



Integral Consulting Inc.
110 Marter Ave.
Suite 304
Moorestown, NJ 08057

telephone: 856.399.7700
www.integral-corp.com

MEMORANDUM

To: James Fish— Environmental Program Specialist, Alaska Department of Environmental Conservation

From: Integral Consulting Inc.

Date: September 26, 2024

Subject: Work Plan Technical Memorandum— Onsite Soil and Groundwater Characterization REV1, Williams Alaska Petroleum, Inc., Former North Pole Refinery, North Pole, Alaska

Project No.: CF2052

On behalf of Williams Alaska Petroleum, Inc. (Williams), Integral Consulting Inc. (Integral) has prepared this Work Plan Technical Memorandum for onsite soil and groundwater characterization as described in the Updated Site Characterization Report (SCR) for PFAS – Revision 1 (Integral 2024) at the former Flint Hills Resources Alaska North Pole Refinery (Site; Figure 1). This work plan specifically describes and elaborates on the investigation proposed in the Updated SCR for PFAS which describes subsurface soil sampling and groundwater collection through temporary well points (TWPs) to be completed within the main plant area based on the results of the 2022 soil investigation. A discussion on sampling was previously included in the Updated SRC for PFAS; however, ADEC requested additional details regarding sample collection and methods.

CHARACTERIZATION ACTIVITIES

Soil Sampling

Initial soil characterization was completed at the Site in October 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 2.

Borings were advanced to the observed, the groundwater interval containing the highest PFOA and PFOS concentrations ¹. Three samples were collected from each location: the surface interval, the 6-in. interval corresponding to the midpoint of the boring, and the interval directly about the water table observed at the time of sampling. 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 were some exceedances of the Migration to Groundwater Soil Cleanup Levels (0.0014 mg/kg for PFOA and 0.003 mg/kg for PFOS). Based on these results, additional soil delineation activities were proposed in areas exhibiting the highest soil PFOA and PFOS concentrations in 2022.

A total of 31 soil borings (Figure 2) are proposed as part of 2024 field activities. Soil borings will be completed to the water table zone, consistent with the 2022 sampling. All soil boring locations will be recorded in the field using a handheld global positioning system unit with sub-meter accuracy. Direct-push (Geoprobe® or equivalent) or hollow-stem auger drilling technologies will be used to advance soil borings to a depth of approximately 16 ft below ground surface or the water table. In areas of the facility where subsurface utilities or structures are of concern, the overlying soils will be removed via vac truck to expose the sampling interval for sample collection. All drilling locations will be cleared of buried utilities prior to drilling using a vacuum truck in accordance with facility requirements at the Site.

A minimum of three soil samples will be collected from each boring in accordance with the 2022 *Field Sampling Guidance* (ADEC 2022a). Consistent with the 2022 characterization event, one soil sample will be 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 to determine whether PFOA and PFOS in the soil may be a source of groundwater contamination.

To determine the approximate midpoint of the boring, the following protocol will be followed:

- At locations where a macrocore is used for the entire boring, the midpoint is determined based on the unsaturated soil column thickness (measurement from the surface to saturated soil) and confirmation of groundwater depth with a depth to water meter. The field team will wait to sample the mid-point location until after the boring is completed and groundwater depth has been verified.

¹ Locations may be adjusted based on access requirements from the current property owner Marathon Inc.

Groundwater depth will be noted in the boring log based on observed soil saturation and confirmed using a water sounder in the borehole or temporary well point. Samples will then be collected from the macrocore sleeve at the measured midpoint.

- For locations where a vacuum truck is required, a surface soil sample is collected prior to vacuum excavation using hand tools (trowel, rock hammer, and stainless-steel spoons). Based on site knowledge and measuring water depth at nearby MWs, if present, the approximate midpoint sample depth is determined. The vacuum truck will clear borings to the presumed mid-point where a sample will be collected using a hand auger up to 6 feet. Below 6 feet, a macrocore will be used to further advance the boring as necessary. Groundwater depth is confirmed by noting the saturated soil on the boring log and from collection of a depth to groundwater measurement from the borehole.

All sample depths will be recorded in the fieldwork documentation and midpoint depths taken into consideration when comparing sample results.

Groundwater Sampling

As requested by the Alaska Department of Environmental Conservation, 8 of the 31 soil borings will be converted to TWPs to collect groundwater grab samples (Figure 2). In accordance with the 2022 *Field Sampling Guidance*, three well volumes will be purged from each TWP using a peristaltic pump (ADEC 2022a). One groundwater sample will be collected for PFAS analysis as described below. Samples collected from TWPs will be named based on their associated soil boring location. For example, a groundwater sample collected from soil boring location NPT24-SB1 will be named NPT244-TWP1.

Sample Handling and Quality Control Sampling

For both soil and groundwater, samples will be collected and shipped with completed chain-of-custody documentation to an ADEC-certified analytical testing laboratory.

Field quality control samples will be collected at a minimum of 1 field duplicate per every 10 samples and 1 field equipment blank per sampling team/equipment per day per the ADEC guidance document referenced above.

Sample Analysis

The soil samples will be submitted for analysis using U.S. Environmental Protection Agency (EPA) Method 1633. Sampling and reporting will follow the ADEC guidance *Guidelines for Data Reporting Technical Memorandum 22-01* (ADEC 2022b).

The results of these analyses will be validated by EcoChem, who performed a compliance validation (USEPA Stage 2A). That validation will be based on the EPA National Functional Guidelines for Organic Data Review (USEPA 2017, 2020).

Investigation Derived Waste

Following completion of sampling activities, the excess soil will be containerized for characterization and proper disposal. Prior to transport or treatment, the Contaminated Media Transport and Treatment or Disposal Approval Form will be prepared and submitted to ADEC for approval. It is anticipated that the NRC/US-Ecology Viking Road Facility will be the final receiving location.

SCHEDULE/REPORTING

The sampling will be completed in late July 2024. The data will be used to continue characterization of PFAS in soil and groundwater as well as attempt to horizontally and vertically delineate areas of elevated PFAS concentrations for future remedial activities. If additional samples are necessary, a work plan for another mobilization will be submitted to ADEC.

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

REFERENCES

ADEC. 2022a. Field sampling guidance. Alaska Department of Environmental Conservation Division of Spill Prevention and Response Contaminated Sites Program. January.

ADEC. 2022b. Guidelines for Data Reporting. Alaska Department of Environmental Conservation Division of Spill Prevention and Response Contaminated Sites Program. August.

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Integral. 2024. Updated Site Characterization Report for PFAS – REV1, Williams Alaska Petroleum, Inc., Former North Pole Refinery, North Pole, AK. Integral Consulting Inc. January 5.

USEPA. 2017. EPA Contract Laboratory Program national functional guidelines for organic Superfund methods data review. EPA-540-R-2017-002. U.S. Environmental Protection Agency, Washington, DC. January.

USEPA. 2020. EPA Contract Laboratory Program national functional guidelines for organic Superfund methods data review. EPA-540-R-20-005. U.S. Environmental Protection Agency, Washington, DC. November.

Figures

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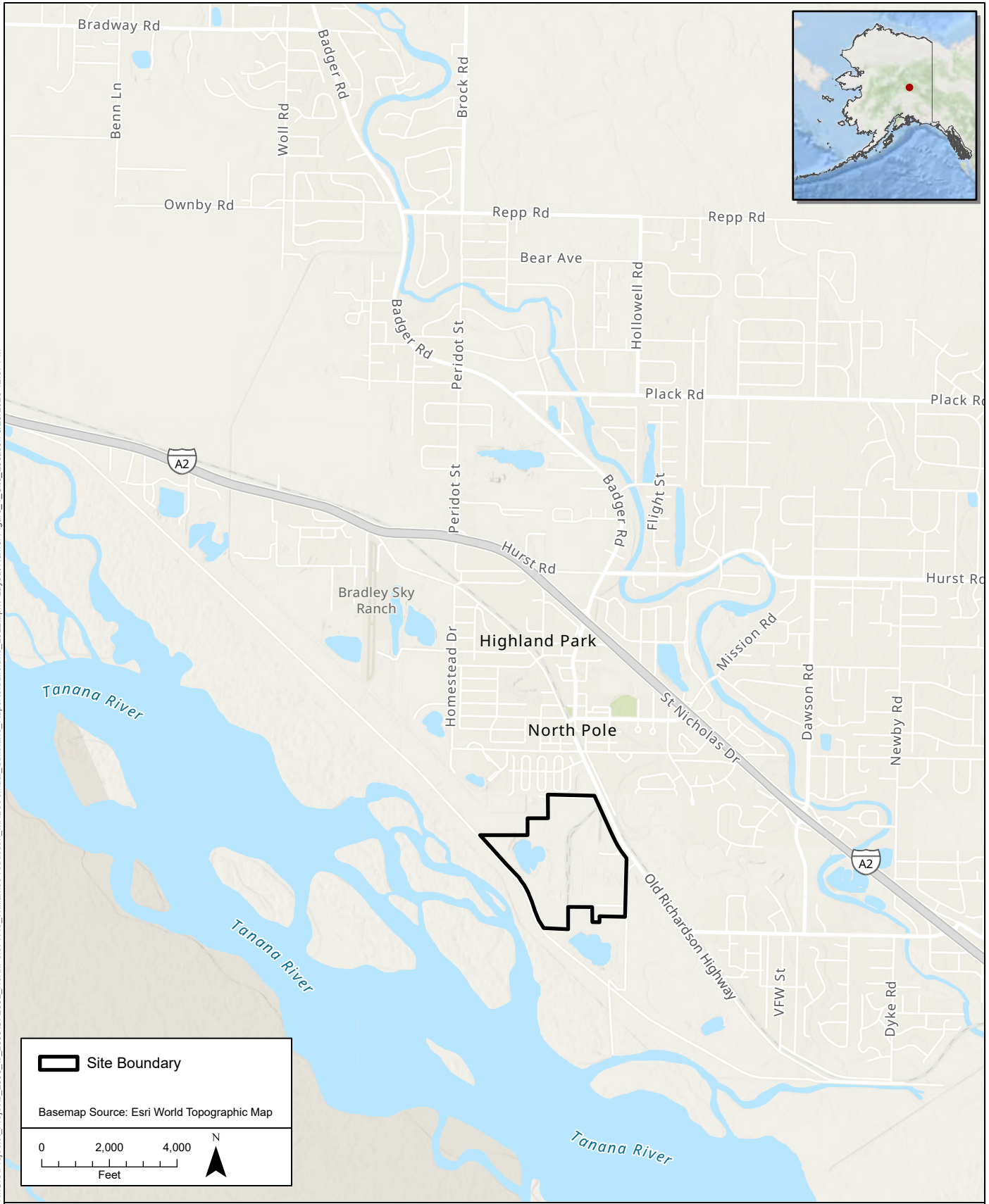
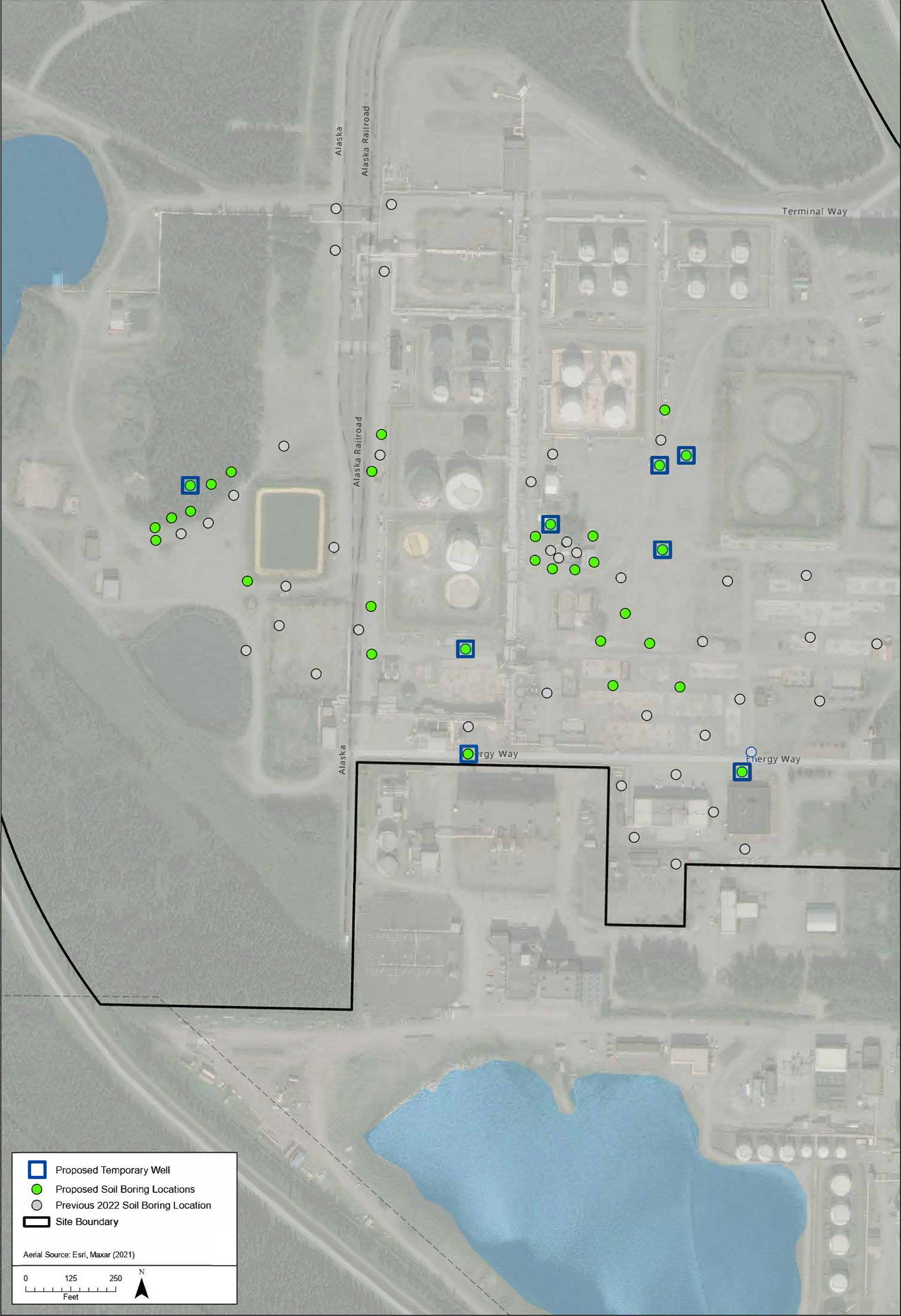






Figure 1.
Site Location

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

Aerial Source: Esri, Maxar (2021)

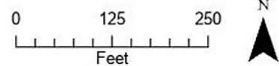


Figure 2.
Proposed Soil Boring and Temporary Well Locations

DEC comments to Work Plan Technical Memorandum --- Fish Tissue Sampling and Analysis for PFAS, Williams Alaska Petroleum, Inc., Former North Pole Refinery,
 From Integral Consulting, Inc. to James Fish, ADEC; August 16, 2024, and

DEC comments to Work Plan Technical Memorandum --- Onsite Soil and Groundwater Characterization, Williams Alaska Petroleum, Inc., Former North Pole Refinery,
 From Integral Consulting, Inc. to James Fish, ADEC; August 16, 2024

Num.	Page	Paragraph or Section	Comment	
Fish Tissue Sampling Work Plan Comments				Response
1	2	2 nd	The text states that the minnow traps will be retrieved after 24 hours. If the traps do not contain sufficient fish for a sample, DEC requests re-deploying the traps to increase capture and success of the sample event.	The text has been updated to state that the exercise will be repeated (i.e. the trap will be deployed for a second 24-hour interval) if sufficient fish are not captured for a sample.
2	2	3 rd	The text states, “All fish present in a minnow trap will be counted, measured (to the nearest mm), weighed (to the nearest 0.1 g), and keyed out to the lowest-possible taxonomic level (preferably down to species). All fish captured by a given trap will be combined across species with all the fish captured by an adjacent trap to create up to five composite samples representing five equal sections of the North Gravel Pit.” Please clarify the following: <ul style="list-style-type: none"> ○ Please provide more information (preferably including a figure) regarding the planned distribution of the 10 minnow traps in the North Gravel Pit and determination of the “five equal sections of the North Gravel Pit.” 	Approximate trap locations are provided on Figure 1. As noted in the text, trap locations will be placed close to submerged structures (e.g., boulders, aquatic vegetation, sunken wood, overhanging branches) that are more likely to attract fish, where possible. Regarding compositing, the text will be revised to: “Specimens will be composited per species and by trap location when possible. If insufficient mass is available for a given trap after 48 hours, specimens will be composited among multiple traps by species. Up to five composite samples will

			<ul style="list-style-type: none"> ○ Will the description of “adjacent” traps for fish compositing be pre-determined based on trap location or determined in the field based on capture or other factors? ○ Will the composite samples be species-specific or a combination of species? <ul style="list-style-type: none"> ○ If not species-specific, how will variability between adjacent traps be addressed when compositing the fish? Will fish species or size or other variables be considered when determining which fish to composite together? 	<p>be targeted for each species (longnose suckers and lake chubs) for a total of up to 10 composite fish tissue samples.”</p>
3	2		<p>In addition to the minnow traps, please consider using a fyke net or gill net set from shore to collect fish – these can still be set with a small unmotorized boat or canoe. This will potentially allow capture of fish > 100mm in length. It is possible that larger fish may have a different body burden of PFAS. If larger fish are captured, they could be composited separately from the smaller fish and/or organ-specific PFAS analysis may also be possible. Please comment.</p>	<p>If sufficient tissue mass is not collected with minnow traps, additional methods will be assessed for future sampling events.</p>

Soil and Groundwater Characterization Work Plan Comments				Response
1	2	3 rd paragraph	<p>Please confirm how the middle soil sample interval for the soil borings will be established to clarify the text description, “one from the 6-in. interval corresponding to the midpoint of the soil boring.”</p> <ul style="list-style-type: none"> ○ How will “the 6-in. interval corresponding to the midpoint of the soil boring” be determined? Since the soil boring depth will vary based on the water table depth at each location, how will this depth be known before the soil boring is advanced? 	<p>Generally speaking, groundwater is relatively shallow at this time of year, between 5.5 to 7.5 feet bgs, so the approximate midpoint can be estimated prior to advancing the boring. That estimate was used to make protocols based on the type of tools used (hand clearing tools or macrocore). Text has been added to clarify these protocols.</p>
2	3	Sample Handling and Quality Control Sampling	<p>The text states that, “Field quality control samples will be collected at a minimum of 1 field duplicate per every 20 samples and 1 field equipment blank per sampling team/equipment per day per the ADEC guidance document referenced above.”</p> <p>However, the ADEC guidance requires a minimum of 1 field duplicate per every 10 samples. Please revise.</p>	<p>The correct number of duplicates was completed during field sampling (1 per 10 samples). The text has been revised.</p>
3	3	Schedule/Reporting	<p>While DEC understand some sampling has occurred already, the text states that “The sampling will be completed in late July 2024.” Please confirm whether the sampling has already occurred or provide a revised sample schedule if additional sampling will occur.</p>	<p>The sampling was completed successfully between July 23-28, 2024.</p>