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FINAL

GENERAL WORK PLAN ADDENDUM

DOT& PF Statewide PFAS
Addendum 009-FAI-01
Tall Spruce Monitoring Well Installation

FAIRBANKS, ALASKA

SHANNON & WILSON

November 2021

Shannon & Wilson No: 102519-022

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Submitted To: Fairbanks International Airport
6450 Airport Way, Suite 1
Fairbanks, Alaska 99709
Attn: Elise Thomas

Subject: FINAL GENERAL WORK PLAN ADDENDUM, DOT& PF STATEWIDE PFAS ADDENDUM 009-FAI-01
TALL SPRUCE MONITORING WELL INSTALLATION, FAIRBANKS, ALASKA

Shannon & Wilson has prepared this Final Work Plan Addendum (Addendum) on behalf of the Alaska Department of Transportation & Public Facilities (DOT&PF) Fairbanks International Airport (FAI). This Addendum is a supplement to the *Revision 1 - DOT&PF Statewide PFAS General Work Plan* (GWP), approved by the Alaska Department of Environmental Conservation in August 2020. The services proposed in this GWP Addendum, 009-FAI-01, describe the DOT&PF FAI's planned activities for installation and sampling of monitoring wells (MWs) in the Tall Spruce neighborhood. This work is being completed to continue site characterization associated with the per- and polyfluoroalkyl substances (PFAS) contamination originating from the FAI.

The scope of services outlined in this Addendum was specified in our proposal dated August 12, 2021 and authorized in a notice to proceed issued on September 27, 2021 by DOT&PF under Professional Services Agreement Number 25-19-013 Per- *and Polyfluorinated Substances (PFAS) Related Environmental & Engineering Services*. Funding to implement the scope defined in this document has been authorized by DOT&PF.

This Addendum was prepared and reviewed by:

Ashley Jaramillo
Senior Chemist, Project Manager

VTY:AMJ/KRF/CBD/vty

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ACRONYMS

AAC	Alaska Administrative Code
AFFF	aqueous film forming foam
bgs	below ground surface
COC	contaminant of concern
CSM	Conceptual Site Model
CUC	College Utilities Corporation
DEC	Alaska Department of Environmental Conservation
DOT&PF	Alaska Department of Transportation & Public Facilities
DVPP	Data Validation Program Plan
EPA	U.S. Environmental Protection Agency
FAI	Fairbanks International Airport
ft.	feet
GAC	granular activated carbon
GTA	GeoTek Alaska, Inc.
GWP	*Revision 1 - DOT&PF Statewide PFAS General Work Plan*
IDW	investigative-derived waste
LHA	lifetime health advisory
mg/kg	milligram per kilogram
MS	matrix spike
MSD	matrix spike duplicate
MW	monitoring well
ng/L	nanograms per liter
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
POC	point of contact
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RL	reporting limit
SAP	Sampling and Analysis Plan
SSHP	Site Safety and Health Plan
µg/L	micrograms per liter
µg/kg	micrograms per kilogram

1 INTRODUCTION

This Work Plan Addendum (Addendum), 009-FAI-01, is a supplement to *Revision 1 - DOT&PF Statewide PFAS General Work Plan* (GWP), which was approved by the Alaska Department of Environmental Conservation (DEC) on August 10, 2020. In collaboration with the GWP, this Addendum provides guidance for installation and sampling of monitoring wells (MWs) in the Tall Spruce neighborhood on the west side of the Chena River (Figure 1, Exhibit 1-1).

Exhibit 1-1: Airport Information

Airport Name:	Fairbanks International Airport
Airport Code:	FAI
DEC File No. / Hazard ID:	100.38.277 / 26816
Airport Address:	6450 Airport Way, Fairbanks, AK 99709
FAI POC:	Elise Thomas
DOT&PF PFAS POC:	Sammy Cummings
Airport Type:	Current Part 139 Airport
Airport Coordinates (Lat/Long):	64.813025, -147.87316

DEC = Alaska Department of Environmental Conservation, DOT&PF = Alaska Department of Transportation and Public Facilities; FAI= Fairbanks International Airport, PFAS = per- and polyfluoroalkyl substances, POC = point of contact

Shannon & Wilson has prepared the GWP and this Addendum in accordance with DEC's March 2017 *Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites* and DEC's October 2019 *Field Sampling Guidance* document, with the addition of our Site Safety and Health Plan (SSHP, Appendix A). Additional information and activities required for the site that are not detailed in the GWP, and deviations made to the GWP for the specific project site, are described in this Addendum, where applicable.

1.1 Background

General background information relating to sites covered under the GWP is included in Section 1.1 of the GWP. Background information specific to the FAI is detailed below.

1.1.1 Site History and Previous Investigations

Water supply well sampling for the presence of PFAS at DOT&PF sites began with the FAI in 2017. The FAI encountered perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic

acid (PFOA) above the respective DEC groundwater cleanup levels in several groundwater MWs on airport property. This led to off airport water supply well sampling.

Beginning in November 2017, the FAI observed PFOS and PFOA above the applicable action level for drinking water in numerous water supply wells in neighborhoods downgradient of the airport. Two water supply wells, located on the western side of the Chena River on Tall Spruce Road, were identified as having PFAS concentrations above the applicable action level (Figure 2).

Interim alternative water has been provided to the locations with PFAS-impacted water supply wells and those who have potentially PFAS-impacted water supply wells (i.e. close proximity to PFAS-impacted wells).

Quarterly and annual monitoring of water supply wells for PFAS began in February 2018 and continued through February 2019 when FAI made the decision to offer PFAS-impacted water supply well owners a connection to College Utilities Corporation (CUC) water system. Most of the properties with PFAS-impacted water supply wells within the plume area have been connected to the CUC water system, and the wells are no longer in use. Negotiations are ongoing between FAI and the few remaining properties with PFAS-impacted wells regarding CUC service connections.

PFAS site characterization work began in 2018 by FAI term contractors. Exceedances to the applicable DEC soil and groundwater cleanup levels were observed in samples collected from various locations at the airport. The FAI commenced decommissioning the former fire training pit in 2019 and anticipates completing the corrective action effort in 2020.

1.1.2 PFAS Regulatory History

PFOS and PFOA are two PFAS commonly found at sites where aqueous film forming foam (AFFF) were used. Due to their persistence, toxicity, and bioaccumulative potential, these compounds are of increasing concern to environmental and health agencies. In May 2016 the U.S. Environmental Protection Agency (EPA) published a recommended Lifetime Health Advisory (LHA) level of 70 nanograms per liter (ng/L) for the sum of PFOS and PFOA in drinking water. The DEC Contaminated Sites Program published groundwater-cleanup levels of 400 ng/L for PFOS and PFOA in November 2016. Prior to the publication of these levels, there were no state-level cleanup levels established for PFAS. On October 2, 2019, DEC published a Technical Memorandum amending the April 9, 2019 Technical Memorandum to include additional PFAS analytes to the testing requirements. The action level remains 70 ng/L for the sum of PFOS and PFOA. Current DEC soil cleanup levels are

3.0 micrograms per kilogram (µg/kg) for PFOS and 1.7 µg/kg for PFOA. A summary of changes to action levels and regulatory requirements is described in Section 1.1 of the GWP.

The current DEC groundwater cleanup levels are summarized in Exhibit 2-1 below. If regulatory changes occur prior to implementation of this work plan Shannon & Wilson may need to amend the sampling and analysis plan.

1.2 Project Scope and Objectives

DOT&PF requested Shannon & Wilson prepare this Addendum for installation and sampling of MWs in the Tall Spruce neighborhood. This work is being completed to continue site characterization associated with the PFAS contamination originating from the FAI and evaluate changes to groundwater PFAS concentrations in the Tall Spruce neighborhood. The information will be used to evaluate the fate and transport of PFAS resulting from the use of AFFF at the FAI. The scope of these activities includes:

- Pre-Investigation (Section 3.1.1)
  - Site Access and Permitting
  - Utility Locates
- Soil Characterization (Section 3.1.2)
  - Soil Boring Sampling
- Groundwater Characterization (Section 3.1.3)
  - Install and Sample Monitoring Wells
- IDW Management (Section 4.9)
- Evaluation and Reporting of the Analytical Data (Section 5).

These tasks are described in the noted sections.

2 SITE AND PROJECT DESCRIPTION BOUNDARIES

The following sections provide a site and project description.

2.1 Site Location and Boundaries

The Tall Spruce neighborhood is located in the south-west part of Fairbanks, Alaska, on the west side of the Chena River from FAI. The boundaries of the project are shown on Figure 2.

2.2 Potential Sources of Contamination

General information regarding potential sources of contamination at DOT&PF sites is provided in Section 2.1 of the GWP.

Specific potential sources of contamination at the FAI include:

- Historic use, storage, and management of AFFF

At this time, we do not have reason to believe PFAS originated from sources outside of AFFF use.

2.3 Contaminants of Concern and Regulatory Levels

General information regarding contaminants of concern (COCs) and regulatory levels is included in Section 2.2 of the GWP. The COCs for this project are PFAS compounds PFOS and PFOA.

To evaluate analytical data, soil results will be compared to the most conservative of either the migration to groundwater or human health cleanup levels listed in 18 Alaska Administrative Code (AAC) 75.341 *Tables B1 Method Two and B2, Method Two – Above 40 - inch*. Groundwater samples will be compared to Alaska's 18 AAC 75.341 *Table C, Groundwater Human Health Cleanup Level*.

The current cleanup levels and analytical reporting limits for the site COCs are summarized in Exhibit 2-1, below.

Exhibit 2-1: COCs, Regulatory and Laboratory Reporting Limits

Method	Analyte	Regulatory Soil Limit [a] (mg/kg)	Regulatory Water Limit [b] (µg/L)	Laboratory RLs	
				Soil (mg/kg)	Water (µg/L)
537.1 or 537.1M	PFOS	0.0030	0.40	0.000500	0.00200
	PFOA	0.0017	0.40	0.000200	0.00200

Notes:

All available PFAS analytes will be requested for analytical reports. However, only PFOS and PFOA have a DEC drinking water action level or cleanup levels and are reported in this table.

mg/kg = milligram per kilogram; µg/L = microgram per liter; PFAS = per- and polyfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFOS = perfluorooctanesulfonic acid; RL = reporting limit

2.4 Conceptual Site Model

A conceptual site model (CSM) describes potential pathways between a contaminant source and possible receptors (i.e., people, animals, and plants) and is used to determine who may

be at risk of exposure to those contaminants. A DEC *Human Health Conceptual Site Model Graphic Form* and *Human Health Conceptual Site Model Scoping Form* was completed based on the preliminary understanding of site conditions. These forms are included in Appendix B of this Addendum.

Little is known about potential PFAS-affected media in the Tall Spruce neighborhood. The draft CSM will be revised in the final report following the receipt of analytical data. Potentially affected media include contaminated soil, groundwater, surface water sediment, and biota. Potential human exposure pathways include:

- incidental soil, groundwater, or surface water ingestion;
- dermal absorption of contaminants from soil, groundwater, or surface water;
- ingestion of fugitive dust or groundwater (i.e. water supply wells);
- direct contact with sediment; and
- ingestion of wild or farmed foods.

2.5 Project Team

Chris Darrah will be Shannon & Wilson's Principal-in-Charge and Ashley Jaramillo will serve as the Project Manager. Shannon & Wilson's project team also includes other State of Alaska Qualified Environmental Professionals to support the various field and reporting tasks required to achieve the project objectives. The project team and their associated responsibilities are summarized in Exhibit 2-2 below.

Exhibit 2-2: Project Team

Affiliation	Responsibility	Representative	Contact Number
DOT&PF	Client – FAI POC	Elise Thomas	(907) 474-2598
	Client – Statewide PFAS POC	Sammy Cummings	(907) 888-5671
DEC	Regulatory agency POC	Robert Burgess	(907) 451-2153
Shannon & Wilson	Principal-in-charge	Christopher Darrah	(907) 458-3143
	Project Manager	Ashley Jaramillo	(907) 458-3118
	Statewide PFAS POC	Kristen Freiburger	(907) 458-3146
Eurofins/ TestAmerica, Inc	PFAS analytical laboratory services	David Alltucker	(916) 374-4383

DEC = Alaska Department of Environmental Conservation, DOT&PF= Alaska Department of Transportation & Public Facilities, FAI = Fairbanks International Airport, PFAS = per- and polyfluoroalkyl substances, POC = point of contact

2.6 Project Schedule and Submittals

Section 2.5 of the GWP provides general information regarding project schedules (i.e. the general order of occurrence of site characterization activities) and associated submittals. The FAI project schedule and submittals are outlined below.

Once DEC approval is received for the proposed scope of services outlined in this Addendum, Shannon & Wilson will coordinate with FAI to schedule field work. Field activities are anticipated to occur during one sampling event in Spring/Summer 2022. Laboratory analysis will be requested on a standard 14-day turn-around time.

After field work is complete, a Site Characterization Report will be prepared documenting the results of the sampling event. The report will include summarized field observations, analytical results and discussion of data quality, photo documentation, figures showing sample locations, description of deviations from the approved Addendum, if any, and conclusions and recommendations. The report will also include an updated CSM.

The following is the anticipated schedule for the FAI MW installation and sampling activities in the Tall Spruce neighborhood:

- Work Plan Implementation (field activities) – Spring/Summer 2022
- Draft Report Submittal - within 60 days of receipt of analytical results
- Final Report Submittal - within 30 days of receiving DEC comments on the Draft Report

3 SITE CHARACTERIZATION FIELD ACTIVITIES

General information regarding field activities is described in Section 3 of the GWP. The following sections describe the field activities to be conducted as a part of MW installation and sampling activities in the Tall Spruce neighborhood. Sampling procedures and analytical methods are described in Section 4, below. A quality assurance project plan (QAPP) is included in Section 5, below. Field personnel will document field activities with notes and photographs using the applicable forms, as detailed in Section 5.2. Analytical laboratories and methods employed as a part of this Addendum are identified in Section 4.5, below. An analytical sample summary is detailed in Exhibit 4-1.

3.1.1 Pre-investigation Activities

General information regarding pre-investigation tasks is presented in Section 3.2.1 of the GWP.

FAI specific pre-investigation activities, including site access and permitting, and utility locates, are outlined in the following sections.

3.1.1.1 Site Access and Permitting

The Tall Spruce Subdivision road, "Tall Spruce Road", is a publicly dedicated road located outside of a road service area and is therefore privately maintained. We will coordinate with the private property owners along the Tall Spruce Road to determine final placement of the MWs. Figure 2 shows the proposed area of MW install.

Advancing soil borings/MWs will require a FAA 7460 permit. Shannon & Wilson will complete the application for the FAA 7460 to obtain permission to use a drill rig adjacent to the FAI. Shannon & Wilson and the drilling contractor will follow the 7460 permit stipulations related to working hours, locations, etc., if applicable. The FAI Environmental Manager will coordinate issuance of applicable notices.

Shannon & Wilson is not aware of other required permits or authorizations for conducting this field effort.

3.1.1.2 Utility Locates

Utility clearance will be coordinated by contacting the Alaska Digline, Inc. and the FAI Environmental Manager. A map of drilling locations will be provided to the Alaska Digline and FAI Environmental Manager, no later than 10 days prior to planned activities. Shannon & Wilson assumes the Digline. We will coordinate with property owners regarding private utilities on their property prior to installation of wells on private property (if applicable).

3.1.2 Soil Characterization Activities

General information regarding soil characterization activities is described in Section 3.2.2 of the GWP. FAI specific soil characterization activities for this project include soil sample collection as described in the following section.

3.1.2.1 Soil Borings

General information regarding soil borings is included in Section 3.2.2.4 of the GWP. Soil sampling procedures are described in Section 4.2, below. The drilling subcontractor for this project is GeoTek Alaska, Inc (GTA).

GTA will mobilize a Geoprobe 8040 Drill Machine, personnel, and equipment to the project site in Fairbanks, Alaska. GTA will install one cluster of wells consisting of four MW's set at the following approximate depths:

- One MW screened from 10 feet (ft.) to 20 ft. below ground surface (bgs), 2 inch well, 10 ft. screen.
- One MW screened from 35 ft. to 40 ft. bgs, 2 inch well, 5 ft. screen.
- One MW screened from 55 ft. to 60 ft. bgs, 2 inch well, 5 ft screen.
- One MW screened from 60 ft. to 70 ft. bgs, 2 inch well, 10 ft screen.

GTA will collect continuous soil samples from the 70 ft. bgs boring. Logging observations from the 70 ft. bgs soil boring will be applied to the other three wells in the well cluster. Soil sampling will be performed using Direct Pushed Technology.

Shannon & Wilson field staff will log the soil type encountered during drilling and collect up to six subsurface analytical soil samples from the deepest MW boring.

3.1.3 Groundwater Characterization

General information regarding groundwater characterization activities is described in Section 3.2.3 of the GWP.

Groundwater characterization activities for the FAI include sample collection from each of the MWs installed in the Tall Spruce cluster. Groundwater samples will be submitted for analysis of PFAS, as shown in Exhibit 4-1.

4 SAMPLING AND ANALYSIS PLAN

A general sampling and analysis plan (SAP) describing the methods and procedures for site characterization activities is included as Section 4 of the GWP. The sampling effort described in this Addendum will be conducted in general accordance with the methods and procedures detailed in the SAP. The following sections contain supplemental information and exceptions to the general SAP.

A DEC-qualified sampler will collect and handle the samples for this project and collect required quality control (QC) samples in accordance with DEC's *Field Sampling Guidance*. Field personnel will document field activities with notes and photographs using the applicable forms, as detailed in Section 5.2, below.

Analytical laboratories and methods employed as a part of this Addendum are identified in Section 4.5. An analytical sample summary is detailed in Exhibit 4-1. Sample containers, preservation methods, and holding times are included in Section 4.6. Sample custody, storage, and transport will be followed as described in Section 4.7. Equipment decontamination procedures are outlined in Section 4.8. Investigative-derived waste management is described in Section 4.9.

4.1 Methods for Soil Sample Retrieval

General methods for soil sample retrieval are described in Section 4.2 of the GWP. Soil samples will be collected using hand tools from surface soil locations and soil borings as described in Section 4.2.1, 4.2.3, and 4.2.3.1 of the GWP.

4.2 Soil Sampling

Soil sample collection procedures are described in Section 4.4 of the GWP.

4.3 Special Considerations for PFAS

Special considerations for PFAS sampling are described in Section 4.10 of the GWP.

4.4 Analytical Sample Summary

Exhibit 4-1: Analytical Sample Summary[1]

Number of Samples	Matrix	PFAS (537.1 or 537M)
	Groundwater	4 + 2 FD
	Boring Subsurface Soil	6 + 1 FD

Notes:

1 In addition to field duplicate samples, other possible QC samples include effluent, equipment blank, field blank, trip blank samples. Laboratory QC samples are not included in these totals. A GAC effluent sample will also be collected. Table assumes all potential samples will be collected.

2 Up to six analytical samples will be collected from the deepest soil boring

FD = field duplicate; GAC = granular activated carbon, PFAS = per- and polyfluoroalkyl substances; QC = quality control sample

Additional information regarding QC samples can be found in Section 5.4 and 5.5.

4.5 Analytical Laboratories and Methods

Analytical soil and water samples collected for this project will be submitted to Eurofins TestAmerica of Sacramento, California. Based on the DEC Technical Memorandum issued on October 2, 2019, we will submit the samples for PFAS analysis and request the laboratory report the full list of 18 PFAS compounds defined in the EPA Method 537.1 and/or 537M.

4.6 Sample Containers, Preservation, and Holding Times

General information regarding sample containers, preservation, and holding times is described in Section 4.12 of the GWP.

Exhibit 4-2 summarizes the analytical methods employed for this project.

Exhibit 4-2: Sample Containers, Preservation, and Holding Time Requirements

Analyte	Method	Media	Container and Sample Volume	Preservation	Holding Time
PFAS	537.1 or 537M	Water	2 x 250 mL polycarbonate	0 °C to 6 °C	14 days to extraction, analyzed within 40 days of extraction
		Soil	4-oz polycarbonate	0 °C to 6 °C	

°C = degrees Celsius, mL = milliliter, oz = ounce, PFAS = per- and polyfluoroalkyl substances

4.7 Sample Custody, Storage, and Transport

Sample custody, storage, and transport procedures are described in Section 4.13 of the GWP.

4.8 Equipment Decontamination

Equipment decontamination procedures are described in Section 4.14 of the GWP.

4.9 Investigative-Derived Waste Management

General information regarding investigative-derived waste (IDW) management is included in Section 4.15 of the GWP. IDW for this project may consist of soil cuttings, MW development and purge water, decontamination rinsate water, and disposable sampling equipment.

Soil cuttings will be spread in the immediate surroundings of the boring location unless field observations (i.e. visual staining or odor) suggest the presence of contamination. If contaminants are suspected to be present in soil cuttings, the cuttings will be combined and placed in a 55-gallon drum or supersack and temporarily stored in warm storage at the FAI. The appropriate soil disposal method will be selected following the receipt of analytical results.

Liquids will be treated using three in-line five-gallon granular activated carbon (GAC) filters and discharged to the ground surface at least 100 ft. from drainage ditches or surface water bodies. Silty MW development water will be allowed to settle prior to filtration. An effluent sample will be collected following the completion of the sampling event.

Other IDW will primarily consist of disposable sampling equipment (nitrile gloves, pump tubing, etc.). These items will be disposed of at an onsite dumpster and ultimately the Fairbanks North Star Borough Landfill.

5 QUALITY ASSURANCE PROJECT PLAN

This QAPP is intended to guide activities during assessment and review of resulting analytical data set. Shannon & Wilson will be responsible for conducting data reduction, evaluation, and reporting under this QAPP. A general QAPP is provided as Section 5 of the GWP. Additionally, a Data-Validation Program Plan (DVPP) which describes the procedures for qualifying analytical data in a consistent manner, has been prepared, and is included as Appendix C to the GWP.

The following sections describe specific procedures to be followed for data collected at the FAI, so sampling and documentation are effective, laboratory data are usable, and the information acquired is of high quality and reliable.

5.1 Quality Assurance Objectives

Data quality objectives are detailed in Section 5.1 of the GWP.

Numeric quality assurance (QA) objectives for this project are presented in Exhibit 5-1 below.

Exhibit 5-1: Quality Assurance Objectives for Analytical Samples

Analyte	Method	Matrix	Precision	Accuracy	Completeness
PFAS	537.1 or 537M	Water	±30%	(analyte dependent)	85%
		Soil	±50%	(analyte dependent)	85%

PFAS = per- and polyfluoroalkyl substances

5.2 Field Documentation

Field documentation is described in Section 5.2 of the GWP.

5.3 Field Instrument Calibration

Field instrument calibration is discussed in Section 5.3 of the GWP.

5.4 Field Quality Control Samples

Field QC samples are discussed in Section 5.4 of the GWP.

The field QA/QC program for this project includes the collection of the following QA/QC samples as described in the following sections.

5.4.1 Field Duplicate Sample

Field duplicate sample collection procedures and frequency are described in Section 5.4.1 of the GWP.

Refer to Exhibit 4-1 for the number of field duplicates to be collected for each sample type. Our table assumes the monitoring wells will take two days to develop and sample.

5.4.2 Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS) and matrix spike duplicate (MSD) samples are discussed in Section 5.4.2 of the GWP.

MS/MSD samples will not be collected for this project. However, the laboratories may report these QC samples collected from projects not associated with this Addendum to meet their reporting requirements.

5.4.3 Equipment Blank Samples

Equipment blank sample collection procedures and frequency are described in Section 5.4.4 of the GWP. We do not anticipate collection of equipment blanks for this project due to use of disposable equipment.

5.4.4 Temperature Blank Samples

Temperature blanks are described in Section 5.4.6 of the GWP.

5.5 Laboratory Quality Control Samples

Laboratory quality control samples are described in Section 5.5 of the GWP.

5.6 Laboratory Data Deliverables

Laboratory data deliverables are described in Section 5.6 of the GWP.

5.7 Data Reduction, Evaluation, and Reporting

Data reduction, evaluation, and reporting are discussed in Section 5.7 of the GWP.

6 REFERENCES

Alaska Department of Environmental Conservation (DEC), 2019a, 18 AAC 75, Oil and Other Hazardous Substances Pollution Control: Juneau, Alaska, Alaska Administrative Code (AAC), Title 18, Chapter 75, January available: http://dec.alaska.gov/commish/regulations/.

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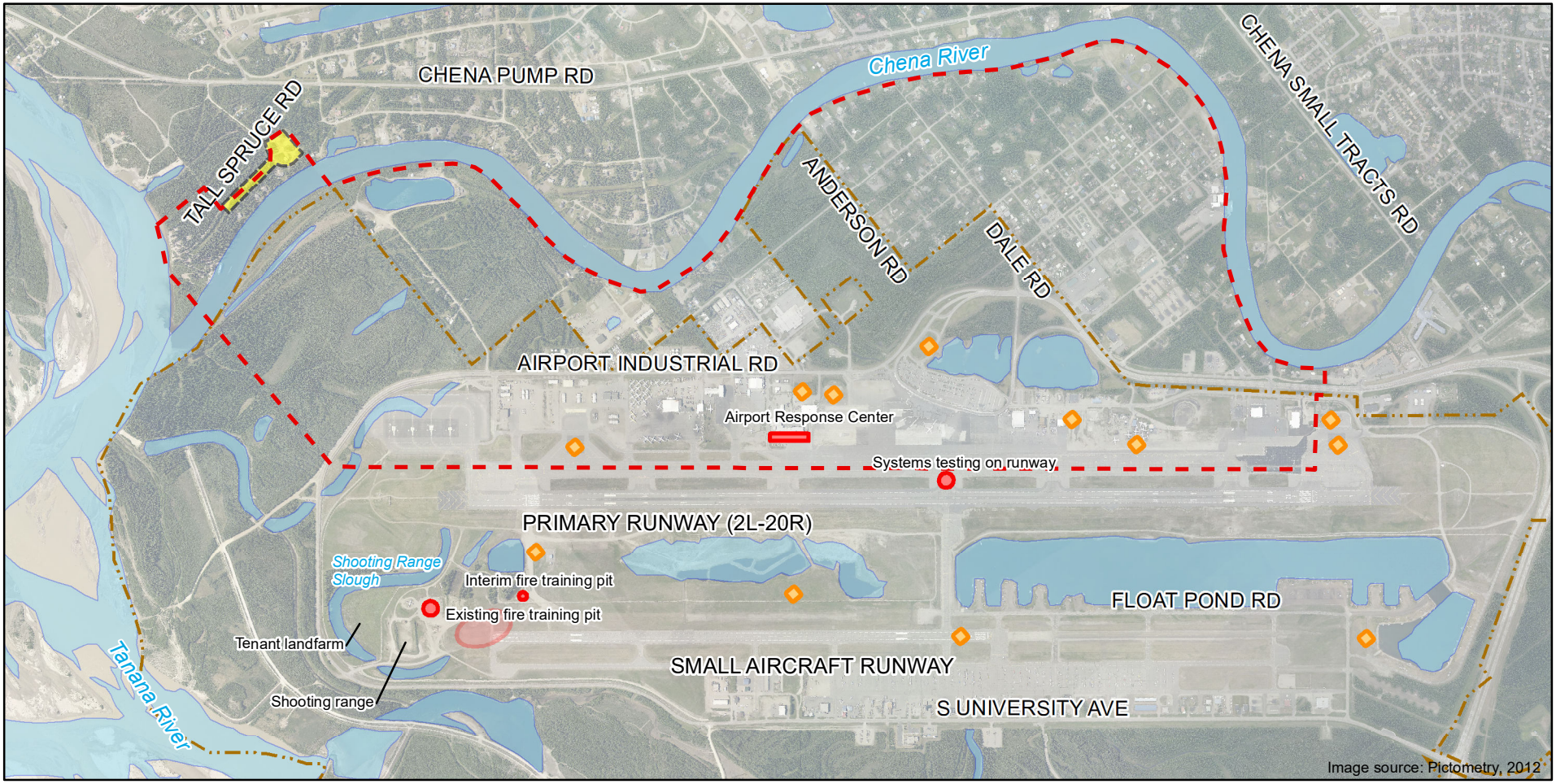


LEGEND

- PFAS-impacted
- Tall Spruce Project
- ARFF Emergency Response Sites
- Suspected ARFF Site, Approx.
- Aircraft Rescue and Firefighting (ARFF) Training Sites
- FAI Boundary

0 0.5

Miles

N

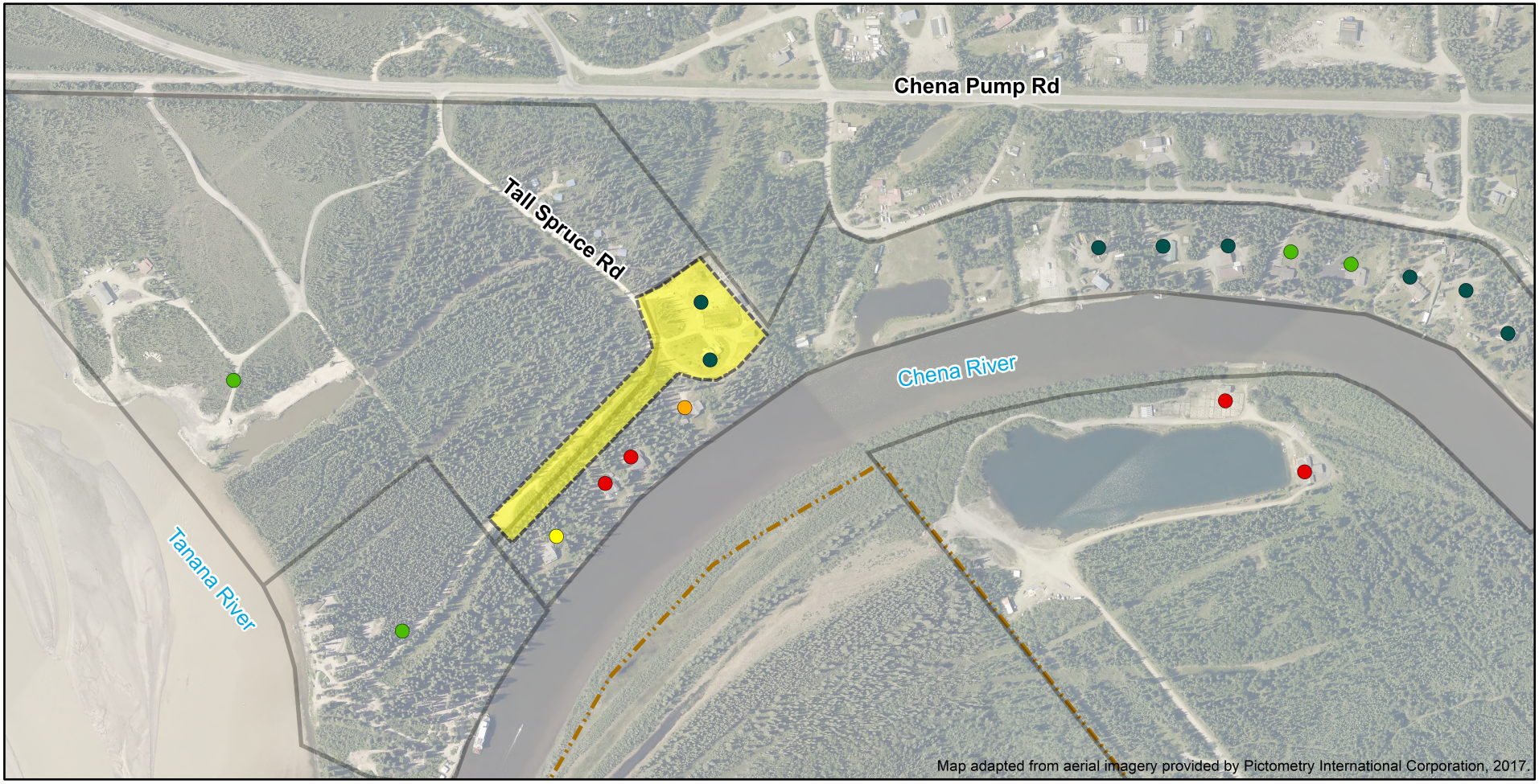
Tall Spruce Addendum
Fairbanks, Alaska

FAIRBANKS INTERNATIONAL AIRPORT VICINITY

November 2021 102519-022

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1



LEGEND

Wells sampled before April 2019: compared to former ADEC action level*

- Maximum sum of 5 PFAS result ≤2.0 ppt
- 2.1 to 16.9 ppt
- 17 to 34.9 ppt
- 35 to 64.9 ppt
- ≥65 ppt

- Tall Spruce Project Area
- Well Search Areas
- FAI Boundary

*Sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA

N

0 500 1,000

Feet

Tall Spruce Addendum
Fairbanks, Alaska

PROJECT AREA
WEST OF THE CHENA RIVER

November 2021 102519-022

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 2

APPENDIX A: SITE SAFETY AND HEALTH PLAN

Appendix A

Site Safety and Health Plan

APPENDIX A: SITE SAFETY AND HEALTH PLAN

1.1 Applicability and Purpose

Shannon & Wilson prepared this Site Safety and Health Plan (SSHP) for site characterization activities in the Tall Spruce neighborhood. The purpose of this SSHP is to protect the health and safety of field personnel from physical and chemical hazards associated with work at this site.

The provisions of this plan apply to Shannon & Wilson personnel who will potentially be exposed to safety and/or health hazards during this investigation. Shannon & Wilson employees are covered under our Corporate Safety and Health Program. General safety and health requirements described in that program will be met. Each Shannon & Wilson employee on the site will complete the personal acknowledgement form documenting they have read and understand this SSHP and agree to abide by its requirements. A copy of this SSHP will be kept on site throughout the duration of the corrective action field effort.

1.2 Site Hazard Analysis

There are two categories of hazards that may occur during the field work: potential chemical exposure hazards and physical hazards associated with site characterization activities. These hazards are discussed below.

1.2.1 Chemical-Exposure Hazards

Contaminated soil may be encountered during site exploration activities. Per- and polyfluoroalkyl substances (PFAS) are believed to be the primary contaminants of concern and may be encountered in soil and water at unknown concentrations. Shannon & Wilson personnel will implement skin protection when they are to come into contact with potentially contaminated soil or water. Field personnel will wear work gloves or nitrile gloves as needed, and Level D personal protective equipment. Field personnel will not require respiratory protection based on our current understanding of site conditions and scope of services.

1.2.2 Physical Hazards

Primary physical hazards associated with site characterization activities include: being struck by equipment or other mechanically related injuries; temperature stress; lifting, slipping, tripping, falling; and risk of eye injuries. The best means of protection against accidents related to physical hazards are careful control of equipment activities in the

planned work area and use of experienced and safety- and health-trained field personnel.

Field personnel will not enter confined spaces for site characterization activities, nor will they enter trenches or excavations greater than four feet in depth.

1.2.2.1 Heavy Equipment

Our personnel will be working near a drill rig and/or other heavy equipment during the project. Personnel will exercise caution when working around heavy equipment and maintain a safe distance from moving equipment. Eye contact will be made with the operator prior to entering the work area, and personnel within the work area will always remain within sight of the operator. A hardhat, high-visibility vest, safety-toe boots, and hearing protection will be worn whenever working around heavy equipment.

1.2.2.2 Slips, Trips, and Falls

The most common hazards on a job site are typically slips, trips, and falls. These hazards will be reduced through the following practices:

- Personnel will stay alert.
- All access-ways will be kept free of materials, supplies, and obstructions at all times.
- Tools and other materials will be located so as not to cause tripping or other hazards.
- Personnel should be aware of potential tripping hazards associated with vegetation, debris, and uneven ground.
- Personnel should be aware of limitations imposed by work clothing and personal protective equipment (PPE).

The project site may be inherently hazardous due to the potential presence of rain, snow, and ice, which can alter the character of the ground surface. The risk for slips, trips, and falls by site workers is increased due to wet surfaces; therefore, workers will use caution when walking at the site.

1.2.2.3 Insects and Animals

During the summer months mosquitoes and other insects are common, particularly near areas predominantly covered with vegetation. Wearing PPE should be sufficient to protect site workers. The site is located within a residential neighborhood; therefore, animals such as loose dogs and moose are may pose a potential hazard. Personnel will remain alert and aware of their surroundings.

1.2.2.4 Temperature Stress

Wearing PPE may put a worker at risk of developing heat stress; however, since the field screening activities will be conducted in Level D PPE the risk of heat stress is considered low. Field personnel will be cautious to hydrate adequately.

1.2.2.1 Noise Hazards

Noise is considered a probably physical hazard given the proximity of the FTP to an active airport runway. Additionally, field personnel will be working around heavy equipment for a portion of this effort. Hearing protection will be used as necessary by field staff when near heavy equipment, drill rigs, or other loud equipment. Disposable earplugs will be used to reduce noise levels. Disposable earplugs will have the capacity to reduce noise by at least 30 decibels (dB), and below the OSHA PEL (eight-hour TWA) of 85 dB.

1.2.2.2 Lifting Hazards

Moving coolers of analytical samples or other heavy objects presents a lifting hazard. Personnel will use proper lifting techniques and obtain assistance when lifting objects weighing more than 40 pounds.

1.2.2.3 Congested Area

The site may become congested during project activities in and near residential locations. Field personnel will observe the speed and frequency of traffic proximal to the work site. We will use appropriate cones, barricades, or signs to secure the work area when required.

1.2.3 Other Hazards

Underground utilities are present at the site. We will request utility locates prior to conducting any ground penetrating work.
Biological or ionizing radiation hazards are not expected to be present.

1.2.4 COVID-19

COVID-19 is a respiratory illness spread by person-to-person contact. In order to slow and prevent the spread of COVID-19, Shannon & Wilson staff will stay informed to current local and state mandates, the CDC guidelines, and will follow appropriate screening protocols. Shannon & Wilson staff shall also adhere to client safety and COVID-19 requirements.

Symptoms of COVID-19 include:

- Fever,

- Cough,
- Shortness of breath,
- Trouble breathing,
- Persistent pain or pressure in chest,
- Confusion or inability to arouse, and
- Bluish lips or face.

If field personnel experience any of these symptoms or are feeling sick, they should immediately report their symptoms to the PM or their supervisor.

Field personnel should check their internal temperature prior to departing to the work site. If a member of the field personnel's household is sick, field personnel should inform the PM or their supervisor. Field personnel should not report to work if they feel ill.

The following practices should be followed:

- Travel to and from the work site in separate vehicles unless all occupants are masked while inside the vehicle.
- Wipe down shared surfaces with sanitizing wipes prior to touching them.
- Maintain a distance of 6 feet apart, if possible. When not possible, wear a mask. Acceptable masks include manufactured particulate masks, hand-sewn cloth masks, or other styles that cover the wearer's mouth and nose.
- Avoid touching face, mouth, eyes, and nose.
- Cover sneezes and coughs.
- Assign separate tasks, when possible, and avoid sharing tools.
- Before eating or touching shared cooking/living/restroom areas, wash hands with soap and water for at least 20 seconds.
- Use hand sanitizer with at least 60% alcohol when soap and water are not available.
- Daily body temperature measurement with a thermometer.

1.3 Personnel Responsibilities, Training, and Medical Surveillance

1.3.1 Assignment of Responsibilities

We are responsible for understanding and complying with the requirements of this SSHP. Following is a list of responsibilities of all Shannon & Wilson personnel working on the site:

- Review and follow this SSHP.

- Attend and participate in safety meetings.
- Take appropriate action as described in this SSHP regarding accidents, fires, or other emergency situations.
- Take all reasonable precautions to prevent injury to themselves and their fellow workers.
- Perform only those tasks they believe they can do safely, and immediately report any accidents or unsafe conditions to Shannon & Wilson's Project Manager or Office Health and Safety Manager.
- Halt work, by themselves or by others, when they observe an unsafe act or potentially unsafe working condition.
- Report accidents, illnesses, and near-misses to the local contact and to Shannon & Wilson's Fairbanks office Health and Safety Manager.

1.3.2 Personnel Training

Shannon & Wilson personnel performing activities on this site and under this plan have completed the appropriate training requirements specified in 29 CFR 1910.120(e). Each individual has completed an annual eight-hour refresher-training course and/or initial 40-hour training course within the last year.

A personal acknowledgement form will be completed by field personnel prior to commencing field activities. This acknowledgment form will document that they have read and understand this SSHP.

1.3.3 Medical Surveillance Program

All field personnel performing activities on this site covered by this SSHP have undergone baseline and annual physical/medical examinations as part of Shannon & Wilson's Corporate Health and Safety Program. All field personnel are active participants in Shannon & Wilson's Medical Monitoring Program or in a similar program, which complies with 29 CFR 1910.120(f).

1.4 Personal Protective Equipment

PPE will be required during the course of the field work. PPE selection will be based primarily on work-task requirements and potential exposure. Field personnel will use Level D protective equipment during normal work activities. Personnel are trained in the use of PPE that is, or may be, required. All personnel shall wear Level D PPE as a minimum:

- standard work clothes or cotton overalls;

- reflective, high-visibility safety vest;
- safety-toe boots;
- safety glasses;
- gloves; and
- hard hat.

Disposable nitrile gloves will be worn during any activity that may require dermal contact with potentially contaminated media. Hearing protection will be worn as needed.

1.5 Decontamination Procedures

Equipment decontamination procedures are necessary for any reusable equipment that comes into contact with contaminated soil and/or water. Decontamination procedures are documented within the body of this work plan.

Shannon & Wilson will conduct all site characterization activities in Level D PPE. For this reason, personnel will not be decontaminated when leaving the work site unless gross visual contamination of protective clothing is present.
When decontamination is necessary, it will consist of the following:

- Personnel shall be instructed in proper decontamination technique. This entails removal of protective equipment in an "inside-out" manner. Removal of contaminants from protective clothing or equipment by blowing, shaking, or other means that may disperse material into the air is prohibited.
- Personnel protective clothing that has been removed shall remain at the decontamination station pending personnel re-donning the clothing. At the conclusion of site work each day, PPE will be placed in trash bags for off-site disposal.
- Personnel will not exit the work site until contaminated clothing and equipment have been removed and employees have washed their hands and face with soap and water. A washtub with soap and water will be available to personnel as they exit the work site.
- Employees will wash their hands and face with soap and water before eating, drinking, smoking, or applying cosmetics. These activities will be restricted to designated rest area(s).
- Decontaminated items will be visually inspected for residual contamination to determine if decontamination procedures are effective.

1.6 Accidents and Emergencies

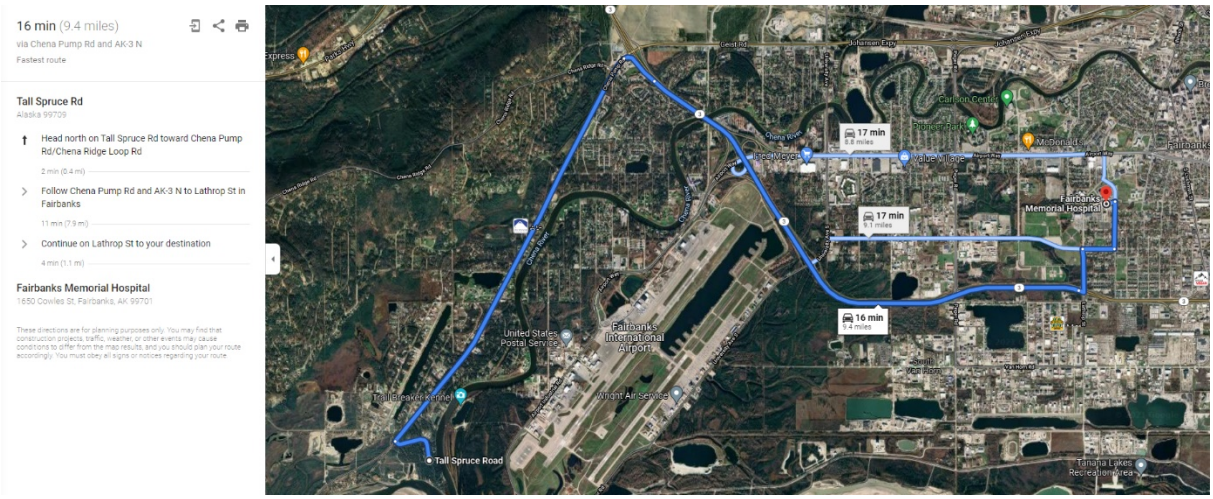
Shannon & Wilson field personnel are current in first aid and cardiopulmonary resuscitation (CPR) training. At a minimum, the following site safety equipment and first aid supplies shall be available in the field:

- PPE and clothing specialized for known site hazards;
- first aid kit;
- portable eye wash; and
- clean water in portable containers.

The primary emphasis of any health and safety plan is accident prevention. If an injury or illness occurs during the course of field work, the severity of the problem will dictate the level of response. Minor injuries or illness will be addressed with basic first aid measures as recommended by a registered nurse through our corporate Medcor service (1-800-775-5866).

More serious injuries may require assistance from the emergency medical staff at Fairbanks Memorial Hospital at 1650 Cowles Street, Fairbanks AK 99701. The telephone number for all emergencies is 911; the telephone number for the hospital is (907) 452-8181. We will keep field phones easily accessible in the case of an emergency.

Exhibit A1-1: Directions from Tall Spruce Road to Fairbanks Memorial Hospital



Shannon & Wilson's Corporate Health and Safety Program requires accident reporting when there is a site-related accident, near-miss incident, or medical emergency. If an employee is treated by medical personnel, the medical attendant will complete an Incident Medical Treatment Documentation form. Completion of an Alaska Department of Labor Report of Occupational Injury or Illness is also required within 10 days for any work-related injury or illness.

1.7 General Site Safety Requirements

The following measures are designed to augment the specific health and safety guidelines provided in this plan:

- Field personnel will refrain from smoking, eating, drinking, or chewing tobacco while in work zones or a potentially contaminated area.
- Field personnel should avoid contact with potentially contaminated surfaces such as: walking through puddles or pools of liquid; kneeling on the ground; or leaning, sitting, or placing equipment on contaminated soil or containers.
- Field personnel will be familiar with procedures for initiating an emergency response.
- Hazard assessment is a continual process; personnel must be aware of their surroundings and any chemical/physical hazards present.
- Personnel in the exclusion area shall be the minimum number necessary to perform work tasks in a safe and efficient manner.
- Equipment contacting potentially contaminated soils must be decontaminated or properly discarded before leaving the site.

Field personnel will be familiar with the physical characteristics of the work site including wind direction, site access, and location of communication devices and safety equipment.

SITE SAFETY AND HEALTH PLAN

PERSONAL ACKNOWLEDGMENT FORM

TALL SPRUCE MONITORING WELL INSTALLATION
FAIRBANKS, AK

I have reviewed this document and understand its contents and requirements. A copy of the above-referenced document has been made available to me. I agree to abide by the requirements of this Site Safety and Health Plan.

_____	_____
Signature	Name (printed)
_____	_____
Date	Representing
_____	_____
Signature	Name (printed)
_____	_____
Date	Representing
_____	_____
Signature	Name (printed)
_____	_____
Date	Representing

APPENDIX B: CONCEPTUAL SITE MODEL

Appendix B

Conceptual Site Model

CONTENTS

Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: Fairbanks Int'l Airport Statewide PFAS - Tall Spruce Neighborhood

File Number: 100.38.277 / 26816

Completed by: Shannon & Wilson, Inc.

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☐ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: Aqueous Film Forming Foam (AFFF) release upgradient of site

Release Mechanisms *(check potential release mechanisms at the site)*

- ☐ Spills
- ☐ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☒ Other: Migration from upgradient PFAS contamination at FAI

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☐ Air
- ☒ Sediment
- ☒ Groundwater
- ☒ Surface water
- ☐ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☒ Subsistence harvester (i.e. gathers wild foods)
- ☒ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☒ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

Please note, it is unlikely we will find surface contamination in the Tall Spruce area; however, PFAS surface contamination is present at FAI.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Please note, it is unlikely we will find PFAS contamination above the water table in the Tall Spruce area; however, PFAS contamination is present at FAI between 0 to 15 feet bgs.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the ground-water is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☒

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☒

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☒

If all of the boxes are checked, label this pathway complete: Complete

Comments:

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☐

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☐

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

Print Form

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Fairbanks Int'l Airport Statewide PFAS - Tall Spruce Neighborhood
100.38.277 / 26816

Completed By: Shannon & Wilson, Inc.

Date Completed: November 5, 2021

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Current & Future Receptors

Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil — check soil	☑ soil	☑ Incidental Soil Ingestion	C/F	C/F	I	C/F	C/F	C/F	
	☐ Migration to subsurface — check soil		☑ Dermal Absorption of Contaminants from Soil	C/F	C/F	I	C/F	C/F	C/F	
	☐ Migration to groundwater — check groundwater		☐ Inhalation of Fugitive Dust							
	☐ Volatilization — check air									
	☑ Runoff or erosion — check surface water									
	☑ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Subsurface Soil (2-15 ft bgs)	☑ Direct release to subsurface soil — check soil	☑ groundwater	☑ Ingestion of Groundwater	C/F	C/F	I	C/F	C/F	C/F	
	☐ Migration to groundwater — check groundwater		☑ Dermal Absorption of Contaminants in Groundwater	C/F	C/F	I	C/F	C/F	C/F	
	☐ Volatilization — check air		☐ Inhalation of Volatile Compounds in Tap Water							
	☑ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Ground-water	☑ Direct release to groundwater — check groundwater	☐ air	☐ Inhalation of Outdoor Air							
	☐ Volatilization — check air		☐ Inhalation of Indoor Air							
	☑ Flow to surface water body — check surface water		☐ Inhalation of Fugitive Dust							
	☑ Flow to sediment — check sediment									
	☑ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Surface Water	☑ Direct release to surface water — check surface water	☑ surface water	☑ Ingestion of Surface Water	C/F	C/F	I	C/F	C/F	C/F	
	☐ Volatilization — check air		☑ Dermal Absorption of Contaminants in Surface Water	C/F	C/F	I	C/F	C/F	C/F	
	☑ Sedimentation — check sediment		☐ Inhalation of Volatile Compounds in Tap Water							
	☑ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Sediment	☑ Direct release to sediment — check sediment	☑ sediment	☑ Direct Contact with Sediment	C/F	C/F	I	C/F	C/F	C/F	
	☑ Resuspension, runoff, or erosion — check surface water									
	☑ Uptake by plants or animals — check biota	☑ biota	☑ Ingestion of Wild or Farmed Foods	C/F	I	I	I	C/F	C/F	
	☐ Other (list):									

Revised, 10/01/2010

IMPORTANT INFORMATION

Important Information

About Your Work Plan

IMPORTANT INFORMATION

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

IMPORTANT INFORMATION

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report

IMPORTANT INFORMATION

prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland