

# **PIN-C Site Remediation**

**Wastewater Treatment Facility Design, Operation and Maintenance  
Details**

**Public Services and Procurement Canada  
FINAL**

**Client Reference No. EW699-250476**

**June 17, 2025**

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# Public Services and Procurement Canada

## Client Reference No. EW699-250476

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## Revisions and publications log

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## Distribution

1 PDF copy	Claire Brown, PSPC, Peter Martin, CIRNAC, Greg Wright, AECOM
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**APPENDIX A:        Water Treatment Unit Design**

# 1 Introduction

This plan outlines the procedures and systems in place for managing wastewater generated by a temporary, 25-person camp in Nunavut. The plan ensures compliance with applicable territorial and federal regulations, and adherence to environmental protection best practices in the Arctic context.

The camp will use the following treatment methods:

- **Pacto dry toilets:** Waste is sealed in plastic liners and disposed of as solid waste; **no blackwater** will be generated. The waste will be burned in the camp incinerator.
- **Greywater sump:** Greywater (wastewater from sinks, showers, and non-industrial kitchen use) will be managed via a properly constructed, monitored, and decommissioned sump.
- **A water treatment unit for process/contact water.**

## 2 Regulatory Framework

This WMP complies with the following legislation and guidelines:

- Nunavut Environmental Protection Act (R.S.N.W.T. 1988, c. E-7, as amended for Nunavut)
- Canadian Environmental Protection Act (CEPA), 1999
- Nunavut Waters and Nunavut Surface Rights Tribunal Act (S.C. 2002, c.10)
- Nunavut Planning and Project Assessment Act (S.C. 2013, c.14, s.2)
- Environmental Protection Act (R.S.N.W.T. 1988, c.E-7, as duplicated in Nunavut)
- Guidelines for the Greywater Disposal in the Northwest Territories and Nunavut (GNWT, adapted for Nunavut)
- Workers' Safety and Compensation Commission (WSCC) regulations for worker camps.
- Government of Nunavut. Guidelines for Industrial Waste Discharges (2022 Update)
- Federal Fisheries Act (prohibition against harmful alteration or deposition into fish-bearing waters)
- Typical Land Use Permit and Water License Conditions

## 3 Wastewater Sources and Volumes

### 3.1 Camp

Camp wastewater will consist of greywater originating from the kitchen sink, the bathroom sinks and showers and laundry machines. No blackwater will be produced since Pacto toilets will be used for the duration of the project.

It is estimated that over the course of a month, the camp will generate 85.25 m<sup>3</sup> of wastewater based on a daily water consumption of 110 L/person. Sila intends to discharge camp greywater directly to a sump located at a minimum of 31 m away from any waterbody, including lakes, rivers, or wetlands, and a minimum of 100 m away from any camp structures, fuel storage, or food storage areas. The location will be chosen in an area with adequate permeability and stability for sump construction.

Permafrost conditions will also be verified to ensure avoiding any areas with high ice content that could cause instability.

### 3.1.1 Sump Design and Operation

The sump will be an excavated pit lined with filter fabric and gravel to promote filtration and infiltration. The size of the sump will be based on expected volume and soil absorption capacity, plus a buffer for weather events. The pit will be excavated to a depth that can contain the waste without overflowing, ensuring proper drainage and structural integrity. Berms will be constructed around the sump to prevent runoff from entering and enhance containment.

The sump will be operated as follows:

- All greywater will be directed into the sump using a controlled piping system.
- A monitoring schedule will be implemented to track sump capacity and identify potential overflow, leaking or erosion risks.
- The sump will be treated regularly with environmentally safe chemicals or biological agents to accelerate decomposition and to remove odours.
- To ensure no solid debris makes its way into the sump, basket strainers will be installed in all sinks in the camp. A grease trap will be used to recover any waste, which will then be incinerated.
- The sump will be covered with plywood to minimize access and odours.
- Fencing will be installed around the sump to prevent wildlife from accessing the area.
- A tracking sheet will be used to track daily discharge volumes via a water meter.

Water consumption rules and hygiene will be communicated in the Worker Orientation Seminar to every worker and will be included in the camp rules. These rules include the following:

- All soaps will be phosphate-free
- Cleaning wipes will be used in the kitchen to limit water use
- Dedicated containers will be placed in washrooms and the kitchen to dispose of all liquids other than water
- Signs will be posted at each faucet and drain to remind camp users to limit water consumption
- Water consumption will be discussed in the weekly health and safety meeting

### 3.1.2 Decommissioning

To decommission the sump, any remaining water in the pipes will be transferred to a tote tank, and the water transported south to a licensed disposal facility. The sump will be backfilled with clean fill, and regraded to match the surrounding topography and promote positive drainage.

## 3.2 Process/Contact Water

Wastewater from work activities can be generated from the landfarm facility, during barrel processing, from contact water from landfill excavation, pipe and tank cleaning, decontamination, and excavation activities. A two-tank system in conjunction with the Water Treatment Unit (WTU) will be used to treat contaminated water.

Water will be sampled to confirm whether treatment is required. If results confirm the water meets discharge criteria, it will be discharged following approval from the DR.

Water confirmed as requiring treatment will be pumped into the first tank and allowed to stand to promote settling of sediment and metals. Absorbent booms will be deployed to absorb any oil or grease. The water will be pumped into the second tank while avoiding disturbance to the settled sediments. From the second tank, water will be circulated through the WTU. Please refer to Appendix A for design details of the WTU. The WTU is designed so that different filtration media (such

as activated carbon, organo-clays and ion exchange resins) can be used in the filtration units to capture various types of contaminants. The filtration components can be arranged in various configurations to adapt the flow rates and the treatment to a specific contaminant. As an example, for hydrocarbon contamination, activated carbon is used. Based on the soil and drum contamination profiles detailed in the site characterization data, the water treatment unit proposed will meet the treatment criteria. Used filter media will be containerized in a Quatrex-type bag. Wash water will be circulated until sample results indicate that the water complies with discharge criteria. The WTU requires little maintenance beyond the daily checking for leaks and deficiencies and the changing of filter media.

### 3.2.1 Sampling and Discharge Criteria

Englobe is responsible for testing any water from the Contaminated Soil Treatment Facility (CSTF), contact water, and camp wastewater. As previously mentioned, no blackwater will be discharged during the project, therefore no sampling will be required. Blackwater will be burned in the camp incinerator. Greywater will be discharged directly to a sump without sampling.

Sampling for contact water and water from the CSTF will be collected as grab samples. The sampler will wear appropriate personal protective equipment, such as nitrile gloves, and will either collect the sample directly by placing the sample jar into the water or will use a swing sampler. For treatment monitoring, samples will be collected weekly from the water treatment unit from the outlet named CE01 as shown on the drawing provided in Appendix A. Several tote tanks will be used should water need to be stored before or after treatment.

Anticipated water license discharge criteria are detailed hereafter. Treated water will only be discharged once it has been confirmed that the water has reached the discharge criteria, and following approval from the DR.

Duplicates will be taken for 10% of the samples.

#### 3.2.1.1 Contaminated Soil Treatment Facility Effluent

Parameter	Maximum Grab Sample Concentration
pH	6 – 9
Oil and Grease	No visible sheen
Lead (Total)	1 µg/L
Benzene	370 µg/L
Toluene	2 µg/L
Ethylbenzene	90 µg/L

### 3.2.1.2 Contact Water

Parameter	Maximum Grab Sample Concentration
pH	6 – 9
Total Suspended Solids (TSS)	50 mg/L
Arsenic (Total)	100 µg/L
Cadmium (Dissolved)	10 µg/L
Chromium (Dissolved)	100 µg/L
Cobalt (Dissolved)	50 µg/L
Copper (Dissolved)	200 µg/L
Lead (Dissolved)	50 µg/L
Mercury (Total)	0.6 µg/L
Nickel (Dissolved)	200 µg/L
PCBs (Total)	1000 µg/L
Zinc (Total)	500 µg/L
Benzene	370 µg/L
Toluene	2 µg/L
Ethylbenzene	90 µg/L
Oil and Grease	15 mg/L and no visible sheen

### 3.2.2 Discharge Methodology

Upon approval from the DR, compliant wastewater will be discharged directly onto land using a pipe with the end placed above ground surface onto a splash pad. The discharge point will be chosen following assessment of several parameters including soil permeability, presence of vegetation, topography (a gentle slope to avoid pooling), and distance from water bodies (>100 m). Discharge will not take place on frozen ground.

### 3.2.3 Decommissioning

Any water that does not meet the treatment criteria by the end of the project will be transported off-site in 1 m<sup>3</sup> tote tanks. Numerous tote tanks will be brought to site to ensure sufficient capacity to hold the wastewater until analysis has proven it meets discharge criteria, or for shipment off site if treatment is unsuccessful.

## 3.3 Spill Response

Spill kits will be placed in areas where wastewater is present. Any spill will be contained immediately and cleaned using absorbents and excavation of contaminated materials as necessary. The DR will be informed immediately.

Please refer to the Spill Contingency Plan for full details on spill response.



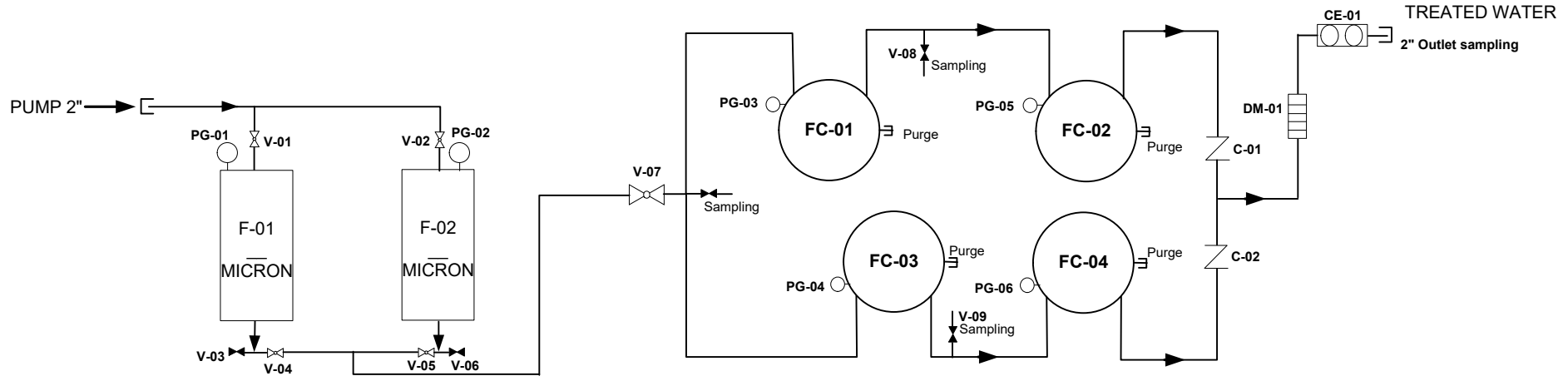
# Appendix A

## Water Treatment Unit Design

MAXIMUM OPERATING FLOW:20 GPM

PROJECT : PIN-C

OPERATED BY:



Date	Time	PG-01	PG-02	PG-03	PG-04	PG-05	PG-06	DM-01	CE-01
		(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(gpm)	(Gallons)

✖ : V-00 : Normally closed valve

✚ : V-00 : Normally open valve

DM-00 : Flow meter

PG-00 : Pressure gauge

CE-00 : Water meter

FC-00 : Carbon filter

F-00 : Bag filter

Inlet sampling (V-01)

Time	# Sample	Time	# Sample

PURGE:

- ☐ Yes  
☐ No  
☐ See observations

#### EQUIPMENTS CHECK-UP:

ITEM	Check-up	Cleaning	Replacement
F-01 Filter (bag filter)	<input type="checkbox"/>	N/A	<input type="checkbox"/>
F-02 Filter (bag filter)	<input type="checkbox"/>	N/A	<input type="checkbox"/>
FC-01 Filter	<input type="checkbox"/>	N/A	<input type="checkbox"/>
FC-02 Filter	<input type="checkbox"/>	N/A	<input type="checkbox"/>
FC-03 Filter	<input type="checkbox"/>	N/A	<input type="checkbox"/>
FC-04 Filter	<input type="checkbox"/>	N/A	<input type="checkbox"/>



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#### WATER TREATMENT UNIT # 02-73

#### Piping diagram and follow-up sheet

Units: None	Scale: None	Date: 2022-12-13
Drawn by:	Verified by:	Approved by: C. LeBlanc
Project: U-230-049-02-073	Identification Code :	Drawing No: U-230-049-02-073 Page: 1 / 1