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Transportation & Public
Facilities
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Fairbanks, Alaska 99709

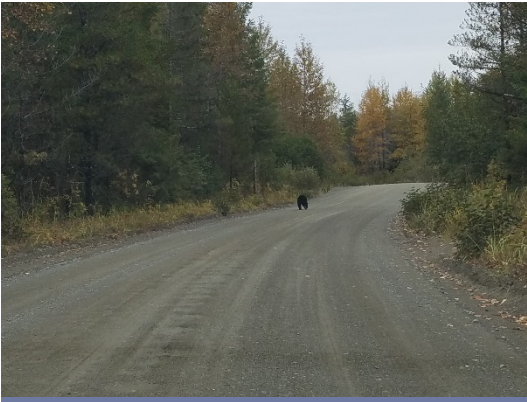


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REVISION 1

GENERAL WORK PLAN ADDENDUM
DOT&PF Statewide PFAS
Addendum 006-GST-02 Gustavus
Site Characterization
GUSTAVUS, ALASKA



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Submitted To: Alaska Department of Transportation & Public Facilities
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Fairbanks, Alaska 99709
Attn: Ms. Samantha Cummings

Subject: REVISION 1 GENERAL WORK PLAN ADDENDUM, DOT&PF STATEWIDE
PFAS
ADDENDUM 006-GST-02 GUSTAVUS SITE CHARACTERIZATION,
GUSTAVUS, ALASKA

Shannon & Wilson prepared this Revised Work Plan Addendum on behalf of the Alaska Department of Transportation & Public Facilities (DOT&PF). This Addendum is a supplement to the *Revision 1 - DOT&PF Statewide PFAS General Work Plan (GWP)*, submitted July 2020 and the *Revision 1 - Gustavus Airport PFAS Site Characterization Work Plan* dated July 2019. The services proposed in this GWP Addendum, 006-GST-02, describe the DOT&PF planned activities for continued site characterization associated with the per- and polyfluoroalkyl substances (PFAS) contamination originating from the Gustavus Airport (GST).

The scope of services to author this Addendum was specified in our proposal dated January 26, 2021, and authorized in a notice to proceed (NTP) issued on March 26, 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 will be requested in a separate proposal and will be conducted following Alaska Department of Environmental Conservation (DEC) approval.

This GWP Addendum was prepared and reviewed by:

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ACRONYMS

AAC	Alaska Administrative Code
AFFF	aqueous film forming foam
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
COPC	contaminant of potential concern
CSM	Conceptual Site Model
DEC	Alaska Department of Environmental Conservation
DOT&PF	Alaska Department of Transportation & Public Facilities
DRO	diesel range organics
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
GAC	granular activated carbon
GRO	gasoline range organics
GST	Gustavus Airport Terminal
GWP	<i>Revision 1 - DOT&PF Statewide PFAS General Work Plan</i>
IDW	investigative-derived waste
LHA	lifetime health advisory
LOD	limit of detection
mg/kg	milligram per kilogram
MW	monitoring well
ng/L	nanograms per liter
NPS	National Park Service
NTP	notice to proceed
PAH	polycyclic aromatic hydrocarbons
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PPE	personal protective equipment
POC	point of contact
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RL	reporting limit
RRO	residual range organics
SIM	selective ion monitoring
SSHP	Site Safety and Health Plan
TWP	temporary well point
µg/L	micrograms per liter

ACRONYMS

µg/kg

micrograms per kilogram

1 INTRODUCTION

This Final Addendum, 003-GST-00, is a supplement to *Revision 1 - DOT&PF Statewide PFAS General Work Plan (GWP)* and the 2019 *Revision 1 - Gustavus Airport PFAS Site Characterization Work Plan*. This Addendum describes our proposed approach for additional per- and polyfluoroalkyl substances (PFAS) site characterization activities near the Gustavus Airport (GST) in Gustavus, Alaska (Figures 1 and 2). The GST is an active, Alaska Department of Environmental Conservation (DEC) listed contaminated site due to the presence of PFAS in groundwater, soil, sediment, and surface water (File Number 1507.38.017, Hazard ID 26904).

Shannon & Wilson prepared this Addendum in accordance with DEC's March 2017 *Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites* and October 2019 *Field Sampling Guidance* document, with the addition of the Conceptual Site Model (CSM; Appendix A) and our Site Safety and Health Plan (SSHP).

1.1 Data Quality Objectives

This section outlines our data quality objectives (DQOs) for this project based on the six-part DQO process presented in DEC's March 2017 *Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling* technical memorandum. The results of our soil, water, and other media sampling will support an informed evaluation of the extent of the PFAS contamination at and near the GST property. Findings from our site characterization will guide our recommendations for continued monitoring or corrective actions.

1.1.1 Project Objectives

The project objectives are to sample surface soil, subsurface soil, surface water, and groundwater at and near the GST to better understand PFAS source areas. The information will be used to evaluate the fate and transport of PFAS resulting from the use of aqueous film forming foam (AFFF). The project objectives also include evaluating changes to groundwater PFAS concentrations in the area of the GST, including surface water impacts to groundwater near the GST, and investigating transport of PFAS near areas where high-level detections in asphalt were reported from samples collected from runway asphalt in March and April 2021.

1.1.2 Information Inputs

Shannon & Wilson proposes to install 23 additional monitoring wells (MWs) to provide information about PFAS movement offsite, and to supplant data no longer being collected from affected water supply wells removed from the quarterly monitoring network. The new MWs will provide additional data from a more robust monitoring network for continuation of plume monitoring. Wells will be used for analysis of trends after sufficient data are collected. We will also install and sample 16 temporary well points (TWP) in areas that received heavy flooding in 2020, are in close proximity to drainage ditches near the GST, or other areas where groundwater concentration is unknown.

Previous work indicates surface water movement has contributed to offsite groundwater contamination near the GST. Shannon & Wilson proposes to collect 24 surface water and sediment samples from drainage ditches on and near the GST. In addition, we will collect 29 surface soil samples to evaluate horizontal extent of contamination in areas where previous soil and asphalt PFAS results exceeded regulatory limits. We will collect up to 4 subsurface soil samples from soil borings to evaluate vertical extent of PFAS contamination in preparation for future remediation efforts.

Proposed sample locations are shown on Figures 3 and 4. The sampling plan is described in detail in Section 5.0.

1.1.3 Site Location and Boundaries

The GST terminal is located at 1 Airport Way in Gustavus, Alaska (Figure 2). The property is owned by DOT&PF, who also owns multiple adjacent parcels. Figure 2 shows the property boundaries for land owned by the DOT&PF. The geographic coordinates of the GST terminal are latitude 58.4252, longitude -135.7074.

Based on the current understanding of site conditions, we consider the boundary for the activities described in this addendum to include the GST and the impacted areas as defined by our previous water supply well search activities (Figure 2).

1.1.4 Proposed Analytical Approach

Contaminants of potential concern (COPC) and proposed cleanup levels are outlined in Section 3. Analytical methods are presented in Section 6.

1.1.5 Acceptance Criteria

We use a data validation process to verify environmental data are of known and acceptable quality. For analytical data, the DQO is to meet acceptable quality assurance (QA) standards

of precision, representativeness, comparability, and completeness. Laboratory and field quality control measures are outlined in Section 6. QA objectives for analytical data and data review procedures are presented in Section 7.

1.1.6 Data Collection Methods

Sample collection and handling procedures are outlined in Section 5.

1.2 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.

Upon DEC approval for the proposed scope of services outlined in this Addendum, Shannon & Wilson will coordinate with DOT&PF staff to collect the proposed samples. Field activities are anticipated to occur during August 2021. Laboratory analysis will be requested on a standard 14-day turn-around time. We will submit a draft report within 60 days of receiving analytical results.

1.3 Project Team

Chris Darrah will be Shannon & Wilson's Principal-in-Charge and Kristen Freiburger 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 1-1 below.

Exhibit 1-1: Project Team

Affiliation	Responsibility	Representative	Contact Number
DOT&PF	Client – Regional POC	Marcus Zimmerman	(907) 465-4655
	Client – Statewide PFAS POC	Sammy Cummings	(907) 888-5671
DEC	Regulatory agency POC	Erin Gleason	(907) 269-7556
Shannon & Wilson	Principal-in-charge	Christopher Darrah	(907) 458-3143
	Project Manager	Kristen Freiburger	(907) 458-3146
Eurofins/ TestAmerica, Inc	PFAS analytical laboratory services	David Alltucker	(916) 374-4383
SGS North America, Inc.	Petroleum analytical laboratory services	Jennifer Dawkins	(907) 474-8656

POC = point of contact

2 SITE AND PROJECT DESCRIPTION

2.1 Background

General background information relating to sites covered under the GWP is included in Section 1.1 of the GWP. Site location and study boundaries are described in Section 1.1.3.

The DOT&PF Crash and Fire Rescue program used AFFF for training, systems testing, and emergency response at the GST for many years. Areas of known and potential use are shown as AFFF sites on Figure 2. The precise timeline and locations of AFFF use at the GST are unknown. Please note, several additional AFFF use locations have been added to Figure 2 based on asphalt-sample PFAS results and information recently received in a document produced by the public (Howell, 2019).

Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two PFAS commonly found at sites where 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 drinking-water action level, DEC groundwater cleanup levels, and DEC soil cleanup levels are summarized in Exhibit 3-1 below. If regulatory changes occur prior to implementation of this work plan Shannon & Wilson may need to amend the sampling and analysis plan.

2.2 Previous Investigations

On May 4, 2018 DEC informed DOT&PF the airport terminal well and the National Park Service (NPS) Water System well serving the school were at risk for PFAS contamination. On June 27, 2018, DOT&PF sampled both drinking-water supply wells for the presence of PFAS. The analytical results were received on July 30, 2018. The airport terminal well contained levels of PFAS exceeding the EPA LHA. The NPS well had detections of several PFAS, with concentrations of PFOS and PFOA less than the EPA's LHA. DOT&PF and the Alaska Department of Administration Division of Risk Management contacted Shannon & Wilson regarding the Gustavus results. Shannon & Wilson began water supply well search and sampling efforts in August 2018.

Since August 2018, Shannon & Wilson has collected samples from 116 water supply wells in Gustavus. As part of the initial site characterization efforts completed in October 2019, Shannon & Wilson collected samples from 15 MWs, eight TWPs, 29 surface-soil locations, 13 sediment locations, and 10 surface water locations. We also completed a groundwater elevation survey. The results of the October 2019 site characterization are discussed in detail in our *Gustavus 2019 Summary Report*, dated April 8, 2020.

Shannon & Wilson has been in regular communication with the public in response to resident concerns, participated in State of Alaska public-outreach meetings, and prepared communication materials for distribution to Gustavus residents.

Water supply well sample concentrations for the sum of PFOS and PFOA range from not detected to 6,110 ng/L for samples associated with the GST PFAS plume. Sampling areas were expanded until PFAS concentrations along the edges of the sampling areas were found to be below DEC regulatory levels. Water supply well depths are generally between 15 to 25 feet below ground surface (bgs), based on information provided by the residents and the former local driller. Shannon & Wilson were not able to obtain well-drilling or construction logs to confirm these depths.

MW and TWP sample concentrations for the sum of PFOS and PFOA range from not detected in monitoring wells offsite to 188 ng/L on GST property in samples collected since October 2019. MWs were installed at 15, 20, 30 and 40 feet bgs; in some locations multiple monitoring wells were installed at varying depths. TWP were drilled to groundwater table. Subsequent samples collected on a quarterly basis from MWs have shown similar PFOS and PFOA concentrations, with some exceptions following the December 2020 flooding. These samples will be reported following the June 2021 sampling event; however, the results are available for DEC upon request.

Surface water PFOS and PFOA concentrations in samples collected in 2019 ranged from not detected at a location north of the GST to 379 ng/L downgradient of reported AFFF use areas. The surface water sample collected from the “duck pond” also showed concentrations of PFOS and PFOA over 100 ng/L. The duck pond may be a source area for PFAS detections in water supply wells near the GST. The investigation proposed in this Addendum seeks to understand the infiltration of the water in the duck pond and the resulting affect to nearby water supply wells.

Surface soil and sediment sample concentrations of PFOS and PFOA ranged from not detected in upgradient locations at the north edges of the runways to 520 µg/kg PFOS in sediment taken from an onsite culvert and 4.5 µg/kg PFOA in surface soil taken onsite near the DOT building. Soil boring concentrations ranged from not detected to 14 µg/kg PFOS and 1.9 µg/kg PFOA for samples collected during onsite MW installation.

2.3 Site Characterization Field Activities

Shannon & Wilson’s characterization activities will be performed in accordance with the conditions of our DOT&PF Professional Services Agreement Number 25-19-1-013 *Per- and Polyfluoroalkyl Substance (PFAS) Related Environmental & Engineering Services*, 18 Alaska Administrative Code (AAC) 75, and the DEC *Field Sampling Guidance*. We have used information collected from our initial site visits and water supply well sample results to select sample locations of soil, surface water, and groundwater to better delineate the extent of PFAS contamination from the GST.

This work plan will guide the following:

- collection of 29 surface soil samples;
- collection of 30 surface water samples from ditches on and near the GST;
- collection of 35 sediment samples from locations associated with the surface water sample locations;
- installation and sampling of 16 TWPs;

- installation and sampling of up to 27 MWs;
- sampling of 14 soil borings;
- collection of groundwater, surface soil, subsurface soil, and surface water samples for laboratory analysis; and
- evaluation and reporting of the analytical data.

These tasks are described in detail in Section 5. A drilling contractor will be required to install TWP and MWs and drill soil borings. A waste management contractor will be required to remove and/or treat contaminated investigation derived waste (IDW). Additional details regarding IDW management are discussed in detail in Section 5.9.

2.4 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 GST to be investigated as a part of this Addendum are listed below.

- Fire training areas where diesel fuel and AFFF were used;
- AFFF-equipment testing areas; and
- AFFF storage areas.

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

3 CONTAMINANTS OF POTENTIAL CONCERN AND REGULATORY LEVELS

General information regarding COPCs and regulatory levels is included in Section 2.2 of the GWP. The primary COPCs for the GST site are PFAS. The secondary COPCs for onsite locations located in former AFFF training areas are benzene, toluene, ethylbenzene, and total xylenes (BTEX), gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO), and polycyclic aromatic hydrocarbons (PAHS), as defined in Appendix F of the October 2019 DEC *Field Sampling Guidance* due to the likelihood of diesel fuel use during training exercises as an ignition/fuel source.

To evaluate analytical data, groundwater samples will be compared to 18 Alaska Administrative Code (AAC) 75.341 *Table C, Groundwater Human Health Cleanup Level* and the EPA LHA (for PFAS). Soils samples will be compared to AAC 75.341 *Tables B1, Method Two*

– Migration to Groundwater, and B2, Method Two – Over 40-Inch Zone – Migration to Groundwater.

The current cleanup levels and analytical reporting limits for these site COPCs are summarized below in Exhibit 3-1.

Exhibit 3-1: COPCs, Regulatory and Laboratory Reporting Limits

Method	Analyte	Regulatory Soil Limit ^a (mg/kg)	Regulatory Water Limit ^b (µg/L)	Laboratory LODs/RLs ^c	
				Soil (mg/kg)	Water (µg/L)
PFAS Analytes					
537.1 or 537.1M ^d	PFOS	0.0030	0.40	0.000500	0.00200
	PFOA	0.0017	0.40	0.000200	0.00200
	PFOS+PFOA (drinking)	-	0.070	-	-
Petroleum Analytes					
AK101	GRO	300	2,200	1.25	50
AK102	DRO	250	1,500	10	300
AK103	RRO	11,000	1,100	50	250
EPA 8260 (BTEX)	Benzene	0.022	4.6	0.00625	0.2
	Toluene	6.7	1,100	0.0125	0.5
	Ethylbenzene	0.13	15	0.0125	0.5
	Xylenes Total	1.5	190	0.0375	1.5
PAH Analytes					
EPA 8270D-SIM (PAH)	1-Methylnaphthalene	0.41	11	0.0125	0.025
	2-Methylnaphthalene	1.3	36	0.0125	0.025
	Acenaphthene	37	530	0.0125	0.025
	Acenaphthylene	18	260	0.0125	0.025
	Anthracene	390	43	0.0125	0.025
	Benzo(a)anthracene	0.70	0.30	0.0125	0.025
	Benzo[a]pyrene	1.9	0.25	0.0125	0.01
	Benzo[b]fluoranthene	20	2.5	0.0125	0.025
	Benzo[g,h,i]perylene	15,000	0.26	0.0125	0.025
	Benzo[k]fluoranthene	190	0.80	0.0125	0.025
	Chrysene	600	2.0	0.0125	0.025
	Dibenzo[a,h]anthracene	6.3	0.25	0.0125	0.01
	Fluoranthene	590	260	0.0125	0.025
	Fluorene	36	290	0.0125	0.025
	Indeno [1,2,3-c,d] pyrene	65	0.19	0.0125	0.025
	Naphthalene	0.38	1.7	0.0100	0.05
	Phenanthrene	39	170	0.0125	0.025
Pyrene	87	120	0.0125	0.025	

Notes:

- 18 AAC 75 Table B2. Method Two - Petroleum Hydrocarbon Soil Cleanup Levels – Over 40-Inch Zone - Migration to Groundwater or Table B1. Method Two - Soil Cleanup Levels Table - Migration to Groundwater.
- 18 AAC 75 Table C. Groundwater Cleanup Levels.
- May 2021 LODs from SGS North America, Inc. for petroleum and PAH analyses. May 2021 RLs from Eurofins TestAmerica, Sacramento for PFAS analyses.
- 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.

BTEX = benzene, toluene, ethylbenzene, and total xylenes; DRO = diesel range organics; EPA = U.S. Environmental Protection Agency; GRO = gasoline range organics; LOD = limit of detection; mg/kg = milligram per kilogram; µg/L = microgram per liter; PAH = polynuclear aromatic hydrocarbons; PFAS = per- and polyfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFOS = perfluorooctanesulfonic acid; RL = reporting limit; RRO = residual range organics; SIM = selective ion monitoring

4 CONCEPTUAL SITE MODEL

Shannon & Wilson revisited the most recent CSM presented in *Revision 1 – DOT&PF Statewide PFAS Addendum 002-GST-00 Gustavus Well Monitoring*. A copy of the most recent version is provided as Appendix A.

4.1 Description of Potential Receptors

The CSM considers commercial/industrial workers, site visitors, construction workers, subsistence hunters and consumers, farmers/gardeners, and residents to be current or future potential receptors.

4.1.1 Potential Exposure Pathways

Potential human exposure pathways include inhalation of fugitive dust; direct contact with contaminated sediment; inhalation of indoor and outdoor air; and incidental soil and groundwater ingestion. Additionally, ingestion of wild and farmed foods may be a human exposure pathway as PFOS and PFOA are bioaccumulative (DEC; 2017).

4.1.2 Soil

Incidental ingestion may be a potential direct-contact exposure pathway for soil. Direct contact with the contaminated surface and subsurface soil at the site is unlikely at present. However, future excavation at the site may result in ingestion of soil by commercial workers, site visitors, residents, or construction workers. Contaminated surface soil can become entrained in fugitive dust, which could be a current exposure pathway for site workers, visitors, and nearby residents.

4.1.3 Groundwater

Ingestion of groundwater is an exposure pathway, as several water supply wells near the GST have been found to have PFAS contamination that exceeds state regulatory levels. Water supply wells near the GST are generally shallow, at about 15 – 25 feet bgs. Shannon & Wilson understands setting wells in a deeper, uncontaminated aquifer is not an option in Gustavus. Groundwater may also be used to water edible vegetation (i.e. gardens).

4.1.4 Surface Water and Biota

Surface water, while unlikely to be an exposure pathway because PFAS is not readily absorbed through the skin, is contributing to groundwater contamination by moving contaminants off-site. Animals are known to use the area where a previous surface-water

sample showed contamination. Due to the bioaccumulative risk of PFAS, biota is considered a potential pathway for exposure. Our site assessment activities are not designed to assess the biota exposure pathway. However, we understand the State of Alaska is conducting sampling at various PFAS sites to investigate this pathway. We also consider consumption of subsistence foods (salmon, berries, etc.) to be a potential exposure pathway.

4.2 Site Safety and Health Plans

Shannon & Wilson's SSHP will be used by staff to protect the health and safety of field personnel from physical and chemical hazards associated with work at the GST. The SSHP is provided in Appendix B.

5 SAMPLING AND ANALYSIS PLAN

This section describes the analytical sampling approach for site characterization activities at the GST. A general Sampling and Analysis Plan is included in Section 4 of the GWP.

A DEC qualified sampler will collect and handle the samples for the scope covered under this Addendum and collect required quality control (QC) samples in accordance with DEC's *Field Sampling Guidance*. Field personnel will document field activities with field notes and photographs, using the applicable field forms (Appendix B of GWP), as detailed in Section 7.2 below.

Analytical laboratories and methods; sample containers, preservation methods, and holding times; and sample custody, storage, and transport used as a part of this Addendum are identified in Section 6. Equipment decontamination procedures are outlined in Section 6.3. IDW management is described in Section 5.9.

Shannon & Wilson plans to install up to 27 additional MWs in the area around the GST. MW nests will include a well installed at the water table and a deep MW (30-40 feet bgs), where not restricted by subsurface conditions. Monitoring wells for a given nest will be spaced at least 15 feet between the bottom of the shallow groundwater well screen and top of the deep groundwater well screen. We will install the deep groundwater well first, using the subsurface information log for both the deep and the shallow well. A shallow well will not be installed at the location if it does not meet the criteria listed above. The proposed MW locations are described below:

- One water table MW will be installed adjacent to MW-9-30 to better understand the influence of surface water infiltration located upgradient; (1)

- one MW nest on Fara Way Road, one MW nest on White Drive, and one MW nest on Parker Drive for plume monitoring points lost when impacted water supply well locations were removed from the quarterly sampling events; (6)
- one MW nest at the end of the short runway; (2)
- one water table MW near the DOT shop to monitoring groundwater near a known AFFF use area and replace information no longer obtained from the water supply well at that building; (1)
- three additional MW nests, between onsite well MW-11-15 and the Gustavus School/National Park Service (NPS) housing/school to monitor concentrations of PFAS leaving known AFFF use areas prior to the community well at the school; (6)
- one MW nest between the community well known as the Alaska Terminal Well and the area of known AFFF used behind the Alaska Airlines Terminal building to evaluate presence of PFAS found in asphalt upgradient from this location; (2)
- one MW nest at the northeast corner of Gustavus Road and Wilson Road to monitor this area for PFAS; (2)
- one MW nest along Wilson Road near Icy Drive; (2)
- one MW nest east of the river to evaluate PFAS detections in the MWs across the Salmon River, near City Hall; (2)
- one MW nest along Gustavus Road east of Wilson Road, focusing in an area that experienced flooding in 2020 to monitor impacts of the 2020 and potential future flooding in this area; and (2)
- one replacement MW near the location of MW-11, if needed due to removal during construction activities. (1)

Shannon & Wilson will also collect quarterly groundwater samples from the current MW network. Newly installed MWs will be added to the quarterly sampling schedule after initial sampling in September 2021, pending funding and DEC approval.

Shannon & Wilson plans to sample groundwater from 16 TWP's at the following locations:

- two TWP's south of MW-12-10, one on either side of a major drainage ditch downgradient from the former fire training pit; (2)
- one TWP north of MW-12-10 to evaluate stockpile leakage from asphalt resurfacing project and evaluate presence of PFAS upgradient of the former fire training pit; (1)
- two TWP's north of MW-11-15, to evaluate potential sources of PFAS contamination based on known use of AFFF in the area, placing the southern-most TWP along the edge of the new runway apron construction; (2)

- three TWPs north of the short runway to better understand potential infiltration from the slough that runs adjacent; (3)
- two TWPs south of the short runway in an area prone to flooding during heavy precipitation; (2)
- one TWP at the west end of the short runway and one TWP to the northwest of the “duck pond” (Figure 3) to better understand infiltration and groundwater movement from the “duck pond”; (2)
- four additional TWPs onsite in areas where PFAS was detected in asphalt samples collected in April 2021. (4)

Ditches appear to have directly impacted PFAS contamination in groundwater wells near the GST. To better understand the influence of surface water movement on groundwater near the GST, Shannon & Wilson will be collecting 30 additional surface water samples with co-located sediment samples from ditches that drain runoff from the GST. Our goal is to identify drainage ditches with PFAS contamination as well as evaluating those without PFAS detections to better inform our understanding of surface water movement around the GST. Shannon & Wilson will also meet with a local NPS Geographic Information Specialist to discuss new surface water flow data from recent investigations, if possible.

Surface water samples are proposed to be collected from the following locations, where possible:

- three samples from the gravel pits north of the airport, one from each of the southern gravel pits. (3)

Surface water and co-located sediment samples are proposed to be collected from the following locations, where possible:

- two samples from the drainage ditch that runs adjacent to the north side of Gustavus Road, one between the airport and Moose Lane and one between the Gustavus School and Glen’s Ditch Road; (2)
- one sample from the drainage ditch that runs adjacent to the south side of Gustavus Road near Glen’s Ditch Road; (1)
- one location on Glen’s ditch south of Same Old Road; (1)
- two samples from drainage ditches near MW-11-15; (2)
- one sample from the drainage ditch adjacent (north) to Moose Lane; (1)
- three samples at different locations from drainages surrounding the northwest portion of the long runway; (3)
- one resample from the on-airport drainage south of the former fire training pit near the exit of the under-runway culvert; (1)

- one sample along the drainage ditch running along the eastern side of the airport (outside the fenced area) where drainage ditch maintenance has occurred; (1)
- one sample from the square pond east of the airport, collected from the north eastern edge near the stockpiles staged in this area from historic construction activities; (1)
- one sample from the drainage ditch on State Dock Road, south of Gustavus Road; (1)
- one sample from the drainage ditch adjacent to Wilson Road, north of the short runway, between Harry Hall Drive and Parker Drive; (1)
- one sample from the drainage ditch behind NPS housing on Gustavus Road; (1)
- one sample from the drainage ditch that runs between the Alaska Airlines terminal and the southeast end of the long runway; (1)
- the drainage ditch adjacent to Airport Beach Road on south side of the long runway; and (1)
- a sample from the drainage ditch adjacent to the road to the DOT&PF Shop from Gustavus Road (1).

Surface water and co-located sediment samples in addition to “deep” sediment samples are proposed to be collected from the following locations, where possible:

- four samples along the drainage ditch running along the eastern side of the airport (outside of the fenced area) in anticipation of future drainage ditch maintenance projects, including a resample from location SW-19-02, a sample approximately 50 to 100 feet north of the outfall for the airport drainage ditch coming from the former training pit area, a sample from south of the outfall, and a sample south of the airport midway to the beach; (4)
- two locations along Glen’s ditch, one resample of where the duck pond drainage meets Glen’s ditch, and one resample of Glen’s ditch south of Gustavus road; and (2)
- two samples from the area known as the “duck pond” to the community, one a resample (SW-19-07) and an additional sample from the northern portion of this water body. (2)

If a surface water body is dry during the time of our sampling event, we will not be able to collect a surface water sample; however, we will collect a sediment sample from the location.

Shannon & Wilson will collect 86 surface and subsurface soil samples at the GST to evaluate vertical and horizontal extent of PFAS contamination and to advise future plans to remove contaminated soil. Soil sampling will focus in areas that showed high PFAS concentrations in soil samples collected in October 2019 and in asphalt samples collected in March/April 2021. We propose soil samples at the following locations:

- approximately seven surface-soil samples around the former fire training pit to evaluate extent of surface contamination resulting from AFFF training activities; (7)

- three soil borings at the former fire training pit (near MW-12-10) to evaluate the vertical extent of PFAS contamination in this area to advise future plans to remove contaminated soil; (12)
- nine surface soil samples and three soil borings near and around the DOT&PF shop building to delineate contamination in this area and provide information for future building construction; (21)
- a surface soil sample from the north corner of the intersection of the short and long runways; (1)
- approximately four surface soil samples and five soil borings surrounding MW-11-15 to investigate known PFAS source areas; (25)
- four surface soil samples and two soil borings from the short runway near the location of the highest asphalt sample result from April 2021; (12) and
- four surface soil samples and one soil boring near a high-level asphalt result location near the Alaska Airlines terminal building. (8)

Shannon & Wilson will also attempt to speak with the author of the recent community report documenting AFFF use areas and continue to evaluate surface water and groundwater movements as it relates to the duck pond location. We note at a recent community meeting it was noted there may be additional areas that were not documented, as they could not be validated.

5.1 Analytical Sample Summary

An analytical sample summary is presented in Exhibit 5-1 below.

Exhibit 5-1: Analytical Sample Summary

Number of Samples	Matrix	PFAS (537.1 / 537M)	GRO (AK101)	DRO (AK102)	RRO (AK103)	BTEX (EPA 8260)	PAH (EPA 8270D-SIM)
Surface Soil (not collected in soil boring)	Soil	29 + 5 QC	-	-	-	-	-
Soil Boring	Soil	56 + 10 QC	20 + 5 QC	20 + 5 QC	20 + 5 QC	20 + 5 QC	20 + 5 QC
Surface Water	Surface Water	30 + 4 QC	-	-	-	-	-
Sediment	Sediment	35 + 6 QC	-	-	-	-	-
New Monitoring Wells	Groundwater	27 + 12 QC	-	-	-	-	-
New Onsite Monitoring Wells	Soil	36 + 8 QC	-	-	-	-	-
Temporary Well Points	Groundwater	16 + 4 QC	-	-	-	-	-

Notes:

QC samples include field duplicates, equipment blanks, and field blanks, as necessary.

BTEX = benzene, toluene, ethylbenzene, and total xylenes; DRO = diesel range organics; EPA = U.S. Environmental Protection Agency; GRO = gasoline range organics; PAH = polynuclear aromatic hydrocarbons; PFAS = per- and polyfluoroalkyl substances; RRO = residual range organics; SIM = selective ion monitoring

5.2 Soil Borings

Shannon & Wilson will coordinate with DOT&PF and local personnel to select final boring locations and schedule utility locates using the Alaska Digline prior to drilling activities. Borings will be offset from asphalt or pavement, where possible. Shannon & Wilson will contract with a drilling services company to perform MW and TWP installation and subsurface soil sampling using a drill rig. At this time, we have not selected a drilling subcontractor.

The drilling contractor will advance soil borings at each subsurface location (MW, TWP, and soil boring; Figures 3 and 4). Shallow MWs will be set to span the water table using a 10-foot screened interval; deep wells will be set at 40 to 50 feet bgs unless an impermeable soil layer is encountered using a 5-foot screened interval.

The drilling contractor will use a drill rig equipped with a solid barrel (2-inch outside diameter) direct-push device for collecting continuous core samples (1.5-inch diameter) of unconsolidated materials at depth. An experienced field professional will observe and log the soil borings, describe samples based on visual observations, collect analytical soil samples, as necessary, and prepare descriptive logs of soil conditions encountered during drilling.

Subsurface soil samples collected from onsite boring locations (MWs and soil borings) will be taken from within six inches of the soil-groundwater interface and from every 5-10 feet (depending on changes in soil lithology) thereafter to a maximum extent of the well or boring scope. Soil borings will be terminated approximately 5 feet below the groundwater table. Soil boring samples will be submitted for analysis of 18 PFAS by EPA Method 537M for each vertical increment.

Samples will also be collected for analysis of BTEX by EPA Method 8260, GRO by Alaska (AK) Method 101, DRO/RRO by AK Method 102/103, and PAH by EPA Method 8270D-SIM, per Appendix F table of DEC's *Field Sampling Guidance* document from a subset of onsite soil borings. These locations are depicted on Figure 4. At these boring locations, one surface-soil sample will be collected as well as one sample at depth. The subsurface sample will be collected from the range where the photoionization detector reading is the highest.

5.3 Soil Sample Collection Procedures

Shannon & Wilson field staff will don clean nitrile gloves prior to collecting each soil sample. Staff will use new, clean, stainless steel spoons to collect surface and subsurface soil samples.

Where necessary, surface soil samples will be collected beneath the new construction grading. We have been provided the construction plans for this purpose. Our samplers will reference these documents to understand where samples may be affected by newly-graded soils. These locations are shown on Figure 4.

Soils collected for analysis will be placed in a laboratory-provided jars. Samples will be shipped to TestAmerica Laboratories, Inc. in West Sacramento, California, also referred to as Eurofins, for the analysis of PFAS by EPA method 537.1M.

5.4 Monitoring Well Installation and Development

The MWs will be installed as described in the DEC *Monitoring Well Guidance* (2013). The drilling contractor will install the MWs on the GST property or along a city right-of-way, where possible. Shannon & Wilson will obtain permission from private property owners

where needed. The wells will be constructed with two-inch inside-diameter schedule 40 PVC material and have a 5-foot (deeper wells) or 10-foot section (groundwater table wells) of 0.010-inch slotted screen and threaded end caps. The filter pack around the screened intervals will be 20/40 rounded silica sand and will extend 2 feet above the top of the screen. The grout seal above the sand pack will be bentonite chips, hydrated in place. The MWs will be completed as flush-mount.

Shannon & Wilson field staff will develop the wells to remove sediment and to verify proper hydraulic connection to the aquifer prior to collecting groundwater samples. To allow time for annular-seal materials to set, development will occur no sooner than 24 hours after installation is complete. We will develop the MWs using a Waterra inertial pump and a combination of surging and purging. Development water will be treated and disposed of in accordance with section 5.9.

Well construction and installation information will be recorded on the Monitoring Well Construction Details form (Appendix B of GWP).

5.5 Temporary Well Point Installation

The drilling contractor will install TWPs using 1-inch steel sand-point wells driven to approximately five feet below the groundwater table. TWPs will be purged and sampled directly after installation. Purge water will be treated and disposed of in accordance with section 5.9.

5.6 Groundwater Sampling

Groundwater sampling is described in Section 4.6 of the GWP.

Our proposed groundwater activities include sampling 16 TWPs and 23 MWs (Figure 3). At each well sampled, we will record the following on a standard Shannon & Wilson Monitoring Well Sampling Log (Appendix B of GWP):

- Water levels prior to sampling;
- Groundwater parameters;
- Depth of the pump or tubing where the groundwater sample is collected within the well screen;
- Measurements of the well casing and monument relative to the ground surface;
- Total volume of water purged; and
- Odor, color, or other apparent groundwater characteristics.

We will purge and sample each well using decontaminated pump and new, disposable PFAS-free tubing. We will place the pump tubing within the screened interval in each well for purging and sampling activities. We will measure groundwater parameters during purging using a YSI Pro Plus or equivalent multiprobe water quality meter, inserted into a flow-through cell attached to the pump discharge line. Shannon & Wilson field personnel are trained to calibrate and use water quality meters.

5.6.1 Groundwater-level Monitoring

We will measure the static groundwater level in each well prior to sampling using an electronic water-level indicator. The probe of the water-level indicator will be decontaminated prior to each use and between each well to prevent the addition of external or cross-contamination into a well. Decontamination procedures are outlined in Section 6.3.

5.6.2 Monitoring Well Sampling

MW sampling procedures are described in Section 4.6.3 of the GWP. A peri-pump with new, PFAS-free tubing will be used to collect groundwater samples from each MW where non-volatile analytes are collected. A positive displacement pump will be used for wells where volatile analytes (GRO and VOCs) will be collected. Purge water will be treated and disposed of in accordance with Section 5.9.

5.7 Surface Water Sampling

The proposed water-sampling activities include collecting 24 surface water samples from various water bodies on and around the GST property. Shannon & Wilson will attempt to collect surface water samples at least 72 hours after precipitation to prevent potential dilution effects. If possible, field staff will collect surface-water samples using a peristaltic pump and new, PFAS-free disposable tubing. We will place the pump tubing approximately 6 inches to 1 foot below the water's surface at each location and fill sample containers directly from the discharge line. Samples will be collected as close to the center of water body cross section as possible. Prior to entering a water body, field staff will verify they are not wearing PFAS-containing clothing or gear. Samples will be collected once disturbed solids have settled to the bottom or have moved down stream. If a peri-pump cannot be used to collect surface water samples, a clean, PFAS-free disposable cup will be used. Surface water collected for analysis will be placed in laboratory provided HDPE bottles. Samples will be shipped to TestAmerica for the analysis of PFAS by EPA method 537.1.

5.7.1 Sediment Sample Collection Procedure

A sediment sample will be collected at the locations noted in Section 5 above. We will collect the sediment samples from the shore using a hand auger, collecting soil right beneath the vegetation layer. We will drain away excess water from the sample and place the remaining solid material in a laboratory-provided sampling container. Eight locations will also have “deep” sediment samples collected from two to three feet below the sediment surface in anticipation of future construction activities.

Sample containers will be labeled with a unique identifier, date, and time, and placed immediately in a cooler with ice-substitute.

5.8 Special Considerations for PFAS Sampling

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

5.9 Investigation-Derived Waste

Drilling activities and soil sampling may generate excess soil, which will be contained in 5-gallon buckets or 55-gallon drums pending results of analysis. Excess soil with results below the action level will be disposed of to the ground. Soil with results above the action level will be disposed of via shipment to a waste disposal facility, yet to be determined, or an equivalent alternative. DEC approval will be received prior to removing disposal materials from the site.

Decontamination fluids will be treated through granular activated carbon (GAC) and disposed of to the ground surface on-site. Development and purge water from TWP and MWs will be treated with GAC and disposed of to the ground surface at least 100 feet from a surface water body. Appendix C presents manufacturer’s information for the GAC to be used.

An effluent sample will be collected following GAC disposal. Other investigation-derived waste will include non-reusable equipment such as nitrile gloves and sample tubing and will be disposed of in the Gustavus landfill.

6 ANALYTICAL LABORATORIES AND METHODS

Shannon & Wilson will ship samples for PFAS analysis via air courier to TestAmerica. Based on the DEC Technical Memorandum issued on October 2, 2019, PFAS analysis will report 18 PFAS compounds. Samples for the analysis of BTEX, GRO, DRO and PAH analytes will be

submitted to SGS North America, Inc. of Anchorage, Alaska. Upon receipt of the samples, authorized laboratory personnel will store and prepare the samples for analysis, taking into consideration sample holding times for the analysis. A summary of laboratory methods, preservation methods, and holding time is presented in Exhibit 6-1. Analytical deliverables will be provided as described in Section 7.6.

6.1 Sample Containers, Preservation, and Holding Times

General information regarding sample containers, preservation, and holding times is provided in Exhibit 6-1, below, for the analytical methods employed for this project.

Exhibit 6-1: Sample Containers, Preservation, and Holding Time Requirements

Analyte	Method	Media	Container and Sample Volume	Preservation	Holding Time
PFAS		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	
GRO	AK101	Water	3 x 40-mL VOA vials (no headspace)	HCl to <4 0 °C to 6 °C	14 days to extraction, analyzed within 40 days of extraction
		Soil	Pre-weighed 4-oz amber glass jar with septa	25mL MeOH 0 °C to 6 °C	
DRO	AK102	Water	2 x 250-mL amber glass	HCl to <4 0 °C to 6 °C	7 days to extraction, analyzed within 40 days of extraction
		Soil	4-oz amber glass jar	0 °C to 6 °C	14 days to extraction, analyzed within 40 days of extraction
RRO	AK103	Water	2 x 250-mL amber glass	HCl to <4 0 °C to 6 °C	7 days to extraction, analyzed within 40 days of extraction
		Soil	4-oz amber glass jar	0 °C to 6 °C	14 days to extraction, analyzed within 40 days of extraction
BTEX	EPA 8260	Water	3 x 40-mL VOA vials (no headspace)	HCl to <4 0 °C to 6 °C	14 days
		Soil	Pre-weighed 4-oz amber glass jar with septa	25mL MeOH 0 °C to 6 °C	
PAHs	EPA 8270D-SIM	Water	2 x 250-mL amber glass	0 °C to 6 °C	7 days to extraction, analyzed within 40 days of extraction
		Soil	4-oz amber glass jar		14 days to extraction, analyzed within 40 days of extraction

Notes:

† - Analytes analyzed outside of hold time will be marked as tentatively identified and not rejected, per recent discussions with DEC regarding the stability of these analytes. It is unlikely this scenario will be needed for these samples.
 BTEX = benzene, toluene, ethylbenzene, and total xylenes; °C = degrees Celsius; DRO = diesel range organics; EPA = U.S. Environmental Protection Agency; GRO = gasoline range organics; HDPE - high density polyethylene; HCl = hydrochloric acid; mL = milliliter; oz = ounce; PAH = polynuclear aromatic hydrocarbons; PFAS = per- and polyfluoroalkyl substances; RRO = residual range organics; SIM = selective ion monitoring; VOA = volatile organic analysis

6.2 Sample Custody, Storage, and Transport

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

6.3 Equipment Decontamination

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

6.4 Field Notes

Shannon & Wilson will maintain field notes throughout the project to document our field activities, procedures, and observations. Our field representative will sign and date each page. Daily field notes will include the following at a minimum:

- name of sampling personnel;
- names and affiliations of pertinent field contacts;
- date and time(s) of sampling;
- date, time, and location of sampling;
- summary of field measurements;
- unusual/unexpected events, such as leaks, releases, signs of soil contamination, or equipment malfunction;
- photographic data (contact number, date/time, location, photographer, photograph number, description, and direction of view);
- YSI identification and calibration data, if applicable; and
- weather conditions.

6.5 Deviations from the General Work Plan

Deviations from this Work Plan may be required due to unexpected circumstances. Deviations will be clearly documented in field logs and reported to the project manager.

The project report will include a separate section discussing deviations. Modifications to this Work Plan may be made in the form of an addenda.

7 QUALITY ASSURANCE PROJECT PLAN

The quality assurance project plan (QAPP) is intended to guide activities during assessment and review of resulting data. 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 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 during sampling at the GST, assuring sampling and documentation are effective, laboratory data are usable, and the information acquired is of high quality and reliable.

7.1 Quality Assurance Objectives

Data quality objectives are detailed in Section 5.1 of the GWP. Numeric QA objectives for this project are presented in Exhibit 7-1 below.

Exhibit 7-1: Quality Assurance Objectives for Analytical Samples

Analyte	Method	Matrix	Precision	Accuracy	Completeness
PFAS	EPA 537.1 / 537M	Water	±30%	(analyte dependent)	85%
		Soil	±50%	(analyte dependent)	85%
GRO	AK101	Water	±30%	60-120%	85%
		Soil	±50%	60-120%	85%
DRO	AK102	Water	±30%	60-120%	85%
		Soil	±50%	60-120%	85%
RRO	AK103	Water	±30%	60-120%	85%
		Soil	±50%	60-120%	85%
BTEX	8260	Water	±30%	(analyte dependent)	85%
		Soil	±50%	(analyte dependent)	85%
PAHs	8270D-SIM	Water	±30%	(analyte dependent)	85%
		Soil	±50%	(analyte dependent)	85%

Notes:

The primary COPCs are PFAS, specifically PFOS and PFOA, for projects conducted under this GWP Addendum. However, Appendix F of DEC’s Field Sampling Guidance (DEC 2019) identifies the following additional COPCs for sites associated with fire training facilities, fires, and facilities where AFFF was used: GRO, DRO, RRO, BTEX, and PAHs.

BTEX = benzene, toluene, ethylbenzene, and xylenes; COPC = contaminant of potential concern; DRO = diesel range organics; EPA = U.S. Environmental Protection Agency; GRO = gasoline range organics; PAH = polynuclear aromatic hydrocarbons; PFAS = per- and polyfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFOS = perfluorooctanesulfonic acid; RRO = residual range organics; SIM = selective ion monitoring

7.2 Field Documentation

Field documentation is described in Section 5.2 of the GWP. Field forms to be used for this project are included in Appendix B of GWP.

7.3 Field Instrument Calibration

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

7.4 Field Quality Control Samples

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

7.4.1 Field Duplicate Sample

Field duplicate sample collection procedures are described in Section 5.4.1 of the GWP. Refer to Exhibit 5-1 for number of field duplicates for each matrix. We will collect one field duplicate per 10 field samples per matrix per day, as defined in the *DEC Field Sampling Guidance*.

7.4.2 Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike and matrix spike duplicate 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.

7.4.3 Trip Blank Samples

Trip blank samples are described in Section 5.4.3 of the GWP. Trip blank samples will be stored and shipped with project samples where volatile analyses are requested.

7.4.4 Equipment Blank Samples

Equipment blank sample collection procedures are described in Section 5.4.4 of the GWP. Equipment blank samples will be collected at a rate of one per day per sample matrix.

7.4.5 Field Blank Samples

Field blank sample collection procedures are described in Section 5.4.5 of the GWP. Field blank samples will be collected at one per day for groundwater samples collected near high-level PFAS soil contamination areas.

7.4.6 Temperature Blank Samples

Temperature blanks are described in Section 5.4.6 of the GWP.

7.5 Laboratory Quality Control Samples

Shannon & Wilson will request standard DEC-Level II Data Deliverables from the analytical laboratory for transmittal with the summary report. We will also include our own internal QA assessment and submit a copy of the completed DEC laboratory data review checklist.

7.6 Laboratory Data Deliverables

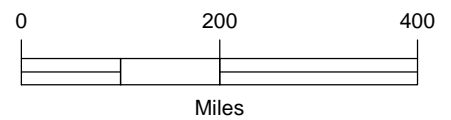
Laboratory data deliverables are described in Section 5.6 of the GWP.

7.7 Data Reduction, Evaluation, and Reporting

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

8 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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- Shannon & Wilson, Inc., 2019, Summary report, August 2018 to November 2018 Private Well Sampling, Gustavus, Alaska: Report prepared by Shannon & Wilson, Inc., Fairbanks, Alaska, 101543-001, for Alaska Department of Administration's Division of Risk Management, Juneau, Alaska, March.
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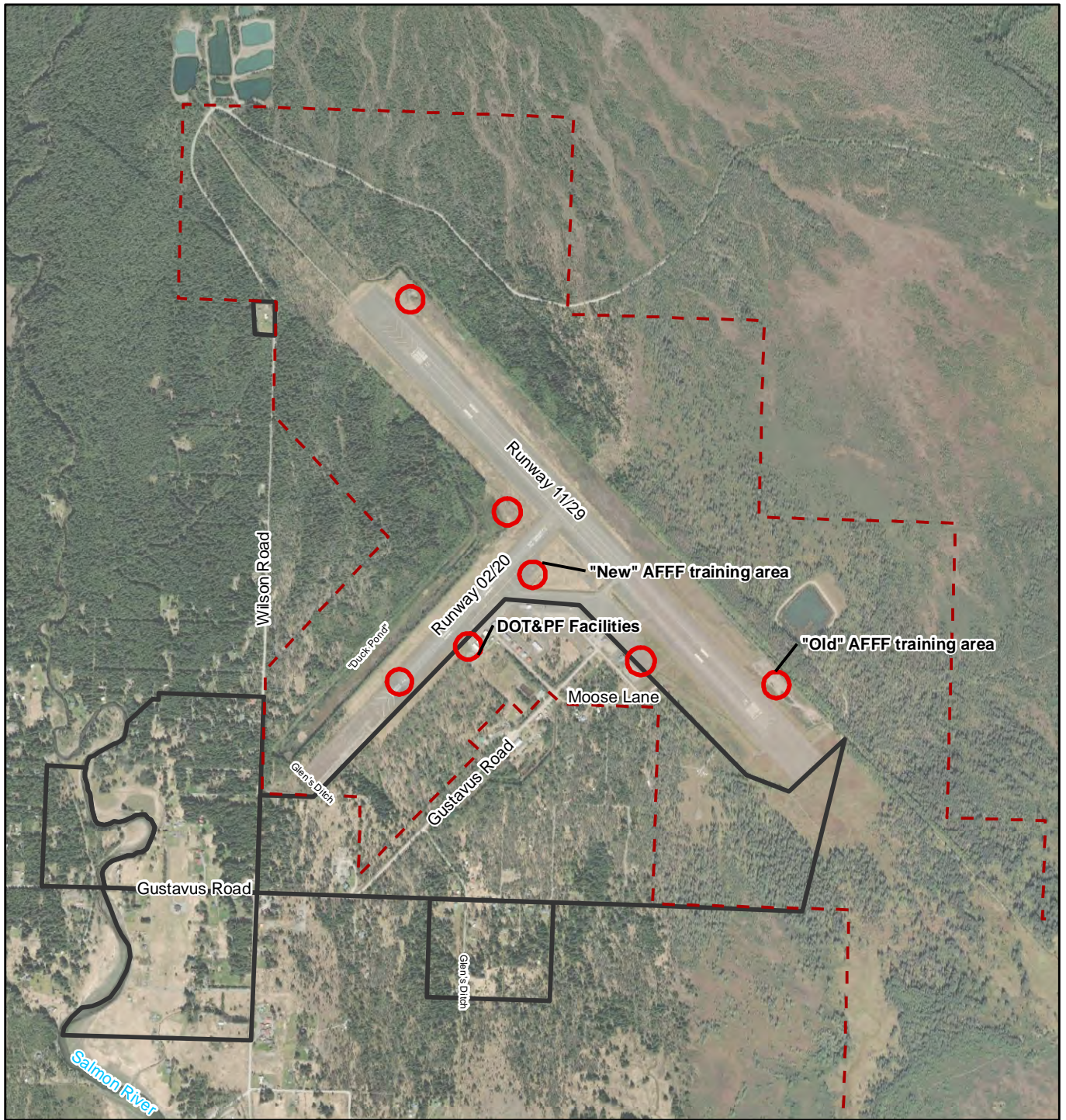


Gustavus Airport PFAS
 Site Characterization Work Plan
 Gustavus, Alaska

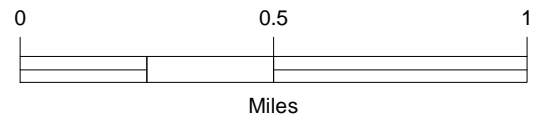
SITE VICINITY

August 2021

102599-014



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

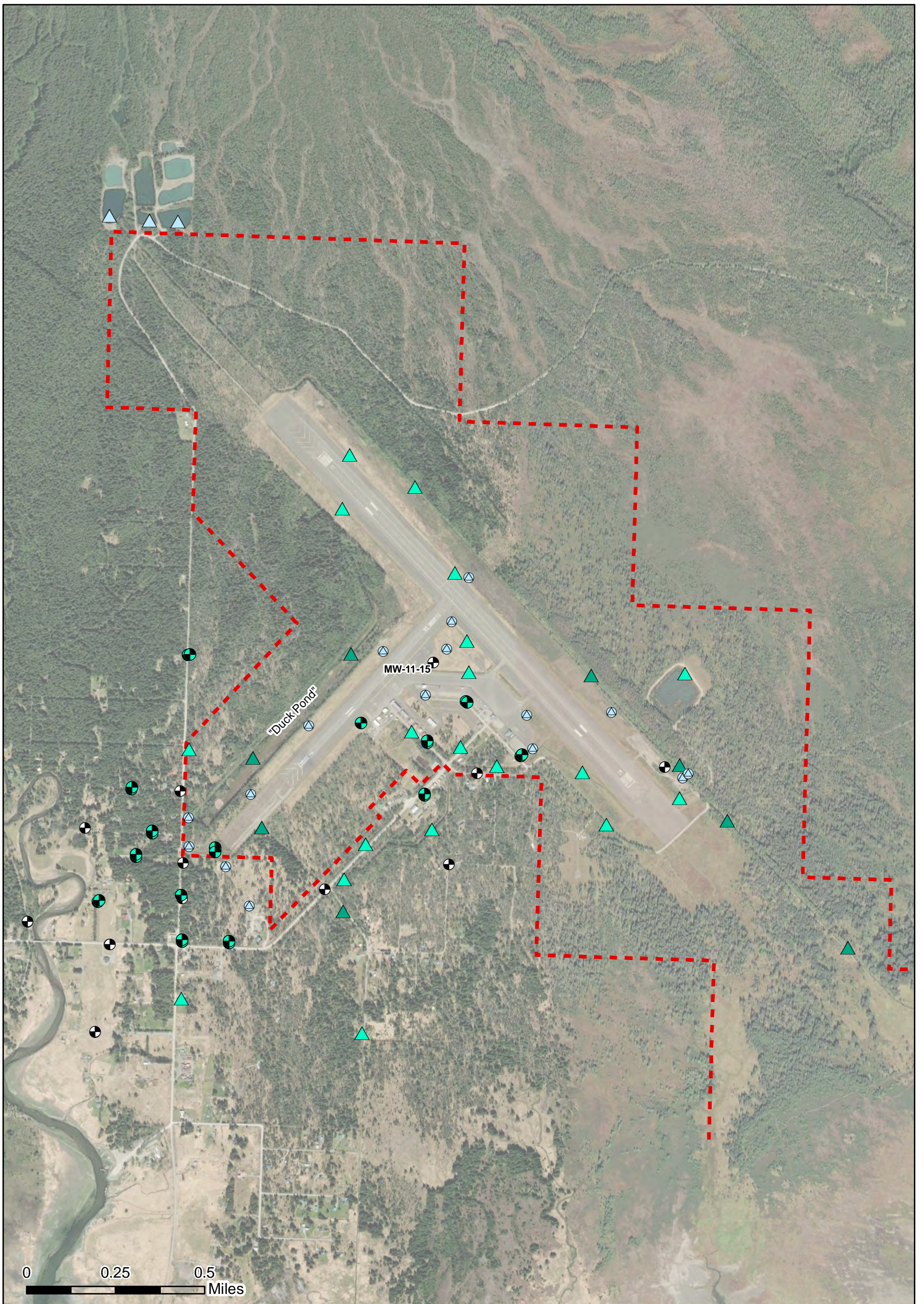


LEGEND

- - - Airport Property Boundary
- Sampling Boundaries
- Potential AFFF Use



Gustavus Airport PFAS Site Characterization Gustavus, Alaska	
SITE MAP	
August 2021	102599-014
SHANNON & WILSON, INC. <small>GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS</small>	Figure 2

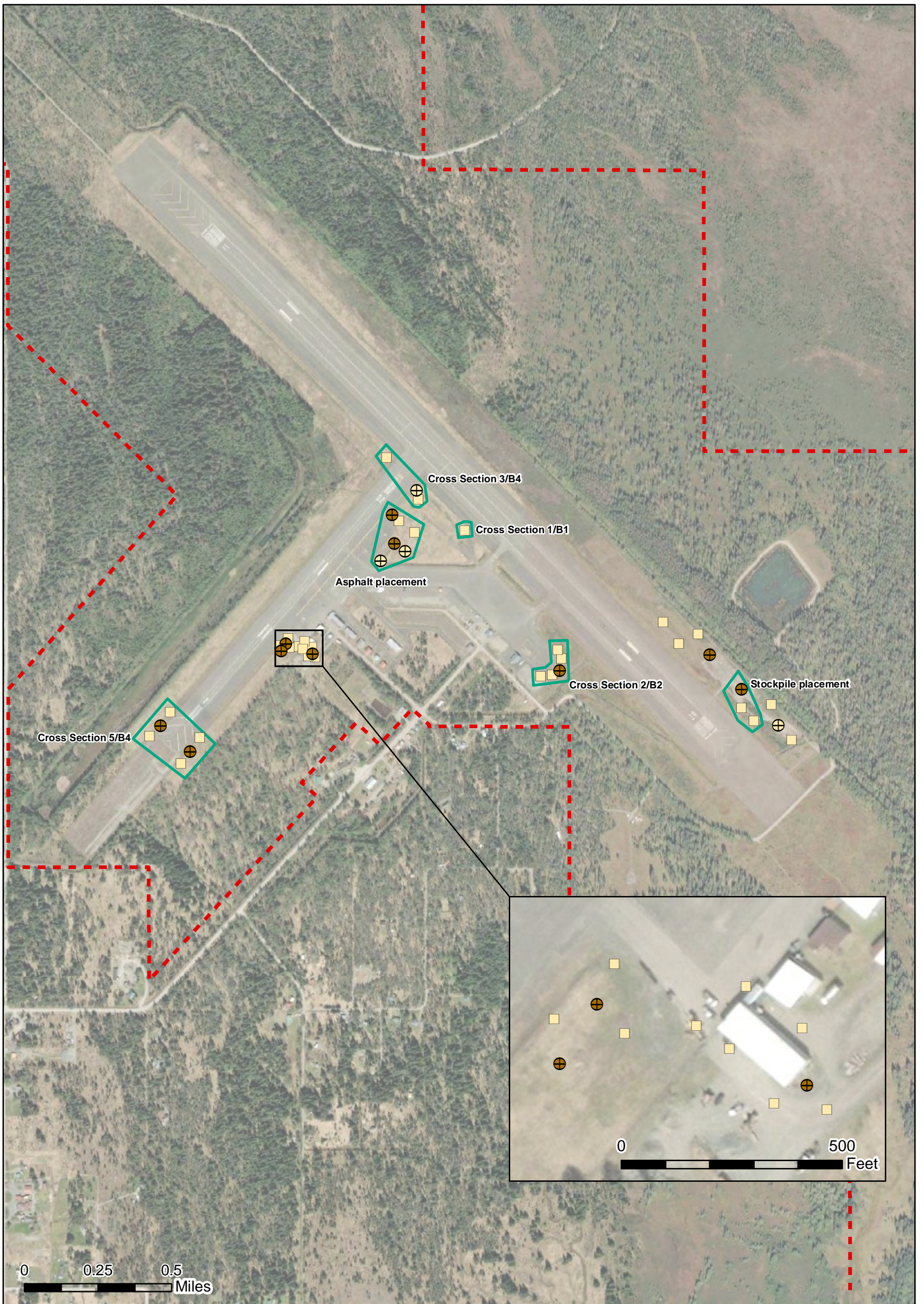


Map source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND	
⊕	Temporary Well Point Sample
⊗	Proposed Monitoring Well
⊕	Existing Monitoring Wells
- - -	Airport Property Boundary
Surface Water Samples	
△	Surface Water - No Sediment
▲	Surface Water/Sediment
▲	Surface Water - With Deep Sediment



Gustavus PFAS- DOT&PF Gustavus, Alaska	
PROPOSED WATER SAMPLE LOCATIONS	
August 2021	102599-014
SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS	Figure 3



Map source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- ⊕ Soil Boring - PFAS only
- ⊙ Soil Boring - Petroleum and PFAS
- Surface Soil Samples
- - - Airport Property Boundary
- Potentially Affected by Construction Activities, Document Reference Noted

Note: Sample locations affected by recent construction activities may be moved to edge of newly-placed asphalt. Surface soil samples located near recent grade changes will be collected beneath newly placed soils.

Gustavus PFAS- DOT&PF Gustavus, Alaska	
PROPOSED SOIL SAMPLE LOCATIONS	
August 2021	102599-014
SHANNON & WILSON, INC. <small>GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS</small>	
Figure 4	

Appendix A

Conceptual Site Model

Scoping and Graphics Form

CONTENTS

- Human Health Conceptual Site Model Scoping Form
- Human Health Conceptual Site Model Graphic Form

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

Site Name:

File Number:

Completed by:

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:

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

- Spills
- Leaks
- Direct discharge
- Burning
- Other:

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:

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:

Incomplete

Comments:

We note PFOS and PFOA are present on the Appendix B guidance document; however, according to the Alaska Department of Health and Social Services, PFOS and PFOA are not appreciably absorbed through the skin. We therefore consider dermal exposure to these compounds to be insignificant.

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 groundwater 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:

This pathway is considered complete due surface-water influence on drinking-water wells in the affected area.

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:

Complete

Comments:

Revised per DEC direction due to VOCs being contaminants of concern.

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 contaminated 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:

Complete

Comments:

Revised per DEC direction due to VOCs being contaminants of concern.

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 - PM₁₀). 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:

Several surface soil samples were above current cleanup levels.

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:

Several surface, subsurface and sediment analytical samples were above current cleanup levels.

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

[Empty box for providing other comments]

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Gustavus Airport Terminal

Completed By: Amber Masters; Shannon & Wilson, Inc.

Date Completed: Updated 5/3/2021

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

(1) Media	(2) Transport Mechanisms	
<input checked="" type="checkbox"/> Surface Soil (0-2 ft bgs)	<input checked="" type="checkbox"/> Direct release to surface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration to subsurface <i>check soil</i> <input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input checked="" type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Runoff or erosion <i>check surface water</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____	
	<input checked="" type="checkbox"/> Subsurface Soil (2-15 ft bgs)	<input checked="" type="checkbox"/> Direct release to subsurface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
	<input checked="" type="checkbox"/> Ground-water	<input checked="" type="checkbox"/> Direct release to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Flow to surface water body <i>check surface water</i> <input checked="" type="checkbox"/> Flow to sediment <i>check sediment</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
	<input checked="" type="checkbox"/> Surface Water	<input checked="" type="checkbox"/> Direct release to surface water <i>check surface water</i> <input type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Sedimentation <i>check sediment</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
	<input checked="" type="checkbox"/> Sediment	<input checked="" type="checkbox"/> Direct release to sediment <i>check sediment</i> <input checked="" type="checkbox"/> Resuspension, runoff, or erosion <i>check surface water</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____

(3) Exposure Media	(4) Exposure Pathway/Route	(5) Current & Future Receptors						
		Residents (adults or children)	Commercial or Industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
<input checked="" type="checkbox"/> soil	<input checked="" type="checkbox"/> Incidental Soil Ingestion <input type="checkbox"/> Dermal Absorption of Contaminants from Soil <input checked="" type="checkbox"/> Inhalation of Fugitive Dust	C/F	C/F	C/F	C/F		F	
	<input checked="" type="checkbox"/> groundwater	<input checked="" type="checkbox"/> Ingestion of Groundwater <input type="checkbox"/> Dermal Absorption of Contaminants in Groundwater <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water	C/F	C/F	C/F	C/F	C/F	
		<input checked="" type="checkbox"/> air	<input checked="" type="checkbox"/> Inhalation of Outdoor Air <input checked="" type="checkbox"/> Inhalation of Indoor Air <input checked="" type="checkbox"/> Inhalation of Fugitive Dust		C/F	C/F	C/F	
<input checked="" type="checkbox"/> surface water			<input type="checkbox"/> Ingestion of Surface Water <input type="checkbox"/> Dermal Absorption of Contaminants in Surface Water <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water					
	<input checked="" type="checkbox"/> sediment		<input checked="" type="checkbox"/> Direct Contact with Sediment	C/F	C/F	C/F	C/F	C/F
	<input checked="" type="checkbox"/> biota	<input checked="" type="checkbox"/> Ingestion of Wild or Farmed Foods	C/F	C/F	C/F	C/F		F

Appendix B

Site Safety and Health Plan

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ATTACHMENTS:

COVID-19 Safety Plan Attachment and Cleaning JHA

SITE SAFETY AND HEALTH PLAN

Shannon & Wilson prepared this SSHP for the well monitoring site characterization and water supply well sampling activities at and near the GST. 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 also covered under its 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 sampling operations.

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.

Chemical-Exposure Hazards

Contaminated soil and water may be encountered during site exploration activities. PFAS are believed to be the primary contaminants of potential concern and may be encountered in soils and water at unknown concentrations.

Shannon & Wilson personnel will implement skin protection when they are to contact 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 the current understanding of site conditions and scope of services.

Physical Hazards

Primary physical hazards associated with site characterization activities include drilling equipment; temperature stress; lifting, slipping, tripping, falling; and risk of eye injuries. In addition, wildlife may be a hazard in forested areas around the airport. 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.

B.1.1.1 Temperature Stress

Wearing personal protective equipment (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. Cold stress or injury due to hypothermia will be guarded against by wearing appropriate clothing, having warm shelter available, scheduling rest periods, adequate hydration, and self-monitoring physical and mental conditions.

B.1.1.2 Lifting Hazards

Moving coolers of soil 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.

B.1.1.3 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 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 or icy surfaces; therefore, workers will use caution when walking at the site.

B.1.1.4 Insects and Animals

During the summer months in Alaska, mosquitoes and other insects are common in areas predominantly covered with vegetation. Wearing PPE should be sufficient to protect site workers. Animals such as moose and bears are also commonly seen in Alaska. If a large

animal approaches the site, workers should keep their distance or seek shelter in their vehicles.

B.1.1.5 Congested Areas

The site investigation may at times require field personnel to work adjacent to or in roadways. Field personnel will observe the speed and frequency of traffic proximal to the work site. Appropriate cones, barricades, or signs to secure the work area will be used when required.

B.1.2 Other Hazards

Biological, ionizing radiation, and other hazards are not expected to be present. However, be aware of the surroundings and maintain safe work practices in accordance with Shannon & Wilson's Corporate Health & Safety Plan.

B.2. PERSONAL RESPONSIBILITIES, TRAINING, AND MEDICAL SURVEILLANCE

Below is a summary of the assignment of responsibilities, training requirements, and medical surveillance information for Shannon & Wilson personnel.

B.2.1 Assignment of Responsibilities

Shannon & Wilson is 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.

B.2.2 Personal 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.

B.2.3 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).

B.3. 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;
- hearing protection;
- gloves; and,
- hard hat.

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

B.4. DECONTAMINATION PROCEDURES

Equipment decontamination procedures are necessary for any reusable equipment that comes into contact with contaminated soil and/or water. Decontamination procedures will consist of a rinse with non-phosphate-based detergent, a second rinse with plain tap water, and a final rinse with distilled water. Sampling equipment and PPE that is expendable will be disposed of at the site or in a landfill off-site.

Shannon & Wilson will conduct all site characterization activities in Level D PPE. Personnel decontamination will consist of the following:

- At the conclusion of site work each day, disposable PPE (likely limited to nitrile gloves) will be placed in trash bags for off-site disposal.
- Employees will wash their hands and face with soap and water before eating, drinking, smoking, or applying cosmetics.

B.5. 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, including first aid booklet;
- portable eye wash;
- clean water in portable containers; and
- other decontamination supplies.

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 Shannon & Wilson's corporate Medcor service (1-800-775-5866). More serious injuries will require assistance from the medical staff at the Gustavus Clinic, located at 42 Dolly Varden Road in Gustavus, Alaska. The telephone number for the Gustavus Clinic is (907) 697-3008. Field phones will be kept easily accessible in the case of an emergency.

Exhibit B-1: Map Showing Gustavus Clinic.



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.

B.6. GENERAL SITE SAFETY REQUIREMENTS

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

- 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.
- The use of contact lenses is prohibited; soft lenses may absorb irritants, and all lenses concentrate irritants.

- Equipment contacting potentially contaminated soil or water 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.

B.7. COVID SPECIFIC REQUIREMENTS

Shannon & Wilson has produced guidance documents for conducting field work during the outbreak of the coronavirus disease (COVID-19). These guidance documents are included as an attachment to this appendix. Additionally, DOT&PF has provided guidance to their contractors for work conducted for the State of Alaska during the COVID-19 outbreak. This information is located at the following link: <http://dot.alaska.gov/2020>.

SITE SAFETY AND HEALTH PLAN PERSONAL ACKNOWLEDGEMENT FORM

DOT&PF STATEWIDE GENERAL WORK PLAN
ADDENDUM 002-GST-00: GUSTAVUS WELL MONITORING

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

GUIDANCE FOR FIELD WORK DURING THE COVID-19 PANDEMIC

The purpose of this document is to provide guidance to individuals conducting field work during the outbreak of the coronavirus disease (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 project managers (PM)s and staff shall stay informed with local, state and federal agencies regarding the rapidly changing COVID-19 health mandates, and screening protocols. Field personnel shall adhere to the guidelines provided by the Center for Disease Control (CDC). 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 the chest,
- New 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 are ill.

The following practices should be followed as applicable:

- Travel to and from the work site in separate vehicles.
- Wipe down surfaces with sanitizing wipes prior to touching them.
- Maintain a social distance of 6 feet apart, if possible. When not possible, wear a mask. Acceptable masks include manufactured particulate masks, hand-sewn ("homemade") cloth masks, or other styles that cover the wearer's mouth and nose.



- Air purifying respirators with HEPA filter cartridges may be used if the employee has received medical clearance to do so and uses a properly fitted respirator.
- Avoid touching face, especially mouth, nose and eyes.
- Cover sneezes or coughs.
- Assign separate tasks to avoid sharing tools.
- Wash hands with soap and water for at least 20 seconds, when possible.
- Use hand sanitizer with at least 60% alcohol when soap and water are not available.
- Wear disposable gloves, and dispose of them in a trash receptacle after use.
- Stay informed, monitor local conditions, and stay up to date on policy changes enacted by the local, state and federal government.

Additional Information

Additional information regarding what to do if you are experiencing symptoms you suspect are related to COVID-19 can be found on the following websites:

<https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/index.html>

Alaska Department of Health and Social Services COVID-19 website:

<http://dhss.alaska.gov/dph/Epi/id/Pages/COVID-19/default.aspx>.

Alaska Office of the Governor website: <https://gov.alaska.gov/>.

For current information related to COVID-19 in Alaska you can dial 211 or 1-800-478-2221 from 7am to 8 pm 7 days a week.



PROPER DISINFECTION OF VEHICLES, SHARED EQUIPMENT, AND COMMON SURFACES

- Create a cleaning/disinfecting plan including:
 - What is being cleaned;
 - When cleaning is to occur;
 - Who is responsible for cleaning what; and
 - How to do it.
- Cleaning (dirt and dust removal by wiping or vacuuming) followed by disinfection must always be performed before and after each day and again if there are known or suspected infectious materials, such as if an employee has a highly contagious infection (e.g. COVID-19). All surfaces must be coated with a disinfectant product, remain wet for at least 5 minutes and allowed to air dry.



Disinfection is to be done using cleaning wipes, spray, or fresh bleach solution. All surfaces must be coated with the product and allowed to air dry. Bleach solution is made by combining ¼ cup bleach with 1 ¼ gallons of water (<https://www.cdc.gov/disasters/bleach.html>). Any solution less than 10% may not be an effective disinfectant.

Bleach solutions must be freshly made immediately prior to decontamination and must be discarded after use. Solutions older than 24 hours may not be effective.

<https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>

- Assign one individual to clean each piece of equipment (or a defined set of pieces) upon arrival each day and on a regular basis during the day, including sinks, copiers, tables, interior and exterior door handles, door-push panels, coffee pots, microwave control panel and door, refrigerator handle, light switches, etc.

- Post signs in common areas reminding everyone to keep them clean.
- Truck users should be responsible for cleaning trucks before and after each day.
- Stock trucks with gloves, wipes, sanitizer, and disinfectant spray.
- Use wipes for localized surficial cleaning while in transit, such as after getting gas or food.
- Consider purchasing redundant pieces of equipment that might limit shared usage (field tools, common-area tools such as staplers, etc.).
- Please reference the *COVID-19 Best Practice Guidelines* for site-specific health & safety plans. The language for both these forms should be added to the JHA section of your SSHSP. Instruct all field staff and/or subcontractors to review at the beginning of each shift.

COVID-19 compared to other common conditions

SYMPTOM	COVID-19	COMMON COLD	FLU	ALLERGIES
Fever	Common	Rare	Common	Sometimes
Dry cough	Common	Mild	Common	Sometimes
Shortness of breath	Common	No	No	Common
Headaches	Sometimes	Rare	Common	Sometimes
Aches and pains	Sometimes	Common	Common	No
Sore throat	Sometimes	Common	Common	No
Fatigue	Sometimes	Sometimes	Common	Sometimes
Diarrhea	Rare	No	Sometimes*	No
Runny nose	Rare	Common	Sometimes	Common
Sneezing	No	Common	No	Common

*Sometimes for children

Sources: CDC, WHO, American College of Allergy, Asthma and Immunology

BUSINESS INSIDER

GUIDANCE FOR RESIDENTIAL WATER SAMPLING DURING THE COVID-19 PANDEMIC

This document provides guidance to Shannon & Wilson, Inc. employees conducting residential water sampling during the outbreak of the coronavirus disease (COVID-19). COVID-19 is a respiratory illness primarily spread by person-to-person contact and airborne particulate matter. Residential sampling requires special considerations due to the nature of the work, where Shannon & Wilson sampling staff enter people's properties and homes in order to collect a water sample. During these sampling events, staff may enter a property owner's or occupant's self-isolation area and may be in close proximity to those persons. In order to slow the spread of COVID-19, Shannon & Wilson has implemented practices to protect both staff and the resident. Shannon & Wilson project managers (PMs) and staff shall stay informed with local, state and federal COVID-19 health mandates as well as client-specified requirements and guidelines. Shannon & Wilson field personnel shall adhere to these guidelines.

Shannon & Wilson project staff will work closely with our clients prior to the planned sampling event to determine if a project should be considered essential work. For field work where travel to communities other than Fairbanks occurs, PMs and project staff will check for local health mandates or recommendations to ensure the community is open to outside essential-business travel before scheduling the sampling event. PMs and staff should also verify the availability of, and additional precautions required by, hotels and other businesses we may rely on during our travels (i.e. restaurants, grocery stores, car rental facilities, hardware stores, etc.).

Prior to scheduling travel, PMs or field staff will contact local government or tribal leadership to assist in determining whether members of the community would be willing to allow staff into their homes to collect samples during this time. Shannon & Wilson staff will not travel to rural communities until we receive permission from the local and/or tribal government. PMs will document the permission and save to the project file.

Where possible, staff will contact individual residents prior to the planned sampling event to determine if they are agreeable to staff entering their premises during the COVID-19 outbreak. Staff are not permitted to collect samples where either the owner or occupant refuses access. During the initial conversation, staff will ask a series of questions to determine if the environment is safe for our staff to enter. Where contact information is not available, staff will publicize the sampling event prior to arrival using available avenues.



Notification tools may include public notices, radio and other news outlets, email list serves, social media posts, and speaking with key community members.

Below is a list of questions staff will ask residents during the initial scheduling of the sampling appointment, and prior to entering the premises.

- Are you feeling sick?
- Has anyone in the household or recent guests experienced symptoms of COVID-19?
- Has anyone in the household or recent guests traveled outside of Alaska within the last 14 days, or are fulfilling a mandated quarantine?
- Have you been in contact with anyone who has been diagnosed with COVID-19 or experiencing symptoms of COVID-19 within the last 14 days?

If the answer is “yes” to any of these questions, sampling at that residence will not occur inside the home. If sampling is to occur on that day, it must be conducted from an outside spigot. If an outside spigot is not available for sampling, a sample will not be collected at that time. Sampling may also occur after a 14-day period has passed and the answer to the questions are no longer “yes”.

While in the community, staff will minimize our exposure and contact, limiting activities to essential business and the outdoors. As a result, we will not hold or join public meetings.

Below are guidelines for traveling to other communities and sampling residential water wells.

- Follow Shannon & Wilson’s *COVID-19 Best Practices and Guidelines and Proper Disinfection of Vehicles, Shared Equipment, and Common Surfaces* plans.
- Follow local, state, federal and client COVID-19 screening guidelines prior to traveling. DO NOT travel if you don’t meet the screening criteria.
- Follow airline-specified requirements for travel.
- While in the field, check body temperature daily before reporting to work. If you have an elevated temperature (greater than 100.4 °F), contact your supervisor or project PM immediately.
- Do not enter occupant property without consent. Let occupant know it is ok to not give permission.



- Wear mask or cloth covering at all times while on occupants' premises and during travel. The sampler will also have a respirator available to wear and use their discretion on when to use it, such as if they are indoors for five minutes or more with someone not wearing a face covering. Prior to wearing the respirator inside the building, the sampler will explain this option to the resident to ease potential fears.
- Cold knocking may be necessary (i.e., initial well searches, no contact information for new occupants, etc.), and require our staff to visit a property without the occupants prior knowledge. Staff will knock on the door, and then back up a minimum of 6 feet from the door. Staff will be wearing a mask and gloves to knock on doors.
- Initial conversations are to be held outside. During this time the sampler will discuss safety for both occupant and sampler. Ask where the nearest sampling point is and explain that for everyone's well-being it is best staff only go a necessary minimal distance into the home.
- The sampler will purge well and sample from an outside spigot, where possible. Inside samples should only be collected where an outside spigot is not available. Field staff will minimize their time spent indoors.
- Request the occupant wear a mask while staff is on the premises. If the occupant refuses, the continuation for sampling at that residence will be at the discretion of the sampling staff. It is likely our staff will not collect a sample in these situations. Staff will arrive at the site with individually pre-packaged masks for residents to wear if they do not already have one.
- Wear nitrile gloves at all times while on the premises. A new pair of gloves should be put on prior to initiating any contact with a residence.
- Ask that occupants stay at least 6 feet away at a minimum. If a resident does not maintain 6 feet distance, our staff have the discretion to leave the premises and not collect a sample at that time.
- Avoid any person to person contact and maintain 6 feet distance from people.
- Ask residents the questions on the questionnaire, don't pass them the paper and ask them fill it out. Staff will not share pens or pass paperwork back and forth during the appointment. However, we will provide copies of paper documents to residents for their reference, where necessary (fact sheets, project contact information, etc.). We will not accept back any paperwork once it has been handled by a resident.



- Wipe down surfaces with a disinfectant prior to and after touching them.
- Only take minimum required sampling equipment into the residence. This will reduce the amount of equipment required to be disinfected and disinfectant supplies.
- Disinfect equipment between residences.
- Don't throw nitrile glove or other refuse in the resident's trash. Keep a closed trash collection point with the sampling equipment and regularly dispose of contents at an approved site such as a dumpster or landfill.

This document is supplemental to our site specific health and safety plan (SSHSP). The guidelines and emergency response plan in the SSHSP should be followed as well as the guidelines outlined in this document.

Additional Information

Additional information regarding what to do if you are experiencing symptoms you suspect are related to COVID-19 can be found on the following websites:

<https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/index.html>

Alaska Department of Health and Social Services COVID-19 website:

<http://dhss.alaska.gov/dph/Epi/id/Pages/COVID-19/default.aspx>.

Alaska Office of the Governor website: <https://gov.alaska.gov/>.

Current information related to COVID-19 in Alaska is available by phone at 211 or 1-800-478-2221 from 7am to 8 pm 7 days a week.

Appendix C

GAC Manufacturer's Specifications

APPENDIX C: GAC MANUFACTURER'S SPECIFICATIONS

OXPURE 1230C-AW

OxPure 1230C-AW is a virgin granular activated carbon produced from coconut shell char through a high temperature steam activation process under stringent quality control. It has a large surface area, high mechanical hardness, excellent pore volume and chemical stability that make it ideal for many liquid phase applications. Finally, the product is acid-washed to reduce ash and enhance purity.

Meets or exceeds all US Food Chemical CODEX standards. ANSI / NSF certified and California Prop 65 compliant available upon request.

SPECIFICATIONS

US Standard Sieve Mesh Size:	12x30 (1.70 mm – 0.60 mm)
> 12 mesh (1.70 mm), %	5 maximum
< 30 mesh (0.60mm), %	5 maximum
Iodine Number (mg/g)	1100 minimum
Carbon Tetrachloride Activity, %	60 minimum
Hardness Number, (Ball-Pan)	98 minimum
Moisture (as packed), %	5 maximum
Total Ash, %	1 maximum

TYPICAL PROPERTIES

Apparent density, (g/cc)	0.50
BET Surface Area, (m ² /g)	1100
pH	7

Standard packing is 25kg (55-lb.) bags or 500kg (1100-lb.) bulk sacks.
 All test methods are ASTM procedures where applicable.

This information has been gathered from standard reference materials and/or test data that are assumed to be accurate and reliable. Oxbow Activated Carbon LLC makes no warranties or representations with respect to this product except as may be set forth in purchase and sale documentation relating to this product. Oxbow Activated Carbon LLC makes no other warranties of any kind, either expressed or implied, in connection with this product, including but not limited to any warranty of merchantability or fitness for a particular purpose or application. Buyer assumes all liability and risk that may arise from the use of this product.

Oxbow Activated Carbon LLC reserves the right to modify product properties without prior notification.



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Important Information

About Your Geotechnical/Environmental Report

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.

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 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

IMPORTANT INFORMATION