NIRB Uuktuutinga Ihivriuqhikhamut #126460

Arctic Water Solutions: Harnessing Native Northern Plants for Nature-Based Wastewater Treatment in Canada's Arctic

Uuktuutinga Qanurittuq:	New
Havaap Qanurittunia:	Scientific Research
Uuktuutinga Ublua:	Friday, June 19, 2026
Period of operation:	from 2027-03-01 to 2028-05-01
Havauhikhaq Ikayuqtinga:	Wenxi Liao School of Environmental Sciences at the University of Guelph 50 Stone Road East Guelph ON N1G 2W1 Canada Hivayautit Nampanga:: 4168764905, Kayumiktukkut Nampanga::

QANURITTUT

Tukihiannaqtunik havaariyauyumayumik uqauhiuyun

Qablunaatitut: University of Guelph. Dr. Wenxi Liao, Dr. David McCarthy, Dr. Shadman Khan, Dr. Marc Habash, Dr. Jacqueline Goordial.Northern communities across Canada's Arctic rely heavily on simple sewage lagoons that have limited wastewater treatment capacity. Conventional wastewater treatment plants are often impractical in these regions due to extreme cold conditions. Nature-based biofilters have demonstrated effective removal of nutrients, pathogens, and emerging contaminants in cold regions. However, more research is needed to adapt these systems using local plant species and suitable filter materials so that they are environmentally compatible, culturally appropriate, and resilient to Canada’s Arctic conditions. This project will develop and optimize low-cost, scalable, and climate-adapted biofilters for wastewater treatment in Canada’s Arctic, while protecting native plant species and enhancing ecosystem services. The project is important for Northern communities because it offers an effective, affordable, and locally relevant wastewater treatment solution that is informed by local knowledge and community input.In the first phase in 2026, we will design and optimize biofilter systems using native Arctic plants and effective filter media through laboratory and greenhouse experiments at the University of Guelph. The most promising biofilter designs will then be tested at a demonstration site at or near CHARS in Cambridge Bay and monitored across Arctic seasons from 2027 to early 2028. During field monitoring, locally sourced wastewater will be applied to the biofilters, and treated effluent will be collected to assess performance. A portion of the effluent and selected plant samples will be transported to the University of Guelph for laboratory analysis. Any remaining effluent will be returned to the original wastewater facility or an approved local disposal site, following local guidelines and regulations. Plant performance will also be monitored during the experiment.The project will involve a research team, CHARS staff, and local community partners. Only small experimental biofilter units and monitoring equipment will be installed. The biofilters and equipment will be removed at the end of the experiment in early 2028. Travel and transport of materials will use existing airline routes and facilities.The field demonstration is proposed to take place at the Canadian High Arctic Research Station (CHARS) in Cambridge Bay, Nunavut. Cambridge Bay is the closest community to the proposed field activities. The field deployment and monitoring of biofilters is planned between March 2027 to March 2028. The biofilters and equipment will be disassembled around April 2028.

Uiviititut: N/A

Inuktitut: N/A

Inuinnaqtun: University of Guelph. Dr. Wenxi Liao, Dr. David McCarthy, Dr. Shadman Khan, Dr. Marc Habash, Dr. Jacqueline Goordial.Ukiuqtaqtumi nunallaat Kanatami tamaat ihariagiplugu atuqpagait anaqnut kuvviit ikittut kuvvikunik imaqmik halummaqhitilgit. Nutaatqiyat kuvvikunik imaqmik halummaqhitit amihuiqtuqhutik ihuaqutaunngittut hapkunani aviktuqhimayunit qaayuqnaqpallaamut. Maniraqmiutanik halummaqhitit ihiriitkutat ilittuqhitivaktuq ahivaiyunik niqittianik, halumailrunik, nuivalliayullu halumailruit qaayuqnaqtumi aviktuqhimayuni. Kihimi, qauyihaihimmaaqtughat ihuaqhaiyaamik havauhiqnik atuqhutik nunallaarmiut nauttianginnik ihuaqtuniklu ihiriitkutanik taimaa avatinut naammagiamik, ilitquhinut ihuaqtughat, hakugiktughallu Kanatam Ukiuqtaqtuanit qaayuqnaqtumi.Una havaaghaq hanayauhimayuq ihuaqhailutiklu akikittunik, qauyiharnaqtunik, hilamullu-nakuuhihimayunik ihiriitkutat kuvvikuqnik imaqnik halummaqhitinik Kanatam Ukiuqtaqtuanit, munariplugit nauttiat ihuaqhivaalliriamiklu uumayunut ikayuutighat. Havaaghat aghuurnaqtut Ukiuqtaqtumi nunallaanut tuniqhihimakkamik ihuaqtunik, akikittunik, nunallaarmiunullu ihuaqtunik kuvvikunik imaqmik halummaqhitighaq naunaiyaqhimayut nunallaarmiut qauhimayatuqainit nunallaarmiullu uqauhiinit.Hivulliqni havaanginnit 2026-mi, hanayaghaliuqniaqtugut ihuaqhailugulu ihiriitkutaq atuqhugit maniraqmiutat Ukiuqtaqtumiu nauttiangit ihuaqtumiklu ihiriitkutaqmik qauyihaivingmi nauttivingnilu qauyihaiplutik talvani Ilihaqpaalliqvianit Guelph. Nakuutqiyaunahugiyauyuq ihiriitkutaq uuktuqtauniaqtuq ilihaiyut havakvianit hanianiluuniit CHARS-kut Iqaluktuuttiaqmi munaqtaulutiklu Ukiuqtaqtumi hilautainit 2027-mit 2028-mut. Maniraqmi ilittuqhitillugit, nunallaarmit kuvvikuit imait uuktuqtauniaqtut ihiriitkutanut, halummaqtauhimayuqlu imaq katitauniaqtuq qauyihariamik qanurininganiit. Ilanga halummaqhimayuq kitullu tikkuaqtauhimayut halummaqhivingnit qimilruktaghat aullaqtitauniat Ilihaqpaalliqvianut Guelph-mi qauyihaqvingnit ihivriuqtauyaamik. Amiakkuit

imaq utiqtitauniat kuvvivinianit halummaqhivingnut angiqtauhimayumulluuniit nunallaarnit kuvviqmut, malighugit nunallaarmiut maliktaghait. Qanuriningania munaqtauniaqtuqlu ihivriuqhitillutik.Havaaghanut ilauniat qauyihaiyit havaktiit, CHARS-kut havaktiit, nunallaarmiullu havaqatigiit. Mikiyuinnait qauyihautauyut ihiriitkutat ingilrutait munaqtillu ingilrutait iliuraqtauniaqtut. Ihiriitkutat ingilrutillu ahivaqtauniaqtut iniqvianit qauyihaiyut atulihaaqqat 2028. Aullaarutait agyaqtaqtullu hunaqutinik ingilraviqaqniat tingmitjanut havakvighaqaqlutiklu.Maniraqmi ilihaqtittiyughat naahuriyauyuq talani Kanatam Ukiuqtaqtumi Qauyihaqvianit (CHARS) Iqaluktuuttiaqmi, Nunavunmi. Iqaluktuuttiaq qanitqiyauyuq nunallaaq talvunga maniraqmi havaaghainut. Maniraqmi aullaqtittiyut munaqtiuyullu ihiriitkutanik parnaiyaqhimayuq aulayaamik qakugukiaq Qiqailruq 2027-mit Qiqailruq 2028-mut. Ihiriitkutat ingilrutiillu ituptiqtaunahuat haniani Qitiqqautijuq 2028.

Personnel

Personnel on site: 3
Days on site: 90
Total Person days: 270
Operations Phase: from 2027-01-01 to 2027-07-01
Operations Phase: from 2027-03-01 to 2028-05-01
Closure Phase: from 2028-04-01 to 2028-06-01
Post-Closure Phase: from to

Hulilukaarutit

Inigiya	Hulilukaarut Qanurittuq	Nunannga Qanurittaakhaanik	Initurlinga qanuritpa	Initurlinga utuqqarnitat unaluuniit Ingilraaqnitat Uyaranngugtut akhuurninnga	Qanitqiyauyuq qanitqiamut nunallaat kitulluuniit ahiruqtailiyainnit nuna
Cambridge Bay	Researching	Crown	We plan to work near Canadian High Arctic Research Station (CHARS)	N/A	Approximately 1.5 km between CHARS and Hamlet of Cambridge Bay

Nunaliin Ilauyun, Aviktuqhimayuniitunullu Ikayuuhiarunguyun

Nunauyuq	Atia	Timiuyuq	Upluani Uqaqatigiyaungmata
Ikaluktuttiak	N/A	We are currently working with staff at CHARS. We plan to visit Cambridge Bay this year (2026) to connect and co-develop the project with local communities through community engagement activities, such as workshops. The project application is associated with the field work planned for 2027-2028.	2026-06-03

Angiuttauvaktunik

Naunaiqlugu nunanga talvani havauhikhaq ittuq:

Kitikmeot

Angiuttauvaktunik

Munariniqmut Ayuittiaqtuq	Angirutinga Qanurittuq	Tadja Qanurittaakhaanik	Ublua Tuniyauyuq/Uuktuqtuq	Umikvikhaa Ublua
Nunavut Imaligiyit Katimayit	We have contacted NWB and they have confirmed that we do not need to apply for a permit/licence with NWB for this project.	Not Yet Applied		
Nunavunmi Ihivriuqniqmut Timiqutigiyanga	We are in the process of preparing the permit application. Since the fieldwork associated with this project is planned for 2027 and will involve co-development with local communities, we plan to submit the NRI permit after our first visit to Cambridge Bay this summer, once we have had feedback and knowledge exchange with the local communities.	Not Yet Applied		
Nunavut Kavamanga, Avatiliriyikkut	We also plan to apply for a permit/licence with Government of Nunavut - Department of Environment after our first visit to Cambridge Bay.	Not Yet Applied		

Project transportation types

Transportation Type	Qanuq Atuqtauniarmangaa	Length of Use
Air		

Project accomodation types

Alaanut,

Ihuaqutivaluin Atuqtauyukhan

Hanalrutit atuqtaunahuat (ukuallu ikuutat, pampiutainnik, tingmitinik, akhaluutinik, hunaluuniit)

Hanalrutit Qanurittuq	Qaffiuyut	Aktikkulaanga – Qanurittullu	Qanuq Atuqtauniarmangaa
Information is not available			

Qanurittuq Urhuqyuaq unalu Qayangnaqtut Hunavaluit Aturninnga

Qanurittuq urhuqyuaq hunavaluit aturninnga:	Urhuqyuaq Qanurittuq	Qaffiuyut qattaryut	Qattaryuk Aktikkulaanga	Atauttimut Qaffiuyut	Ilanga	Qanuq Atuqtauniarmangaa
Information is not available						

Imaqmik Aturninnga

Ubluq qanuraaluk (m3)	Aturumayain imavaluin utiqtittagaani qanuq	Atulirumayain imavaluin utiqtittagani humi
0		

Iqqakuq

Ikkakunik Munakgiyauyunik

Havauhikhaq Hulilukaarut	Qanurittuq Iqqakut	Ihumagiyauyuq Qanuraaluktut Atuqtait	Qanuq Iqqakuurniarmangaa	Halummaqtirarnirutikhan piyutin
Researching	Other, wastewater	Small volume	A defined volume of locally sourced wastewater will be applied to the biofilters, and effluent will be collected for treatment performance assessment. A portion of the treated effluent will be transported to the University of Guelph for laboratory analysis. Any treated effluent exceeding analytical requirements will be returned to the originating wastewater treatment facility or an approved local wastewater disposal location, in accordance with local guidelines, facility requirements, and applicable regulations.	N/A

Avatiliriniqmut Ayurhautingit:

This project is funded through Polar Knowledge Canada (POLAR). As described in the project summary, the proposed research aims to evaluate the wastewater treatment performance of vegetated biofilter systems. A defined volume of locally sourced wastewater will be applied to the biofilters, and effluent will be collected for treatment performance assessment. A portion of the treated effluent will be transported to the University of Guelph for laboratory analysis. Any treated effluent exceeding analytical requirements will be returned to the originating wastewater treatment facility or an approved local wastewater disposal location, in accordance with local guidelines, facility requirements, and applicable regulations. The proposed work is expected to pose minimal environmental risk. Wastewater samples will be handled, stored, and transported using appropriate containment and biosafety procedures to minimize the risk of spills, releases, or exposure. Only the volume of wastewater necessary for experimental application and analysis will be used. Any excess treated or untreated wastewater will be returned to the originating wastewater treatment facility or other approved local disposal locations in accordance with local guidelines and operational requirements. These measures will minimize environmental impacts while ensuring safe and responsible handling of wastewater throughout the project. We consulted the Nunavut Water Board and were informed that no permits or licences are required from the NWB for the proposed project.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

SECTION H2: Disposal At Sea

SECTION I1: Municipal Development

Qanurittuq Ittunik Avatinga: Avatingalluanga

Qanurittuq Ittunik Avatinga: Inuuhimayunut Avatinga

Qanurittuq Ittunik Avatinga: Inungit-maniliurutingit Avatinga

Miscellaneous Project Information

Naunaiyainiq ukuninnga Ayurhautingit unalu Piumayaat Ikikliyuumiutinahuarutit

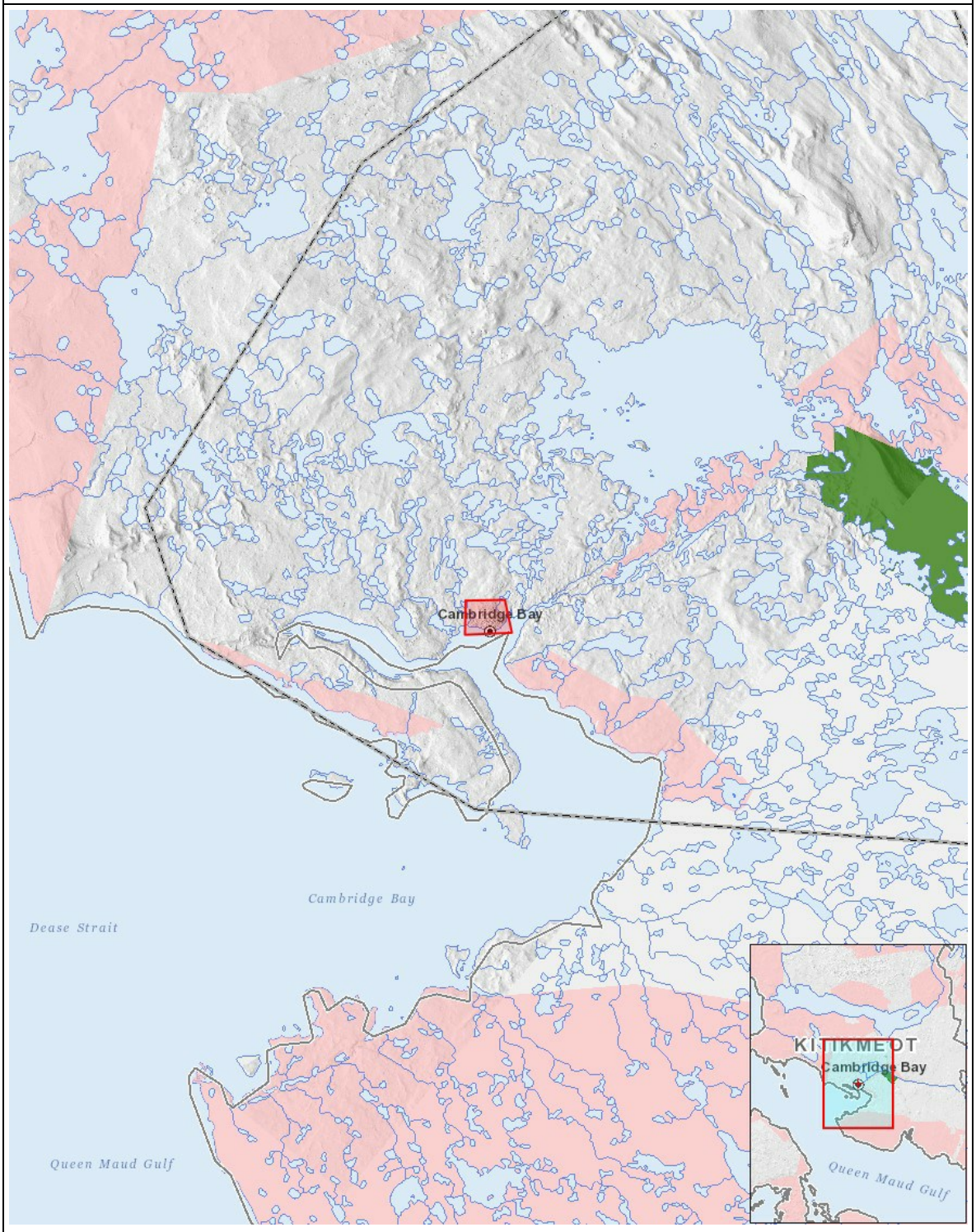
Tamatkiumayunik Ihuikgutivaktunik

Impacts

Ilitariyauniq Avatiliriniqmut Ayurhautingit

	PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
Havakvinga																									
Researching		-	-	-	-	P	-	-	-	-	-	-	-		P	-	-	-	-		-	-	-	P	-
Aulapkaininnga																									
Researching		-	-	-	-	P	-	-	-	-	-	-	-		P	-	-	-	-		-	-	-	P	-
Piiqtauniq																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

(P = Nakuuyuq, N = Nakuungittut unalu mikhilimaittuq, M = Nakuungittut unalu mikhittaaqtuq, U = Naluyauyuq)

Havaariyauyukhamut Nayugaa

List of Project Geometries
1 polygon Cambridge Bay