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PROTECTING OUR ARCTIC ENVIRONMENT

CLOSURE AND RECLAMATION PLAN

PPD BAKER LAKE LANDFARM

October 15, 2025

Nunatta Environmental Services Project 25-29

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1 INTRODUCTION

1.1 Background

The Petroleum Products Division (PPD) of the Government of Nunavut's Department of Community and Government Services (CGS) is responsible for the purchase, transportation, storage and distribution of all petroleum products in Nunavut. PPD's headquarters is in Rankin Inlet, where it also maintains the tank farm and other fuel infrastructure.

After a spill at the Baker Lake Tank Farm in 2021, Nunatta and others excavated and segregated impacted soil in a lined containment cell south of the Tank Farm. Since the time of the spill, some soil has been bioremediated and is ready for re-use, but it is likely that some soil remains impacted with petroleum hydrocarbons.

PPD has proposed to construct a landfarm to treat this remaining soil and possibly other impacted soil in the community. The Hamlet of Baker Lake has selected an area northwest of the built up area and north of the airport for the landfarm.

A parcel of land (Lot 454, Plan 4945 – see Figure C-01) has been surveyed to use as the landfarm site. Because the lot is owned in fee simple by the Hamlet, no additional paperwork is required to have the survey registered at the Land titles office. Once the titles are carried over, the Hamlet will issue an equity lease to the Commissioner of Nunavut for Lot 454 to be used for a land farm that will be administered by PPD.

Nunatta submitted the project to the Nunavut Planning Commission (NPC). The NPC reviewed the project and determined that it conforms to the Keewatin Regional Land Use Plan.

1.2 The Landfarm

The proposed landfarm is located northwest of the hamlet of Baker Lake, in the Kivalliq Region of Nunavut. The geographical coordinates of the site are

Latitude	Longitude
64.321680° N	96.092068°W

The landfarm will be constructed from gravel and sand with an impermeable membrane that limits the transmission of impacts from the landfarm to the surrounding area. The plan is for the landfarm to accept only soil contaminated with hydrocarbons in which the primary petroleum is fuel oil and/or diesel fuel and/or gasoline.

2 PRINCIPLES AND OBJECTIVES

2.1 Principles

PPD's general principles[1] for site closure are as follows:

- The restored site should be **physically stable**. This means that it will not erode, subside or otherwise move from its final location under naturally occurring circumstances, even extreme or disruptive forces like floods.
- The restored site should be **chemically stable**. This means that any material used for reclamation that remains on site does not adversely affect human health or the environment.
- **Active care** is not required. Post-restoration sampling of one year is anticipated, after which PPD does not expect that any additional active measures should be required.
- The restored site should be **ready for future use**, consistent with the adjacent properties.

2.2 Objectives

The objectives of this plan are as follows:

- All landfarm contents are removed from the site, through achievement of Treatment Objectives or disposal to another site;
- Berm materials meet site guidelines and are re-used for grading or are disposed of at another site;
- Geomembrane, fencing and other materials are removed from the site;
- The site is re-graded to a slope that is consistent with the surrounding topography;
- Site monitoring is completed; and
- Remaining monitoring infrastructure (i.e., monitoring wells) is decommissioned.

[1] Adapted from the Mackenzie Valley Land and Water Board's Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories. While mineral exploration and mine sites are typically much larger than the landfarm, the principles are relevant.

3 PROJECT DESCRIPTION

The landfarm decommissioning and site restoration project will be undertaken at PPD's discretion, or at the direction of a Regulatory Authority.

3.1 Disposal of Landfarm Contents

Formerly impacted soils in the landfarm will be disposed of in accordance with territorial requirements. This means that soils leaving the landfarm will meet reuse criteria for soils as indicated in Nunavut and Federal guidelines.

The site re-use guidelines were determined from the Environmental Guideline for the Management of Contaminated Sites (EGMCS) developed by the Nunavut Department of Environment (DOE).[2] The EGMCS focuses on the management of petroleum hydrocarbon (PHC) contaminated soil, because "[m]ost contaminated sites in Nunavut are the result of petroleum hydrocarbon spills (i.e., gasoline, jet fuel, diesel, bunker fuel)."

The EGMCS incorporates values for contaminants developed by the Canadian Council of Ministers of the Environment (CCME) that "may be adopted de facto as the site-specific remediation criteria and incorporated directly into the Remedial Action Plan or modified within certain limits," according to the Guideline. As a result, Nunatta has referred directly to the CCME source guidelines for this assessment.

Relevant soil guidelines for the site can be found in the following CCME sources:

- Canada-Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) in Soil (CWS-PHC); and
- Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CSQG).

Both guidelines contain numerical limits intended to maintain, improve or protect environmental quality and human health at contaminated sites. The limits come from models and are adjustable based on certain site characteristics, including land use, soil grain size, and whether groundwater is used as a source of drinking water. The guidelines are derived using toxicological data and aesthetic considerations.

For re-use, soils will meet target values for destination sites. For example, if soils are to be re-used as road base in Baker Lake, they will meet commercial land use guidelines. Soils will be sampled for relevant contaminants including:

- Petroleum hydrocarbons;

[2] Government of Nunavut Department of Environment. Environmental Guideline for the Management of Contaminated Sites. 2014.

- Benzene, toluene, ethylbenzene, and xylenes;
- Polycyclic aromatic hydrocarbons; and
- Lead.

Soil that does not meet the Treatment Objectives will be disposed of off-site in accordance with Nunavut and federal Acts and Regulations.

3.2 Berm Sampling

PPD will collect soil samples from the material that was used to construct the berms. Soil samples will be collected as composites from the berm material.

Sampling frequency will be based on the number laid out in Ontario Regulation 153/04, *Records of Site Condition* for stockpile sampling.

Berm material meeting guidelines for re-use at the site will be used for grading. Berm material that does not meet guidelines will be transported off-site with any landfarm contents that do not meet the Treatment Objectives.

The site re-use guidelines will also be determined from the EGMCS as noted above.

For the restoration site, PPD will use the following site characteristics.

- Land use: industrial, based on the proposed use of the site as a landfarm.
- Soil grain size: coarse, based on field observations, and
- Groundwater: not used as a source of drinking water in Baker Lake.

As a result, the site restoration criteria are as follows:

Table 1: Site Restoration Criteria

Analyte	Concentration (mg/kg)
Benzene	2.8
Toluene	250
Ethylbenzene	300
Xylenes	160
PHC F1	320
PHC F2	260
PHC F3	1,700

Analyte	Concentration (mg/kg)
PHC F4	3,300
Lead	600

3.3 Water Disposal

PPD will dispose of any remaining water in the landfarm in accordance with its standard procedures. For this project, PPD will not dispose of water on land that exceeds CCME water quality guidelines for the protection of aquatic life.

Wastewater above the criteria will be treated on site until it meets the criteria or containerized for off-site disposal.

3.4 Infrastructure Disposal

PPD will remove any other materials required for construction of the landfarm from the site. This includes fences, posts, and the geomembrane liner.

These materials will be cleaned on site and re-used elsewhere if possible. Where the materials cannot be re-used, they will be disposed of in accordance with relevant Acts and Regulations.

3.5 Site Grading

After the removal of landfarm material and any berm material above site guidelines, the site will be re-graded.

Any additional material required for site grading will be similar to existing site materials and obtained from a local source.

Berm material and any imported aggregate will be placed in lifts and compacted. The site will be graded so that water drains away from the road and matches the topography of adjacent properties.

4 POST-RESTORATION MONITORING

After restoration is complete, PPD will return to the restored site in the summer of the following year. PPD will collect soil and water samples to assess the success of the restoration program.

4.1 Soil Sampling

PPD will collect four composite soil samples from the area where the landfarm was previously located.

The soil samples will be analyzed for the same components as identified in the berm re-use guidelines.

4.2 Abandonment of Other Infrastructure

After monitoring is complete, PPD will abandon any remaining infrastructure around the former landfarm.

5 REPORTING

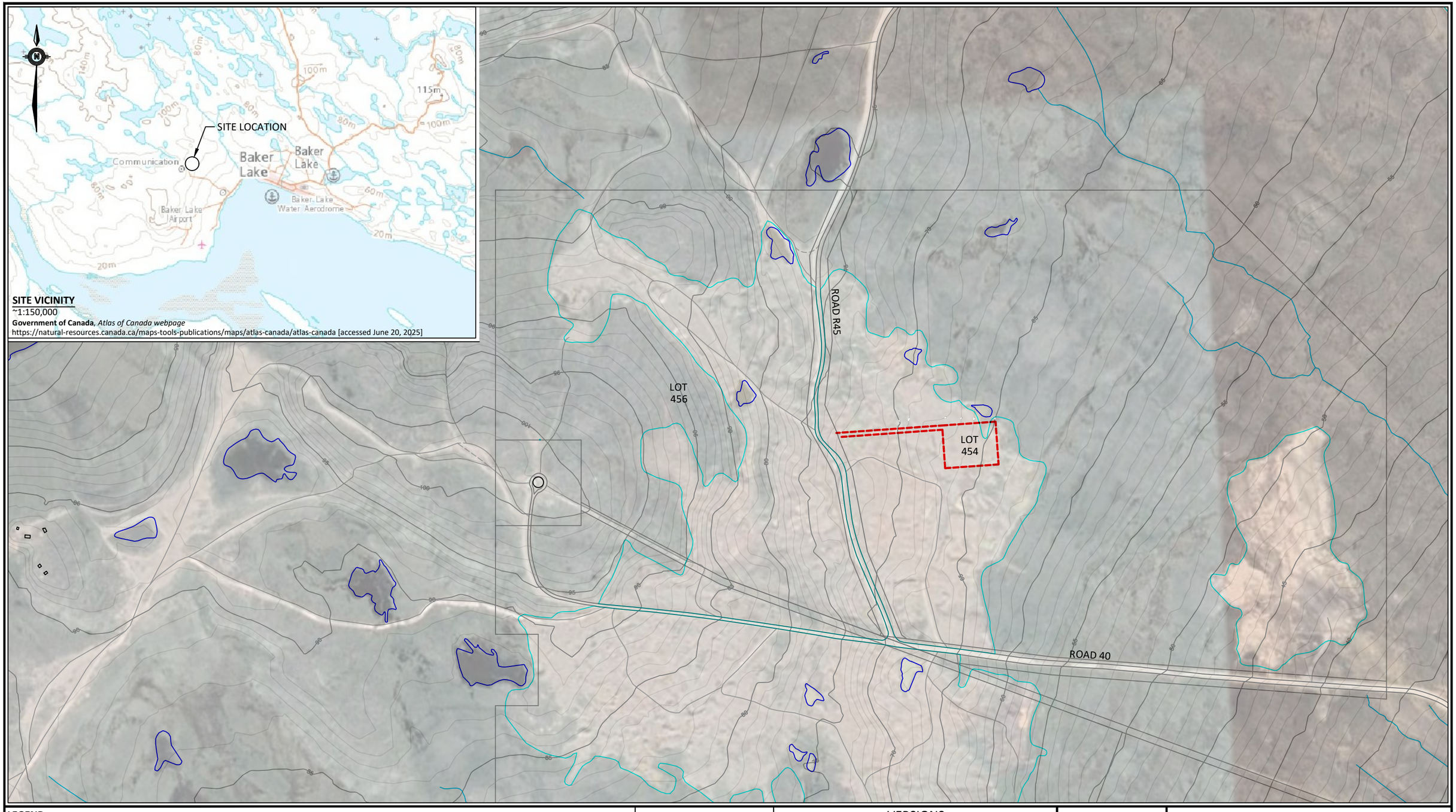
PPD will submit a report within six months of the closure of the landfarm. This report will include a description of the closure activities, photos of the activities, relevant drawings, laboratory analytical results, and other information that describes the closure.

After post-restoration monitoring is complete, PPD will submit a report on the monitoring program. The report will describe the program and summarize analytical results. Any deviations from the methods outlined in this plan will be identified. The report will be submitted within six months of the completion of the monitoring program.

FIGURE

FILE: 25-29-V0-R0.dwg

SITE VICINITY
~1:150,000
Government of Canada, *Atlas of Canada webpage*
https://natural-resources.canada.ca/maps-tools-publications/maps/atlas-canada/atlas-canada [accessed June 20, 2025]



LEGEND

SUBJECT PROPERTY BOUNDARY

SCALE 1:5000

50 0 50 100 200m

REFERENCES:

1. Government of Nunavut Department of Community Services Panning and Lands Division website: https://cs-pals.ca/downloads/baker-lake/ [accessed June 27, 2025]
2. Sub-Arctic Geomatics, "Compiled Plan of Lots 454 to 456, and Road R45 and Field Notes of Survey Baker Lake, Nunavut" Canada Lands Surveys Records 114003 Dated 2025-04-10, Filed in the Land Titles Office for Nunavut as 4945.
3. Google Earth V 7.3.6.10201. (6/20/2023) Baker Lake, NU 14W 639835.58 m E 7136064.65 m N, eye alt 2.90 km 2025 Airbus 2025 CNES / Airbus [acdessed June 10, 2025]

SEAL

VERSIONS

NO	DESCRIPTION	DATE
1	90% SUBMISSION	2025-06-30

CLIENT
COMMUNITY AND GOVERNMENT SERVICES PETROLEUM PRODUCTS DIVISION

PROJECT
BAKER LAKE LANDFARM

TITLE
CIVIL SITE PLAN

PROJECT NO.	DWN	CKD	DATE	
25-29	SG	AH	June 27, 2025	C-01