



## **NIRB Application for Screening #125365**

### **Characterizing Iqaluit's baseline municipal wastewater contaminant loadings to the marine environment**

**Application Type:** New

**Project Type:** Scientific Research

**Application Date:** 7/4/2018 12:03:51 PM

**Period of operation:** from 0001-01-01 to 0001-01-01

**Proposed Authorization:** from 0001-01-01 to 0001-01-01

**Project Proponent:** Mark Hanson  
University of Manitoba  
252 Wallace Building  
Winnipeg Manitoba R3T 2N2  
Canada  
Phone Number:: 204-474-9897, Fax Number::

## DETAILS

### Non-technical project proposal description

English: The University of Manitoba (Dr. Mark Hanson, Department of Environment and Geography) and University of Winnipeg (Dr. Charles Wong, Department of Chemistry) are proposing to evaluate the City of Iqaluit's wastewater effluent for contaminants. Our overall objective is to better understand the risks, if any, wastewater might pose to ecosystems or human health within Frobisher Bay. We plan to measure contaminants at sites in Frobisher Bay near Iqaluit influenced by wastewater effluent, and at reference locations, distant from any wastewater sources. Work will be carried out between 2018-2022 by Drs. Hanson and Wong, their students, and with the assistance of local guides and field technicians from Iqaluit. Sampling will be accomplished by deploying small devices ("passive samplers") in the water column for several weeks that will take up the contaminants of interest or by collecting small volumes of water (approximately 2L) for analysis. No environmental modification or damage will occur as a result of the proposed sampling approaches. Chemical and biological analysis will occur in Winnipeg or other labs. To understand if season matters for contaminant concentrations, we will collect samples in the summer and winter. This will let us know how well the wastewater treatment plant works and how far wastewater extends into Frobisher Bay at different times of year. By comparing the contaminant levels near Iqaluit with those from reference sites, we will determine the relative importance of local sources, such as wastewater discharges, vs. long-range sources, such as ocean water and the atmosphere. The contaminants to be measured include microplastics, nutrients, contaminants of emerging concern (e.g., pharmaceuticals), and microbial contaminants (e.g., E. coli and antibiotic resistant bacteria). We also hope to deploy and sample in the drinking water source for the City of Iqaluit. Data will be made freely available to the public and other interested parties and yearly public updates in Iqaluit will take place. We encourage interested members of the public to get in touch with ideas or concerns they may have related to wastewater in Nunavut. This project will enable the collection of coastal environmental baseline data to help better understand the current state of the ecosystem in the Iqaluit region, Frobisher Bay, and surrounding areas as it relates to wastewater contaminants. The project will also contribute to the capacity building in Nunavut to collect environmental data into the future. Results will not only provide an open source of data to compare between regions and over time, but may also support evidence-based decision-making (such as traditional harvesting, infrastructure development, city planning, public health policy).

French: Le Dr Mark Hanson du Département de l'environnement et de la géographie de l'Université du Manitoba et le Dr Charles Wong du Département de la chimie de l'Université de Winnipeg proposent d'entreprendre une évaluation des contaminants des effluents d'eaux usées de la ville d'Iqaluit. Notre objectif global est de mieux comprendre les risques, le cas échéant, que les eaux usées pourraient représenter pour les écosystèmes ou la santé humaine dans la baie Frobisher. Nous envisageons de mesurer les contaminants qui sont influencés par les effluents d'eaux usées dans divers sites de la baie Frobisher, près d'Iqaluit, ainsi que dans des sites de référence éloignés des sources d'eaux usées. Les travaux seront effectués de 2018 à 2022 par les Drs Hanson et Wong et leurs étudiants, avec l'aide de guides locaux et de techniciens d'Iqaluit. Afin de réaliser l'échantillonnage, de petits échantillonneurs passifs seront déployés dans la colonne d'eau pendant plusieurs semaines en vue d'absorber les contaminants d'intérêt; une autre méthode consiste à collecter de petits volumes d'eau (environ 2 L) à des fins d'analyse. Les méthodes d'échantillonnage proposées ne donneront lieu à aucune modification de l'environnement et n'entraîneront aucun dommage à l'environnement. L'analyse chimique et biologique aura lieu dans des laboratoires à Winnipeg ou ailleurs. Afin de comprendre le rôle que peut jouer la saison dans les concentrations de contaminants, nous prélèverons des échantillons en été ainsi qu'en hiver. Cela nous permettra de savoir si l'usine de traitement des eaux usées fonctionne comme il faut et jusqu'à quel point les eaux usées se rendent dans la baie Frobisher à différents moments de l'année. En comparant les niveaux de contaminants près d'Iqaluit à ceux des sites de référence, nous déterminerons l'importance relative des sources locales, telles que les rejets d'eaux usées, par opposition aux sources éloignées, comme l'eau de la mer et l'atmosphère. Les contaminants devant être mesurés comprennent les microplastiques, les nutriments, les nouveaux contaminants préoccupants (p. ex., les produits pharmaceutiques) et les contaminants microbiens (p. ex., E. coli et les bactéries résistantes aux antibiotiques). Nous espérons aussi effectuer un déploiement et un échantillonnage dans la source d'eau potable de la ville d'Iqaluit. Les données seront gratuitement mises à la disposition du public et des autres parties intéressées, et des mises à jour publiques annuelles auront lieu à Iqaluit. Nous encourageons les particuliers intéressés à nous communiquer leurs idées ou leurs préoccupations concernant les eaux usées au Nunavut. Ce projet de collecte de données de référence sur l'environnement côtier permettra une meilleure compréhension de l'état actuel de l'écosystème dans la région d'Iqaluit, la baie Frobisher et les régions avoisinantes pour ce qui est des contaminants des eaux usées. Le projet contribuera également à renforcer les capacités au Nunavut, ce qui permettra de collecter des données environnementales à l'avenir. Les résultats fourniront non seulement un approvisionnement libre de données pouvant être comparées entre les régions et au fil du temps, mais ils pourront aussi appuyer la prise de décisions fondée sur des données probantes dans divers domaines, tels que l'exploitation traditionnelle, le développement d'infrastructures, la planification urbaine et la politique en matière de santé publique.

Operations Phase: from 2018-08-23 to 2022-03-22

## Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Possible Reference Site	Sampling sites	Marine	Site of continuous effluent release by the City of Iqaluit for many years.	Not known.	Adjacent to the City of Iqaluit wastewater treatment plant.
Possible Reference Site	Sampling sites	Marine	Not known.	Not known.	Located near Iqaluit, but outside the Sylvia Grinnell Territorial Park.
Sampling site in effluent plume	Sampling sites	Marine	Active shipping lane.	Not known.	Close to City of Iqaluit and proposed new harbour.
Sampling site in effluent plume	Sampling sites	Marine	Active shipping lane.	Not known.	Close to City of Iqaluit and proposed new harbour.
Sampling site in effluent plume	Sampling sites	Marine	Active shipping lane.	Not known.	Close to City of Iqaluit and proposed new harbour.
Sampling site at possible farthest extent of effluent plume	Sampling sites	Marine	Active shipping area.	Not known.	Close to City of Iqaluit and proposed new harbour.
Sampling site at possible farthest extent of effluent plume	Sampling sites	Marine	Active shipping area.	Not known.	Close to City of Iqaluit and proposed new harbour.

## Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Iqaluit	Matthew Hamp	City of Iqaluit	2018-05-07
Iqaluit	Christopher Lewis	Department of Fisheries and Oceans	2018-05-01
Iqaluit	Pitseolak Alainga	Amaruq Hunters and Trappers Association	2018-05-01

# Authorizations

Indicate the areas in which the project is located:

South Baffin

## Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Nunavut Research Institute	Pending outcome of NIRB decision.	Not Yet Applied		

## Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	Boat and snowmobile in winter	

## Project accomodation types

Community

# Material Use

Equipment to be used (including drills, pumps, aircraft, vehicles, etc)

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Manta trawl	1	2m by 1m	Skim water surface for microplastic sampling

## Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Information is not available						

## Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0		

# Waste

## Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Researching	Sewage (human waste)	2L of effluent each year of study	Filtrate collected from wastewater effluent will be filtered for microbial analysis at a lab located at the NRI. Resulting filtrate will be sterilized (isopropyl alcohol or bleach) and disposed of down the drain, or stored for disposal back at the wastewater plant, depending on NRI preference or policy.	If available, we will also autoclave the waste.

### Environmental Impacts:

There should be no environmental impacts from the proposed sampling program.

# **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**

**Description of Existing Environment: Physical Environment**

**Description of Existing Environment: Biological Environment**

**Description of Existing Environment: Socio-economic Environment**

**Miscellaneous Project Information**

**Identification of Impacts and Proposed Mitigation Measures**

Our study should result in no impacts to ecosystems or human health.

**Cumulative Effects**

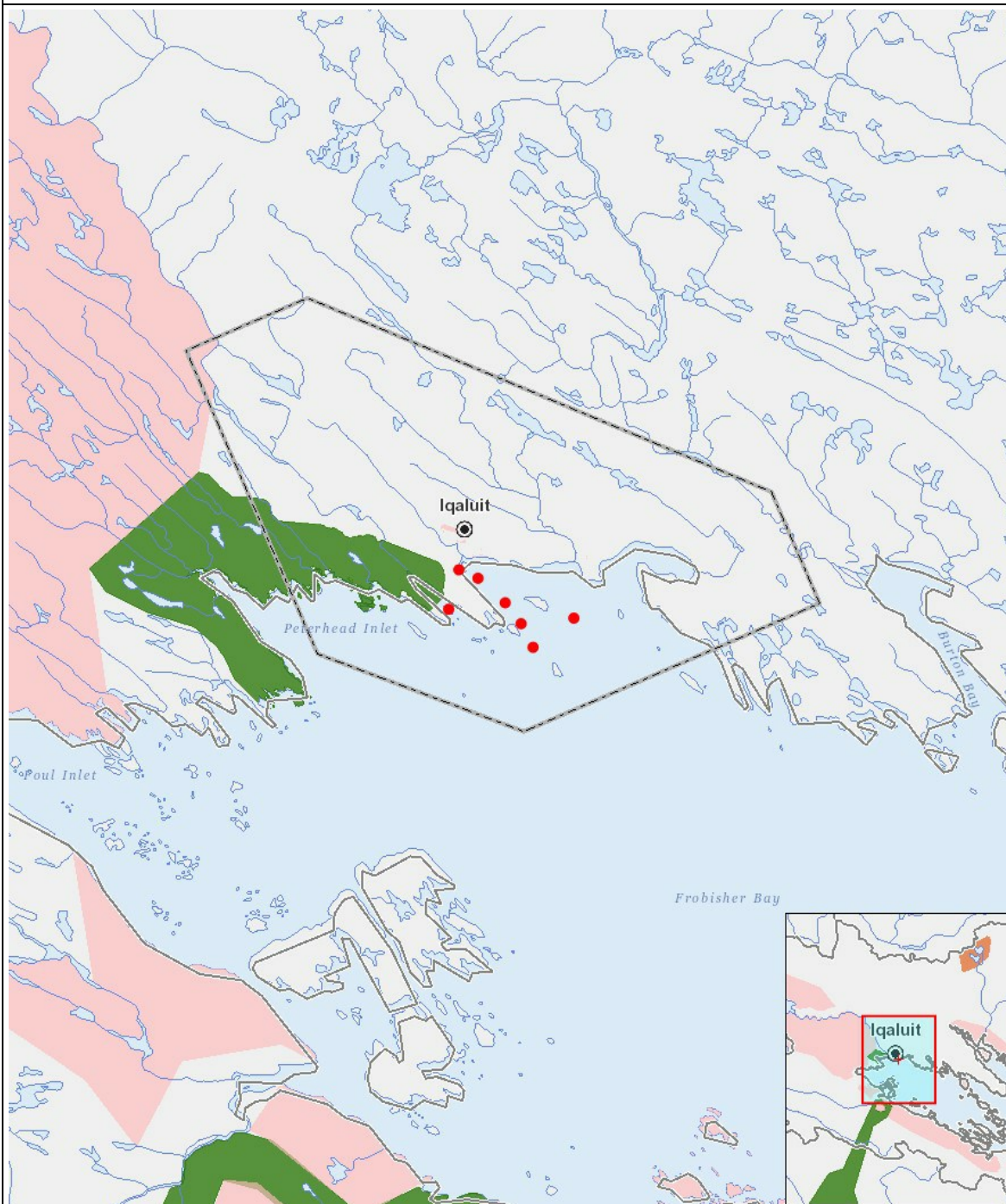
# Impacts

## Identification of Environmental Impacts

		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
Construction																										
-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operation																										
-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Decommissioning																										
-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)

## PROJECT MAP



### LIST OF PROJECT GEOMETRIES:

- |   |       |   |
|---|-------|---|
| 1 | point | Possible Reference Site   |
| 2 | point | Sampling site in direct City of Iqaluit wastewater effluent release |
| 3 | point | Sampling site in effluent plume                                     |
| 4 | point | Sampling site in effluent plume                                     |
| 5 | point | Sampling site in effluent plume                                     |
| 6 | point | Sampling site at possible farthest extent of effluent plume         |
| 7 | point | Sampling site at possible farthest extent of effluent plume         |