

# 2023 Updated Site Characterization Report for PFAS - Revision 1

Former North Pole Refinery  
North Pole, AK

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## ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
bgs	below ground surface
CSM	Conceptual Site Model
DMPDB	dual membrane passive diffusion sampler
FHRA	Flint Hills Resources Alaska
FTA	Fire Training Area
IDW	investigation derived waste
Integral	Integral Consulting Inc.
LCS	laboratory control sample
MGW	migration to ground water
MRL	method reporting limit
MS/MSD	matrix spike and matrix spike duplicate
PARCC	precision, accuracy, representativeness, completeness, comparability
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanoic sulfonate
RPD	relative percent difference
SCR	Site Characterization Report
SGS Orlando	SGS North America Inc facility in Orlando, FL
TWP	temporary well point
Williams	Williams Alaska Petroleum

## EXECUTIVE SUMMARY

On behalf of Williams Alaska Petroleum (Williams), Integral Consulting Inc. (Integral) has prepared this updated site characterization report (SCR) for the former Flint Hills Resources Alaska (FHRA) North Pole Refinery, located on H and H Lane in North Pole, Alaska (Site; Figure 1). This SCR is intended to describe the results of work outlined in the site characterization submittals provided for the Site in 2021 and 2022 for investigation of per- and polyfluoroalkyl substances (PFAS) in soil, groundwater, surface water, and sediment.

The investigations described herein were completed during the 2022 field season. Soil samples were collected from a total of 40 soil boring locations at three discrete depths between ground surface and the water table. Eleven of the soil boring locations were converted to temporary well points and a groundwater grab sample collected; two of the soil boring locations were converted to permanent monitoring wells along the southern property boundary. These monitoring wells as well as nine additional onsite monitoring wells were sampled for PFAS. A preliminary ecological investigation was completed including surface water and sediment sampling as well as fish capture and release activities.

The investigation activities described herein have identified concentrations of perfluorooctanoic acid (PFOA) and perfluorooctanoic sulfonate (PFOS) exceeding the Migration to Groundwater Soil Cleanup Levels (0.0014 mg/kg for PFOA and 0.003 mg/kg for PFOS) and/or the groundwater Clean Up Levels (0.4 µg/L for PFOA and 0.4 µg/L for PFOS) near the following Site features: the firehouse, the former sulfolane extraction unit, the former crude units 1 and 2, the area east of CA5A/CA5B, and Lagoons B and C.

Proposed activities to be completed as a result of the characterization activities described herein include the following:

- Additional soil delineation in the areas exhibiting the highest soil PFOA and PFOS concentrations consisting of approximately 17 soil borings.
- Document review surrounding historic remedial activities near the Fire Training Area.
- Surface soil sampling to support the ecological conceptual site model from approximately 37 locations in a randomized grid pattern.
- Preliminary alternatives analysis to identify potential future remedial actions to address PFOA and PFOS.

# 1 INTRODUCTION

On behalf of Williams Alaska Petroleum (Williams), Integral Consulting Inc. (Integral) has prepared this updated groundwater and surface water site characterization report (SCR) for the former Flint Hills Resources Alaska (FHRA) North Pole Refinery, located on H and H Lane in North Pole, Alaska (Site; Figure 1). This SCR is intended to describe the results of work outlined in the following site characterization submittals provided for the Site:

- Site Characterization Report – Groundwater dated August 25, 2021 (2021 SCR; Integral 2021)
- Work Plan Technical Memorandum Addendum – Groundwater dated May 4, 2022 (Integral 2022a)
- Work Plan Technical Memorandum Addendum Rev. 1 – Groundwater dated July 27, 2022 (Integral 2022b)

Field activities described herein were completed by Shannon & Wilson in October and November 2022, by qualified persons as defined by 18 Alaska Administrative Code (AAC) 75.990. This included the following:

- Installation of soil borings, temporary well points, and permanent monitoring wells at the Site. Soil collection for analysis of per- and polyfluoroalkyl substances (PFAS).
- Groundwater sample collection from temporary and permanent monitoring wells for PFAS analysis.
- Surface water and sediment sample collection from the Site ponds (North Gravel Pit and South Gravel Pit).
- Fish capture and release within the Site ponds.

The objectives of this investigation were to determine the nature and extent of PFAS at the Site, with a particular focus on PFOS and PFOA.



## 2 FOCUSED SITE CHARACTERIZATION

The following sections describe field mobilization activities completed as proposed in the 2021 SCR and associated addendum technical deliverables. Sampling locations were chosen based on current and historic features at the Site previously discussed in the 2021 SCR and associated Addendum documents (Figure 2).

### 2.1 SOIL CHARACTERIZATION

Soil characterization activities were completed at the Site between October 10 and 20, 2022 to further characterize areas surrounding monitoring wells with reported concentrations of perfluorooctanoic acid (PFOA) and perfluorooctanoic sulfonate (PFOS) during the 2020 groundwater investigation. A total of 40 soil borings (NPT22-SB01 through NPT22-SB40) were advanced at the Site as presented on Figure 3.

Soil sampling locations were pre-cleared with a vacuum truck in accordance with facility requirements. Borings were advanced to the water table, total depths generally ranged between 10 and 15 ft below ground surface (bgs). One soil boring location, NPT22-SB07, was collected from within Lagoon B and encountered groundwater at 3.5 ft bgs. Soil boring location NPT22-SB21 encountered refusal due to concrete slab at 2.2 ft bgs. Boring logs, which include soil recovery, lithology, and color, were recorded at each location. Logs are included as Appendix A.

Soil samples were collected from the surface (0–6-in. interval) to assess for surface discharges and/or surface runoff, one from the 6-in. interval corresponding to the midpoint of the soil boring, and one from the 6-in. interval above the seasonal water table observed at the time of sampling. A total of 120 soil samples were collected, and 12 duplicate samples were analyzed for QA/QC. Samples were submitted to the SGS North America Inc facility in Orlando, FL (SGS Orlando) for PFAS analysis.

### 2.2 GROUNDWATER EVALUATION

Groundwater investigation activities included temporary well point (TWP) installation and collection, permanent monitoring well installation, and groundwater sampling activities. The temporary well point investigation occurred in conjunction with soil investigation activities described in Section 2.1. Eleven of the soil boring locations (NPT22-SB13, NPT22-SB15, NPT22-SB23, NPT22-SB27, NPT22-SB28, NPT22-SB29, NPT22-SB30, NPT22-SB32, NPT22-SB33, and NPT22-SB40) were converted to TWPs (Figure 3). Three well volumes were purged from each TWP using a peristaltic pump, and then a sample was collected for PFAS analysis. Samples collected from TWPs were named based on their associated soil boring location. For example,

the soil samples collected from NPT22-SB13 were named NPT22-SB13-1, -2, and -3 to demonstrate depth intervals. The groundwater sample collected from this location was named NPT22-TWP13. Groundwater sampling logs are included as Appendix B.

Following the temporary well point investigation, two new monitoring wells, MW22-374-15 and MW22-375-15 were installed in October 2022 at former soil boring locations NPT22-SB38 and NPT22-39, respectively. This is a minor deviation from the previously proposed work plan which showed permanent monitoring well locations would be located at former soil boring locations NPT22-SB38 and NPT22-SB40. Well construction included 2-in. diameter PVC with 10-ft of 0.010-slot screen, and wells were set at 17.49-ft bgs (MW22-374-15) and 15.32-ft bgs (MW22-375-15). Permafrost was not encountered at either location. Groundwater was measured at approximately 8-ft bgs. The new permanent wells as well as other monitoring wells included in this investigation were surveyed in November 2022 by a licensed surveyor. The survey is included as Appendix C.

Groundwater samples were collected from the following onsite monitoring wells on October 25-27<sup>th</sup>, 2022: MW-116-15, MW-138-20, MW-179A-15, MW-337-20, MW-348-15, MW22-374-15, MW22-375-15, O-1, and O-20. Monitoring well location O-21 was also proposed for sampling, but it was not able to be located by field personnel and likely requires future repair. A sample was not collected from this location. Duplicate groundwater samples were collected from location O-1 and MW-359-80 for QA/QC, and all samples were analyzed for PFAS. Groundwater sampling logs are included as Appendix B.

Dual Membrane Passive Diffusion Samplers (DMPDBs) were deployed on October 27, 2022 and collected November 18<sup>th</sup> and 21<sup>st</sup>, 2022 from the following well locations: O-1, MW-179A-15, MW-358-20, MW-360-35, and MW-364-30. A discussion of the DMPDB pilot study is included in Appendix D.

In addition to collection of samples for PFAS analysis, a gauging event was completed for the monitoring wells sampled as part of this characterization event. A table of groundwater elevation measurements is included as Appendix E.

## **2.3 NORTH AND SOUTH GRAVEL PIT CHARACTERIZATION**

Sediment and surface water samples were collected from the North Gravel Pit and South Gravel Pit in September 2022 (Figure 4). Shannon & Wilson's subcontractor, Wilderness Fishing, LLC, assisted with the boat work. Surface water sample depths included one sample from the surface, one at a mid-depth, and from the interval directly above the base of the pond. In conjunction with the surface water and sediment sampling, initial assessments consisting of fish capture and release were completed using baited minnow traps to determine whether resident fish are present in each pond.

The North Gravel Pit is reportedly an unlined water feature as per Marathon personnel. Measured pond depths in the North Gravel pit ranged from 7.9 to 33.7 ft below surface. Investigation completed within the North Gravel Pit include collection of six sediment samples (NGP-SED01 through NGP-SED06) and three surface water samples at each SED location. Four minnow traps (NGP Fish Trap 1 through NGP Fish Trap 4) were set within the North Gravel pit, and angling was completed at three locations. Longnosed suckers and lake chubs were collected in the minnow traps, and waterfowl and diving beetles were also observed.

The South Gravel Pit is reported as lined with an unknown liner, and depths within the pond ranged from 13 to 15 ft below surface except for a shallow area near the center where the water is only approximately 2 ft. deep. Two sediment samples and co-located surface water samples were collected from the South Gravel Pit (SGP-SED01 and SGP-SED02). Additionally, a third surface water sample (SGP-SW09) was collected from within the South Gravel Pit. Four minnow traps (SGP Fish Trap 1 through SGP Fish Trap 3) were set within the South Gravel Pit, but no fish were captured within the traps. Diving beetles were identified in the South Gravel Pit; no waterfowl were observed.

Surface water and sediment samples were submitted to the SGS Orlando for PFAS analysis. One field duplicate (NGP-SED103) was collected for sediment and three surface water sample duplicates were collected (NGP-SW105, NGP-SW114, SGP-SW109) for analysis. Gravel pit investigation field logs are included as Appendix B.

## **2.4 IDW DISPOSAL**

Investigation derived waste (IDW) resulting from soil and groundwater characterization activities were containerized in 55-gallon steel drums for disposal. Total waste included 16 drums of soil from soil boring activities, 18 drums of decontamination water from drilling activities, and a 300-gallon tote of purge water from monitoring well sampling. US Ecology Alaska, LLC brought the material offsite on January 26, 2023. Disposal documentation and the Contaminated Media Transport and Treatment or Disposal Approval Forms are provided in Appendix F.

### 3 RESULTS AND FINDINGS

#### 3.1 SOIL RESULTS

Soil samples collected in October 2022 were compared to Alaska Department of Environmental Conservation (ADEC) Soil Cleanup Levels as per 18 AAC 75.341 (Table 1). PFOA and PFOS were not detected in any soil samples at concentrations exceeding the applicable Soil Cleanup Level for Under 40 Inch Zone (1.6 mg/kg for PFOA and 1.6 mg/kg for PFOS), but there are some exceedances of the Migration to Groundwater Soil Cleanup Levels (0.0014 mg/kg for PFOA and 0.003 mg/kg for PFOS).

A total of 43 samples (including 2 duplicates) were collected from the surface depth range, 48 samples (including 7 duplicates) were collected from the mid depth range, and 38 samples (including 3 duplicates) were collected from the interval directly above the water table. For the exhibit below, when duplicates were collected, only the higher reported result of the parent and duplicate samples is included in the analysis. A summary of the results of soil sampling are as follows:

Exhibit 1. Soil Results

Analyte	Depth Range	Max Detection (mg/kg)	Max Sample ID	Min Detection (mg/kg)	Min Sample ID	# Non-detects	Exceedances of MGW Standard
PFOA	Shallow	0.0013	NPT22-SB14-1	0.00031 J	NPT22-SB41-1	36	0
PFOS		0.0558	NPT22-SB13-1	0.00029 J	NPT22-SB29-1	21	8
PFOA	Mid	0.0054	NPT22-SB03-2	0.00032 J	NPT22-SB33-102	28	3
PFOS		0.798	NPT22-SB13-2	0.00022 J	NPT22-SB32-2	14	8
PFOA	Directly above WT	0.0195	NPT22-SB19-3	0.00033 J	NPT22-SB01-3	27	2
PFOS		0.486	NPT22-SB13-3	0.00023 J	NPT22-SB29-4	14	6

The “J” qualifier in the table above signifies that the result is an estimated value, and “WT” is defined as water table.

Sample results are presented on Figures 5 through 7. Site features referenced herein are presented on Figure 2. The highest concentrations of PFOA were detected to the east of CA5A/CA5B in the deepest sampling interval. Other areas with elevated PFOA concentrations in soil include the firehouse and directly to the west-northwest of Lagoon C. The highest PFOS concentrations in soil were collected from the area directly adjacent to the firehouse in the midpoint interval. Areas of interest with elevated concentrations of PFOS include the footprint of the former sulfolane extraction unit, the former crude units 1 and 2, the area east of CA5A/CA5B, and soils surrounding Lagoons B and C (low level exceedances).

Laboratory analytical data packages are included as Appendix G.

### 3.2 GROUNDWATER RESULTS

Groundwater samples were collected from TWPs and nine permanent monitoring wells by qualified field personnel. As noted in Section 2.2, samples collected from TWPs were named based on their associated soil boring location. For example, the groundwater sample collected from NPT22-SB13 was named NPT22-TWP13.

A total of 11 groundwater grab samples (including one duplicate) were collected from the TWPs, and 16 groundwater samples (including one duplicate) were collected from the permanent monitoring wells (Tables 2 and 3). An additional five groundwater samples were collected using DMPDBs, as reflected on Table 3. Sample results were compared to ADEC’s Cleanup Levels of 0.4 µg/L for PFOA and 0.4 µg/L for PFOS as per 18 AAC 75.345. For the exhibit below, when duplicates were collected, only the higher reported result of the parent and duplicate samples is included in the analysis. A summary of the results of groundwater sampling are as follows:

Exhibit 2. Temporary Well Point Results

Analyte	Max Detection (µg/L)	Max Sample ID	Min Detection (µg/L)	Min Sample ID	# Non-detects	Exceedances of Cleanup Standard
PFOA	7.15 J	NPT22-TWP13	0.012	NPT22-TWP40	0	3
PFOS	399 J	NPT22-TWP13	0.0078	NPT22-TWP40	0	5

Exhibit 3. Monitoring Well Results

Analyte	Max Detection (µg/L)	Max Sample ID	Min Detection (µg/L)	Min Sample ID	# Non-detects	Exceedances of Cleanup Standard
PFOA	0.93	MW-116-15	0.0033	MW22-375-15	0	1
PFOS	9.81	MW-116-15	0.0042	MW22-375-15	0	5

The samples collected from the DMPDBs are not included in the summary exhibits and are further discussed in Appendix D. The “J” qualifier in the table above signifies that the result is an estimated value. Groundwater results are presented on Figure 8. PFOA was detected at concentrations exceeding the Alaska cleanup standard of 0.4 µg/L near the firehouse in the TWP samples and in monitoring well MW-116-15 directly adjacent to the footprint of former crude unit 1. PFOS was detected at a concentration exceeding the Alaska cleanup standard of 0.4 µg/L in NPT22-TWP23 adjacent to former crude unit 2.

The highest PFOS concentrations in groundwater at the Site were observed in the TWP samples located near the firehouse. Additionally, elevated concentrations of PFOS were observed in TWP samples collected near the former sulfolane extraction unit and former truck loading area. Monitoring well results downgradient of the former sulfolane extraction unit and crude unit 2

reported concentrations exceeding the applicable cleanup standard as well as the sample collected from MW-116-15 adjacent to the footprint of crude unit 1.

Six property boundary monitoring wells were sampled in both 2020 and 2022 for PFAS: MW-358-20, MW-358-60, MW-359-35, MW-359-80, MW-360-35, and MW-364-30.

Exhibit 4. Results Comparison

	2020 Result			2022 Result		
	PFOA (µg/L)	PFOS (µg/L)	Sum PFOA/OS	PFOA (µg/L)	PFOS (µg/L)	Sum PFOA/OS
MW-358-20	0.063	0.123	0.186	0.0645	0.149	0.2135
MW-358-60	0.0201	0.0493	0.0694	0.02	0.0578	0.0778
MW-359-35	0.0735	0.138	0.2115	0.088	0.228	0.316
MW-359-80	0.0136	0.0395	0.0531	0.0076	0.0232	0.0308
MW-360-35	0.0376	0.0684	0.106	0.0364	0.0848	0.1212
MW-364-30	0.0177	0.0321	0.0498	0.0143	0.0358	0.0501

A discernable trend cannot be identified based on two data points, but all reported concentrations remained below ADEC’s Cleanup Levels (0.4 µg/L for PFOA and 0.4 µg/L for PFOS) in both 2020 and 2022. These monitoring wells are targeted for sampling in 2024 as discussed in Section 5 below, and additional data will be used to confirm that no groundwater exhibiting exceedances of the Cleanup Levels migrates offsite.

Laboratory analytical data packages are included as Appendix G.

### 3.3 GRAVEL PIT RESULTS

Surface water samples collected in September 2022 are presented on Table 4 and Figure 9. There are no promulgated standards for surface water, but results for PFOA and PFOS are as follows:

- Within the North Gravel Pit, concentrations of PFOA ranged between 0.0208 µg/L (NGP-SW01) and 0.0256 µg/L (NGP-SW11), and PFOS results ranged between 0.0461 µg/L (NGP-SW01) and 0.079 µg/L (NGP-SW05).
- Within the South Gravel Pit, PFOA concentrations range between 0.034 µg/L (SGP-SW04) and 0.0439 µg/L (SGP-SW09). PFOS concentrations ranged between 0.0245 µg/L (SGP-SW04) and 0.0348 µg/L (SGP-SW09).

Sediment samples collected in September 2022 are presented on Table 5 and Figure 9. There are no promulgated standards for sediment, but results for PFOA and PFOS are as follows:

- Within the North Gravel Pit, PFOA was not detected in all samples with the exception of NPG-SED06 (0.00042 mg/kg, estimated value). PFOS results ranged between 0.0015 mg/kg (NPG-SED06) and 0.0053 mg/kg (NPG-SED05).
- Within the South Gravel Pit, PFOA was not detected in any samples. PFOS concentrations were reported as 0.0024 mg/kg (estimated value, SGP-SED01) and 0.0026 mg/kg (estimated value, SGP-SED02).

Laboratory analytical data packages are included as Appendix G. The results of surface water and sediment sampling have been incorporated into the ecological assessment as described in Section 3.4 below.

### 3.4 ECOLOGICAL ASSESSMENT

Integral, on behalf of Williams, submitted a draft eco conceptual site model (CSM) to ADEC in early 2022. The CSM, which was based on limited site-specific information, underwent two rounds of revisions and refinements based on input provided by ADEC. An updated version of the eco CSM is included as Appendix H to this report. It was adjusted based on the 2022 analytical data and the biological observations from the two gravel pits.

The key findings are as follows:

- The sediment and surface water samples collected from each gravel pit shows low concentrations of PFOA and PFOS.
- A viable fish community was identified in the North Gravel Pit. No fish were found in the South Gravel Pit.
- Both pits support populations of diving beetles.

These findings confirm that North Gravel Pit is a fully functional aquatic habitat supporting community-level receptor groups consisting of fish and water column invertebrates. This pit can also provide forage to piscivorous, benthivorous, and herbivorous wildlife receptors (note: Integral assumes that the pit supports a functional benthic invertebrate community). Therefore, the CSM for North Gravel Pit remains unchanged from the previous version.

The presence of water column invertebrates, but absence of fish, in South Gravel Pit removes piscivorous wildlife from further consideration. However, this pit can provide forage to benthivorous and herbivorous wildlife receptors (note: Integral assumes that the pit supports a functional benthic invertebrate community). The CSM for South Gravel Pit was updated to reflect this new information.

## 4 QUALITY ASSURANCE ASSESSMENT

The following sections provide an assessment of Quality Assurance for the samples collected as part of this investigation. For additional information, a data validation report is included as Appendix I, and the Laboratory Data Review Checklist is included as Appendix J. A summary of equipment blanks completed with the sample events discussed above are presented on Table 6.

### 4.1 DATA USABILITY EVALUATION

Measurement quality objectives evaluate and control the data-collection process to ensure that measurement uncertainty is within an acceptable range to meet the project data quality objectives. Measurement quality objectives define the acceptable quality of field and laboratory data for the project in terms of data quality indicators, such as the precision, accuracy, representativeness, completeness, comparability (PARCC) parameters (USEPA 2002). These parameters, as well as analytical sensitivity (i.e., detectability), were used to assess conformance of the soil, sediment, groundwater, and surface water data with quality control criteria, as detailed below.

### 4.2 DATA VALIDATION APPROACH

The groundwater and surface water data received 100 percent Stage 2A validation, which included a review of all laboratory summary forms of quality control. The data validation was based upon criteria described in EPA's functional guidelines for organic data review (USEPA 2017) and the referenced analytical method.

Data that did not meet the applicable laboratory or data validation quality control limits were qualified as estimated (assigned a "J" or "UJ" qualifier) during the quality assurance review.<sup>1</sup> The data validation report (Appendix I) provides a synopsis of the quality control metrics that were evaluated and an overview of the data validation qualifiers that were applied to the sample results.

The analytical laboratory provided the electronic data deliverables in an Integral-specified format. Integral incorporated the PFAS sample results into a custom-developed historical database for the project.

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<sup>1</sup> The complete definitions for the data qualifiers are presented in the data validation report.



### 4.3 PRECISION

Precision reflects the reproducibility between individual measurements of the same location. In this context, field duplicate samples (i.e., multiple samples of the same media) are collected to assess the variability resulting from field conditions and/or sampling technique.

Nineteen sets of field replicates were collected:

- Sample MW-459-80 was the blind field duplicate of Sample MW-359-80
- Sample O-101 was the blind field duplicate of Sample O-1
- Sample NGP-SED103 was the blind field duplicate of Sample NGP-SED03
- Sample NPT22-SB39-102 was the blind field duplicate of Sample NPT22-SB39-2
- Sample NPT22-SB01-101 was the blind field duplicate of Sample NPT22-SB01-1
- Sample NPT22-SB06-101 was the blind field duplicate of Sample NPT22-SB06-1
- Sample NPT22-SB11-103 was the blind field duplicate of Sample NPT22-SB11-3
- Sample NPT22-SB16-103 was the blind field duplicate of Sample NPT22-SB16-3
- Sample NPT22-SB19-102 was the blind field duplicate of Sample NPT22-SB19-2
- Sample NPT22-SB20-102 was the blind field duplicate of Sample NPT22-SB20-2
- Sample NPT22-SB25-102 was the blind field duplicate of Sample NPT22-SB25-2
- Sample NPT22-SB27-103 was the blind field duplicate of Sample NPT22-SB27-3
- Sample NPT22-SB28-102 was the blind field duplicate of Sample NPT22-SB28-2
- Sample NPT22-SB33-102 was the blind field duplicate of Sample NPT22-SB33-2
- Sample NPT22-SB40-102 was the blind field duplicate of Sample NPT22-SB40-2
- Sample NPT22-TWP115 was a blind field duplicate of Sample NPT22-TWP15
- Sample NGP-SW105 was the blind field duplicate of Sample NGP-SW05
- Sample NGP-SW114 was the blind field duplicate of Sample NGP-SW14
- Sample SGP-SW109 was the blind field duplicate of Sample SGP-SW09.

The comparability of the replicate results was assessed for field replicates by calculating the relative percent difference (RPD) of the results, as shown in the equation below:

$$RPD = ABS \left[ \frac{Parent_{chem} - Replicate_{chem}}{(Parent_{chem} + Replicate_{chem})/2} \right]$$

EPA has not established control limits for field replicates. For this project, the target control limit for field replicates is an RPD less than 35 percent for values greater than 5 times the method reporting limit (MRL). For values less than 5 times the MRL, the absolute difference should be less than the MRL. These control limits were met for all analytes in the field duplicates with the following exceptions.

The PFOS, PFUnDA, and PFDA RPD values were greater than the control limits between the field duplicate samples NPT22-SB01-1 and NPT22-SB01-101 and the HFPO-DA (GenX) RPD value was greater than the control limits between field duplicate samples O-1 and O-101. The results for these analytes in the field duplicate pair were qualified as estimated.

The RPDs for laboratory duplicates and matrix spike and matrix spike duplicates (MS/MSD) were evaluated against the laboratory-specified control limits. The PFOS result for Sample NPT22-SB19-2 were estimated (“J or UJ”) due to laboratory duplicate results.

## 4.4 ACCURACY

Accuracy (bias) represents the degree to which a measured concentration conforms to a reference value. Matrix spike samples, laboratory control samples (LCSs), and surrogates were analyzed to assess the data accuracy. These results are discussed below.

### 4.4.1 Matrix Spike Recoveries

The percent recoveries of the matrix spikes were evaluated against the laboratory-specified control limits. Qualifiers were not assigned for percent recoveries outside the control limits when the MS/MSD was performed on a non-project batch quality control sample.

The PFOS result for Sample NPT22-SB14-2 was estimated (“J”) due to the associated MS/MSD results.

### 4.4.2 LCS Recoveries

The percent recoveries of the LCSs were evaluated against the laboratory-specified control limits. None of the results were qualified due to LCS results.

### **4.4.3 Labeled Compounds**

The percent recoveries of the labeled compounds were evaluated against the laboratory-specified control limits. Eighteen results were estimated (“J” or “UJ”) for percent recoveries outside the control limits. None of the results were rejected due to surrogate recovery results.

## **4.5 REPRESENTATIVENESS**

Representativeness is the degree to which data represent a characteristic of an environmental condition and is applicable to the samples collected for chemical analysis. The soil, sediment, groundwater, and surface water samples were collected and processed according to protocols outlined in the Tech Memo (Integral 2020). All samples were properly handled (i.e., proper preservation and shipping temperature) during collection and receipt by the laboratory.

No issues were identified related to the analytical results that may affect the representativeness of these results with the following exceptions.

The laboratory extracted several samples beyond the method-recommended 14-day holding time. A total of 175 results were estimated (“J” or “UJ”). None of the results were rejected due to holding time exceedances.

## **4.6 COMPLETENESS**

Data completeness refers to the amount of usable data collected. No results were rejected and completeness for the data set was 100 percent.

## **4.7 COMPARABILITY**

Comparability is the qualitative similarity of one data set to another (i.e., the extent to which different data sets can be combined for use). To allow for future comparability, the 2022 soil, sediment, groundwater, and surface water samples were analyzed by a standard analytical method; which is listed in the Tech Memo (Integral 2020). These data will be compared to both historical and future soil, sediment, groundwater, and surface water data collected as part of the continuing site characterization for determination of potential remedial actions, if needed.

## **4.8 ADDITIONAL QUALITY CONTROL METRICS**

In addition to the PARCC parameters discussed above, the data validation review included the assessment of the field and laboratory blank contamination. No data were qualified for these parameters.

The percent solids result for two sediment samples were less than 30 percent. A total of 36 results were estimated (“J” or “UJ”) because of the water content in the samples.

The laboratory method detection limits for PFOA and PFOS met the ADEC published action levels discussed in the Tech Memo (Integral 2020). The data are usable for evaluation of PFAS in soil, sediment, groundwater, and surface water.

#### **4.9 DATA USABILITY SUMMARY**

In total, 3,648 data points were validated. Of these, 233 (6.4%) of the data points were qualified as estimated (“J” or “UJ” qualifier) during the data validation process. Overall, the data meet the criteria set forth in the referenced quality assurance documents and all results are acceptable for their intended use.

## 5 CONCLUSIONS AND RECOMMENDATIONS

Following the investigation activities described in this report, the following next steps are proposed:

### **Additional Soil Delineation**

To further characterize the extent of PFAS concentrations and assist in Pre-Remedial Investigation, additional soil investigation activities are proposed in areas exhibiting the highest soil PFOA and PFOS concentrations during 2022 soil investigation activities. The following areas to be further investigated are as follows:

- Storage areas to the northeast of the Former Firehouse: 3 soil borings
- Area surrounding the Former Firehouse: 7 soil borings
- Area downgradient of the Former Firehouse near the rail line: 2 soil borings
- Crude Units #2 and #3/Sulfolane Extraction Unit area: 9 soil borings
- Lagoon B and C area: 8 soil borings
- Upgradient locations near the southern property boundary: 2 soil borings

Soil borings will target the same depth intervals as the 2022 investigation to complete horizontal delineation of previously identified exceedances. In addition, as requested by ADEC, 8 of the soil boring locations will be converted to TWP's to collect groundwater grab samples (Figure 10). Drilling and sample collection techniques and procedures will be the same as those described in the 2021 SCR and Sections 2.1 and 2.2 of this document.

Following completion of field mobilization activities, the findings of this work will be reported to ADEC consistent with AAC 75.335.

### **Document Review: Fire Training Area (FTA)**

Historically, remedial activities have been completed in the area of the former FTA to the south of soil boring locations NPT22-SB01 and NPT22-SB02. Elevated concentrations of PFOA and PFOS in this vicinity suggests that previous excavation and remediation by Flint Hills may not have removed all contamination. A review of historical documents describing activities completed at the FTA will be conducted and additional soil borings added as necessary.

### **Ecological Conceptual Site Model Soil Sampling**

The fall 2022 sampling effort at North Gravel Pit and South Gravel Pit generated a robust surface water and sediment PFAS dataset. These data can be used as a basis for further discussion with ADEC regarding any next steps are necessary. As requested by ADEC, fish

sampling is proposed within the North Gravel Pit as part of future activities to further characterize aquatic habitats.

The lack of PFAS analytical data in surface soil outside of the former production area remains as a data gap. This information is required to determine if PFOA and PFOS are of concern in the terrestrial habitats at the site. Figure 11 presents a proposed approach to select surface soil sampling locations in the vegetated terrestrial areas around the facility for PFAS analyses. Integral identified these locations by overlaying a 400 ft. x 400 ft. grid pattern over the site and using the grid intersections outside of previously sampled terrestrial areas as the sampling locations. This approach yields 37 locations, as follows:

- 13 locations in the northwest quadrant of the site west of the railroad yard,
- 6 locations in the northeast quadrant of the site east of the railroad yard, and
- 18 locations in the southern quadrant of the site west of the former production area.

Collecting surface soil samples from the terrestrial habitats outside of the former production area will provide the analytical data required to form the basis of further discussions with ADEC.

### **Remedial Alternatives Analysis**

Using the data collected in 2022 and historical data, a preliminary alternatives analysis will be prepared that describes remedial alternatives that could be used to address media impacted with PFOA and PFOS. A matrix table will be provided of key information to facilitate the selection of a remedial action and will include a summary of the proposed alternatives, technology effectiveness, major design considerations, and relative costs. It is anticipated that this matrix table will be used as part of discussions with ADEC and Site representatives to determine a final remedy.

### **Groundwater Monitoring**

Offsite groundwater sampling is proposed for 2023 as described in the technical memorandum dated May 31, 2023 and approved by ADEC on June 15, 2023. As requested by ADEC, the following monitoring wells are proposed for sampling as part of the 2024 field season (Figure 12):

- MW-115-15
- MW-116-15
- MW-135-20
- MW-141-20\*
- MW-146A-15
- MW-146B-30\*
- MW-176A-15
- MW-321-15
- MW-334-15
- MW-336-20
- MW-345-15
- MW-358-20\*
- MW-358-60\*
- MW-359-35\*
- MW-359-80\*

- MW-360-35\*
- MW-361-15
- MW-362-35\*
- MW-362-50\*
- MW-364-30\*
- O-10
- O-11
- O-13
- O-17
- O-18
- O-21
- O-27-20
- O-34
- O-36
- S-21 (if available)
- S-22 (if available)
- S-41R (if available)

Locations with an asterisk signify an annual sampling requirement as requested by ADEC. Following completion of the offsite monitoring activities, all PFAS groundwater monitoring data both onsite and offsite will be reviewed and provided to ADEC.

### **Use of DMPDBs for Groundwater Sampling**

When monitoring wells are only to be sampled for PFAS and not additional contaminants of concern, DMPDBs may be used as a viable option rather than traditional low-flow sampling techniques. To continue to better understand DMPDB applicability for other PFAS compounds and as a quality assurance check for groundwater samples, data collection using DMPDBs in both onsite and offsite wells will include a 10% frequency of field replicates.

## 6 REFERENCES

ADEC. 2022. Field Sampling Guidance. Alaska Department of Environmental Conservation, Division of Spill Prevention and Response Contaminated Sites Program. January 2022.

Integral. 2020. Technical memorandum: Onsite groundwater and surface water PFAS characterization workplan, September 2020. Integral Consulting Inc.

Integral. 2021. Site Characterization Report – Groundwater. Former North Pole Refinery, North Pole Alaska, August 2021. Integral Consulting Inc.

Integral. 2022a. Technical memorandum: Work Plan Technical Memorandum Addendum—Groundwater, Williams Alaska Petroleum, Inc., Former North Pole Refinery, North Pole, Alaska, May 2022. Integral Consulting Inc.

Integral. 2022b. Work Plan Technical Memorandum Addendum, Rev. 1—Groundwater, Williams Alaska Petroleum, Inc., Former North Pole Refinery, North Pole, Alaska, July 2022. Integral Consulting Inc.

USEPA. 2002. Guidance on environmental data verification and validation. EPA QA/G-8. Office of Environmental Information. EPA/240/R-02/004. Available from <http://www.epa.gov/QUALITY/qs-docs/g8-final.pdf>. U.S. Environmental Protection Agency. November.

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## MEMORANDUM

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**To:** James Fish, Alaska Department of Environmental Conservation  
**From:** Integral Consulting Inc.  
**Date:** January 5, 2024  
**Subject:** Response to Comment – 2023 Onsite PFAS Assessment Report

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On behalf of Williams Alaska Petroleum, Inc. (Williams), Integral Consulting Inc. (Integral) has prepared this document to reply to the comments provided in the Alaska Department of Environmental Conservation (ADEC) on the 2023 Updated Site Characterization Report for PFAS (“2023 PFAS Report”) dated November 30, 2023. This letter describes the responses to each comment provided by ADEC which will be finalized following the meeting between Williams, ADEC, and their respective environmental consultants on December 14<sup>th</sup>, 2023. Following that meeting, a revision of the 2023 PFAS Report with associated comment matrix identifying the location of changes will be submitted to ADEC prior to January 5, 2024.

For clarity, comments from ADEC are below in bold font with Williams’ response directly below.

**ADEC Comment 1. Nondetects are incorrectly reported in these tables and Figures 5, 6 and 7 to the MDL, rather than the RL. DEC guidance is clear that nondetects should never be reported to the MDL (see ADEC’s August 15, 2022 Technical Memorandum 22-001 Guidelines for Data Reporting, starting near bottom of page 1; <https://dec.alaska.gov/media/25979/guidelines-for-data-reporting.pdf>).**

- Please revise and resubmit Tables 1 through 5; please also address the additional comments regarding the tables provided below.
- Please revise and resubmit the spreadsheet containing the 2022 onsite PFAS data.
- Please revise and resubmit Figures 5, 6, and 7; please also address additional comments provided below.

*Williams Response:* Figures and tables will be updated and resubmitted with the revised report.

**ADEC Comment 2. QC duplicate information provided on the tables and figures is inconsistent between different sampled media. The figures and tables should be revised to present consistent information.**

- **Tables:** The information provided in Table 1 does not match the information shown in Figures 5-7. Soil Table 1 appears to present a single average of the primary and QC duplicate sample results. Averaging primary and QC duplicate results is not appropriate nor consistent with DEC guidance and regulation. A single result should be the higher of the duplicate results, as directed by ADEC's August 15, 2022 Technical Memorandum 22-001 Guidelines for Data Reporting (<https://dec.alaska.gov/media/25979/guidelines-for-data-reporting.pdf>).

Groundwater Tables 2 and 3 present results of primary, QC duplicate, and PDB groundwater samples. Surface water Table 4 and sediment Table 5 present results of primary and QC duplicate samples. Table 1 should be revised to present both primary and QC duplicate soil sample results.

- **Figures:** Soil Figures 5-7 present the results of both the primary and QC duplicate soil samples. Similarly, Figure 8 presents the results of primary, QC duplicate, and PDB groundwater samples. However, Figure 9 presents only a single set of results for the sediment and surface water samples (the single result is an average of the primary and QC duplicate results, which is inappropriate per DEC guidance as discussed further below in Comment # 4). DEC prefers that the figures present only the highest concentration of duplicate results for all media.

The figures and tables should be revised to present consistent information, consistent with DEC guidance.

*Williams Response:* Figures and tables will be updated and resubmitted with the revised report.

**ADEC Comment 3. In addition to the Tables and Figures referenced above in Comment #2, quality control duplicate results presented in Exhibit 1 need to be reviewed and presented correctly as the higher of duplicate results, in accordance with DEC guidance.**

*Williams Response:* Exhibit 1 has been reviewed to confirm that only the higher of duplicate results are reflected in the analysis. Changes to the report will include updates to the table as applicable based on the analysis, updates to the text to cite how many duplicates were collected from each interval, and a sentence added to state that only the higher reported result of the parent and duplicate samples were used in the analysis.

**ADEC Comment 4. Groundwater sample results are not displayed consistently or completely in Exhibits 2 and 3 within the text on page 3-5, Tables 2 and 3, and Figure 8.**

- **Temporary well point sample names are inconsistent. Exhibit 2 and Table 2 reference NPT22-TWP13 whereas Figure 8 uses a label of NPT22-SB13. Consistent sample names should be used, and the TWP terminology clearly references groundwater.**
- **Results for monitoring wells O-1 and O-20 are missing from Table 3.**
- **Results for MW-358-20, MW-358-60, MW-359-35, MW-359-80, MW-360-35, and MW-364-30 are missing from Figure 8.**
- **Figure 8 presents results for project samples, QC duplicates, and PDB samples; however, the QC duplicates and PDB samples are not labeled as such. For example, three results are displayed for sample O-1, but there is no indication of which sample is which.**
- **As discussed above in Comment #2, the highest concentration should be reported on Figure 8 for locations with multiple results.**
- **The text discussion regarding PFOS detections above the cleanup level is incomplete. PFOS was also detected above the cleanup level in samples from NPT22-TWP23 (adjacent to CU2).**

**Exhibits 2 and 3 and Table 3 and Figure 8 should be revised to correct the issues described above and resubmitted.**

*Williams Response:* The text, exhibits, tables, and figures will be revised for clarity. The discussion of groundwater in Sections 2.2 and 3.2 will each have additional text added to explain the naming convention of samples. In addition, the discussion of PFOS detections will be reviewed and updated to reflect all concentrations.

**ADEC Comment 5. As discussed above in Comment #2, Figure 9 appears to present an average of the project sample and QC duplicate results for surface water. Figure 9 should instead present a single result, which should be the higher of the duplicate results, as**

**directed by ADEC's August 15, 2022 Technical Memorandum 22-001 Guidelines for Data Reporting. The text should also be updated to reflect the concentration of 0.079 ug/L for NGP-SW05 and other results reviewed to ensure they are reported correctly.**

Williams Response: Figure 9 will be updated to reflect the correct values, and all sample values in the text will be reviewed and updated if necessary.

**ADEC Comment 6. 10% data review is pending. We may have more data quality comments when the revised report is submitted.**

Williams Response: No response required.

**ADEC Comment 7. Text states that soil boring location NPT22-SB25 was converted to TWPs. However, the figures and tables do not show any groundwater results for this location. Please confirm.**

Williams Response: This was an error in the text. NPT22-SB25 was not converted to a TWP, and only soil samples were collected. The text will be corrected in the updated submittal.

**ADEC Comment 8. Text states that the field crew was unable to locate monitoring well location O-21. However, the surveyors were able to survey O-21. Please add groundwater sampling of O-21 to the follow up work scope for summer 2024.**

Williams Response: Monitoring well O-21 is included in the proposed 2024 groundwater monitoring program. A list of proposed wells to be sampled in 2024 will be added to the revised updated submittal.

**ADEC Comment 9. The property boundary wells are not referenced in this section. Specifically, the analysis discussed in the July 28, 2022, Technical Memorandum Response to ADEC Comments, #5, is not presented in the report: “Analytical results will be compared to the 2020 and historical analytical results to evaluate potential changes to the extent of PFOA + PFOS concentrations at the property boundary over time.”**

*Williams Response:* The revised report submittal will be updated to include a comparison between 2020 and 2022 for the monitoring well locations MW-358-20, MW-358-60, MW-359-35, MW-359-80, MW-360-35, and MW-364-30. It should also be noted that these wells are scheduled for sampling in 2024, so a third data point will be available following the completion of that work.

**ADEC Comment 10. It appears that the list of field replicates is missing NPT22-TWP115, which based on its presentation on Table 2 appears to be a duplicate of NPT22-TWP15.**

*Williams Response:* The report text will be updated to include NPT22-TWP115 in Section 4.3 Precision.

#### **ADEC Comment 11. Conclusions and Recommendations**

- **Additional Soil Delineation** – DEC concurs that additional soil characterization activities are appropriate. See comment #12 for detailed comments.
  - Is summer 2024 the expected timeframe for the additional soil delineation?
- **Document Review: FTA** - DEC concurs with the proposal to review historical documents describing remedial activities in the FTA and to add additional soil borings as necessary. Please note the following:
  - Reporting from the 2015 FTA excavation documents that PFOS and PFOA remained above DEC soil cleanup levels in soil sidewall sample locations at the excavation boundary.
- **Ecological CSM Soil Sampling** – DEC concurs with the soil sampling grid plan (shown on Figure 11) to characterize PFAS in terrestrial habitats at the site.

- **What actions are proposed to further characterize aquatic habitats? DEC requests fish sampling in the North Gravel Pit.**
- **Remedial Alternatives Analysis – DEC concurs with the preliminary alternatives analysis proposal.**
  - **Note that the matrix will need to include interim removal actions intended to clean up known source areas in soil and eliminate or mitigate off-refinery PFAS migration in groundwater.**
- **Groundwater Monitoring – In addition to the 2023 offsite groundwater sampling, DEC requests additional onsite groundwater monitoring in conjunction with the 2024 additional soil characterization activities. (See attached figure).**
  - **Groundwater monitoring should be performed annually in selected property boundary wells to assess PFAS trends and potential changes to the extent of PFOA + PFOS concentrations at the property boundary over time.**
    - **MW-358-20; MW-358-60; MW-359-35; MW-359-80; MW-360-35; and MW-364-30, which were sampled in 2022, should be resampled annually.**
    - **MW-362-35; MW-362-50; MW-141-20; and MW-146B should be also sampled annually to delineate the southwestern extent of PFOS + PFOA > 70 ng/L at the property boundary.**
  - **Sampling of selected monitoring wells is also requested to aid in the 2024 characterization activities and to begin to evaluate trends for remedial alternative evaluation.**
    - **Resample monitoring wells with highest PFOS or PFOA concentrations in 2020/2022. Most of these locations also have historical LNAPL, and additional sampling could help evaluate any possible correlation and begin to assess trends: O-10, MW-361-15, MW-366-20, MW-115-15, MW-116-15, MW-176A-15, O-34, MW-321-15 (no historical LNAPL at this location)**

- **Sample or resample monitoring wells to help delineate leading edge of plume above DEC cleanup levels. Note that these locations also have historical LNAPL: S-22 (if available), O-36, and S-21 (if available) downgradient of O-10; MW-135-20 and MW-334-15; MW-345-15, O-27-20, O-11, and O-13**
- **Resample O-18 and sample O-17 to assess the continuity of the plume on the east side of the former railcar area**
- **Sample S-41R (if available) for more definition in the CU-1 area**
- **O-21, for more definition in the CU-2 area**

Williams Response: Responses are as follows:

- Additional Soil Delineation: Yes, summer 2024 is the expected timeframe for soil delineation activities. Williams has requested access to the Site through Flint Hills and is awaiting approval of access for 2023 and 2024 field activities.
- Document Review: While completing the review, Integral will note the sidewall sample concentrations identified by ADEC.
- Ecological CSM: Fish sampling from the North Gravel Pit will be added to the proposed next steps in the investigation.
- Remedial Alternatives Analysis: The matrix will include an assessment of known techniques to remediate PFAS in soil and groundwater including but not limited to in-situ and ex-situ techniques.
- Groundwater Monitoring: The monitoring locations proposed by ADEC will be included in the 2024 field season. Attached Figure 1 was provided to Marathon as part of the request for access, which identifies all locations in this comment. The revised report submittal will include monitoring activities discussed in this comment letter and during the anticipated December 14, 2023 meeting.

**ADEC Comment 12.** A figure showing Integral's interpretation of the areal extent of soil contamination would be helpful in assessing the adequacy of the soil characterization efforts to-date and proposed additional borings. While DEC concurs with the proposed soil boring locations shown on Figure 10, we are concerned that there may be other areas on the site where additional characterization would benefit the evaluation of remedial alternatives, as discussed below and displayed on the attached Figure 10 markup. Note that DEC focused its review on the locations with the highest soil concentrations: those exceeding the MTG cleanup level by approximately a factor of 10, or more.

- **NPT22-SB19/O-10 area:** NPT22-SB19 confirmed high PFOS in mid-depth soil and high PFOA in deep soil near monitoring well O-10 (2020 results of 2.74 ug/L PFOS and 0.39 ug/L PFOA). The source and extent of this contamination are not obvious to DEC reviewers.
  - A minimum of two borings upgradient of SB19 and one downgradient would help delineate the source and extent of soil contamination.
  - Converting the two upgradient borings to TWPs would assist in delineating the upgradient extent of the groundwater plume.
- **NPT22-SB30 area:** NPT22-SB30 confirmed high PFOS in mid-depth soil and temporary well sample TWP-30 exhibited a PFOS concentration of 0.385 ug/L, approximately equal to the 0.4 ug/L cleanup level) and greater than the 2020 results from nearby O-18 (2020 results of 0.32 ug/L PFOS and 0.138 ug/L PFOA).
  - Soil borings up- and down-gradient of SB-30 would help delineate the source/extent of the soil contamination.
- **NPT22-SB25 area:** NPT22-SB25 confirmed high PFOS in mid-depth and deep soil in this location south of Crude Unit #1.
  - A soil boring/TWP upgradient of SB-25 would help delineate the source/extent of soil and groundwater contamination (CU #1 or not?).
  - Locations downgradient of SB-25 would provide information towards the delineation of the soil and groundwater contamination. DEC understands there to be a lack of groundwater monitoring locations in this area; sampling the former recovery wells (R-5 and R-33) may be problematic or impossible, although well S-41R (if available) could add some definition.



- **A soil boring/TWP north (downgradient) of SB-25 would help delineate the northern extent of soil and groundwater contamination in this area.**
- **NPT-SB22 and SB23 area: NPT22-SB22 confirmed high PFOS in mid-depth and deep soil in this location adjacent to MW-361-15. Soil concentrations in NPT22-SB23, to the east of SB22, were below cleanup levels, although groundwater concentrations in TWP23 (0.943 ug/L PFOS) exceeded cleanup levels.**
  - **A soil boring/TWP upgradient of SB-22 would help delineate the source/extent of soil and groundwater contamination (CU#2 or no?).**
- **O-1 area: 2022 sampling showed PFOS at 1.31 ug/L and PFOA at 0.157 ug/L in O-1. The source of these high concentrations is not obvious to DEC.**
  - **A soil boring would assist the delineation by providing a data point to the southeast of O-1. The proposed additional location is north of and between the two borings Integral has already proposed for investigating CU-1.**
- **NPT22-SB01 to SB03 area:**
  - **Two borings in the vicinity of NP22-SB-01 in addition to the borings already proposed, to attempt to delineate the north and west margins of soil above cleanup levels detected in SB-01.**
  - **One soil boring/TWP to the NW of SB02 and SB03 to delineate the NW margin of soil and groundwater above cleanup levels.**
- **NPT22-SB13, SB14, SB15, and SB17 area:**
  - **DEC concurs with additional soil borings for further delineation of the highest soil contamination levels near the Fire House. DEC requests consideration of one additional soil boring/TWP to the NW of the furthest W proposed boring, as this area appears to potentially be a gap.**
- **East of NPT22-SB13 area:**
  - **o DEC proposes for consideration a soil boring/TWP in the open area east of the Fire House to evaluate whether there is any evidence of any AFFF releases in this area.**

*Williams Response:* The soil investigation locations proposed by ADEC will be included in the 2024 field season. Attached Figure 2 was provided to Marathon as part of the request for access, which identifies all locations in this comment. The revised report submittal will include monitoring activities discussed in this comment letter and during the anticipated December 14, 2023 meeting. Integral at this time believes that PFAS concentrations observed in soil are due to a series of hot spots associated with discrete AFFF discharges rather than site-wide impacts. It would be premature to draw the aerial extent of soil concentrations at this time, but following the 2024 data collection, we anticipate that defined impacted areas will be available for ADEC's review.

**ADEC Comment 13. DEC concurs that the Pilot Study shows acceptable agreement between the low-flow and PDB sampling methods for PFOS and PFOA.**

- **What is the future planned use of PDBs on this site, and what will be the QA/QC procedures? Will PDB sampling be the preferred groundwater sampling method? If used in the future, DEC will request collecting low-flow samples at a frequency of 10% (from depth intervals with relatively higher concentrations) as field replicates.**
- **For other PFAS, specifically PFBS, there were insufficient detections to evaluate the comparability of low-flow and PDB sampling. It would be good if the Pilot Study could be expanded (in future sampling events) by collecting enough additional paired samples with detections to assess comparability of PFBS and any other PFAS with EPA RSLs.**

*Williams Response:* In 2023, due to the overlap in select offsite monitoring wells between PFAS and sulfolane sampling, samples will be collected using low flow procedures at locations that require both analyses. PFAS only wells will be sampled using PDBs as approved by DEC in their letter dated June 15, 2023. Going forward, data collection using PDBs in both onsite and offsite wells will include a 10% frequency of field replicates as requested, and assessment of other PFAS concentrations will be conducted.

**ADEC Comment 14. What actions are proposed to further characterize aquatic habitats? DEC requests fish sampling in the North Gravel Pit.**

*Williams Response:* As stated above, sampling of fish in the North Gravel Pit will be included in the proposed activities discussed in the revised report submittal.

Num.	Page	Section	Comment	Document Update
1	Tables and Figures	Table 1 (Soil) and Figures 5, 6, and 7 Table 2 (TWP) Table 3 (MW) Table 4 (SW) Table 5 (Sed)	<p>Nondetects are incorrectly reported in these tables and Figures 5, 6 and 7 to the MDL, rather than the RL. DEC guidance is clear that nondetects should never be reported to the MDL (see ADEC’s August 15, 2022 Technical Memorandum 22-001 Guidelines for Data Reporting, starting near bottom of page 1; <a href="https://dec.alaska.gov/media/25979/guidelines-for-data-reporting.pdf">https://dec.alaska.gov/media/25979/guidelines-for-data-reporting.pdf</a>).</p> <ul style="list-style-type: none"> <li>• Please revise and resubmit Tables 1 through 5; please also address the additional comments regarding the tables provided below.</li> <li>• Please revise and resubmit the spreadsheet containing the 2022 onsite PFAS data.</li> <li>• Please revise and resubmit Figures 5, 6, and 7; please also address additional comments provided below.</li> </ul>	<p>Tables 1 through 5 and figures 5, 6, and 7 have been revised to include the RL, rather than MDL for nondetects. The spreadsheet containing the 2022 onsite PFAS data has also been revised.</p>
2	Tables and Figures	Tables 1 through 5 and Figures 5-9	<p>QC duplicate information provided on the tables and figures is inconsistent between different sampled media. The figures and tables should be revised to present consistent information.</p> <ul style="list-style-type: none"> <li>• Tables: The information provided in Table 1 does not match the information shown in Figures 5-7. Soil Table 1 appears to present a single average of the primary and QC duplicate sample results. Averaging primary and QC duplicate results is not appropriate nor consistent with DEC guidance and regulation. A single result should be the higher of the duplicate results, as directed by ADEC’s August 15, 2022 Technical Memorandum 22-001 Guidelines for Data Reporting <a href="https://dec.alaska.gov/media/25979/guidelines-for-data-reporting.pdf">https://dec.alaska.gov/media/25979/guidelines-for-data-reporting.pdf</a>. Groundwater Tables 2 and 3 present results of primary, QC duplicate, and PDB groundwater samples. Surface water Table 4 and sediment Table 5 present results of primary and QC duplicate samples. Table 1 should be revised to present both primary and QC duplicate soil sample results.</li> <li>• Figures: Soil Figures 5-7 present the results of both the primary and QC duplicate soil samples. Similarly, Figure 8 presents the results of primary, QC duplicate, and PDB groundwater samples. However, Figure 9 presents only a single set of results for the sediment and surface water samples (the single result is an average of the primary and QC duplicate results, which is inappropriate per DEC guidance as discussed further below in Comment # 4). DEC prefers that the figures present only the highest concentration of duplicate results for all media.</li> </ul> <p>The figures and tables should be revised to present consistent information, consistent with DEC guidance.</p>	<p>Tables 1 through 5 have been revised to include both primary and QC duplicate soil sample results.</p> <p>Figure 5, 6, 7, 8, and 9 have been revised to include the highest of duplicate results.</p>
3	3-4	3.1 Soil Results	<p>In addition to the Tables and Figures referenced above in Comment #2, quality control duplicate results presented in Exhibit 1 need to be reviewed and presented correctly as the higher of duplicate results, in accordance with DEC guidance.</p>	<p>Section 3.1 text was revised to include duplicate samples, and a line was added to clarify that the highest of duplicate results was used in the exhibits.</p> <p>Exhibit 1 was revised to include the highest of duplicate results.</p>
4	3-5 and Tables 2 and 3 and Figure 8	3.2 Groundwater Results, Tables 2 and 3 and Figure 8	<p>Groundwater sample results are not displayed consistently or completely in Exhibits 2 and 3 within the text on page 3-5, Tables 2 and 3, and Figure 8.</p> <ul style="list-style-type: none"> <li>• Temporary well point sample names are inconsistent. Exhibit 2 and Table 2 references NPT22-TWP13 whereas Figure 8 uses a label of NPT22-SB13. Consistent sample names should be used, and the TWP terminology clearly references groundwater.</li> <li>• Results for monitoring wells O-1 and O-20 are missing from Table 3.</li> <li>• Results for MW-358-20, MW-358-60, MW-359-35, MW-359-80, MW-360-35, and MW-364-30 are missing from Figure 8.</li> <li>• Figure 8 presents results for project samples, QC duplicates, and PDB samples; however, the QC duplicates and PDB samples are not labeled as such. For example, three results are displayed for sample O-1, but there is no indicator of which sample is which.</li> <li>• As discussed above in Comment #2, the highest concentration should be reported on Figure 8 for locations with multiple results.</li> <li>• The text discussion regarding PFOS detections above the cleanup level is incomplete. PFOS was also detected above the cleanup level in samples from NPT22-TWP23 (adjacent to CU2).</li> </ul> <p>Exhibits 2 and 3 and Table 3 and Figure 8 should be revised to correct the issues described above and resubmitted.</p>	<p>Table 3 was revised to include O-1, O-101, O-1 PDB, and O-20.</p> <p>Text on page 3-5 was revised to include the exceedance in TWP23.</p> <p>Exhibit 3 was revised to include O-1, O-101, and O-20.</p> <p>Figure 8 was revised to reflect the correct sample IDs in Exhibit 2.</p> <p>Samples collected from the DMPDBs are not included in the summary exhibits and are further discussed in Appendix D.</p>
5		3.3 Gravel Pit Results, Table 4 and Figure 9	<ul style="list-style-type: none"> <li>• As discussed above in Comment #2, Figure 9 appears to present an average of the project sample and QC duplicate results for surface water. Figure 9 should instead present a single result, which should be the higher of the duplicate results, as directed by ADEC’s August 15, 2022 Technical Memorandum 22-001 Guidelines for Data Reporting.</li> <li>• The text should also be updated to reflect the concentration of 0.079 ug/L for NGP-SW05 and other results reviewed to ensure they are reported correctly.</li> </ul>	<p>Revised table 4 to include parent and QC sample results and updated text in 3.3 to reflect .079 PFOS result for NGP-SW05.</p>

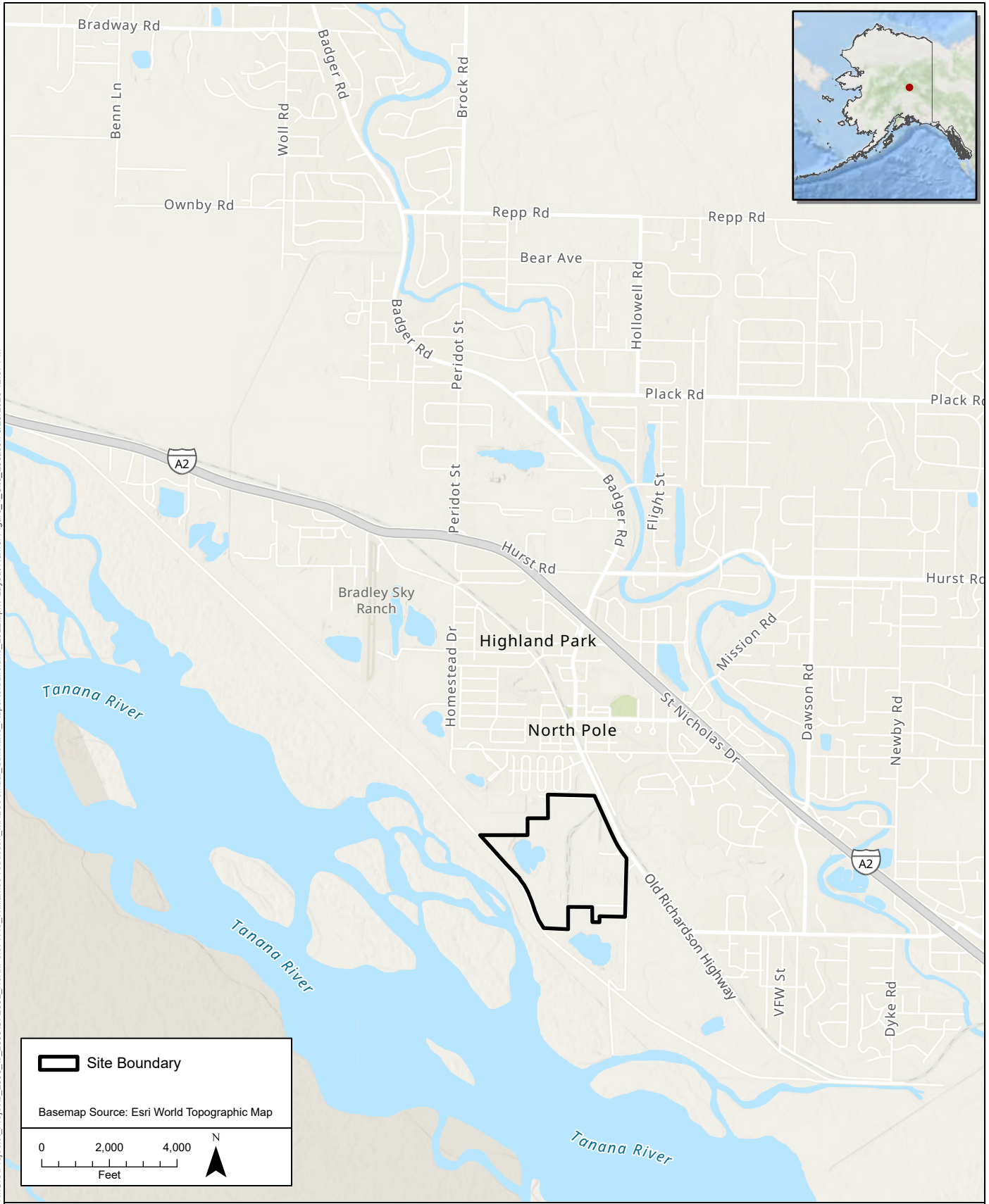
6	4-1	4 Quality Assurance Assessment and Appendices G and I	10% data review is pending. We may have more data quality comments when the revised report is submitted.	N/A
7	2-2	2.2 Groundwater Evaluation	Text states that soil boring locaton NPT22-SB25 was converted to TWPs. However, the figures and tables do not show any groundwater results for this locaton. Please confirm.	NPT22-SB25 was not converted to TWP during the 2022 sampling. The reference for NPT22-SB25 has been removed from section 2.2
8	2-2	2.2 Groundwater Evaluation	Text states that the field crew was unable to locate monitoring well locaton O-21. However, the surveyors were able to survey O-21. Please add groundwater sampling of O-21 to the follow up work scope for summer 2024.	O-21 included in scope for 2024 (Figure 12).
9	3-5	3.2 Groundwater Results	The property boundary wells are not referenced in this secton. Specifically, the analysis discussed in the July 28, 2022, Technical Memorandum Response to ADEC Comments, #5, is not presented in the report: "Analytical results will be compared to the 2020 and historical analytical results to evaluate potential changes to the extent of PFOA + PFOS concentrations at the property boundary over time."	An analysis for the property boundary wells has been added to section 3.2 and is presented on page 3-6.
10	4-2	4.3 Precision	It appears that the list of field replicates is missing NPT22-TWP115, which based on its presentaton on Table 2 appears to be a duplicate of NPT22-TWP15.	The summary on page 4-2 has been revised to include NPT22-TWP15.
11	5-1	Section 5 Conclusions and Recommendatons	<p>Additional Soil Delineaton – DEC concurs that additonal soil characterizatn actvites are appropriate. See comment #12 for detailed comments.</p> <ul style="list-style-type: none"> <li>Is summer 2024 the expected tmeframe for the additional soil delineaton?</li> </ul> <p>Document Review: FTA - DEC concurs with the proposal to review historical documents describing remedial actvites in the FTA and to add additonal soil borings as necessary. Please note the following:</p> <ul style="list-style-type: none"> <li>Reportng from the 2015 FTA excavaton documents that PFOS and PFOA remained above DEC soil cleanup levels in soil sidewall sample locatons at the excavaton boundary.</li> </ul> <p>Ecological CSM Soil Sampling – DEC concurs with the soil sampling grid plan (shown on Figure 11) to characterize PFAS in terrestrial habitats at the site.</p> <ul style="list-style-type: none"> <li>What actons are proposed to further characterize aquatic habitats? DEC requests fish sampling in the North Gravel Pit.</li> </ul> <p>Remedial Alternatves Analysis – DEC concurs with the preliminary alternatves analysis proposal.</p> <ul style="list-style-type: none"> <li>Note that the matrix will need to include interim removal actons intended to clean up known source areas in soil and eliminate or mitigate off-refinery PFAS migraton in groundwater.</li> </ul> <p>Groundwater Monitoring – In additon to the 2023 offsite groundwater sampling, DEC requests additonal onsite groundwater monitoring in conjuncton with the 2024 additonal soil characterizatn actvites. (See atached figure).</p> <ul style="list-style-type: none"> <li>Groundwater monitoring should be performed annually in selected property boundary wells to assess PFAS trends and potential changes to the extent of PFOA + PFOS concentratons at the property boundary over tme. <ul style="list-style-type: none"> <li>MW-362-35; MW-362-50; MW-141-20; and MW-146B should be also sampled annually to delineate the southwestern extent of PFOS + PFOA &gt; 70 ng/L at the property boundary.</li> </ul> </li> <li>Sampling of selected monitoring wells is also requested to aid in the 2024 characterizatn actvites and to begin to evaluate trends for remedial alternativte evaluaton. <ul style="list-style-type: none"> <li>Resample monitoring wells with highest PFOS or PFOA concentratons in 2020/2022. Most of these locatons also have historical LNAPL, and additonal sampling could help evaluate any possible correlaton and begin to assess trends: O-10; MW-361-15, MW-336-20, and MW-115-15; MW-116-15; MW-176A-15 and O-34; MW-321-15 (no historical LNAPL at this locaton)</li> <li>Sample or resample monitoring wells to help delineate leading edge of plume above DEC cleanup levels. Note that these locatons also have historical LNAPL: S-22 (if available), O-36, and S-21 (if available) downgradient of O-10; MW-135-20 and MW-334-15; MW-345-15, O-27-20, O-11, and O-13</li> <li>Resample O-18 and sample O-17 to assess the contnuity of the plume on the east side of the former railcar area</li> <li>Sample S-41R (if available) for more definiton in the CU-1 area</li> <li>O-21, for more definiton in the CU-2 area</li> </ul> </li> </ul>	Section 5 has been revised.

12	Figure 10	Figure 10 - Proposed Soil Boring Locations	<p>A figure showing Integral’s interpretaton of the areal extent of soil contaminaton would be helpful in assessing the adequacy of the soil characterizatn efforts to-date and proposed additional borings. While DEC concurs with the proposed soil boring locatons shown on Figure 10, we are concerned that there may be other areas on the site where additional characterizatn would benefit the evaluaton of remedial alternatives, as discussed below and displayed on the attached Figure 10 markup. Note that DEC focused its review on the locatons with the highest soil concentratons: those exceeding the MTG cleanup level by approximately a factor of 10, or more.</p> <ul style="list-style-type: none"> <li>• NPT22-SB19/O-10 area: NPT22-SB19 confirmed high PFOS in mid-depth soil and high PFOA in deep soil near monitoring well O-10 (2020 results of 2.74 ug/L PFOS and 0.39 ug/L PFOA). The source and extent of this contaminaton are not obvious to DEC reviewers. <ul style="list-style-type: none"> <li>o A minimum of two borings upgradient of SB19 and one downgradient would help delineate the source and extent of soil contaminaton.</li> <li>o Converting the two upgradient borings to TWPs would assist in delineatng the upgradient extent of the groundwater plume.</li> </ul> </li> <li>• NPT22-SB30 area: NPT22-SB30 confirmed high PFOS in mid-depth soil and temporary well sample TWP-30 exhibited a PFOS concentraton of 0.385 ug/L, approximately equal to the 0.4 ug/L cleanup level) and greater than the 2020 results from nearby O-18 (2020 results of 0.32 ug/L PFOS and 0.138 ug/L PFOA). <ul style="list-style-type: none"> <li>o Soil borings up- and down-gradient of SB-30 would help delineate the source/extent of the soil contaminaton.</li> </ul> </li> <li>• NPT22-SB25 area: NPT22-SB25 confirmed high PFOS in mid-depth and deep soil in this locaton south of Crude Unit #1. <ul style="list-style-type: none"> <li>o A soil boring/TWP upgradient of SB-25 would help delineate the source/extent of soil and groundwater contaminaton (CU #1 or not?).</li> <li>o Locatons downgradient of SB-25 would provide informaton towards the delineaton of the soil and groundwater contaminaton. DEC understands there to be a lack of groundwater monitoring locatons in this area; sampling the former recovery wells (R-5 and R-33) may be problematc or impossible, although well S-41R (if available) could add some definiton.</li> </ul> </li> <li>• A soil boring/TWP north (downgradient) of SB-25 would help delineate the northern extent of soil and groundwater contaminaton in this area.</li> <li>• NPT-SB22 and SB23 area: NPT22-SB22 confirmed high PFOS in mid-depth and deep soil in this locaton adjacent to MW-361-15. Soil concentratons in NPT22-SB23, to the east of SB22, were below cleanup levels, although groundwater concentratons in TWP23 (0.943 ug/L PFOS) exceeded cleanup levels. A soil boring/TWP upgradient of SB-22 would help delineate the source/extent of soil and groundwater contaminaton (CU#2 or no?). <ul style="list-style-type: none"> <li>o O-1 area: 2022 sampling showed PFOS at 1.31 ug/L and PFOA at 0.157 ug/L in O-1. The source of these high concentratons is not obvious to DEC. A soil boring would assist the delineaton by providing a data point to the southeast of O-1. The proposed additional locaton is north of and between the two borings Integral has already proposed for investgatng CU-1.</li> <li>o NPT22-SB01 to SB03 area: Two borings in the vicinity of NP22-SB-01 in additon to the borings already proposed, to attempt to delineate the north and west margins of soil above cleanup levels detected in SB-01. One soil boring/TWP to the NW of SB02 and SB03 to delineate the NW margin of soil and groundwater above cleanup levels.</li> <li>o NPT22-SB13, SB14, SB15, and SB17 area: DEC concurs with additional soil borings for further delineaton of the highest soil contaminaton levels near the Fire House. DEC requests consideraton of one additional soil boring/TWP to the NW of the furthest W proposed boring, as this area appears to potentially be a gap.</li> <li>o East of NPT22-SB13 area: DEC proposes for consideraton a soil boring/TWP in the open area east of the Fire House to evaluate whether there is any evidence of any AFFF releases in this area.</li> </ul> </li> </ul>	Figure 10 has been revised to include the information requested in this comment and on the Figure 10 markup.
13		Appendix D – Passive Sampling Pilot Study	<p>DEC concurs that the Pilot Study shows acceptable agreement between the low-flow and PDB sampling methods for PFOS and PFOA.</p> <ul style="list-style-type: none"> <li>• What is the future planned use of PDBs on this site, and what will be the QA/QC procedures? Will PDB sampling be the preferred groundwater sampling method? If used in the future, DEC will request collectng low-flow samples at a frequency of 10% (from depth intervals with relatively higher concentratons) as field replicates.</li> <li>• For other PFAS, specifically PFBS, there were insufficient detectons to evaluate the comparability of low-flow and PDB sampling. It would be good if the Pilot Study could be expanded (in future sampling events) by collectng enough additional paired samples with detectons to assess comparability of PFBS and any other PFAS with EPA RSLs.</li> </ul>	Section 5 has been updated to include the use of DMPDBs for groundwater sampling.
14		Appendix H – Ecological CSM	<ul style="list-style-type: none"> <li>• What actons are proposed to further characterize aquatc habitats? DEC requests fish sampling in the North Gravel Pit.</li> </ul>	Section 5 has been updated to include fish sampling in the North Gravel Pit.

## **Figures**

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**Figure 1.**  
Site Location

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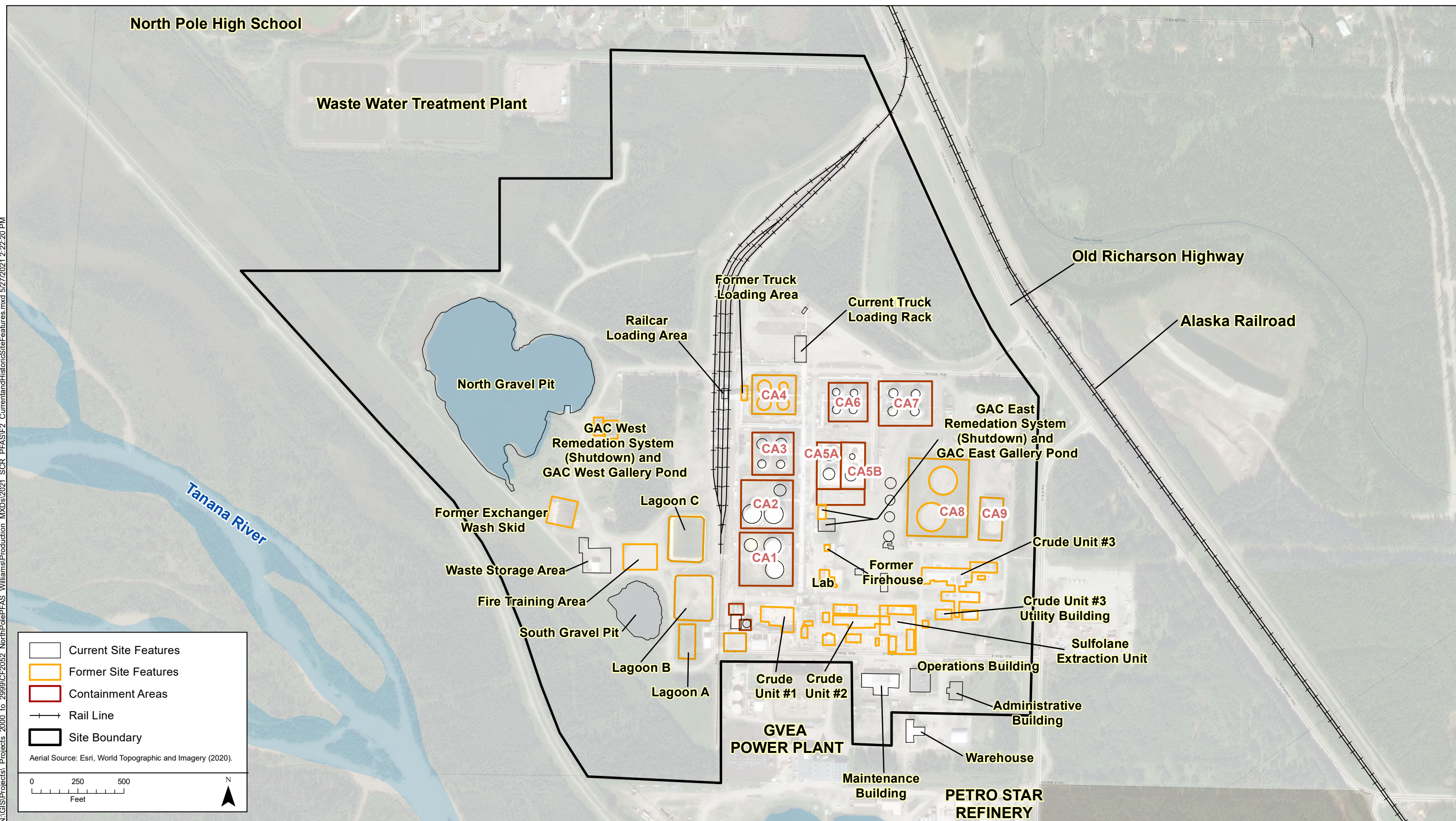
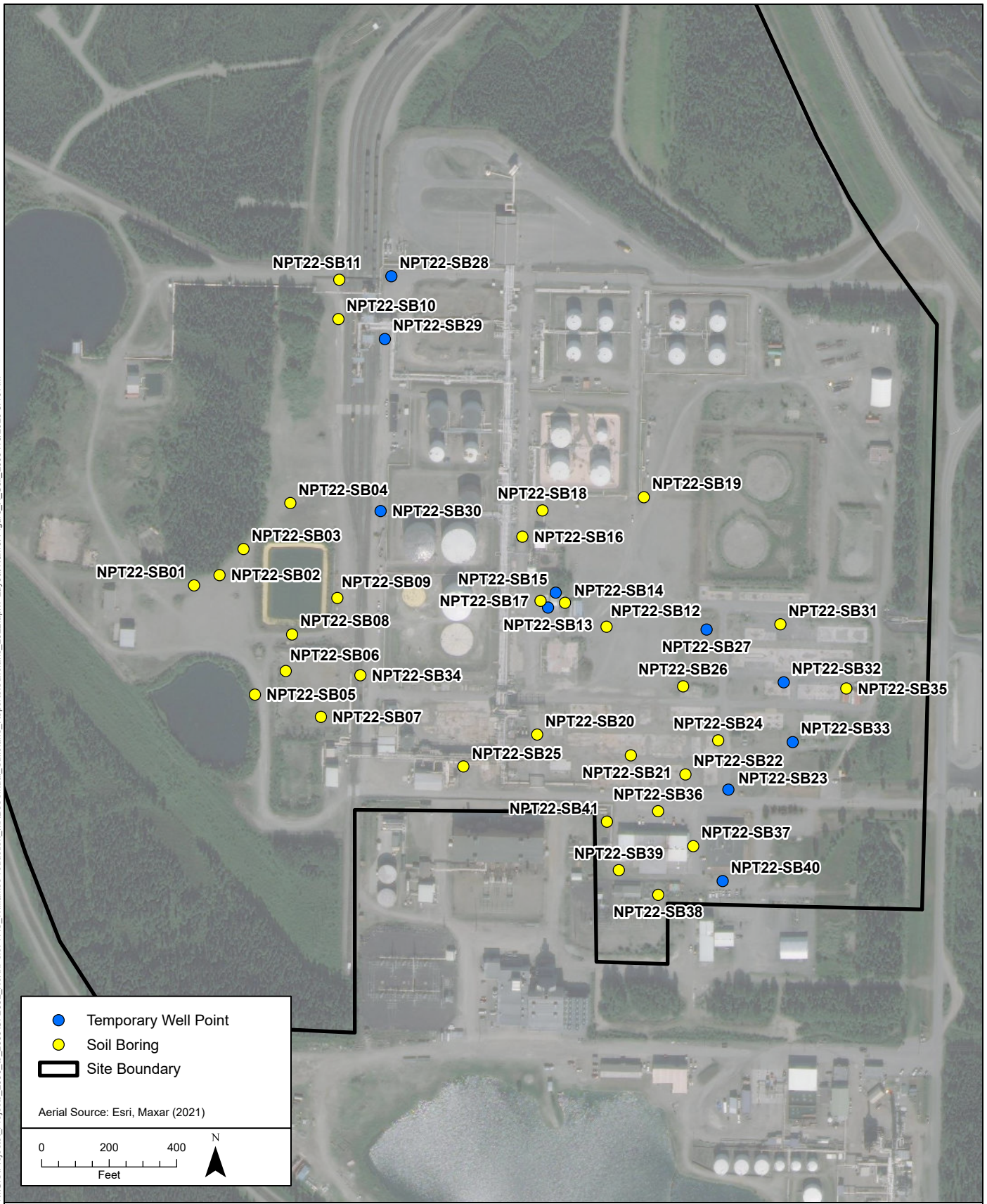


Figure 2. Current and Historic Site Features



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**Figure 3.**  
Soil Sampling and Temporary Well Point Locations

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### North Gravel Pit

### South Gravel Pit

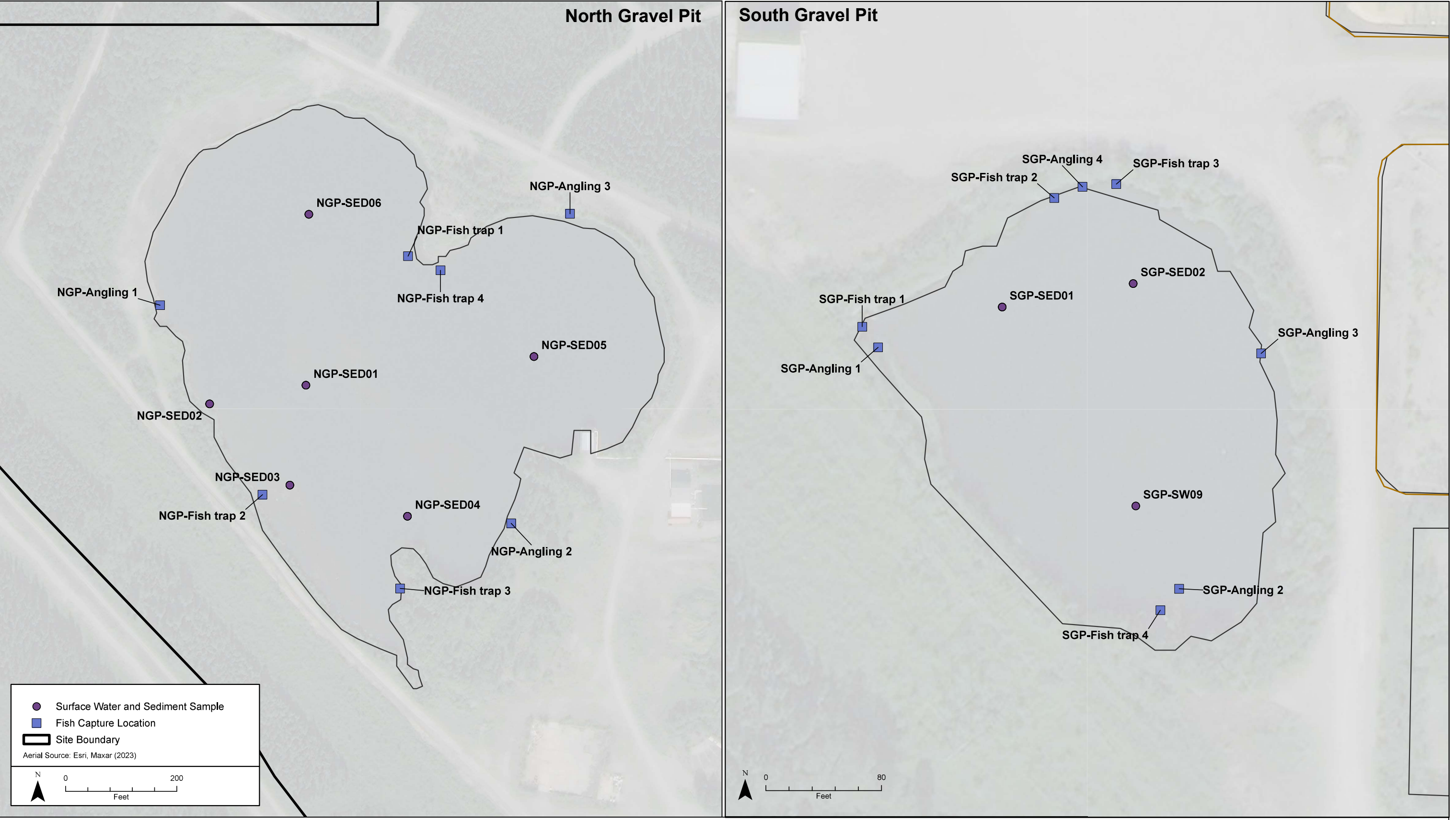


Figure 4. Gravel Pit Investigations

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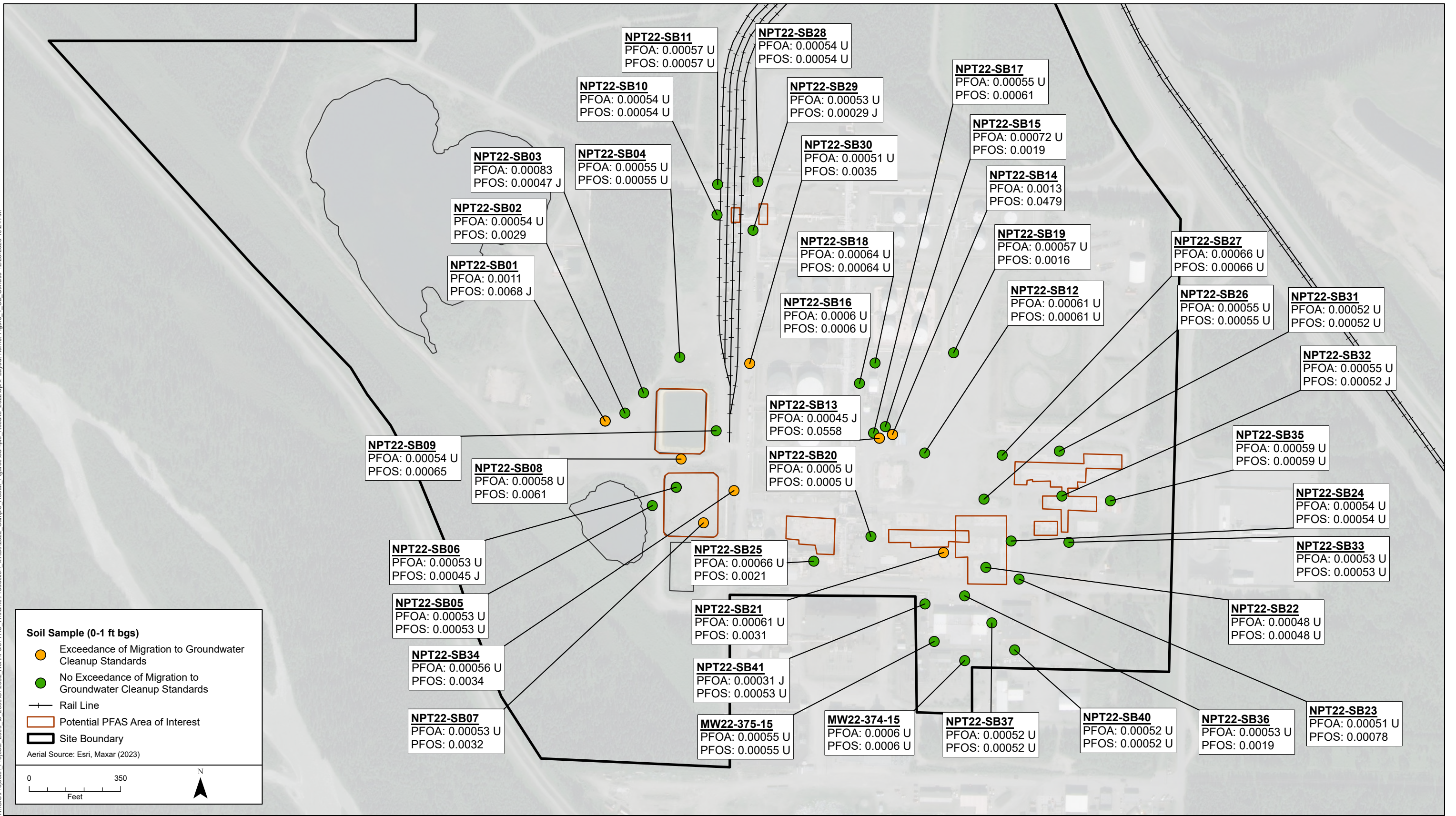


Figure 5.  
Surface Soil Analytical Results (mg/kg)  
0-1 ft bgs

N:\GIS\Projects\Projects\_2000\_to\_2999\CF2052\_NorthPolePFAS\_WilliamsProduction\_MXD\2022\_Sample\_Results\_Figures\Sample\_Results\_2022.aprx Layout Name: Figure\_2\_SB\_Mid\_12/20/2023 11:38 AM

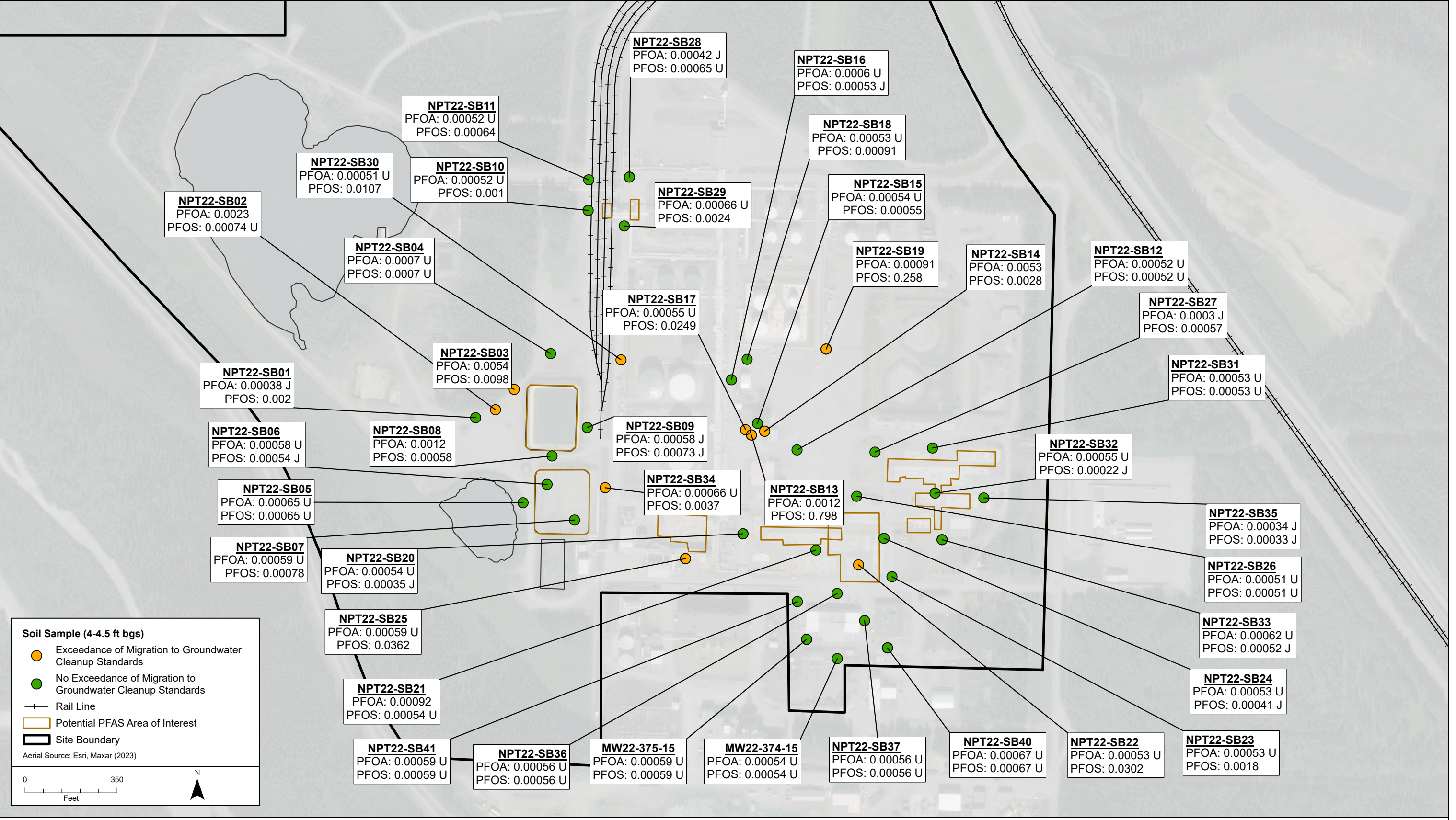


Figure 6. Surface Soil Analytical Results (mg/kg) 4-4.5 ft bgs

N:\GIS\Projects\Projects\_2000\_to\_2999\CF2052\_NorthPolePFAS\_NorthPolePFAS\_Production\_MXD\2022\_Sample\_Result\_Figures\Sample\_Results\_2022.aprx Layout Name: Figure\_3\_SB\_Deep 12/20/2023 10:24 AM

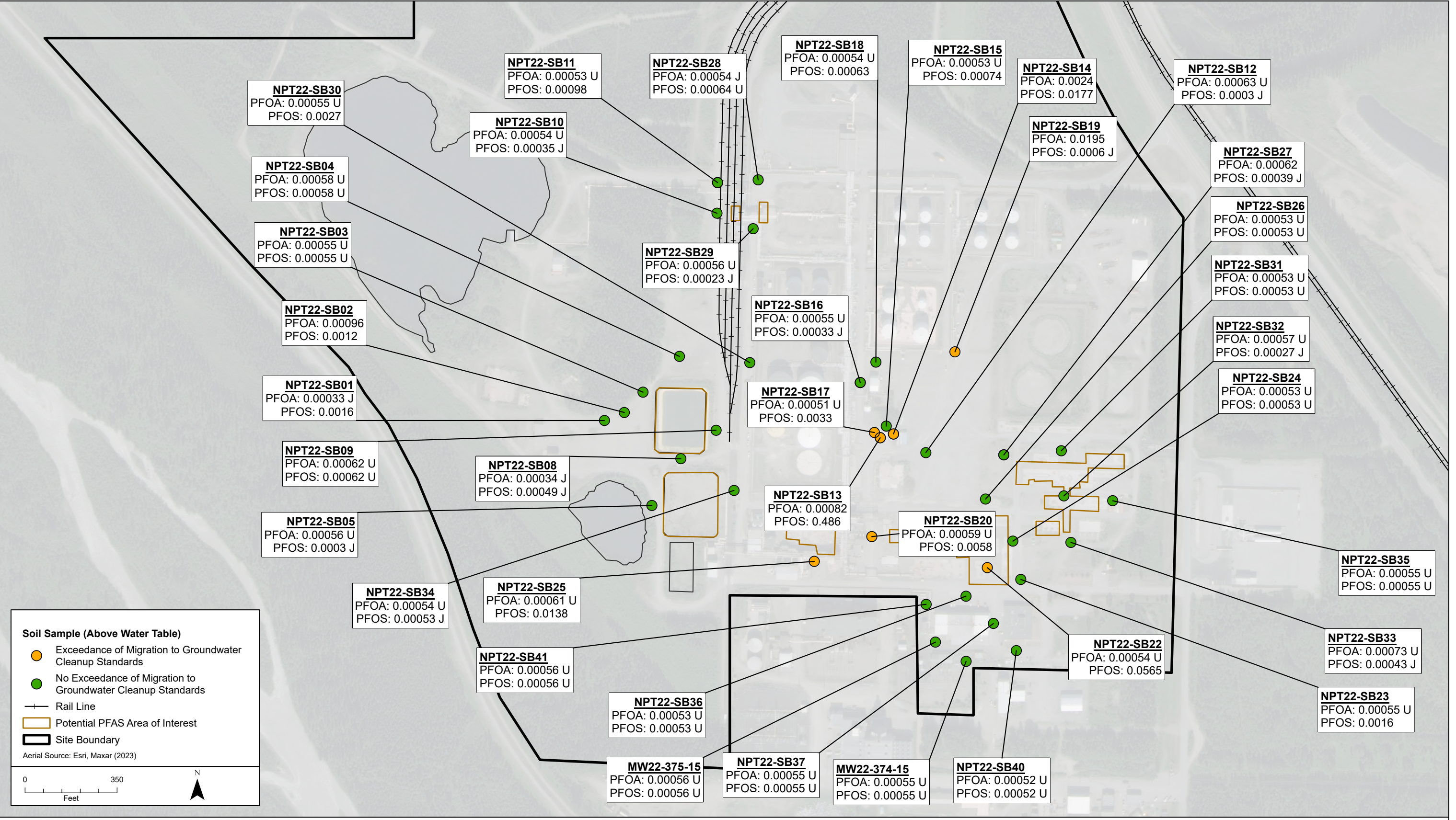
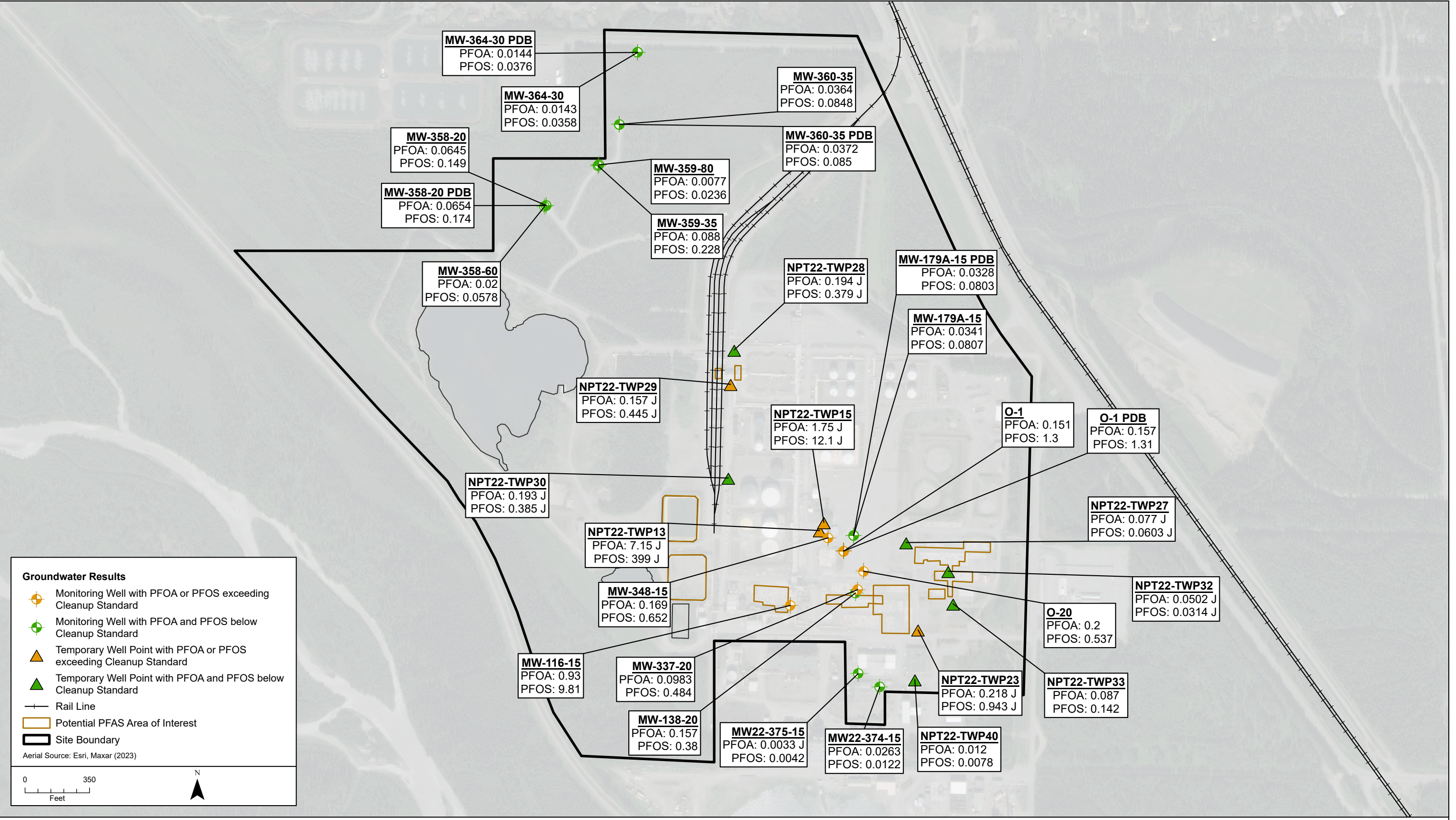


Figure 7.  
Surface Soil Analytical Results (mg/kg)  
Interval Directly Above Water Table

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**Groundwater Results**

- Monitoring Well with PFOA or PFOS exceeding Cleanup Standard
- Monitoring Well with PFOA and PFOS below Cleanup Standard
- Temporary Well Point with PFOA or PFOS exceeding Cleanup Standard
- Temporary Well Point with PFOA and PFOS below Cleanup Standard
- Rail Line
- Potential PFAS Area of Interest
- Site Boundary

Aerial Source: Esri, Maxar (2023)

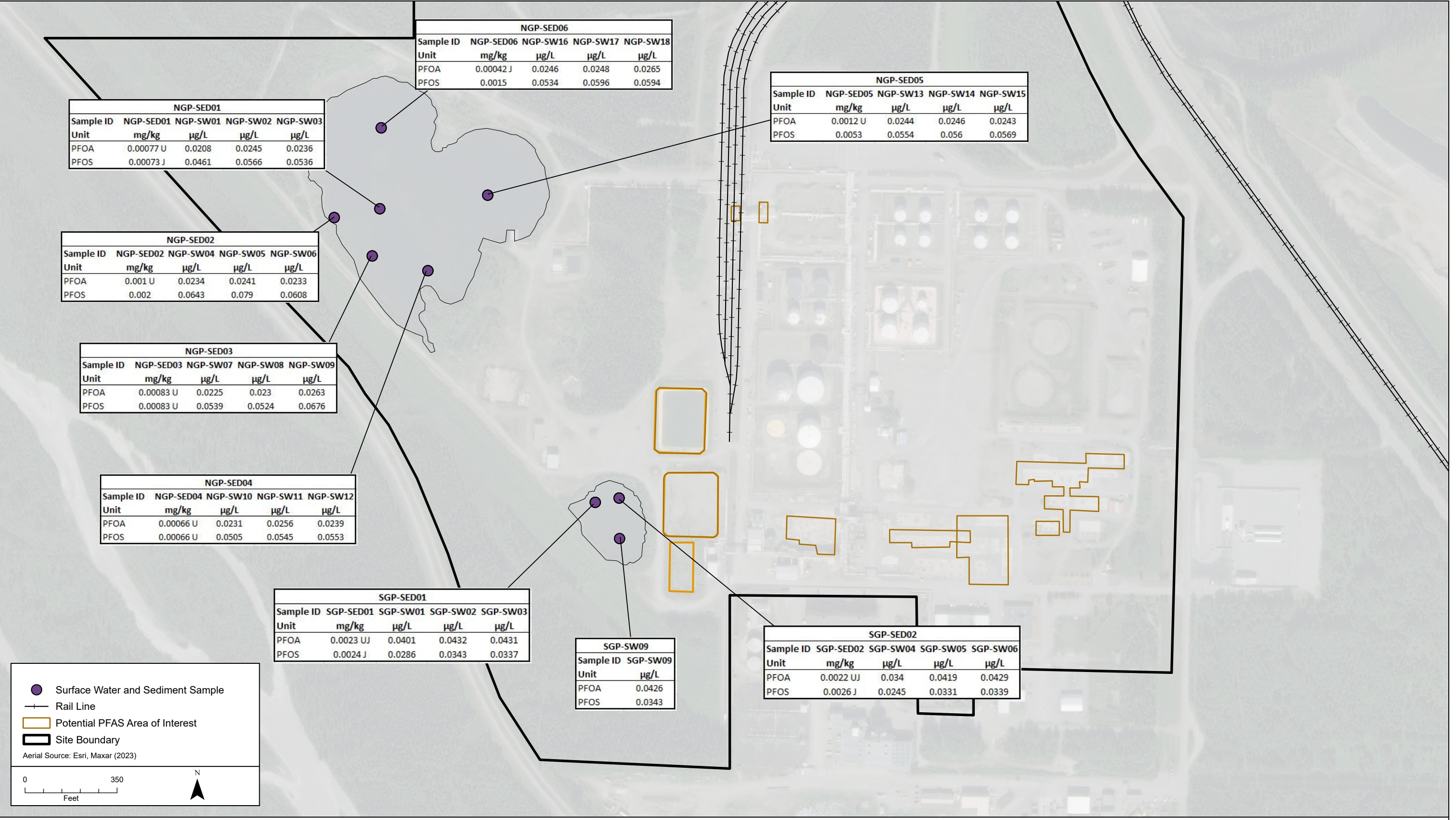
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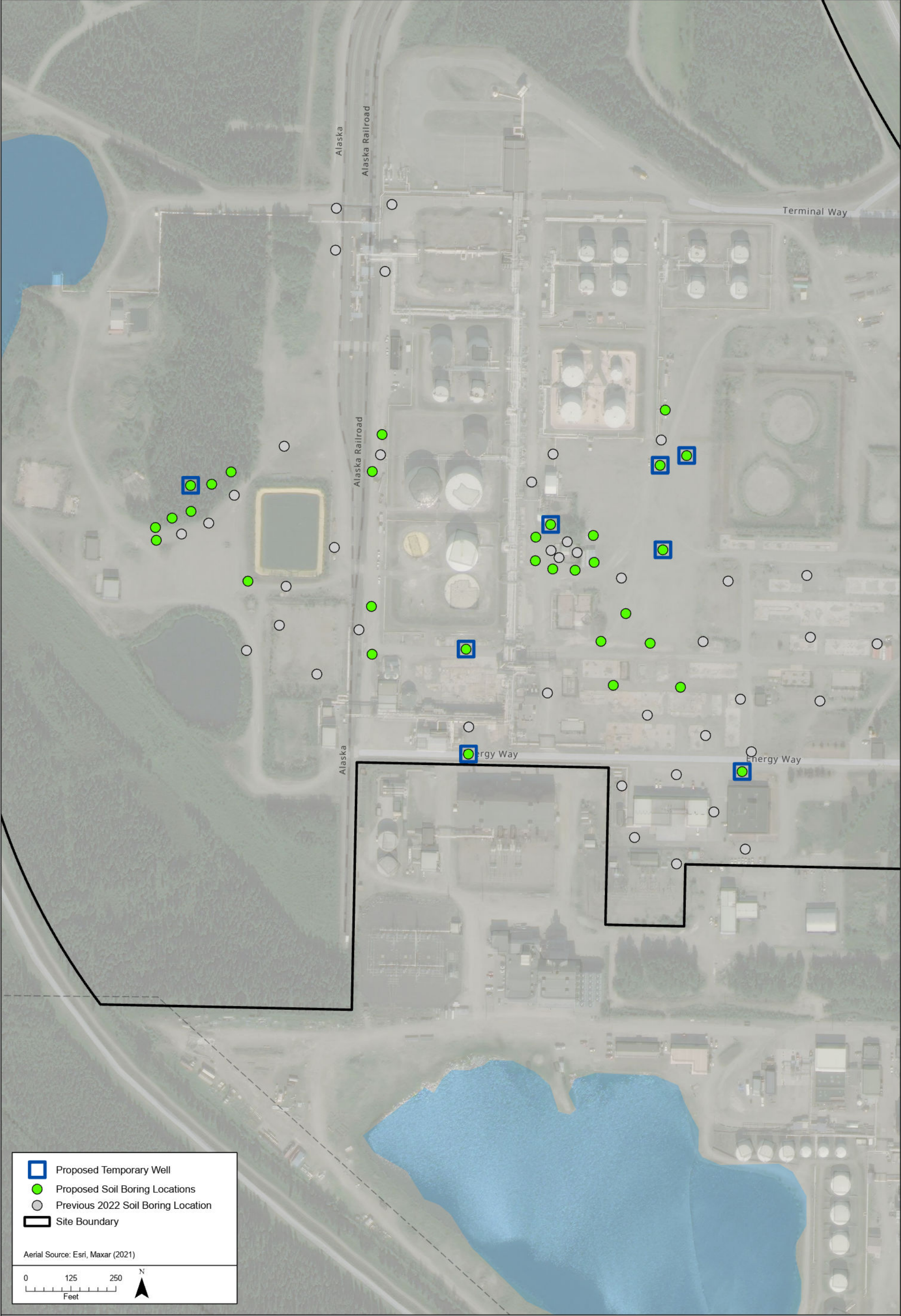
Figure 8. Groundwater Analytical Results (µg/L)

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**Figure 9.**  
Surface Water and Sediment Analytical Results

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- Proposed Temporary Well
- Proposed Soil Boring Locations
- Previous 2022 Soil Boring Location
- Site Boundary

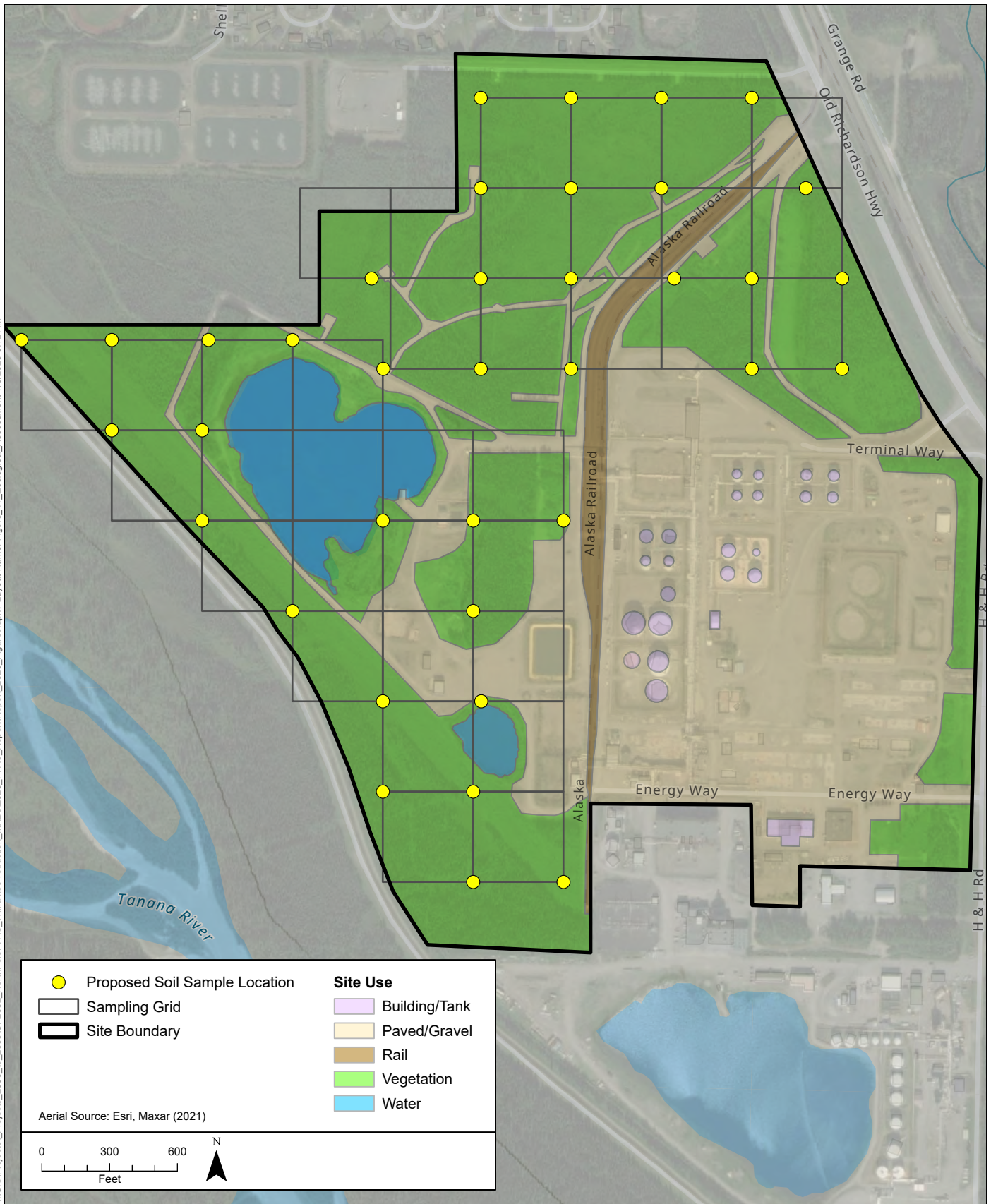
Aerial Source: Esri, Maxar (2021)



Figure 10. Proposed Soil Boring and Temporary Well Locations

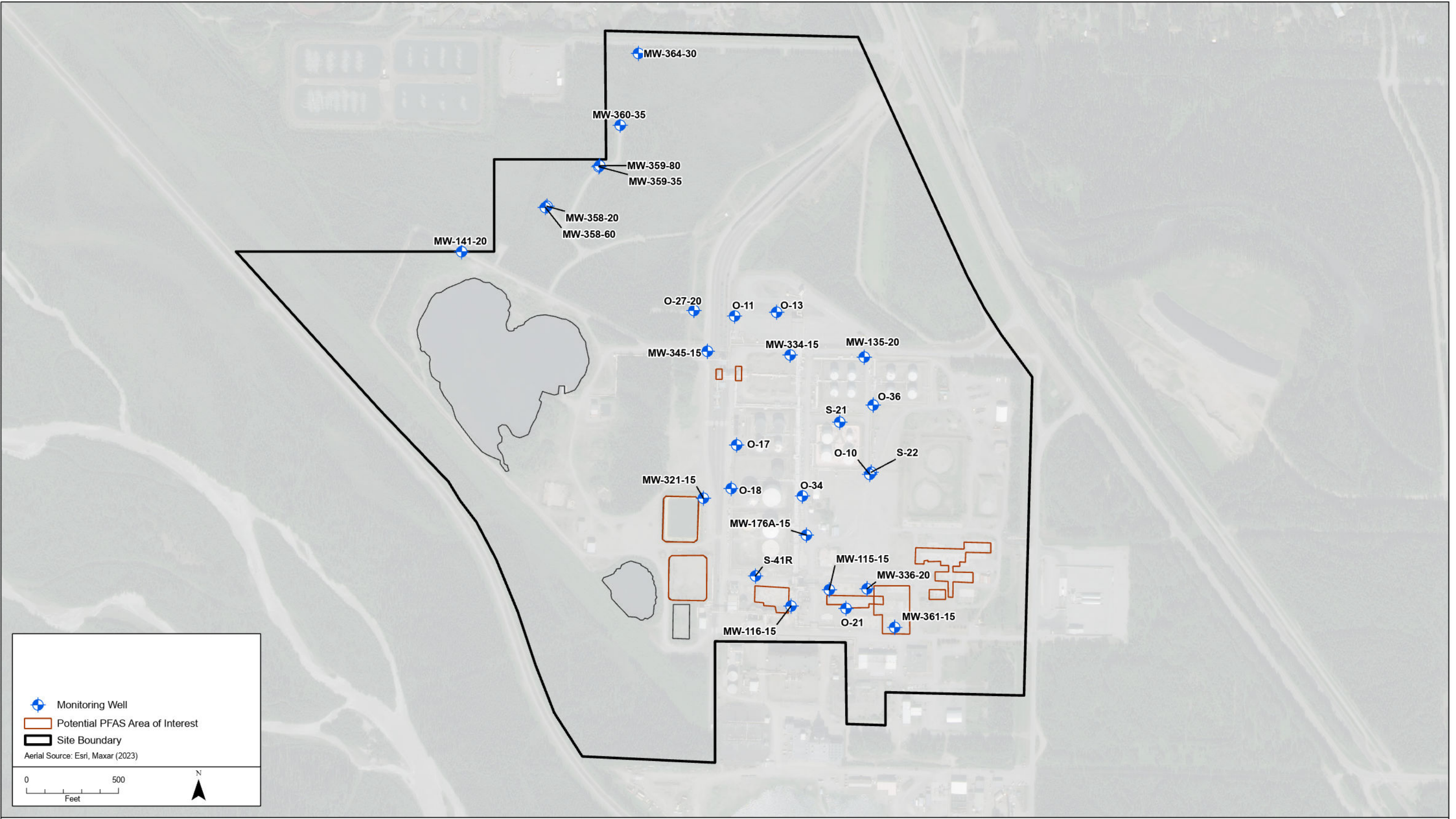


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**Figure 11.**  
Proposed Soil Sampling Locations for Terrestrial Ecological Risk Assessment

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**Figure 12.**  
2024 Proposed Groundwater Sampling Locations

## **Tables**

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Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB01-1	NPT22-SB01-101	NPT22-SB01-2	NPT22-SB01-3	NPT22-SB02-1	NPT22-SB02-2	NPT22-SB02-3
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022
				Result	Result	Result	Result	Result	Result	Result
				Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier
<i>Next Generation Analytes</i>										
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.00053 U	0.00054 U	0.00062 U	0.00052 U	0.00054 U	0.00074 U	0.00057 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00053 U	0.00054 U	0.00062 U	0.00052 U	0.00054 U	0.00074 U	0.00057 U
9CI-PF3ONS (F-53B Major)	NS	NS		0.00053 U	0.00054 U	0.00062 U	0.00052 U	0.00054 U	0.00074 U	0.00057 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0011 U	0.0011 U	0.0012 U	0.001 U	0.0011 U	0.0015 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0011 U	0.0011 U	0.0012 U	0.001 U	0.0011 U	0.0015 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0011 U	0.0011 U	0.0012 U	0.001 U	0.0011 U	0.0015 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00053 U	0.00054 U	0.00062 U	0.00052 U	0.00054 U	0.00074 U	0.00057 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00053 U	0.00054 U	0.00062 U	0.00052 U	0.00054 U	0.0024	0.00092
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.0038 J	0.0068 J	0.002	0.0016	0.0029	0.00074 U	0.0012
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00053 U	0.00091	0.00062 U	0.00052 U	0.00054 U	0.00039 J	0.00057 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00053 U	0.00093	0.00062 U	0.00052 U	0.00054 U	0.00074 U	0.00057 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00053 U	0.0011	0.00038 J	0.00033 J	0.00054 U	0.0023	0.00096
Perfluorononanoic acid (PFNA)	NS	NS		0.00053 U	0.0012	0.004	0.0009	0.0003 J	0.0053	0.0019
Perfluorodecanoic Acid (PFDA)	NS	NS		0.0028 J	0.0055 J	0.00062 U	0.00052 U	0.001	0.00074 U	0.00057 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.0097 J	0.0137 J	0.00062 U	0.00026 J	0.0019	0.00074 U	0.00041 J
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00035 J	0.0015	0.00062 U	0.00052 U	0.00072	0.00074 U	0.00057 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.0023	0.0038	0.00062 U	0.00052 U	0.0022	0.00074 U	0.0004 J
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00053 U	0.001	0.00062 U	0.00052 U	0.00054 U	0.00074 U	0.00057 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB03-1	NPT22-SB03-2	NPT22-SB03-3	NPT22-SB04-1	NPT22-SB04-2	NPT22-SB04-3
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>									
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.00054 U	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00054 U	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.00054 U	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0011 U	0.0012 U	0.0011 U	0.0011 U	0.0014 U	0.0012 U
<i>Perfluorooctanesulfonamidoacetic acids</i>									
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0011 U	0.0012 U	0.0011 U	0.0011 U	0.0014 U	0.0012 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0011 U	0.0012 U	0.0011 U	0.0011 U	0.0014 U	0.0012 U
<i>Perfluoroalkylsulfonic acids</i>									
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00054 U	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00054 U	0.0019	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00047 J	0.0098	0.00055 U	0.00055 U	0.0007 U	0.00058 U
<i>Perfluoroalkylcarboxylic acids</i>									
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00073	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00075	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00083	0.0054	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00092	0.0026	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.0012	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.0019	0.00037 J	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.0011	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.0019	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00075	0.0006 U	0.00055 U	0.00055 U	0.0007 U	0.00058 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB05-1	NPT22-SB05-2	NPT22-SB05-3	NPT22-SB06-1	NPT22-SB06-101	NPT22-SB06-2	NPT22-SB07-1
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/11/2022	10/11/2022	10/11/2022	10/11/2022	10/11/2022	10/11/2022	10/11/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>										
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0011 U	0.0013 U	0.0011 U	0.0011 U	0.0011 U	0.0012 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0011 U	0.0013 U	0.0011 U	0.0011 U	0.0011 U	0.0012 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0011 U	0.0013 U	0.0011 U	0.0011 U	0.0011 U	0.0012 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00053 U	0.00065 U	0.0003 J	0.00045 J	0.00041 J	0.00054 J	0.0032
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00042 J
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.0009	0.0008	0.00058 U	0.0011
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00051 J	0.0004 J	0.00058 U	0.0058
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.0011
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00053 U	0.00065 U	0.00056 U	0.00053 U	0.00053 U	0.00058 U	0.00053 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

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Data Qualifiers:

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UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB07-2	NPT22-SB08-1	NPT22-SB08-2	NPT22-SB08-3	NPT22-SB09-1	NPT22-SB09-2
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/11/2022	10/11/2022	10/11/2022	10/11/2022	10/12/2022	10/12/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>									
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.00059 U	0.00058 U	0.00052 U	0.00063 U	0.00054 U	0.00077 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00059 U	0.00058 U	0.00052 U	0.00063 U	0.00054 U	0.00077 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.00059 U	0.00058 U	0.00052 U	0.00063 U	0.00054 U	0.00077 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0012 U	0.0012 U	0.001 U	0.0013 U	0.0011 U	0.0015 U
<i>Perfluorooctanesulfonamidoacetic acids</i>									
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0012 U	0.0012 U	0.001 U	0.0013 U	0.0011 U	0.0015 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0012 U	0.0012 U	0.001 U	0.0013 U	0.0011 U	0.0015 U
<i>Perfluoroalkylsulfonic acids</i>									
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00059 U	0.00058 U	0.00052 U	0.00063 U	0.00054 U	0.00077 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00059 U	0.00058 U	0.0011	0.0004 J	0.00054 U	0.00073 J
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00078	0.0061	0.00058	0.00049 J	0.00065	0.00073 J
<i>Perfluoroalkylcarboxylic acids</i>									
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00059 U	0.00058 U	0.00052 U	0.00063 U	0.00054 U	0.00072 J
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00059 U	0.00058 U	0.00052 U	0.00063 U	0.00054 U	0.0012
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00059 U	0.00058 U	0.0012	0.00034 J	0.00054 U	0.00058 J
Perfluorononanoic acid (PFNA)	NS	NS		0.00059 U	0.00065	0.0043	0.0015	0.00054 U	0.0018
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00059 U	0.0013	0.00052 U	0.00063 U	0.00054 U	0.00077 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00059 U	0.0088	0.00052 U	0.00063 U	0.00067	0.00077 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00059 U	0.00066	0.00052 U	0.00063 U	0.00054 U	0.00077 U
Perfluorotridecanoic acid (PFTriDA)	NS	NS		0.00059 U	0.0042	0.00052 U	0.00063 U	0.00037 J	0.00077 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00059 U	0.00058 U	0.00052 U	0.00063 U	0.00054 U	0.00077 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

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Data Qualifiers:

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UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB09-3	NPT22-SB10-1	NPT22-SB10-2	NPT22-SB10-3	NPT22-SB11-1	NPT22-SB11-2
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/12/2022	10/12/2022	10/12/2022	10/12/2022	10/12/2022	10/12/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>									
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.00062 U	0.00054 U	0.00052 U	0.00054 U	0.00057 U	0.00052 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00062 U	0.00054 U	0.00052 U	0.00054 U	0.00057 U	0.00052 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.00062 U	0.00054 U	0.00052 U	0.00054 U	0.00057 U	0.00052 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0012 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.001 U
<i>Perfluorooctanesulfonamidoacetic acids</i>									
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0012 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.001 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0012 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.001 U
<i>Perfluoroalkylsulfonic acids</i>									
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00062 U	0.00054 U	0.00052 U	0.00054 U	0.00057 U	0.00052 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00033 J	0.00054 U	0.00052 U	0.00054 U	0.00057 U	0.00052 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00062 U	0.00054 U	0.001	0.00035 J	0.00057 U	0.00064
<i>Perfluoroalkylcarboxylic acids</i>									
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00062 U	0.00054 U	0.00052 U	0.00054 U	0.00057 U	0.00052 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00053 J	0.00054 U	0.00052 U	0.00054 U	0.00057 U	0.00052 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00062 U	0.00054 U	0.00052 U	0.00054 U	0.00057 U	0.00052 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00062 U	0.00054 U	0.00042 J	0.00054 U	0.00057 U	0.00039 J
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00062 U	0.00093	0.00052 U	0.00054 U	0.0008	0.00069
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00062 U	0.008	0.00052 U	0.00089	0.0322	0.0013
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00062 U	0.001	0.00052 U	0.00054 U	0.0023	0.00052 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.00062 U	0.0016	0.00052 U	0.00054 U	0.0126	0.00041 J
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00062 U	0.00029 J	0.00052 U	0.00054 U	0.0004 J	0.00052 U

Notes:

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Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

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Data Qualifiers:

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Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB11-3	NPT22-SB11-103	NPT22-SB12-1	NPT22-SB12-2	NPT22-SB12-3	NPT22-SB13-1	NPT22-SB13-2
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/12/2022	10/12/2022	10/14/2022	10/14/2022	10/14/2022	10/14/2022	10/14/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>										
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.00063 U	0.00051 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.00063 U	0.00051 U
9CI-PF3ONS (F-53B Major)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.00063 U	0.00051 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.001 U	0.0011 U	0.0012 U	0.001 U	0.0013 U	0.0013 U	0.001 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.001 U	0.0011 U	0.0012 U	0.001 U	0.0013 U	0.0013 U	0.001 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.001 U	0.0011 U	0.0012 U	0.001 U	0.0013 U	0.0013 U	0.001 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.00063 U	0.00051 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.00035 J	0.00079
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00092	0.00098	0.00061 U	0.00052 U	0.0003 J	0.0558	0.798
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.00063 U	0.00089
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.00063 U	0.00051 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.00045 J	0.0012
Perfluorononanoic acid (PFNA)	NS	NS		0.0011	0.0012	0.00061 U	0.00052 U	0.00063 U	0.00097	0.0146
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00052 U	0.00053 U	0.00049 J	0.00052 U	0.00063 U	0.0038	0.0066
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00052 U	0.00053 U	0.00038 J	0.00052 U	0.00063 U	0.0106	0.0403
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.0035	0.0015
Perfluorotridecanoic acid (PFTriDA)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.0066	0.0097
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00052 U	0.00053 U	0.00061 U	0.00052 U	0.00063 U	0.001	0.00051 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

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Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB13-3	NPT22-SB14-1	NPT22-SB14-2	NPT22-SB14-3	NPT22-SB15-1	NPT22-SB15-2	
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/14/2022	10/14/2022	10/14/2022	10/14/2022	10/17/2022	10/17/2022	
			Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
<i>Next Generation Analytes</i>										
11Cl-PF3OUdS (F-53B Minor)	NS	NS	0.00053	U	0.00063	U	0.00054	U	0.00055	U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS	0.00053	U	0.00063	U	0.00054	U	0.00055	U
9Cl-PF3ONS (F-53B Major)	NS	NS	0.00053	U	0.00063	U	0.00054	U	0.00055	U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS	0.0011	U	0.0013	U	0.0011	U	0.0014	U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS	0.0011	U	0.0017		0.0011	U	0.0014	U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS	0.0011	U	0.00086	J	0.0011	U	0.0014	U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS	0.00053	U	0.00063	U	0.00054	U	0.00055	U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS	0.00097		0.00061	J	0.0041		0.0054	
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6	0.486		0.0479		0.0028		0.0177	
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS	0.00057		0.00063	U	0.00054	U	0.00063	
Perfluoroheptanoic acid (PFHpA)	NS	NS	0.00053	U	0.00063	U	0.00043	J	0.00049	J
Perfluorooctanoic acid (PFOA)	0.0017	1.6	0.00082		0.0013		0.0053		0.0024	
Perfluorononanoic acid (PFNA)	NS	NS	0.0103		0.0045		0.0057		0.00082	
Perfluorodecanoic Acid (PFDA)	NS	NS	0.0052		0.005		0.00054	U	0.00055	U
Perfluoroundecanoic acid (PFUnA)	NS	NS	0.0045		0.0781		0.00054	U	0.0011	
Perfluorododecanoic acid (PFDoA)	NS	NS	0.0004	J	0.0136		0.00054	U	0.00055	U
Perfluorotridecanoic acid (PFTrDA)	NS	NS	0.001		0.0584		0.00054	U	0.00055	U
Perfluorotetradecanoic acid (PFTA)	NS	NS	0.00053	U	0.0027		0.00054	U	0.00055	U

Notes:

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UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB15-3	NPT22-SB16-1	NPT22-SB16-2	NPT22-SB16-3	NPT22-SB16-103	NPT22-SB17-1	NPT22-SB17-2		
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/17/2022	10/14/2022	10/14/2022	10/14/2022	10/14/2022	10/15/2022	10/15/2022		
			Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier		
<i>Next Generation Analytes</i>												
11Cl-PF3OUdS (F-53B Minor)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00055	U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00055	U
9Cl-PF3ONS (F-53B Major)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00055	U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS	0.0011	U	0.0012	U	0.0012	U	0.0011	U	0.0011	U
<i>Perfluorooctanesulfonamidoacetic acids</i>												
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS	0.0011	U	0.0012	U	0.0012	U	0.0011	U	0.0011	U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS	0.0011	U	0.0012	U	0.0012	U	0.0011	U	0.0055	U
<i>Perfluoroalkylsulfonic acids</i>												
Perfluorobutanesulfonic acid (PFBS)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00055	U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00055	U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6	0.00074		0.0006	U	0.00053	J	0.00025	J	0.00033	J
<i>Perfluoroalkylcarboxylic acids</i>												
Perfluorohexanoic acid (PFHxA)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00055	U
Perfluoroheptanoic acid (PFHpA)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00055	U
Perfluorooctanoic acid (PFOA)	0.0017	1.6	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00055	U
Perfluorononanoic acid (PFNA)	NS	NS	0.00053	U	0.0006	U	0.0013		0.00055	U	0.00032	J
Perfluorodecanoic Acid (PFDA)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00054	U
Perfluoroundecanoic acid (PFUnA)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00054	U
Perfluorododecanoic acid (PFDoA)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00054	U
Perfluorotridecanoic acid (PFTrDA)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00054	U
Perfluorotetradecanoic acid (PFTA)	NS	NS	0.00053	U	0.0006	U	0.0006	U	0.00055	U	0.00054	U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB17-3	NPT22-SB18-1	NPT22-SB18-2	NPT22-SB18-3	NPT22-SB19-1	NPT22-SB19-2	NPT22-SB19-102
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/15/2022	10/15/2022	10/15/2022	10/15/2022	10/15/2022	10/15/2022	10/15/2022
				Result	Result	Result	Result	Result	Result	Result
				Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier
<i>Next Generation Analytes</i>										
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U
9CI-PF3ONS (F-53B Major)	NS	NS		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.001 U	0.0013 U	0.0011 U	0.0011 U	0.0011 U	0.0014 U	0.0013 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.001 U	0.0013 U	0.0011 U	0.0011 U	0.0011 U	0.0014 U	0.0013 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.001 U	0.0013 U	0.0011 U	0.0011 U	0.0011 U	0.0014 U	0.0013 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.0016	0.0018
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.0033	0.00064 U	0.00091	0.00063	0.0016	0.175 J	0.258
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00082	0.00091
Perfluorononanoic acid (PFNA)	NS	NS		0.00051 U	0.00064 U	0.00048 J	0.00054 U	0.0017	0.29	0.296
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00028 J	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00048 J	0.00049 J
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.0016	0.001	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.00051 U	0.00043 J	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00051 U	0.00064 U	0.00053 U	0.00054 U	0.00057 U	0.00068 U	0.00066 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB19-3	NPT22-SB20-1	NPT22-SB20-2	NPT22-SB20-102	NPT22-SB20-3	NPT22-SB21-1	NPT22-SB21-2
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/15/2022	10/15/2022	10/15/2022	10/15/2022	10/15/2022	10/15/2022	10/15/2022
				Result	Result	Result	Result	Result	Result	Result
				Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier
<i>Next Generation Analytes</i>										
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00061 U	0.00054 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00061 U	0.00054 U
9CI-PF3ONS (F-53B Major)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00061 U	0.00054 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0014 U	0.00099 U	0.0011 U	0.0011 U	0.0012 U	0.0012 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0014 U	0.00099 U	0.0011 U	0.0011 U	0.0012 U	0.0012 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0014 U	0.00099 U	0.0011 U	0.0011 U	0.0012 U	0.0012 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00061 U	0.00054 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.0134	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00061 U	0.00054 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.0006 J	0.0005 U	0.00035 J	0.00031 J	0.0058	0.0031	0.00054 U
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00061 U	0.00054 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00061 U	0.00065
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.0195	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00061 U	0.00092
Perfluorononanoic acid (PFNA)	NS	NS		0.0007 U	0.0005 U	0.00043 J	0.00037 J	0.00059 U	0.0015	0.00054 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00043 J	0.00074	0.00054 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.0007 U	0.0025 UJ	0.00054 U	0.00054 U	0.00059 U	0.0054	0.00054 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00038 J	0.00054 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.0026	0.00054 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.0007 U	0.0005 U	0.00054 U	0.00054 U	0.00059 U	0.00061 U	0.00054 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

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Data Qualifiers:

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UJ = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB22-1	NPT22-SB22-2	NPT22-SB22-3	NPT22-SB23-1	NPT22-SB23-2	NPT22-SB23-3
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/15/2022	10/15/2022	10/15/2022	10/15/2022	10/15/2022	10/15/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>									
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
9CI-PF3ONS (F-53B Major)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.00096 U	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>									
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.00096 U	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0048 U	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>									
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00048 U	0.0302	0.0565	0.00078	0.0018	0.0016
<i>Perfluoroalkylcarboxylic acids</i>									
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00034 J	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00048 U	0.00053 U	0.0003 J	0.00051 U	0.00055	0.00055 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.0024 UJ	0.00053 U	0.00054 U	0.0025 UJ	0.00053 U	0.00055 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U
Perfluorotridecanoic acid (PFTriDA)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00043 J	0.00053 U	0.00055 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00048 U	0.00053 U	0.00054 U	0.00051 U	0.00053 U	0.00055 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

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Data Qualifiers:

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UJ = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB24-1	NPT22-SB24-2	NPT22-SB24-3	NPT22-SB25-1	NPT22-SB25-2	NPT22-SB25-102	NPT22-SB25-3
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/17/2022	10/17/2022	10/17/2022	10/17/2022	10/17/2022	10/17/2022	10/17/2022
				Result	Result	Result	Result	Result	Result	Result
				Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier
<i>Next Generation Analytes</i>										
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00059 U	0.00059 U	0.00061 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00059 U	0.00059 U	0.00061 U
9CI-PF3ONS (F-53B Major)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00059 U	0.00059 U	0.00061 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0011 U	0.0011 U	0.0011 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0011 U	0.0011 U	0.0011 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0011 U	0.0011 U	0.0011 U	0.0013 U	0.0012 U	0.0012 U	0.0012 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00059 U	0.00059 U	0.00061 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00059 U	0.00059 U	0.00061 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00054 U	0.00041 J	0.00053 U	0.0021	0.0294	0.0362	0.0138
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00074	0.00071	0.00061 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00059 U	0.00059 U	0.00061 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00059 U	0.00059 U	0.00061 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00054 U	0.00032 J	0.00053 U	0.00066 U	0.0013	0.0015	0.00071
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.0021	0.0023	0.00056 J
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.0054	0.0129	0.0108	0.0047
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00033 J	0.00059 J	0.00061 U
Perfluorotridecanoic acid (PFTTrDA)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.0035	0.0103	0.008	0.0054
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00054 U	0.00053 U	0.00053 U	0.00066 U	0.00059 U	0.00059 U	0.00061 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

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Data Qualifiers:

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U = The material was analyzed for, but was not detected.

UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB26-1	NPT22-SB26-2	NPT22-SB26-3	NPT22-SB27-1	NPT22-SB27-2	NPT22-SB27-3	NPT22-SB27-103
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/17/2022	10/17/2022	10/17/2022	10/17/2022	10/17/2022	10/17/2022	10/17/2022
				Result	Result	Result	Result	Result	Result	Result
				Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier
<i>Next Generation Analytes</i>										
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0011 U	0.001 U	0.0011 U	0.0013 U	0.0011 U	0.001 U	0.001 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0011 U	0.001 U	0.0011 U	0.0013 U	0.0011 U	0.001 U	0.001 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0011 U	0.001 U	0.0011 U	0.0013 U	0.0011 U	0.001 U	0.001 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00057	0.00029 J	0.00039 J
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.0003 J	0.00047 J	0.00062 J
Perfluorononanoic acid (PFNA)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00034 J	0.00051 U	0.00052 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00073	0.00051 U	0.00053 U	0.0016	0.00053 U	0.00051 U	0.00052 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U
Perfluorotridecanoic acid (PFTTrDA)	NS	NS		0.00032 J	0.00051 U	0.00053 U	0.00092	0.00053 U	0.00051 U	0.00052 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00055 U	0.00051 U	0.00053 U	0.00066 U	0.00053 U	0.00051 U	0.00052 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.



Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB28-1	NPT22-SB28-2	NPT22-SB28-102	NPT22-SB28-3	NPT22-SB29-1	NPT22-SB29-2	NPT22-SB29-4
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/18/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>										
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.00054 U	0.00064 U	0.00065 U	0.00064 U	0.00053 U	0.00066 U	0.00056 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00054 U	0.00064 U	0.00065 U	0.00064 U	0.00053 U	0.00066 U	0.00056 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.00054 U	0.00064 U	0.00065 U	0.00064 U	0.00053 U	0.00066 U	0.00056 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0011 U	0.0013 U	0.0013 U	0.0013 U	0.0011 U	0.0013 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0011 U	0.0013 U	0.0013 U	0.0013 U	0.0011 U	0.0013 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0011 U	0.0013 U	0.0013 U	0.0013 U	0.0011 U	0.0013 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00054 U	0.00064 U	0.00065 U	0.00064 U	0.00053 U	0.00066 U	0.00056 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00054 U	0.00064 U	0.00065 U	0.00064 U	0.00053 U	0.00066 U	0.00056 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00054 U	0.00064 U	0.00065 U	0.00064 U	0.00029 J	0.0024	0.00023 J
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00054 U	0.00035 J	0.00035 J	0.0007	0.00053 U	0.00066 U	0.00056 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00054 U	0.00064 U	0.00065 U	0.00093	0.00053 U	0.00066 U	0.00056 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00054 U	0.0004 J	0.00042 J	0.00054 J	0.00053 U	0.00066 U	0.00056 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00054 U	0.00034 J	0.00052 J	0.00035 J	0.00053 U	0.0311	0.00036 J
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00054 U	0.00064 U	0.00065 U	0.00064 U	0.00053 U	0.00075	0.00056 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.0027 UJ	0.00064 U	0.00065 U	0.00064 U	0.002	0.00066 U	0.00056 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.0027 UJ	0.00064 U	0.00065 U	0.00064 U	0.0049	0.00066 U	0.00056 U
Perfluorotridecanoic acid (PFTriDA)	NS	NS		0.0027 U	0.00064 U	0.00065 U	0.00064 U	0.0358	0.00066 U	0.00056 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00054 U	0.00064 U	0.00065 U	0.00064 U	0.00092	0.00066 U	0.00056 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UJ = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB30-1	NPT22-SB30-2	NPT22-SB30-3	NPT22-SB31-1	NPT22-SB31-2	NPT22-SB31-4
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/18/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>									
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.00051 U	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00051 U	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
9CI-PF3ONS (F-53B Major)	NS	NS		0.00051 U	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.001 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>									
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.001 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.001 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>									
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00051 U	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.0004 J	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.0035	0.0107	0.0027	0.00052 U	0.00053 U	0.00053 U
<i>Perfluoroalkylcarboxylic acids</i>									
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00051 U	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00051 U	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00051 U	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00048 J	0.0079	0.0025	0.00052 U	0.00053 U	0.00053 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00034 J	0.00036 J	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.0025 UJ	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.0025 UJ	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.0025 U	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00051 U	0.00051 U	0.00055 U	0.00052 U	0.00053 U	0.00053 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UJ = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB32-1	NPT22-SB32-2	NPT22-SB32-4	NPT22-SB33-1	NPT22-SB33-2	NPT22-SB33-102	NPT22-SB33-3
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/18/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022	10/18/2022
				Result	Result	Result	Result	Result	Result	Result
				Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier
<i>Next Generation Analytes</i>										
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0012 U	0.0013 U	0.0015 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0012 U	0.0013 U	0.0015 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0012 U	0.0013 U	0.0015 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00052 J	0.00022 J	0.00027 J	0.00053 U	0.00052 J	0.00038 J	0.00043 J
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 J	0.00032 J	0.00073 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00055 U	0.00041 J	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00053 J	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Perfluorotridecanoic acid (PFTTrDA)	NS	NS		0.0005 J	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00055 U	0.00055 U	0.00057 U	0.00053 U	0.00062 U	0.00063 U	0.00073 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB34-1	NPT22-SB34-2	NPT22-SB34-3	NPT22-SB35-1	NPT22-SB35-2	NPT22-SB35-3
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/19/2022	10/19/2022	10/19/2022	10/19/2022	10/19/2022	10/19/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>									
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.00056 U	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00056 U	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.00056 U	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0011 U	0.0013 U	0.0011 U	0.0012 U	0.0011 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>									
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0011 U	0.0013 U	0.0011 U	0.0012 U	0.0011 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0011 U	0.0013 U	0.0011 U	0.0012 U	0.0011 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>									
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00056 U	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00056 U	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.0034	0.0037	0.00053 J	0.00059 U	0.00033 J	0.00055 U
<i>Perfluoroalkylcarboxylic acids</i>									
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00056 U	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00056 U	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00056 U	0.00066 U	0.00054 U	0.00059 U	0.00034 J	0.00055 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00039 J	0.0104	0.0012	0.00059 U	0.00037 J	0.00055 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00047 J	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.0091	0.00066 U	0.00051 J	0.00035 J	0.00056 U	0.00055 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00049 J	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.00044 J	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00056 U	0.00066 U	0.00054 U	0.00059 U	0.00056 U	0.00055 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

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PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UU = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB36-1	NPT22-SB36-2	NPT22-SB36-3	NPT22-SB37-1	NPT22-SB37-2	NPT22-SB37-3
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/19/2022	10/19/2022	10/19/2022	10/19/2022	10/19/2022	10/19/2022
				Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>									
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.00053 U	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00053 U	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.00053 U	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0011 U	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>									
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0011 U	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0011 U	0.0011 U	0.0011 U	0.001 U	0.0011 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>									
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00053 U	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00048 J	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.0019	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
<i>Perfluoroalkylcarboxylic acids</i>									
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00053 U	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00053 U	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00053 U	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00079	0.00056 U	0.00053 U	0.00052 U	0.00071	0.00055 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00053 U	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00046 J	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.0027 UJ	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Perfluorotridecanoic acid (PFTriDA)	NS	NS		0.0027 U	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.0027 UJ	0.00056 U	0.00053 U	0.00052 U	0.00056 U	0.00055 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UJ = The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB38-1	NPT22-SB38-2	NPT22-SB38-3	NPT22-SB39-1	NPT22-SB39-2	NPT22-SB39-102	NPT22-SB39-3
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/19/2022	10/19/2022	10/19/2022	10/19/2022	10/19/2022	10/19/2022	10/19/2022
				Result	Result	Result	Result	Result	Result	Result
				Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier
<i>Next Generation Analytes</i>										
11Cl-PF3OUdS (F-53B Minor)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
9Cl-PF3ONS (F-53B Major)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.0012 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0012 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.0012 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0012 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.0012 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0012 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Perfluorononanoic acid (PFNA)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00031 J	0.00057 U	0.00059 U	0.00056 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00044 J	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.0006 U	0.00054 U	0.00055 U	0.00055 U	0.00057 U	0.00059 U	0.00056 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

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U = The material was analyzed for, but was not detected.

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Table 1. PFAS Results - Soil

Analyte (mg/kg)	ADEC Soil Cleanup	ADEC Soil Cleanup	Sample Identification:	NPT22-SB40-1	NPT22-SB40-2	NPT22-SB40-102	NPT22-SB40-3	NPT22-SB41-1	NPT22-SB41-2	NPT22-SB41-3
	Levels Migration to Groundwater	Levels Under 40 Inch Zone	Sample Date:	10/20/2022	10/20/2022	10/20/2022	10/20/2022	10/20/2022	10/20/2022	10/20/2022
				Result	Result	Result	Result	Result	Result	Result
				Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier	Qualifier
<i>Next Generation Analytes</i>										
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U
9CI-PF3ONS (F-53B Major)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		0.001 U	0.0013 U	0.0013 U	0.001 U	0.0011 U	0.0012 U	0.0011 U
<i>Perfluorooctanesulfonamidoacetic acids</i>										
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		0.001 U	0.0013 U	0.0013 U	0.001 U	0.0011 U	0.0012 U	0.0011 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		0.001 U	0.0013 U	0.0013 U	0.001 U	0.0011 U	0.0012 U	0.0011 U
<i>Perfluoroalkylsulfonic acids</i>										
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U
<i>Perfluoroalkylcarboxylic acids</i>										
Perfluorohexanoic acid (PFHxA)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00044 J	0.00059 U	0.00056 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00031 J	0.00059 U	0.00056 U
Perfluorononanoic acid (PFNA)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00033 J	0.00029 J
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.0018	0.0023
Perfluorododecanoic acid (PFDoA)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00046 J	0.00051 J
Perfluorotridecanoic acid (PFTTrDA)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.00052 U	0.00067 U	0.00065 U	0.00052 U	0.00053 U	0.00059 U	0.00056 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

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Table 2. PFAS Results - Temporary Well Points

Analyte (µg/L)	ADEC Groundwater Cleanup Level	Sample Identification: Sample Date:	NPT22-TWP13	NPT22-TWP115	NPT22-TWP15	NPT22-TWP23	NPT22-TWP27
			Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>							
11CI-PF3OUdS (F-53B Minor)	NS		0.4 <i>UJ</i>	0.019 <i>UJ</i>	0.019 <i>UJ</i>	0.017 <i>UJ</i>	0.018 <i>UJ</i>
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS		0.4 <i>UJ</i>	0.019 <i>UJ</i>	0.019 <i>UJ</i>	0.017 <i>UJ</i>	0.018 <i>UJ</i>
9CI-PF3ONS (F-53B Major)	NS		0.4 <i>UJ</i>	0.019 <i>UJ</i>	0.019 <i>UJ</i>	0.017 <i>UJ</i>	0.018 <i>UJ</i>
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS		0.2 <i>UJ</i>	0.0095 <i>UJ</i>	0.0095 <i>UJ</i>	0.0083 <i>UJ</i>	0.0091 <i>UJ</i>
<i>Perfluorooctanesulfonamidoacetic acids</i>							
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS		0.2 <i>UJ</i>	0.0095 <i>UJ</i>	0.0095 <i>UJ</i>	0.0083 <i>UJ</i>	0.0091 <i>UJ</i>
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS		0.2 <i>UJ</i>	0.0095 <i>UJ</i>	0.0095 <i>UJ</i>	0.0083 <i>UJ</i>	0.0091 <i>UJ</i>
<i>Perfluoroalkylsulfonic acids</i>							
Perfluorobutanesulfonic acid (PFBS)	NS		0.605 <i>J</i>	0.0533 <i>J</i>	0.0508 <i>J</i>	0.0042 <i>J</i>	0.0045 <i>UJ</i>
Perfluorohexanesulfonic acid (PFHxS)	NS		16.5 <i>J</i>	1.53 <i>J</i>	1.81 <i>J</i>	0.326 <i>J</i>	0.058 <i>J</i>
Perfluorooctanesulfonic acid (PFOS)	0.4		399 <i>J</i>	10.2 <i>J</i>	12.1 <i>J</i>	0.943 <i>J</i>	0.0603 <i>J</i>
<i>Perfluoroalkylcarboxylic acids</i>							
Perfluorohexanoic acid (PFHxA)	NS		5.16 <i>J</i>	0.993 <i>J</i>	1.18 <i>J</i>	0.0816 <i>J</i>	0.0379 <i>J</i>
Perfluoroheptanoic acid (PFHpA)	NS		1.24 <i>J</i>	0.669 <i>J</i>	0.644 <i>J</i>	0.217 <i>J</i>	0.0853 <i>J</i>
Perfluorooctanoic acid (PFOA)	0.4		7.15 <i>J</i>	1.59 <i>J</i>	1.75 <i>J</i>	0.218 <i>J</i>	0.077 <i>J</i>
Perfluorononanoic acid (PFNA)	NS		49.3 <i>J</i>	4.57 <i>J</i>	5.24 <i>J</i>	0.078 <i>J</i>	0.102 <i>J</i>
Perfluorodecanoic Acid (PFDA)	NS		0.884 <i>J</i>	0.111 <i>J</i>	0.0946 <i>J</i>	0.0064 <i>J</i>	0.0043 <i>J</i>
Perfluoroundecanoic acid (PFUnA)	NS		0.113 <i>J</i>	0.0578 <i>J</i>	0.0541 <i>J</i>	0.0042 <i>UJ</i>	0.0045 <i>UJ</i>
Perfluorododecanoic acid (PFDoA)	NS		0.1 <i>UJ</i>	0.0048 <i>UJ</i>	0.0048 <i>UJ</i>	0.0042 <i>UJ</i>	0.0045 <i>UJ</i>
Perfluorotridecanoic acid (PFTrDA)	NS		0.1 <i>UJ</i>	0.0048 <i>UJ</i>	0.0048 <i>UJ</i>	0.0042 <i>UJ</i>	0.0045 <i>UJ</i>
Perfluorotetradecanoic acid (PFTA)	NS		0.1 <i>UJ</i>	0.0048 <i>UJ</i>	0.0048 <i>UJ</i>	0.0042 <i>UJ</i>	0.0045 <i>UJ</i>

Notes:

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Table 2. PFAS Results - Temporary Well Points

Analyte (µg/L)	ADEC Groundwater Cleanup Level	Sample Identification: Sample Date:	NPT22-TWP28	NPT22-TWP29	NPT22-TWP30	NPT22-TWP32	NPT22-TWP33	NPT22-TWP40
			Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>								
11CI-PF3OUdS (F-53B Minor)	NS		0.019 <i>UJ</i>	0.017 <i>UJ</i>	0.016 <i>UJ</i>	0.02 <i>UJ</i>	0.017 <i>U</i>	0.02 <i>U</i>
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS		0.019 <i>UJ</i>	0.017 <i>UJ</i>	0.016 <i>UJ</i>	0.02 <i>UJ</i>	0.017 <i>U</i>	0.02 <i>U</i>
9CI-PF3ONS (F-53B Major)	NS		0.019 <i>UJ</i>	0.017 <i>UJ</i>	0.016 <i>UJ</i>	0.02 <i>UJ</i>	0.017 <i>U</i>	0.02 <i>U</i>
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS		0.0095 <i>UJ</i>	0.0083 <i>UJ</i>	0.008 <i>UJ</i>	0.01 <i>UJ</i>	0.0083 <i>U</i>	0.01 <i>U</i>
<i>Perfluorooctanesulfonamidoacetic acids</i>								
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS		0.0095 <i>UJ</i>	0.0083 <i>UJ</i>	0.008 <i>UJ</i>	0.01 <i>UJ</i>	0.0083 <i>U</i>	0.01 <i>U</i>
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS		0.0095 <i>UJ</i>	0.0083 <i>UJ</i>	0.008 <i>UJ</i>	0.01 <i>UJ</i>	0.0083 <i>U</i>	0.01 <i>U</i>
<i>Perfluoroalkylsulfonic acids</i>								
Perfluorobutanesulfonic acid (PFBS)	NS		0.0032 <i>J</i>	0.0036 <i>J</i>	0.0035 <i>J</i>	0.005 <i>UJ</i>	0.0042 <i>U</i>	0.005 <i>U</i>
Perfluorohexanesulfonic acid (PFHxS)	NS		0.06 <i>J</i>	0.0977 <i>J</i>	0.106 <i>J</i>	0.0196 <i>J</i>	0.081	0.0064
Perfluorooctanesulfonic acid (PFOS)	0.4		0.379 <i>J</i>	0.445 <i>J</i>	0.385 <i>J</i>	0.0314 <i>J</i>	0.142	0.0078
<i>Perfluoroalkylcarboxylic acids</i>								
Perfluorohexanoic acid (PFHxA)	NS		0.113 <i>J</i>	0.119 <i>J</i>	0.103 <i>J</i>	0.022 <i>J</i>	0.0465	0.0063
Perfluoroheptanoic acid (PFHpA)	NS		0.16 <i>J</i>	0.115 <i>J</i>	0.142 <i>J</i>	0.0425 <i>J</i>	0.055	0.0082
Perfluorooctanoic acid (PFOA)	0.4		0.194 <i>J</i>	0.157 <i>J</i>	0.193 <i>J</i>	0.0502 <i>J</i>	0.087	0.012
Perfluorononanoic acid (PFNA)	NS		0.787 <i>J</i>	1.79 <i>J</i>	0.739 <i>J</i>	0.103 <i>J</i>	0.0562	0.0062
Perfluorodecanoic Acid (PFDA)	NS		0.0277 <i>J</i>	0.0348 <i>J</i>	0.0086 <i>J</i>	0.005 <i>UJ</i>	0.0095	0.005 <i>U</i>
Perfluoroundecanoic acid (PFUnA)	NS		0.0957 <i>J</i>	0.0059 <i>J</i>	0.004 <i>UJ</i>	0.005 <i>UJ</i>	0.0042 <i>U</i>	0.005 <i>U</i>
Perfluorododecanoic acid (PFDoA)	NS		0.0048 <i>UJ</i>	0.0042 <i>UJ</i>	0.004 <i>UJ</i>	0.005 <i>UJ</i>	0.0042 <i>U</i>	0.005 <i>U</i>
Perfluorotridecanoic acid (PFTrDA)	NS		0.0048 <i>UJ</i>	0.0042 <i>UJ</i>	0.004 <i>UJ</i>	0.005 <i>UJ</i>	0.0042 <i>U</i>	0.005 <i>U</i>
Perfluorotetradecanoic acid (PFTA)	NS		0.0048 <i>UJ</i>	0.0042 <i>UJ</i>	0.004 <i>UJ</i>	0.005 <i>UJ</i>	0.0042 <i>U</i>	0.005 <i>U</i>

Notes:

Highlighted indicates value exceeds ADEC Human Health Groundwater Cleanup Levels .

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Data Qualifiers:

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Table 3. PFAS Results - Monitoring Wells

Analyte (µg/L)	ADEC Groundwater Cleanup Level	Sample Identification: Sample Date:	MW-116-15 10/27/2022	MW-138-20 10/27/2022	MW-179A-15 10/26/2022	MW-179A-15 PDB 11/18/2022	MW-337-20 10/27/2022	MW-348-15 10/27/2022
			Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>								
11CI-PF3OUdS (F-53B Minor)	NS		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
9CI-PF3ONS (F-53B Major)	NS		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS		0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
<i>Perfluorooctanesulfonamidoacetic acids</i>								
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS		0.16 UJ	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS		0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
<i>Perfluoroalkylsulfonic acids</i>								
Perfluorobutanesulfonic acid (PFBS)	NS		0.0036 J	0.004 U	0.004 U	0.004 U	0.004 U	0.0024 J
Perfluorohexanesulfonic acid (PFHxS)	NS		0.214	0.075	0.0177	0.0184	0.04	0.0845
Perfluorooctanesulfonic acid (PFOS)	0.4		9.81	0.38	0.0807	0.0803	0.484	0.652
<i>Perfluoroalkylcarboxylic acids</i>								
Perfluorohexanoic acid (PFHxA)	NS		0.573	0.165	0.0299	0.029	0.0683	0.15
Perfluoroheptanoic acid (PFHpA)	NS		0.42	0.136	0.0381	0.0373	0.0765	0.135
Perfluorooctanoic acid (PFOA)	0.4		0.93	0.157	0.0341	0.0328	0.0983	0.169
Perfluorononanoic acid (PFNA)	NS		0.652 J	0.314	0.0815	0.0912	0.43	0.777
Perfluorodecanoic Acid (PFDA)	NS		0.451 J	0.0426	0.0024 J	0.0023 J	0.048	0.0251
Perfluoroundecanoic acid (PFUnA)	NS		0.004 U	0.205	0.004 U	0.004 U	0.371	0.0721
Perfluorododecanoic acid (PFDoA)	NS		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Perfluorotridecanoic acid (PFTrDA)	NS		0.004 U	0.0059	0.004 U	0.004 U	0.003 J	0.0036 J
Perfluorotetradecanoic acid (PFTA)	NS		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U

Notes:

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Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

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Table 3. PFAS Results - Monitoring Wells

Analyte (µg/L)	ADEC Groundwater Cleanup Level	Sample Identification: Sample Date:	MW-358-20 10/26/2022 Result Qualifier	MW-358-20 PDB 11/21/2022 Result Qualifier	MW-358-60 10/26/2022 Result Qualifier	MW-359-35 10/26/2022 Result Qualifier	MW-359-80 10/26/2022 Result Qualifier	MW-360-35 10/26/2022 Result Qualifier
<i>Next Generation Analytes</i>								
11CI-PF3OUdS (F-53B Minor)	NS		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
9CI-PF3ONS (F-53B Major)	NS		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS		0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
<i>Perfluorooctanesulfonamidoacetic acids</i>								
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS		0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS		0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
<i>Perfluoroalkylsulfonic acids</i>								
Perfluorobutanesulfonic acid (PFBS)	NS		0.0029 J	0.0045	0.004 U	0.0055	0.004 U	0.0022 J
Perfluorohexanesulfonic acid (PFHxS)	NS		0.0598	0.0615	0.0157	0.0884	0.0084	0.035
Perfluorooctanesulfonic acid (PFOS)	0.4		0.149	0.174	0.0578	0.228	0.0236	0.0848
<i>Perfluoroalkylcarboxylic acids</i>								
Perfluorohexanoic acid (PFHxA)	NS		0.0548	0.0597	0.0141	0.0858	0.0063	0.0387
Perfluoroheptanoic acid (PFHpA)	NS		0.0424	0.05	0.0112	0.0597	0.0047	0.0277
Perfluorooctanoic acid (PFOA)	0.4		0.0645	0.0654	0.02	0.088	0.0077	0.0364
Perfluorononanoic acid (PFNA)	NS		0.252	0.29	0.0651	0.447	0.0284	0.0903
Perfluorodecanoic Acid (PFDA)	NS		0.0026 J	0.003 J	0.004 U	0.0042	0.004 U	0.004 U
Perfluoroundecanoic acid (PFUnA)	NS		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Perfluorododecanoic acid (PFDoA)	NS		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Perfluorotridecanoic acid (PFTrDA)	NS		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Perfluorotetradecanoic acid (PFTA)	NS		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U

Notes:

Highlighted indicates value exceeds ADEC Human Health Groundwater Cleanup Levels .

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UU = The material was analyzed for, but was not detected. The sample quantitation limit is an

Table 3. PFAS Results - Monitoring Wells

Analyte (µg/L)	ADEC Groundwater Cleanup Level	Sample Identification: MW-360-35 PDB Sample Date: 11/21/2022	MW-360-35 PDB Result Qualifier	MW-364-30 10/27/2022 Result Qualifier	MW-364-30 PDB 11/18/2022 Result Qualifier	MW22-374-15 10/25/2022 Result Qualifier	MW22-375-15 10/25/2022 Result Qualifier	O-1 11/1/2022 Result Qualifier
<i>Next Generation Analytes</i>								
11CI-PF3OUdS (F-53B Minor)	NS		0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS		0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U
9CI-PF3ONS (F-53B Major)	NS		0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS		0.008 U	0.04 UJ	0.0083 U	0.008 U	0.008 U	0.0157 J
<i>Perfluorooctanesulfonamidoacetic acids</i>								
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS		0.008 U	0.008 U	0.0083 U	0.008 U	0.008 U	0.008 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS		0.008 U	0.008 U	0.0083 U	0.008 U	0.008 U	0.008 U
<i>Perfluoroalkylsulfonic acids</i>								
Perfluorobutanesulfonic acid (PFBS)	NS		0.004	0.004 U	0.0042 U	0.004 U	0.004 U	0.0024 J
Perfluorohexanesulfonic acid (PFHxS)	NS		0.035	0.0167	0.0166	0.0106	0.0041	0.089
Perfluorooctanesulfonic acid (PFOS)	0.4		0.085	0.0358	0.0376	0.0122	0.0042	1.3
<i>Perfluoroalkylcarboxylic acids</i>								
Perfluorohexanoic acid (PFHxA)	NS		0.0394	0.013	0.0134	0.0183	0.004 U	0.114
Perfluoroheptanoic acid (PFHpA)	NS		0.0318	0.0098	0.0117	0.0221	0.004 U	0.123
Perfluorooctanoic acid (PFOA)	0.4		0.0372	0.0143	0.0144	0.0263	0.0033 J	0.151
Perfluorononanoic acid (PFNA)	NS		0.0921	0.0331	0.0364	0.0328	0.004 U	1.88
Perfluorodecanoic Acid (PFDA)	NS		0.004 U	0.004 U	0.0042 U	0.0035 J	0.004 U	0.0526
Perfluoroundecanoic acid (PFUnA)	NS		0.004 U	0.004 U	0.0042 U	0.004 U	0.004 U	0.167
Perfluorododecanoic acid (PFDoA)	NS		0.004 U	0.004 U	0.0042 U	0.004 U	0.004 U	0.004 U
Perfluorotridecanoic acid (PFTrDA)	NS		0.004 U	0.004 U	0.0042 U	0.004 U	0.004 U	0.004 U
Perfluorotetradecanoic acid (PFTA)	NS		0.004 U	0.004 U	0.0042 U	0.004 U	0.004 U	0.004 U

Notes:

Highlighted indicates value exceeds ADEC Human Health Groundwater Cleanup Levels .

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

UJ = The material was analyzed for, but was not detected. The sample quantitation limit is an

Table 3. PFAS Results - Monitoring Wells

Analyte (µg/L)	ADEC Groundwater Cleanup Level	Sample Identification: Sample Date:	O-101 11/1/2022 Result Qualifier	O-1 PDB 11/1/2022 Result Qualifier	O-20 11/1/2022 Result Qualifier
<i>Next Generation Analytes</i>					
11CI-PF3OUdS (F-53B Minor)	NS		0.016 <i>U</i>	0.03 <i>U</i>	0.016 <i>U</i>
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS		0.016 <i>U</i>	0.03 <i>U</i>	0.016 <i>U</i>
9CI-PF3ONS (F-53B Major)	NS		0.016 <i>U</i>	0.03 <i>U</i>	0.016 <i>U</i>
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS		0.008 <i>UJ</i>	0.015 <i>U</i>	0.008 <i>U</i>
<i>Perfluorooctanesulfonamidoacetic acids</i>					
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS		0.008 <i>U</i>	0.077 <i>U</i>	0.008 <i>U</i>
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS		0.008 <i>U</i>	0.015 <i>U</i>	0.008 <i>U</i>
<i>Perfluoroalkylsulfonic acids</i>					
Perfluorobutanesulfonic acid (PFBS)	NS		0.0023 <i>J</i>	0.0075 <i>U</i>	0.0023 <i>J</i>
Perfluorohexanesulfonic acid (PFHxS)	NS		0.0986	0.1	0.112
Perfluorooctanesulfonic acid (PFOS)	0.4		1.28	1.31	0.537
<i>Perfluoroalkylcarboxylic acids</i>					
Perfluorohexanoic acid (PFHxA)	NS		0.113	0.121	0.131
Perfluoroheptanoic acid (PFHpA)	NS		0.121	0.141	0.222
Perfluorooctanoic acid (PFOA)	0.4		0.147	0.157	0.2
Perfluorononanoic acid (PFNA)	NS		1.8	1.8	1.98
Perfluorodecanoic Acid (PFDA)	NS		0.0519	0.0526	0.0147
Perfluoroundecanoic acid (PFUnA)	NS		0.157	0.165	0.0513
Perfluorododecanoic acid (PFDoA)	NS		0.004 <i>U</i>	0.0075 <i>U</i>	0.004 <i>U</i>
Perfluorotridecanoic acid (PFTrDA)	NS		0.004 <i>U</i>	0.0075 <i>U</i>	0.004 <i>U</i>
Perfluorotetradecanoic acid (PFTA)	NS		0.004 <i>U</i>	0.0075 <i>U</i>	0.004 <i>U</i>

## Notes:

Highlighted indicates value exceeds ADEC Human Health Groundwater Cleanup Levels .

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

## Data Qualifiers:

*J* = The result is an estimated quantity.

*U* = The material was analyzed for, but was not detected.

*UJ* = The material was analyzed for, but was not detected. The sample quantitation limit is an

Table 4. PFAS Results - Surface Water

Analyte (µg/L)	Sample Identification: NGP-SW01		NGP-SW02		NGP-SW03		NGP-SW04		NGP-SW05		NGP-SW105		NGP-SW06	
	Sample Date: 9/28/2022		9/28/2022		9/28/2022		9/28/2022		9/28/2022		9/28/2022		9/28/2022	
	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
<i>Next Generation Analytes</i>														
11CI-PF3OUdS (F-53B Minor)	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U
9CI-PF3ONS (F-53B Major)	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
<i>Perfluorooctanesulfonamidoacetic acids</i>														
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
<i>Perfluoroalkylsulfonic acids</i>														
Perfluorobutanesulfonic acid (PFBS)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Perfluorohexanesulfonic acid (PFHxS)	0.0202		0.0238		0.0231		0.0232		0.0228		0.0231		0.0223	
Perfluorooctanesulfonic acid (PFOS)	0.0461		0.0566		0.0536		0.0643		0.0569		0.079		0.0608	
<i>Perfluoroalkylcarboxylic acids</i>														
Perfluorohexanoic acid (PFHxA)	0.0216		0.0257		0.0256		0.0247		0.0252		0.0246		0.0246	
Perfluoroheptanoic acid (PFHpA)	0.0167		0.0201		0.0197		0.019		0.0193		0.0191		0.0189	
Perfluorooctanoic acid (PFOA)	0.0208		0.0245		0.0236		0.0234		0.0238		0.0241		0.0233	
Perfluorononanoic acid (PFNA)	0.0675		0.0811		0.0782		0.0868		0.0792		0.0947		0.0827	
Perfluorodecanoic Acid (PFDA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Perfluoroundecanoic acid (PFUnA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Perfluorododecanoic acid (PFDoA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Perfluorotridecanoic acid (PFTrDA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Perfluorotetradecanoic acid (PFTA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U

Notes:

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

- J = The result is an estimated quantity.
- U = The material was analyzed for, but was not detected.

Table 4. PFAS Results - Surface Water

Analyte (µg/L)	Sample Identification:	NGP-SW07	NGP-SW08	NGP-SW09	NGP-SW10	NGP-SW11	NGP-SW12	NGP-SW13
	Sample Date:	9/28/2022	9/28/2022	9/28/2022	9/28/2022	9/28/2022	9/28/2022	9/28/2022
		Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>								
11CI-PF3OUdS (F-53B Minor)		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
9CI-PF3ONS (F-53B Major)		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)		0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
<i>Perfluorooctanesulfonamidoacetic acids</i>								
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)		0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)		0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
<i>Perfluoroalkylsulfonic acids</i>								
Perfluorobutanesulfonic acid (PFBS)		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Perfluorohexanesulfonic acid (PFHxS)		0.0222	0.0222	0.0247	0.0225	0.0254	0.0235	0.0236
Perfluorooctanesulfonic acid (PFOS)		0.0539	0.0524	0.0676	0.0505	0.0545	0.0553	0.0554
<i>Perfluoroalkylcarboxylic acids</i>								
Perfluorohexanoic acid (PFHxA)		0.0238	0.0245	0.0272	0.0248	0.027	0.0264	0.0257
Perfluoroheptanoic acid (PFHpA)		0.0185	0.0187	0.0212	0.0192	0.0213	0.0204	0.02
Perfluorooctanoic acid (PFOA)		0.0225	0.023	0.0263	0.0231	0.0256	0.0239	0.0244
Perfluorononanoic acid (PFNA)		0.0736	0.0769	0.0948	0.0723	0.0844	0.0794	0.0793
Perfluorodecanoic Acid (PFDA)		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Perfluoroundecanoic acid (PFUnA)		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Perfluorododecanoic acid (PFDoA)		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Perfluorotridecanoic acid (PFTTrDA)		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Perfluorotetradecanoic acid (PFTA)		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U

Notes:

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

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U = The material was analyzed for, but was not detected.

Table 4. PFAS Results - Surface Water

Analyte (µg/L)	Sample Identification:	NGP-SW14	NGP-SW114	NGP-SW15	NGP-SW16	NGP-SW17	NGP-SW18	SGP-SW01	
	Sample Date:	9/28/2022	9/28/2022	9/28/2022	9/28/2022	9/28/2022	9/28/2022	9/29/2022	
		Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
<i>Next Generation Analytes</i>									
11CI-PF3OUdS (F-53B Minor)		0.016	U	0.016	U	0.016	U	0.016	U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)		0.016	U	0.016	U	0.016	U	0.016	U
9CI-PF3ONS (F-53B Major)		0.016	U	0.016	U	0.016	U	0.016	U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)		0.008	U	0.008	U	0.008	U	0.008	U
<i>Perfluorooctanesulfonamidoacetic acids</i>									
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)		0.008	U	0.008	U	0.008	U	0.008	U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)		0.008	U	0.008	U	0.008	U	0.008	U
<i>Perfluoroalkylsulfonic acids</i>									
Perfluorobutanesulfonic acid (PFBS)		0.004	U	0.004	U	0.004	U	0.002	J
Perfluorohexanesulfonic acid (PFHxS)		0.0244		0.0228		0.0251		0.0242	
Perfluorooctanesulfonic acid (PFOS)		0.056		0.0545		0.0569		0.0534	
<i>Perfluoroalkylcarboxylic acids</i>									
Perfluorohexanoic acid (PFHxA)		0.0263		0.0251		0.0268		0.0268	
Perfluoroheptanoic acid (PFHpA)		0.0203		0.0195		0.0206		0.0205	
Perfluorooctanoic acid (PFOA)		0.0246		0.0233		0.0243		0.0246	
Perfluorononanoic acid (PFNA)		0.0811		0.0779		0.0799		0.0773	
Perfluorodecanoic Acid (PFDA)		0.004	U	0.004	U	0.004	U	0.004	U
Perfluoroundecanoic acid (PFUnA)		0.004	U	0.004	U	0.004	U	0.004	U
Perfluorododecanoic acid (PFDoA)		0.004	U	0.004	U	0.004	U	0.004	U
Perfluorotridecanoic acid (PFTrDA)		0.004	U	0.004	U	0.004	U	0.004	U
Perfluorotetradecanoic acid (PFTA)		0.004	U	0.004	U	0.004	U	0.004	U

Notes:

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.



Table 4. PFAS Results - Surface Water

Analyte (µg/L)	Sample Identification: SGP-SW02		SGP-SW03		SGP-SW04		SGP-SW05		SGP-SW06		SGP-SW09	
	Sample Date: 9/29/2022		9/29/2022		9/29/2022		9/29/2022		9/29/2022		9/29/2022	
	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
<i>Next Generation Analytes</i>												
11CI-PF3OUdS (F-53B Minor)	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U
9CI-PF3ONS (F-53B Major)	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U	0.016	U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
<i>Perfluorooctanesulfonamidoacetic acids</i>												
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
<i>Perfluoroalkylsulfonic acids</i>												
Perfluorobutanesulfonic acid (PFBS)	0.004	U	0.0022	J	0.004	U	0.004	U	0.004	U	0.004	U
Perfluorohexanesulfonic acid (PFHxS)	0.0447		0.0428		0.0352		0.0428		0.0438		0.0461	
Perfluorooctanesulfonic acid (PFOS)	0.0343		0.0337		0.0245		0.0331		0.0339		0.0343	
<i>Perfluoroalkylcarboxylic acids</i>												
Perfluorohexanoic acid (PFHxA)	0.0453		0.0447		0.0369		0.0437		0.0439		0.045	
Perfluoroheptanoic acid (PFHpA)	0.0374		0.0369		0.0298		0.0353		0.037		0.0369	
Perfluorooctanoic acid (PFOA)	0.0432		0.0431		0.034		0.0419		0.0429		0.0426	
Perfluorononanoic acid (PFNA)	0.0426		0.0421		0.0325		0.0408		0.0425		0.0426	
Perfluorodecanoic Acid (PFDA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Perfluoroundecanoic acid (PFUnA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Perfluorododecanoic acid (PFDoA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Perfluorotridecanoic acid (PFTrDA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Perfluorotetradecanoic acid (PFTA)	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U

Notes:

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

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U = The material was analyzed for, but was not detected.

Former North Pole Refinery

North Pole, Alaska

Table 5. PFAS Results - Sediment

Analyte (mg/kg)	ADEC Soil Cleanup Levels Migration to Groundwater	ADEC Soil Cleanup Levels Under 40 Inch Zone	Sample Identification: Sample Date:	NGP-SED01 9/28/2022 Result Qualifier	NGP-SED02 9/28/2022 Result Qualifier	NGP-SED03 9/28/2022 Result Qualifier	NGP-SED103 9/28/2022 Result Qualifier
<i>Next Generation Analytes</i>							
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
9CI-PF3ONS (F-53B Major)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		1.5 U	2 U	1.7 U	1.5 U
<i>Perfluorooctanesulfonamidoacetic acids</i>							
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		1.5 U	2 U	1.7 U	1.5 U
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		1.5 U	2 U	1.7 U	1.5 U
<i>Perfluoroalkylsulfonic acids</i>							
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.73 J	2	0.83 U	0.76 U
<i>Perfluoroalkylcarboxylic acids</i>							
Perfluorohexanoic acid (PFHxA)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.77 U	1 U	0.83 U	0.76 U
Perfluorononanoic acid (PFNA)	NS	NS		0.68 J	2.4	0.83 U	0.76 U
Perfluorodecanoic Acid (PFDA)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.66 J	0.74 J	0.83 U	0.76 U
Perfluorododecanoic acid (PFDoA)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.77 U	1 U	0.83 U	0.76 U
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.77 U	1 U	0.83 U	0.76 U

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

ADEC = Alaska Department of Environmental Conservation

NS = no standard

PFAS = per- and polyfluoroalkylated substances

Data Qualifiers:

J = The result is an estimated quantity.

U = The material was analyzed for, but was not detected.

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Former North Pole Refinery

North Pole, Alaska

Table 5. PFAS Results - Sediment

Analyte (mg/kg)	ADEC Soil Cleanup Levels Migration to Groundwater	ADEC Soil Cleanup Levels Under 40 Inch Zone	Sample Identification: Sample Date:	NGP-SED04 9/28/2022 Result Qualifier	NGP-SED05 9/28/2022 Result Qualifier	NGP-SED06 9/28/2022 Result Qualifier	SGP-SED01 9/28/2022 Result Qualifier
<i>Next Generation Analytes</i>							
11CI-PF3OUdS (F-53B Minor)	NS	NS		0.66 U	1.2 U	0.8 U	2.3 UJ
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		0.66 U	1.2 U	0.8 U	2.3 UJ
9CI-PF3ONS (F-53B Major)	NS	NS		0.66 U	1.2 U	0.8 U	2.3 UJ
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		1.3 U	2.3 U	1.6 U	4.6 UJ
<i>Perfluorooctanesulfonamidoacetic acids</i>							
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		1.3 U	2.3 U	1.6 U	4.6 UJ
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		1.3 U	2.3 U	1.6 U	4.6 UJ
<i>Perfluoroalkylsulfonic acids</i>							
Perfluorobutanesulfonic acid (PFBS)	NS	NS		0.66 U	1.2 U	0.8 U	2.3 UJ
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		0.66 U	1.2 U	0.8 U	2.3 UJ
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		0.66 U	5.3	1.5	2.4 J
<i>Perfluoroalkylcarboxylic acids</i>							
Perfluorohexanoic acid (PFHxA)	NS	NS		0.66 U	1.2 U	0.57 J	2.3 UJ
Perfluoroheptanoic acid (PFHpA)	NS	NS		0.66 U	1.2 U	0.8 U	2.3 UJ
Perfluorooctanoic acid (PFOA)	0.0017	1.6		0.66 U	1.2 U	0.42 J	2.3 UJ
Perfluorononanoic acid (PFNA)	NS	NS		0.66 U	1.9	2.3	2.3 UJ
Perfluorodecanoic Acid (PFDA)	NS	NS		0.66 U	1.2 U	0.8 U	2.3 UJ
Perfluoroundecanoic acid (PFUnA)	NS	NS		0.66 U	2.4	1.9	2.1 J
Perfluorododecanoic acid (PFDoA)	NS	NS		0.66 U	1.2 U	0.8 U	2.3 UJ
Perfluorotridecanoic acid (PFTrDA)	NS	NS		0.66 U	1.2 U	0.8 U	8.5 J
Perfluorotetradecanoic acid (PFTA)	NS	NS		0.66 U	1.2 U	0.8 U	2.3 UJ

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

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Data Qualifiers:

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Former North Pole Refinery

North Pole, Alaska

Table 5. PFAS Results - Sediment

Analyte (mg/kg)	ADEC Soil Cleanup Levels Migration to Groundwater	ADEC Soil Cleanup Levels Under 40 Inch Zone	Sample Identification: Sample Date:	SGP-SED02 9/28/2022 Result Qualifier
<i>Next Generation Analytes</i>				
11CI-PF3OUdS (F-53B Minor)	NS	NS		2.2 UJ
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	NS		2.2 UJ
9CI-PF3ONS (F-53B Major)	NS	NS		2.2 UJ
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	NS		4.4 UJ
<i>Perfluorooctanesulfonamidoacetic acids</i>				
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS	NS		4.4 UJ
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	NS		4.4 UJ
<i>Perfluoroalkylsulfonic acids</i>				
Perfluorobutanesulfonic acid (PFBS)	NS	NS		2.2 UJ
Perfluorohexanesulfonic acid (PFHxS)	NS	NS		2.2 UJ
Perfluorooctanesulfonic acid (PFOS)	0.003	1.6		2.6 J
<i>Perfluoroalkylcarboxylic acids</i>				
Perfluorohexanoic acid (PFHxA)	NS	NS		2.2 UJ
Perfluoroheptanoic acid (PFHpA)	NS	NS		2.2 UJ
Perfluorooctanoic acid (PFOA)	0.0017	1.6		2.2 UJ
Perfluorononanoic acid (PFNA)	NS	NS		2.2 UJ
Perfluorodecanoic Acid (PFDA)	NS	NS		2.2 UJ
Perfluoroundecanoic acid (PFUnA)	NS	NS		4.7 J
Perfluorododecanoic acid (PFDoA)	NS	NS		2.2 UJ
Perfluorotridecanoic acid (PFTrDA)	NS	NS		2.1 J
Perfluorotetradecanoic acid (PFTA)	NS	NS		2.2 UJ

Notes:

Highlighted indicates value exceeds ADEC Migration to Groundwater Soil Cleanup Levels .

Highlighted indicates value exceeds ADEC Under 40 Inch Zone Cleanup Levels.

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Data Qualifiers:

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Table 6. PFAS Results - Equipment Blanks

Analyte (mg/kg)	ADEC Groundwater Cleanup Level	Sample Identification:	EB-1	NPT 22-EB01	NPT 22-EB02	NPT 22-EB03	NPT 22-EB04	NPT 22-EB05
		Sample Date:	9/30/2022	10/11/2022	10/12/2022	10/14/2022	10/15/2022	10/17/2022
			Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>								
11CI-PF3OUdS (F-53B Minor)	NS		0.004 U	0.004 UJ	0.004 UJ	0.0042 UJ	0.0043 UJ	0.004 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS		0.004 U	0.004 UJ	0.004 UJ	0.0042 UJ	0.0043 UJ	0.004 U
9CI-PF3ONS (F-53B Major)	NS		0.004 U	0.004 UJ	0.004 UJ	0.0042 UJ	0.0043 UJ	0.004 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS		0.004 U	0.004 UJ	0.004 UJ	0.0042 UJ	0.0043 UJ	0.004 U
<i>Perfluorooctanesulfonamidoacetic acids</i>								
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS							
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS		0.004 U	0.004 UJ	0.004 UJ	0.0042 UJ	0.0043 UJ	0.004 U
<i>Perfluoroalkylsulfonic acids</i>								
Perfluorobutanesulfonic acid (PFBS)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluorohexanesulfonic acid (PFHxS)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluorooctanesulfonic acid (PFOS)	0.4		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
<i>Perfluoroalkylcarboxylic acids</i>								
Perfluorohexanoic acid (PFHxA)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluoroheptanoic acid (PFHpA)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluorooctanoic acid (PFOA)	0.4		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluorononanoic acid (PFNA)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluorodecanoic Acid (PFDA)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluoroundecanoic acid (PFUnA)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluorododecanoic acid (PFDoA)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluorotridecanoic acid (PFTrDA)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U
Perfluorotetradecanoic acid (PFTA)	NS		0.002 U	0.002 UJ	0.002 UJ	0.0021 UJ	0.0022 UJ	0.002 U

Notes:

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Table 6. PFAS Results - Equipment Blanks

Analyte (mg/kg)	ADEC Groundwater Cleanup Level	Sample Identification: NPT22-DRILL WATER	NPT22-EB06	NPT22-EB07	NPT22-EB08
		Sample Date: 10/20/2022	10/18/2022	10/19/2022	10/20/2022
		Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
<i>Next Generation Analytes</i>					
11CI-PF3OUdS (F-53B Minor)	NS	0.004 U	0.004 UJ	0.004 UJ	0.004 U
3H-perfluoro-3-[(3-methoxy-propoxy)propanoic acid] (ADONA)	NS	0.004 U	0.004 UJ	0.004 UJ	0.004 U
9CI-PF3ONS (F-53B Major)	NS	0.004 U	0.004 UJ	0.004 UJ	0.004 U
Hexafluoropropylene oxide-dimer acid(HFPO-DA, GenX)	NS	0.004 U	0.004 UJ	0.004 UJ	0.004 U
<i>Perfluorooctanesulfonamidoacetic acids</i>					
2-(N-methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	NS				
2-(N-ethyl-perfluorooctane sulfonamido) acetate (EtFOSAA)	NS	0.004 U	0.004 UJ	0.004 UJ	0.004 U
<i>Perfluoroalkylsulfonic acids</i>					
Perfluorobutanesulfonic acid (PFBS)	NS	0.002 U	0.002 UJ	0.002 UJ	0.002 U
Perfluorohexanesulfonic acid (PFHxS)	NS	0.002 J	0.002 UJ	0.002 UJ	0.002 U
Perfluorooctanesulfonic acid (PFOS)	0.4	0.0072	0.002 UJ	0.002 UJ	0.0051
<i>Perfluoroalkylcarboxylic acids</i>					
Perfluorohexanoic acid (PFHxA)	NS	0.002 U	0.002 UJ	0.002 UJ	0.002 U
Perfluoroheptanoic acid (PFHpA)	NS	0.002 U	0.002 UJ	0.002 UJ	0.002 U
Perfluorooctanoic acid (PFOA)	0.4	0.002 U	0.002 UJ	0.002 UJ	0.002 U
Perfluorononanoic acid (PFNA)	NS	0.002 U	0.002 UJ	0.002 UJ	0.002 U
Perfluorodecanoic Acid (PFDA)	NS	0.002 U	0.002 UJ	0.002 UJ	0.002 U
Perfluoroundecanoic acid (PFUnA)	NS	0.002 U	0.002 UJ	0.002 UJ	0.002 U
Perfluorododecanoic acid (PFDoA)	NS	0.002 U	0.002 UJ	0.002 UJ	0.002 U
Perfluorotridecanoic acid (PFTrDA)	NS	0.002 U	0.002 UJ	0.002 UJ	0.002 U
Perfluorotetradecanoic acid (PFTA)	NS	0.002 U	0.002 UJ	0.002 UJ	0.002 U

Notes:

Highlighted indicates value exceeds ADEC Human Health Groundwater Cleanup Levels .

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Data Qualifiers:

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