Discharge

PFAS Area A or PFAS Area B, soil screening results are below the 50 parts per million (ppm) action level:

- Water presents a petroleum sheen
  - Handling Options: Manage in Place or GAC Treatment and Upland Discharge
- Water does not present a petroleum sheen
  - Handling Options: Manage in Place or Upland Discharge

Areas shown on Drawing A-04 located as Unrestricted Area C:

  - No restrictions, follow SWPPP or DNR TWUA permit

If sheen is determined to be organic, the water will be considered not contaminated and will be discharged accordingly.

The QEP may determine that water is suspected of contamination based on professional judgment using consideration of field observations including odor, presence of debris, and soil screening results. If the QEP determines that groundwater is suspected of contamination in the absence of sheen, it will be handled by managing in place or through a GAC treatment system followed by upland discharge.

4.5 WATER HANDLING

Based on field screening results and project location, surface water or groundwater that must be removed or diverted will be handled as described below:

4.5.1 NO SCREENING REQUIRED

Areas of the project **(Unrestricted Area C)** located more than 1,500 feet from a known ADEC contaminated site and not considered to be within the PFAS plume as delineated by the 2018 investigation for the Central, FTA, Deicing, and Fire Response Contaminated Zones on Drawing A-17 (R&M, 2019) will not be screened. Areas are also based on PFAS detections exceeding 10 percent of the PFOS/PFOA groundwater cleanup level (400 ng/L). **Drawing A-17** provides the locations of the identified Contaminated Zones

4.5.2 UPLAND DISCHARGE

Remove water from the trench and discharge to a vegetated, upland area where it will not drain back into the trench via sheet flow. These practices shall follow the project SWPPP and associated best management practices.

4.5.3 MANAGE IN PLACE

In the event field observations and screening indicate the presence of contaminated water in limited volumes, it will be managed by using pumps to dewater the immediate work area and discharge into the same general area of the trench (to mitigate the potential spread of contamination) isolated with a temporary soil berm to slow infiltration into the immediate work area.

4.5.4 GAC TREATMENT AND UPLAND DISCHARGE

In the event field observations and screening indicate the presence of contaminated water in quantities that cannot be managed in the trench or must be removed for worker safety, water will be pumped from the trench and treated with a GAC treatment system in one of two scenarios based on flow rate and equipment present on site.

- **Scenario One** includes pumping directly from the trench into a GAC system with the effluent exiting the GAC system directly discharged to a vegetated, upland area where it will not drain back into the trench via sheet flow.
- **Scenario Two** includes pumping directly from the trench into a large capacity storage container and then being pumped though GAC system with the effluent exiting the GAC system directly discharged to a vegetated, upland area where it will not drain back into the trench via sheet flow.

4.5.5 DISCHARGE BACK TO SOURCE

If signs of contamination are not observed, the water shall be dealt with by one of two methods:

- Divert water around the work area and back into the source if sediment entrainment can be minimized to maintain turbidity levels that meet the requirements of **Section 4.6.**

- Temporarily store water in a large capacity storage container such as a baffle tank (e.g. Rain-for-Rent) while trenching and construction work is completed. Once construction activites are complete, the water may be discharged back to the source if turbidity levels meet the requirements of **Section 4.6.**

4.6 GAC SYSTEM DESIGN, OPERATION, AND SAMPLING

GAC water treatment systems used in conjunction with this work will be of two possible configurations. The first will be designed to remove the need to store water prior to treatment and will have multiple GAC filter elements connected in parallel to allow a higher aggregate flow through rate. The second will be designed with a holding vessel to allow storage of water as a typical construction trash pump can generate water faster than a GAC can process it.

GAC systems will be commercially procured and will include measures to limit the rate of water processing based on system specifications to mitigate the potential for contaminant breakthrough in system effluent.

Effluent will be monitored for turbidity in accordance with 18 AAC 70 and may not exceed 25 nephelometric turbidity units (NTU) above natural conditions as measured by an electronic turbidimeter. Effluent will be monitored at 60-minute increments during system operation.

Sediment accumulated in the tank will be removed and stockpiled or containerized for disposal. The sediment will then be tested project analytical groups **(Section 3.2.1)** or will be presumed contaminated and disposed in accordance with **Section 2.6.3.**

5.0 ANALYTICAL METHODS

This section details analytical procedures for project field activities. Environmental data will be collected using field screening procedures and by analysis of chemical soil samples. Laboratory analysis of chemical samples will be performed at an ADEC-approved laboratory.

5.1 PROPOSED CLEANUP LEVELS

The most stringent ADEC Method Two under 40-inch zone or migration to groundwater cleanup levels will be used for soil/sediment.

5.2 CHEMICAL ANALYSIS METHODS AND COLLECTION DETAILS

Soil analytical methods and sampling details are presented in **Table 5-1** and includes the required sample containers, sample preservation, holding times and number of samples required for each chemical test. Containers will be new, pre-cleaned containers with Teflon-lined lids (unless otherwise specified). Samples will be preserved as defined in the following table until delivered to the laboratory for chemical analysis. **PFAS** analytes listed in the EPA 537.1 method will be reported by the analytical laboratory.

TABLE 5-1: SOIL CHEMICAL ANALYSES

Analyte Class	Method	Holding Time	Preservative	Containers[1]
GRO	AK 101	28 days	Methanol (MeOH), 0 to 6°C	(1) 4oz amber glass, TLS lid.
DRO	AK 102	14/40 days[3]	0 to 6°C	(1) 4oz amber glass, TLC lid.
VOC	SW 8260B	14 days	Methanol (MeOH), 0 to 6°C	(1) 4oz amber glass, TLS lid
PAH	SW 8270D SIM	14/40 days[3]	0 to 6°C	(1) 4oz amber glass, TLC lid.
PFAS	EPA 537.1 (modified)	14/28 days[3]	0 to 6°C	(1) 4oz clear HDPE, non-TLC lid.

NOTES:
For definitions, see the Acronyms and Abbreviations table.
1: Containers may be combined when multiple analyses can be run from one container.
2: Metals are abbreviated using standard periodic table abbreviations.
3: Collection-extraction/extraction-analysis dual holding times apply. There is no technical collection-extraction holding time for PCBs. PFAS holding times are from Method 537 for water samples; there are no soil sample holding times for this method.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

Field screening, environmental observation and documentation, sampling, and reporting will be conducted by a QEP, as defined 18 AAC 75.333 (ADEC, 2021).

6.1 SAMPLE CUSTODY

The objective of sample custody is to create an accurate, verified written record, which is traceable from the time of sample collection to receipt by the laboratory. Adequate sample custody will be achieved by means of appropriate field and analytical documentation. A sample is defined as in someone's custody if:

- In actual possession.
- In view, after being in physical possession.
- In physical possession and subsequently locked or otherwise sealed so that tampering will be evident.
- Kept in a secure area, restricted to authorized personnel.

In the event samples are shipped to an analytical laboratory using a means where the samples will leave the custody of the QEP the following guidance will be followed.

- Sample coolers/containers must arrive at the lab with an intact and correctly applied custody seal.
- If the seal was broken at some point during transport, the reason for breaking the seal, condition of the container contents, the cooler temperature, and anything added to or removed from the container must be documented on the chain-of-custody form.
- The container must then be sealed with a new custody seal if still in transit.

6.2 SAMPLE STORAGE, PRESERVATION AND HOLDING TIMES

Sample containers are purchased pre-cleaned and treated according to EPA specifications for the appropriate methods. Clean containers will be stored separately to prevent exposure to fuels and solvents, and other chemicals. Sample storage and preservation specifications are provided in **Table 5.1.**

6.3 SAMPLE HANDLING, PACKAGING AND SHIPMENT

Samples will be packaged and shipped in accordance with US Department of Transportation (USDOT) and International Air Transport Association (IATA), as applicable. Sampling handling procedures are designed to transport samples to the laboratory intact, at the proper temperature and free of external contamination. The chain-of-custody record which identifies the method of shipment, courier name(s), and other pertinent information, accompanies all sample shipments. The original chain-of-custody accompanies the shipment and a copy is retained in the project file.

Sample handling, packaging and shipment will follow the guidance in ADEC Field Sampling Guidance (ADEC, 2022)

6.4 QUALITY CONTROL SAMPLES

Duplicate soil samples will be collected at the rate of one per 10 primary samples. Duplicate(s) will be submitted to the laboratory in the same manner as regular samples for all contaminants of concern, and the results compared to the primary samples. An ADEC laboratory data review checklist will be prepared for each set of laboratory data and included with the report.

Temperature blanks will be provided by the analytical laboratory at the rate of one per cooler. Trip blanks for volatile analyses (e.g. AK101, SW 8260) will be provided by the analytical laboratory at the rate of one per analysis per cooler. Blanks will be taken to the site and handled like all other samples during sampling efforts. The temperature blank will indicate whether the samples arrived at the laboratory within the acceptable temperature range. The trip blank(s) for volatile analyses (e.g. AK101, SW 8260) will be analyzed by the laboratory to ensure that handling has not contaminated the samples.

7.0 REPORTING

Following construction activities involving handling of contaminated or potentially contaminated materials, a report will be submitted to DOT&PF and ADEC to include:

- A summary of field efforts and field data, including but not limited to:
    - Site conditions
    - Work plan deviations
    - Issues encountered and how resolved
    - Sample dates
    - Tabulated field screening results
    - Copies of field notes
    - Site Photos
- Site maps
- Final analytical sample results and laboratory data reports, as applicable
- ADEC Laboratory Review Checklist, as applicable

7.1 PRE-DRAFT REPORT

The report shall first be submitted to DOT&PF for review and comment as a Pre-Draft document. The report shall be submitted in electronic format and shall be signed as PRE-DRAFT.

7.2 DRAFT REPORT

The report shall be submitted to ADEC for review and comment as a Draft document following agreement between DOT&PF and the QEP on any comments or suggested changes made by DOT&PF regarding the Pre-Draft document. The report shall be submitted in electronic format and shall be signed as DRAFT.

7.3 FINAL REPORT

The report shall be submitted to ADEC and DOT&PF as a Final document following agreement between DOT&PF, ADEC, and the QEP on any comments or suggested changes made by ADEC regarding the Draft document. The report shall be submitted in electronic format and shall be signed by the QEP.

8.0 CLOSURE

This Work Plan has been prepared for the exclusive use of DOT&PF and their representatives in the study of this site. The investigation procedures and historical site information presented within this Work Plan are based on ADEC guidance current at the time of preparation, limited records review conducted by R&M, and information provided by the client. Since opinions of conditions prevailing on a particular site must be based on the work authorized by the client, the investigation is designed to be representative of the site at a particular moment in time and the result of services performed within the scope, limitations, and cost of the work requested. Changes in the conditions of this site may occur with the passage of time and may be due to natural processes or the works of humans. In addition, changes in government codes, either State or Federal regulations or laws, may occur. Due to such changes, which are beyond our control, observations and recommendations applicable to this site may need to be revised wholly or in part from time to time.

R&M performed this work in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No warranty, express or implied, beyond exercise of reasonable care and professional diligence, is made. Should you require additional information regarding the investigation or this report, please contact us.

Sincerely,

R&M CONSULTANTS, INC

Prepared by:

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Senior Geologist
Qualified Environmental Professional

Reviewed By:

Kristi M. McLean, LEED AP BD+C
Group Manager – Environmental Services
Qualified Environmental Professional

9.0 REFERENCES

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APPENDIX A

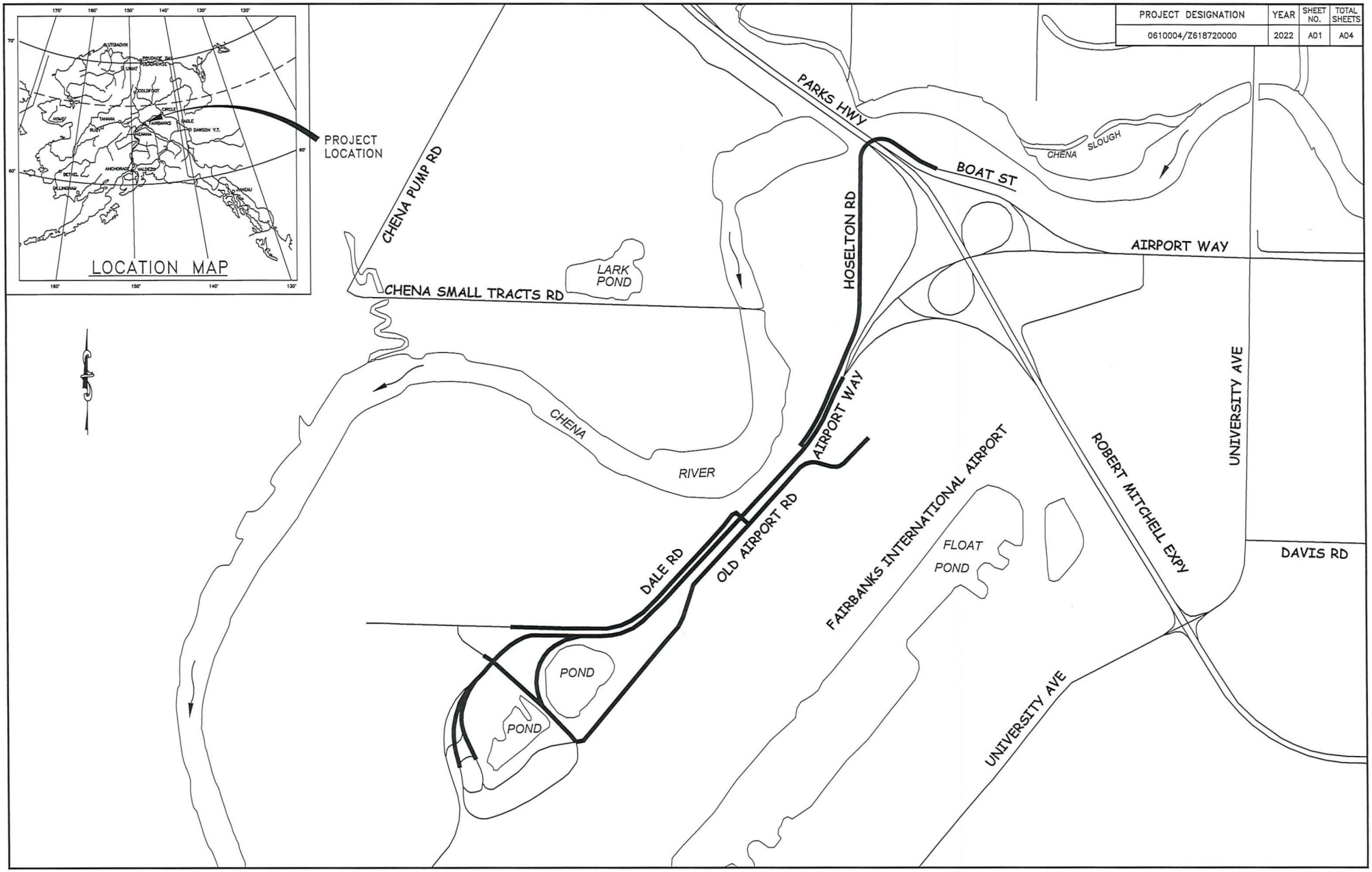
SITE MAPS AND HISTORICAL SITE MAPS (R&M, 2019)

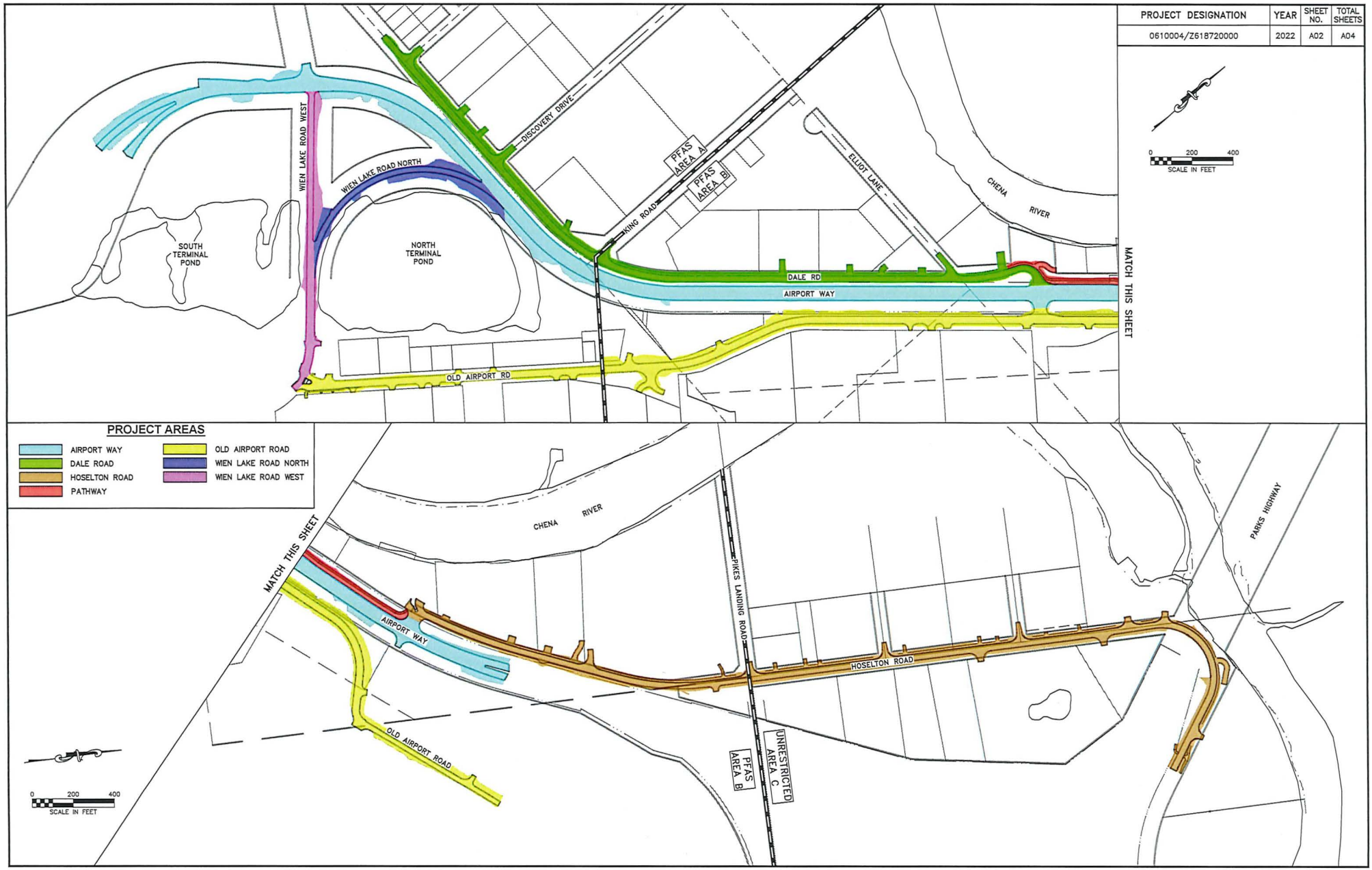
Project Site Maps

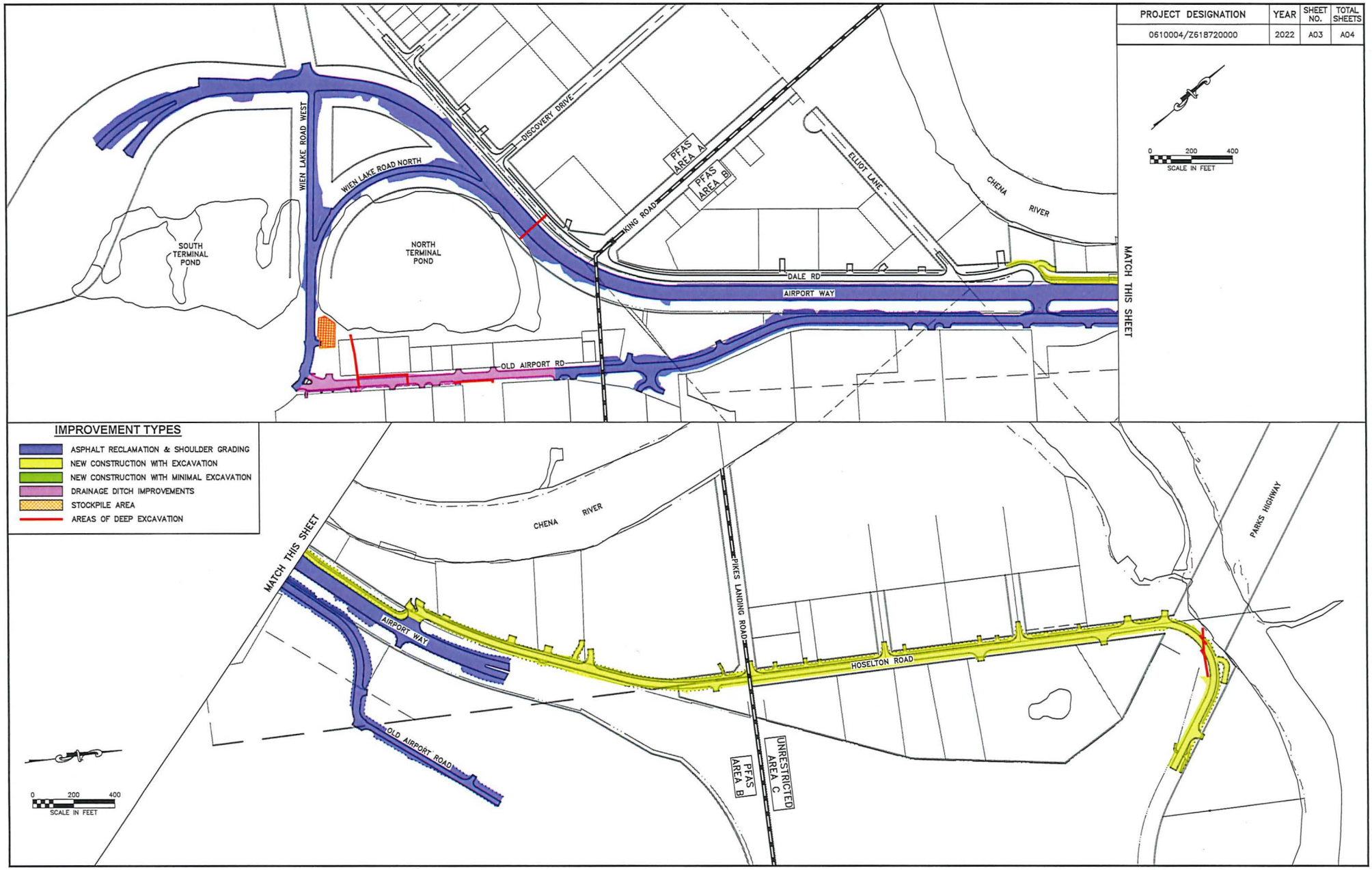
Location and Vicinity Map A-01
Project Areas A-02
Improvement Types A-03
Environmental Risk A-04

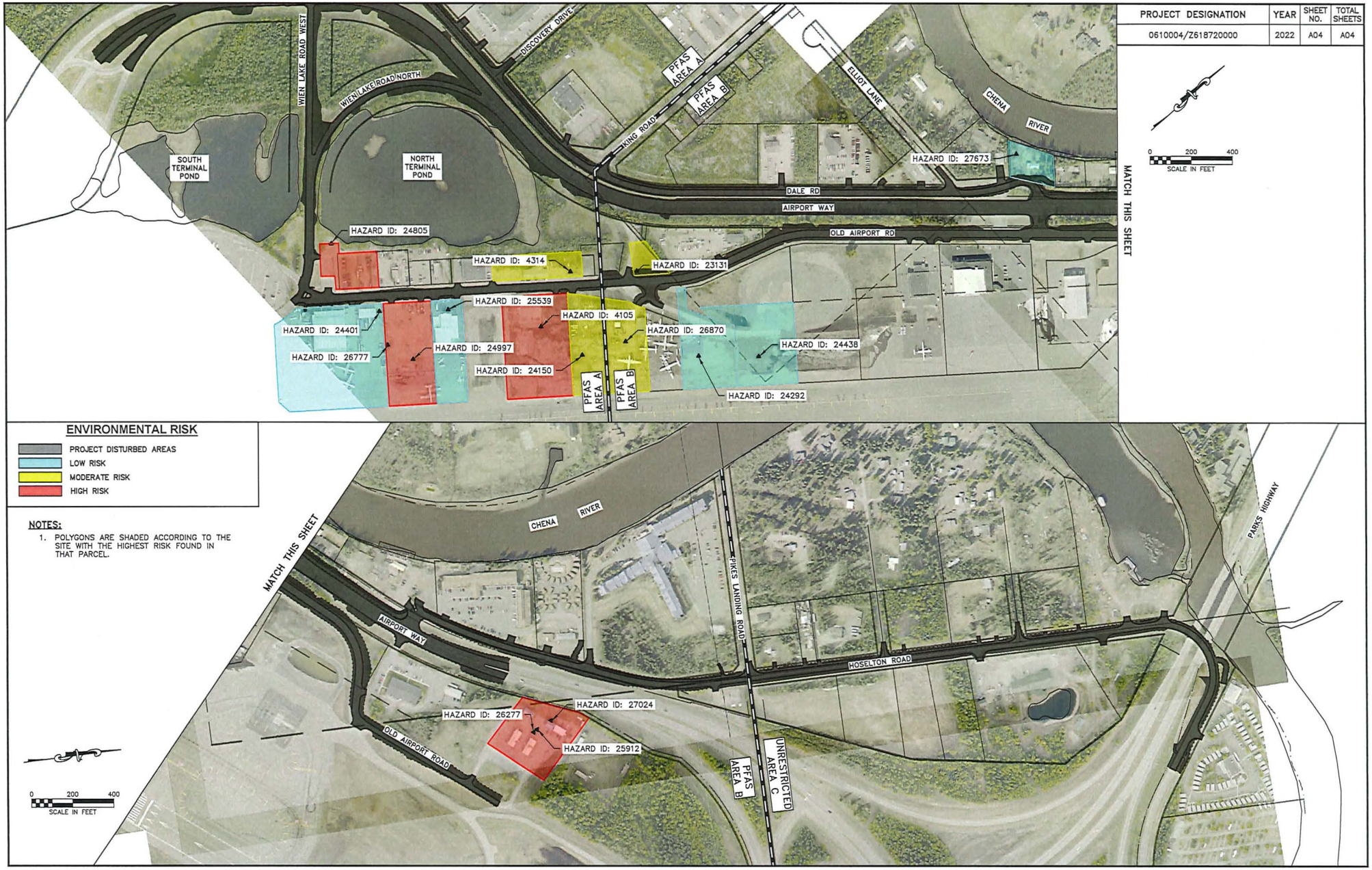
Historical Site Maps

PFBS Summarized Groundwater /Surface Water Analytical Results A-10
Five PFAS Summation Summarized Groundwater /Surface Water Analytical Results A-15
Approximate PFAS Groundwater Contaminated Zone Mapping A-17

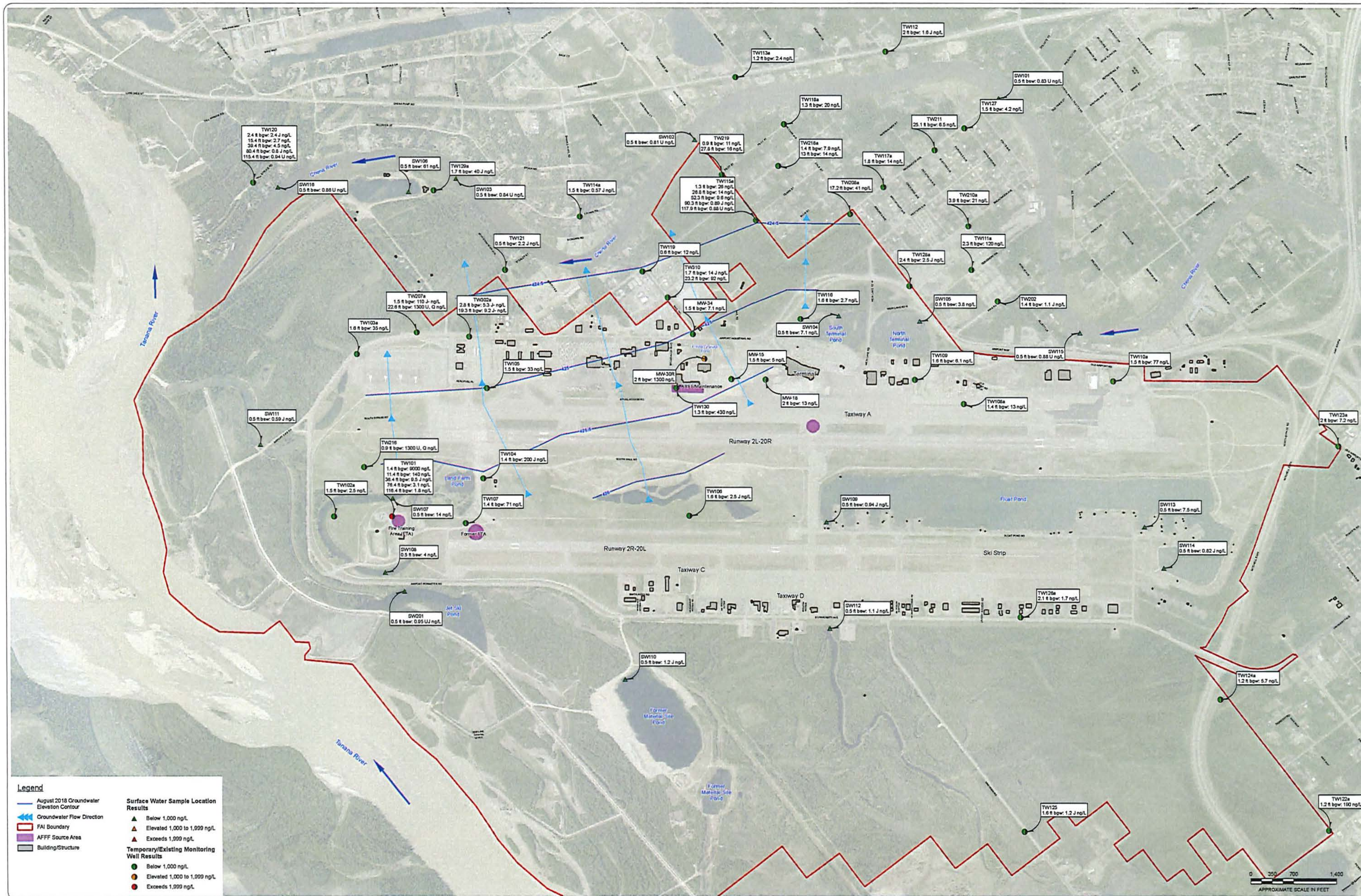

LOCATION MAP
PROJECT LOCATION
PROJECT DESIGNATION
YEAR
SHEET NO.
TOTAL SHEETS
0610004/Z618720000
2022
A01
A04
PARKS HWY
BOAT ST
CHENA SLOUGH
CHENA PUMP RD
HOSELTON RD
AIRPORT WAY
LARK POND
CHENA SMALL TRACTS RD
CHENA RIVER
AIRPORT WAY
UNIVERSITY AVE
ROBERT MITCHELL EXPY
DALE RD
OLD AIRPORT RD
FAIRBANKS INTERNATIONAL AIRPORT
FLOAT POND
DAVIS RD
POND
POND
UNIVERSITY AVE


PROJECT DESIGNATION
YEAR
SHEET NO.
TOTAL SHEETS
0610004/Z618720000
2022
A02
A04
SCALE IN FEET
0 200 400
PROJECT AREAS
AIRPORT WAY
DALE ROAD
HOSELTON ROAD
PATHWAY
OLD AIRPORT ROAD
WIEN LAKE ROAD NORTH
WIEN LAKE ROAD WEST
MATCH THIS SHEET
SOUTH TERMINAL POND
NORTH TERMINAL POND
WIEN LAKE ROAD WEST
WIEN LAKE ROAD NORTH
DISCOVERY DRIVE
KING ROAD
PFAS AREA A
PFAS AREA B
ELLIOT LANE
CHENA RIVER
DALE RD
AIRPORT WAY
OLD AIRPORT RD
MATCH THIS SHEET
CHENA RIVER
PIKES LANDING ROAD
PARKS HIGHWAY
AIRPORT WAY
HOSELTON ROAD
OLD AIRPORT ROAD
PFAS AREA B
UNRESTRICTED AREA C
0 200 400
SCALE IN FEET


PROJECT DESIGNATION
YEAR
SHEET NO.
TOTAL SHEETS
0610004/Z618720000
2022
A03
A04
SCALE IN FEET
0
200
400
IMPROVEMENT TYPES
ASPHALT RECLAMATION & SHOULDER GRADING
NEW CONSTRUCTION WITH EXCAVATION
NEW CONSTRUCTION WITH MINIMAL EXCAVATION
DRAINAGE DITCH IMPROVEMENTS
STOCKPILE AREA
AREAS OF DEEP EXCAVATION
SOUTH TERMINAL POND
NORTH TERMINAL POND
WIEN LAKE ROAD WEST
WIEN LAKE ROAD NORTH
DISCOVERY DRIVE
KING ROAD
PFAS AREA A
PFAS AREA B
ELLIOT LANE
CHENA RIVER
DALE RD
AIRPORT WAY
OLD AIRPORT RD
MATCH THIS SHEET
MATCH THIS SHEET
CHENA RIVER
AIRPORT WAY
OLD AIRPORT ROAD
PIKES LANDING ROAD
HOSELTON ROAD
PARKS HIGHWAY
PFAS AREA B
UNRESTRICTED AREA C



PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
0610004/Z618720000	2022	A04	A04



Legend
August 2018 Groundwater Elevation Contour
Groundwater Flow Direction
FAI Boundary
AFFF Source Area
Building/Structure
Surface Water Sample Location Results
Below 1,000 ng/L
Elevated 1,000 to 1,999 ng/L
Exceeds 1,999 ng/L
Temporary/Existing Monitoring Well Results
Below 1,000 ng/L
Elevated 1,000 to 1,999 ng/L
Exceeds 1,999 ng/L
Tanana River
Chena River
Runway 2L-20R
Runway 2R-20L
Taxiway A
Taxiway C
Taxiway D
Ski Strip
Float Pond
North Terminal Pond
South Terminal Pond
Terminal
Fire Training Area (FTA)
Former FTA
Land Farm Pond
Jet Ski Pond
Former Material Site Pond
TW112 2 ft bgw: 1.6 J ng/L
TW113a 1.2 ft bgw: 2.4 ng/L
SW101 0.5 ft bew: 0.83 U ng/L
TW127 1.5 ft bgw: 4.2 ng/L
TW118a 1.3 ft bgw: 20 ng/L
TW211 25.1 ft bgw: 6.5 ng/L
SW102 0.5 ft bew: 0.81 U ng/L
TW219 0.9 ft bgw: 11 ng/L 27.8 ft bgw: 16 ng/L
TW218a 1.4 ft bgw: 7.9 ng/L 13 ft bgw: 14 ng/L
TW117a 1.8 ft bgw: 14 ng/L
TW120 2.4 ft bgw: 2.4 J ng/L 15.4 ft bgw: 2.7 ng/L 39.4 ft bgw: 4.5 ng/L 80.4 ft bgw: 0.8 J ng/L 115.4 ft bgw: 0.94 U ng/L
SW106 0.5 ft bew: 61 ng/L
TW129a 1.7 ft bgw: 40 J ng/L
SW118 0.5 ft bew: 0.86 U ng/L
SW103 0.5 ft bew: 0.84 U ng/L
TW114a 1.5 ft bgw: 0.57 J ng/L
TW115a 1.3 ft bgw: 26 ng/L 26.8 ft bgw: 14 ng/L 52.3 ft bgw: 9.6 ng/L 90.3 ft bgw: 0.89 J ng/L 117.9 ft bgw: 0.88 U ng/L
TW208a 17.2 ft bgw: 41 ng/L
TW210a 3.9 ft bgw: 21 ng/L
TW111a 2.3 ft bgw: 120 ng/L
TW121 0.5 ft bgw: 2.2 J ng/L
TW119 0.6 ft bgw: 12 ng/L
TW128a 2.4 ft bgw: 2.5 J ng/L
TW310 1.7 ft bgw: 14 J ng/L 23.2 ft bgw: 92 ng/L
TW207a 1.5 ft bgw: 110 J- ng/L 22.6 ft bgw: 1300 U, Q ng/L
TW002a 2.8 ft bgw: 5.3 J- ng/L 19.3 ft bgw: 9.2 J- ng/L
TW116 1.6 ft bgw: 2.7 ng/L
SW105 0.5 ft bew: 3.8 ng/L
TW202 1.4 ft bgw: 1.1 J ng/L
TW103a 1.6 ft bgw: 35 ng/L
MW-34 1.5 ft bgw: 7.1 ng/L
SW104 0.5 ft bew: 7.1 ng/L
MW-15 1.5 ft bgw: 5 ng/L
TW109 1.6 ft bgw: 6.1 ng/L
SW115 0.5 ft bew: 0.88 U ng/L
TW110a 1.5 ft bgw: 77 ng/L
TW105 1.5 ft bgw: 33 ng/L
MW-30R 2 ft bgw: 1300 ng/L
MW-18 2 ft bgw: 13 ng/L
TW108a 1.4 ft bgw: 13 ng/L
TW130 1.3 ft bgw: 430 ng/L
SW111 0.5 ft bew: 0.59 J ng/L
TW123a 2 ft bgw: 7.2 ng/L
TW216 0.9 ft bgw: 1300 U, Q ng/L
TW104 1.4 ft bgw: 200 J ng/L
TW101 1.4 ft bgw: 9000 ng/L 11.4 ft bgw: 140 ng/L 36.4 ft bgw: 9.5 J ng/L 76.4 ft bgw: 3.1 ng/L 116.4 ft bgw: 1.8 ng/L
TW102a 1.5 ft bgw: 2.5 ng/L
TW106 1.6 ft bgw: 2.5 J ng/L
SW107 0.5 ft bew: 14 ng/L
TW107 1.4 ft bgw: 71 ng/L
SW109 0.5 ft bew: 0.94 J ng/L
SW113 0.5 ft bew: 7.5 ng/L
SW108 0.5 ft bew: 4 ng/L
SW114 0.5 ft bew: 0.82 J ng/L
TW126a 2.1 ft bgw: 1.7 ng/L
SW112 0.5 ft bew: 1.1 J ng/L
SW201 0.5 ft bew: 0.95 UJ ng/L
SW110 0.5 ft bew: 1.2 J ng/L
TW124a 1.2 ft bgw: 5.7 ng/L
TW125 1.6 ft bgw: 1.2 J ng/L
TW122a 1.2 ft bgw: 190 ng/L
0 350 700 1,400
APPROXIMATE SCALE IN FEET

Notes:
1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018. Groundwater flow lines were interpreted to run perpendicular to elevation contours.
2. Groundwater contours are labeled with the elevation in feet in the NAVD 88 elevation datum.
3. Chemical results are reported in nanograms per liter (ng/L). Data flags (e.g. J, U) are defined in Appendix E. U flags represent non-detect results.
4. Abbreviations: bgw = below groundwater level, bew = below surface water, ng/L = nanograms per liter
5. Complete chemical data and quality review are provided in Appendices E, D, and F.
6. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.

PREPARED BY R&M CONSULTANTS, INC.

FAIRBANKS INTERNATIONAL AIRPORT
2018 PFAS GW CHARACTERIZATION

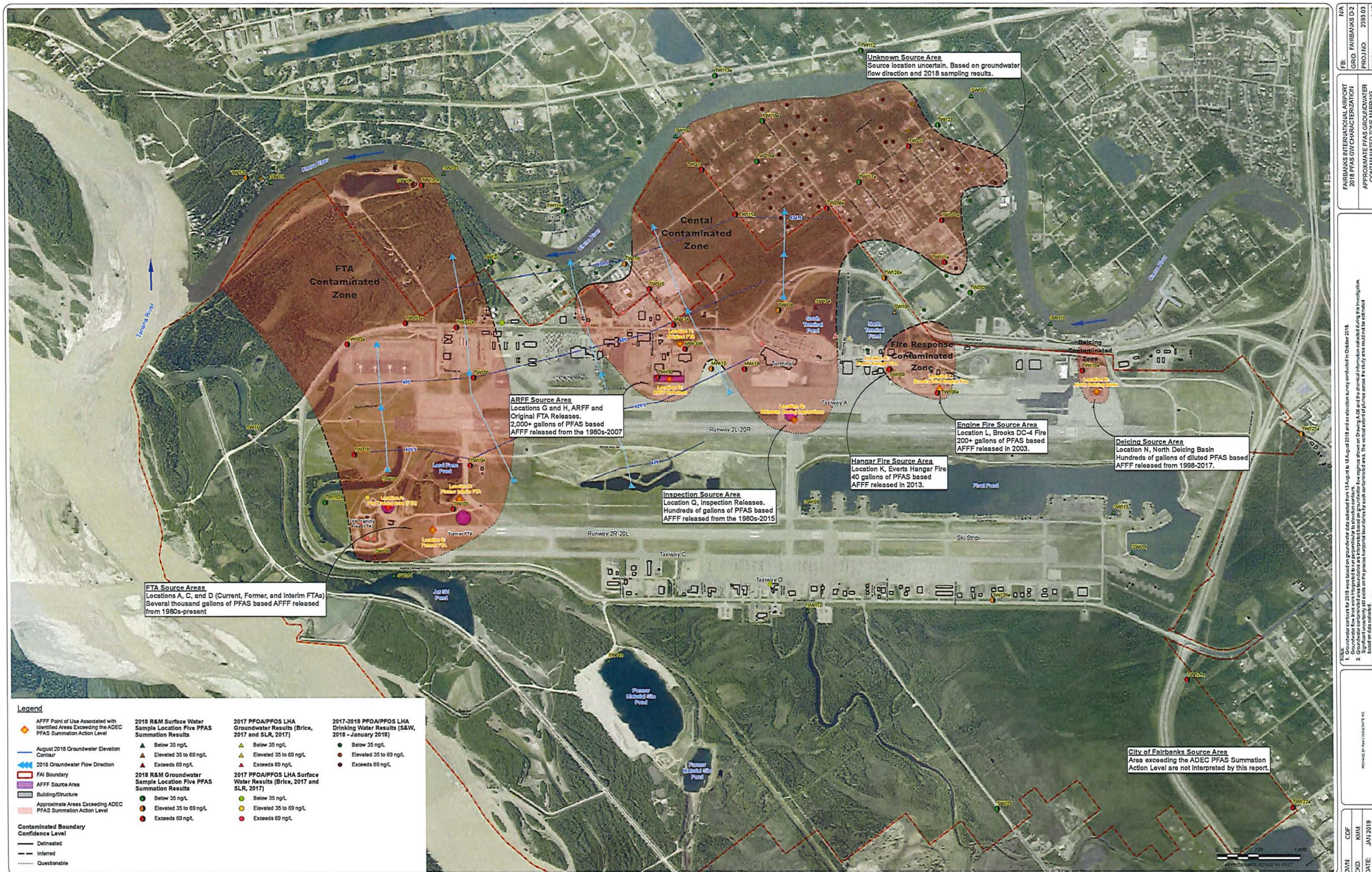
PFBS SUMMARIZED GROUNDWATER / SURFACE WATER ANALYTICAL RESULTS

DWN:	CDF
CKD:	KMM
DATE:	JAN 2019
SCALE:	AS SHOWN

FB:	N/A
GRID:	FAIRBANKS D-2
PROJ.NO.:	2393.03
DWG.:	A-10


Legend
August 2018 Groundwater Elevation Contour
Groundwater Flow Direction
FAI Boundary
AFFF Source Area
Building/Structure
Surface Water Sample Location Results
Below 35 ng/L
Elevated 35 to 69 ng/L
Exceeds 69 ng/L
Groundwater Sample Location Results
Below 35 ng/L
Elevated 35 to 69 ng/L
Exceeds 69 ng/L
Tanana River
Chena River
Runway 2L-20R
Runway 2R-20L
Taxiway A
Taxiway C
Taxiway D
Ski Strip
Float Pond
North Terminal Pond
South Terminal Pond
Jet Ski Pond
Former Material Site Pond
Fire Training Area (FTA)
Former FTA
ARFF/Maintenance
Terminal
TW112 2 ft bgw: 10 ng/L
TW113a 1.2 ft bgw: 6.7 ng/L
SW101 0.5 ft bsw: 6.7 ng/L
TW127 1.5 ft bgw: 9.7 ng/L
TW118a 1.3 ft bgw: 21 ng/L
TW211 25.1 ft bgw: 110 ng/L
TW218a 1.4 ft bgw: 22 ng/L 13 ft bgw: 33 ng/L
SW102 0.5 ft bsw: 6.5 ng/L
TW219 0.9 ft bgw: 230 ng/L 27.8 ft bgw: 630 ng/L
TW117a 1.8 ft bgw: 28 ng/L
TW120 2.4 ft bgw: 35 J ng/L 15.4 ft bgw: 41 ng/L 38.4 ft bgw: 60 ng/L 80.4 ft bgw: 15 ng/L 115.4 ft bgw: 9.4 ng/L
SW106 0.5 ft bsw: 590 ng/L
TW129a 1.7 ft bgw: 160 J ng/L
SW103 0.5 ft bsw: 7 ng/L
SW116 0.5 ft bsw: 7.2 ng/L
TW114a 1.5 ft bgw: 11 ng/L
TW115a 1.3 ft bgw: 1800 ng/L 26.8 ft bgw: 540 ng/L 52.3 ft bgw: 400 ng/L 90.3 ft bgw: 23 ng/L 117.9 ft bgw: 9.1 ng/L
TW208a 17.2 ft bgw: 550 ng/L
TW210a 3.9 ft bgw: 170 ng/L
TW111a 2.3 ft bgw: 170 ng/L
TW121 0.5 ft bgw: 31 ng/L
TW119 0.8 ft bgw: 40 ng/L
TW010 1.7 ft bgw: 310 ng/L 23.2 ft bgw: 2000 ng/L
TW128a 2.4 ft bgw: 62 J ng/L
TW207a 1.5 ft bgw: 1300 J- ng/L 22.6 ft bgw: 10000 J, Q ng/L
TW002a 2.8 ft bgw: 80 J- ng/L 19.3 ft bgw: 250 J- ng/L
TW116 1.6 ft bgw: 37 ng/L
SW105 0.5 ft bsw: 51 ng/L
TW202 1.4 ft bgw: 16 ng/L
SW115 0.5 ft bsw: 7.1 ng/L
TW103a 1.6 ft bgw: 1300 ng/L
MW-34 1.5 ft bgw: 180 ng/L
SW104 0.5 ft bsw: 280 ng/L
MW-15 1.5 ft bgw: 37 ng/L
TW109 1.8 ft bgw: 200 ng/L
TW110a 1.5 ft bgw: 75 ng/L
TW105 1.5 ft bgw: 1400 ng/L
MW-30R 2 ft bgw: 1600 ng/L
MW-16 2 ft bgw: 140 ng/L
TW130 1.3 ft bgw: 7900 J ng/L
TW108a 1.4 ft bgw: 280 ng/L
SW111 0.5 ft bsw: 11 ng/L
TW123a 2 ft bgw: 60 ng/L
TW216 0.9 ft bgw: 10000 J, Q ng/L
TW104 1.4 ft bgw: 3200 QN ng/L
TW101 1.4 ft bgw: 740000 J ng/L 11.4 ft bgw: 4400 ng/L 36.4 ft bgw: 870 J ng/L 76.4 ft bgw: 560 ng/L 116.4 ft bgw: 330 ng/L
TW102a 1.5 ft bgw: 10 ng/L
TW106 1.6 ft bgw: 42 J ng/L
SW109 0.5 ft bsw: 13 ng/L
SW113 0.5 ft bsw: 9.8 ng/L
SW107 0.5 ft bsw: 230 ng/L
TW107 1.4 ft bgw: 720 ng/L
SW114 0.5 ft bsw: 11 ng/L
SW108 0.5 ft bsw: 100 ng/L
TW126a 2.1 ft bgw: 39 ng/L
SW112 0.5 ft bsw: 13 ng/L
SW201 0.5 ft bsw: 7 QL ng/L
SW110 0.5 ft bsw: 22 ng/L
TW124a 1.2 ft bgw: 100 ng/L
TW125 1.6 ft bgw: 13 ng/L
TW122a 1.2 ft bgw: 190 ng/L
0 350 700 1,400
APPROXIMATE SCALE IN FEET

DWN: CDF CKD: KMM DATE: JAN 2019 SCALE: AS SHOWN	PREPARED BY R&M CONSULTANTS INC.	Notes: 1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018. Groundwater flow lines were interpreted to run perpendicular to elevation contours. 2. Groundwater contours are labeled with the elevation in feet in the NAVD 88 elevation datum. 3. Chemical PFAS results are reported in nanograms per liter (ng/L). Data flags (e.g. J, U) are defined in Appendix E. U flags represent non-detect results. 4. Abbreviations: bgw = below groundwater level, bsw = below surface water, ng/L = nanograms per liter 5. Complete chemical data and quality review are provided in Appendices E, D, and F. 6. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.	FAIRBANKS INTERNATIONAL AIRPORT 2018 PFAS GW CHARACTERIZATION FIVE PFAS SUMMATION GROUNDWATER / SURFACE WATER ANALYTICAL RESULTS	FB: N/A GRID: FAIRBANKS D-2 PROJ.NO.: 2393.03 DWG.: A-16



Unknown Source Area
Source location uncertain. Based on groundwater flow direction and 2018 sampling results.
Cental Contaminated Zone
FTA Contaminated Zone
Fire Response Contaminated Zone
Deicing Contaminated Zone
ARFF Source Area
Locations G and H, ARFF and Original FTA Releases. 2,000+ gallons of PFAS based AFFF released from the 1980s-2007
Engine Fire Source Area
Location L, Brooks DC-4 Fire 200+ gallons of PFAS based AFFF released in 2003.
Deicing Source Area
Location N, North Deicing Basin Hundreds of gallons of diluted PFAS based AFFF released from 1998-2017.
Hangar Fire Source Area
Location K, Everts Hangar Fire 40 gallons of PFAS based AFFF released in 2013.
Inspection Source Area
Location Q, Inspection Releases. Hundreds of gallons of PFAS based AFFF released from the 1980s-2015
FTA Source Areas
Locations A, C, and D (Current, Former, and Interim FTAs) Several thousand gallons of PFAS based AFFF released from 1980s-present
City of Fairbanks Source Area
Area exceeding the ADEC PFAS Summation Action Level are not interpreted by this report.
Tanana River
Chena River
Runway 2L-20R
Runway 2R-20L
Taxiway A
Taxiway C
Taxiway D
Ski Strip
Float Pond
Land Farm Pond
South Terminal Pond
North Terminal Pond
Jet Ski Pond
Former Material Site Pond
Terminal
Former FTA
Legend
AFFF Point of Use Associated with Identified Areas Exceeding the ADEC PFAS Summation Action Level
August 2018 Groundwater Elevation Contour
2018 Groundwater Flow Direction
FAI Boundary
AFFF Source Area
Building/Structure
Approximate Areas Exceeding ADEC PFAS Summation Action Level
Contaminated Boundary Confidence Level
Delineated
Inferred
Questionable
2018 R&M Surface Water Sample Location Five PFAS Summation Results
Below 35 ng/L
Elevated 35 to 69 ng/L
Exceeds 69 ng/L
2018 R&M Groundwater Sample Location Five PFAS Summation Results
Below 35 ng/L
Elevated 35 to 69 ng/L
Exceeds 69 ng/L
2017 PFOA/PFOS LHA Groundwater Results (Brice, 2017 and SLR, 2017)
Below 35 ng/L
Elevated 35 to 69 ng/L
Exceeds 69 ng/L
2017 PFOA/PFOS LHA Surface Water Results (Brice, 2017 and SLR, 2017)
Below 35 ng/L
Elevated 35 to 69 ng/L
Exceeds 69 ng/L
2017-2018 PFOA/PFOS LHA Drinking Water Results (S&W, 2018 - January 2018)
Below 35 ng/L
Elevated 35 to 69 ng/L
Exceeds 69 ng/L
APPROXIMATE SCALE IN FEET
FAIRBANKS INTERNATIONAL AIRPORT
2018 PFAS GW CHARACTERIZATION
APPROXIMATE PFAS GROUNDWATER CONTAMINATED ZONE MAPPING
FB: N/A
GRID: FAIRBANKS D-2
PROJ NO: 2393.03
DWG: A-17
DWN: CDF
CKD: KMM
DATE: JAN 2019
SCALE: AS SHOWN