



**Water Supply Facility
Operation and Maintenance (O&M) Plan
Hamlet of Whale Cove**

Prepared by

**Nuna Burnside Engineering and Environmental Ltd.
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December 2008

File No: N-O 14851

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1.0 Introduction

1.1 Purpose

The purpose of the Operation and Maintenance (O&M) Plan is to provide guidance for Water Supply Facility Operations, with regard to meeting the requirements of the Water License. This O&M Plan does not include the requirements or detailed guidance of the handling and treatment of water for domestic consumption. The NWB Water License is for water with drawl and impacts to the environment. This O&M Plan focuses on withdrawal of water from the environment without causing a significant impact, and how the potential for environmental impact is monitored annually.

1.2 Hamlet Description

The Community of Whale Cove is located within the Kivalliq Region, Nunavut, at general latitude 62°11'N and general longitude 92°35'W. The Community is located approximately 80 km south of Rankin Inlet (Figure 1).

Whale Cove is located on sheltered bay off of Hudson Bay. The terrain consists of grassy, boulder-strewn ground with overburden of sand and gravel with depths up to 1 m. A ridge of Precambrian rock 15 to 20 m in height surrounds the Hamlet. The Hamlet is located in a zone of continuous permafrost, which has an active layer of approximately 50 cm and 1 m (in poorly drained and well drained soils, respectively). A thin organic layer supports a limited growth of lichen and moss on the low-lying areas (FSC, 2001).

The community has a population of approximately 353 (2006), with an approximate 1.4 percent projected growth rate over the 20-year design period. Community infrastructure includes:

- A water supply facility with pumphouse that draws water from the Fish Lake and provides treatment by chlorination
- Trucked water to holding tanks in each building
- A sewage lagoon which receives trucked sewage collected from holding tanks in each building
- Sewage treatment via an exfiltration lagoon to a wetland discharging to the ocean
- A Solid Waste Management Facility, which includes a bulky metals disposal area
- A contaminated soil pile landfarm
- A quarry located beside the landfill
- Diesel powered generators
- Barge landing area.

The Hamlet of Whale Cove is predominately residential with a few small commercial establishments including a hotel and grocery store. Hunting and fishing in the traditional

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manner is still a prime occupation for many of the inhabitants. A layout of the entire community and infrastructure is displayed on Figure 2.

1.3 Nunavut Water Board License

The Hamlet of Whale Cove operates their municipal water, sewage, and solid waste facilities under the Nunavut Water Board (NWB) License NWB3BWHIA0207, The licence dated September 1, 2002, expired on August 31, 2007 (Appendix A). Part G, Section 1 requires that an Operation and Maintenance (O&M) Plan be submitted for the facilities in accordance with applicable regulations and guidelines. The Hamlet is currently in the process of renewing the licence that expired in August 2007.

1.4 Climate

Whale Cove is affected by Arctic air masses, and experiences a maritime Arctic climate characterized by short cool summers, and long cold winters. The Whale Cove area receives an average of 34 cm of precipitation per year. July mean high and low temperatures are 13.6°C and 5.9°C, respectively. January mean high and low temperatures are -26.8°C and -33.9°C, respectively. Winds are generally north-west. (Environment Canada, 2008). Climate data is included in Appendix B.

1.5 Fish Lake Supply Capacity

The Hamlet of Whale Cove obtains its potable water from Fish Lake, located approximately 3.5 km north of the community (Figure 2). The total drainage area of Fish Lake is 213 hectares. Using an annual precipitation rate of 340 mm and an annual evapotranspiration rate of 200 mm, the total recharge to the lake is approximately 300 000 m³ per year.

The volume of Fish Lake is estimated at 88,000 m³ based on a surface area of approximately 110,000 m² (Figure 3) and an estimated average depth of 8 m.

Assuming 25 percent loss for ice thickness in the winter, the winter capacity is estimated at 660,000 m³.

1.6 Water Use Volumes

Using population numbers from Census Reports between the years 1981 and 2006 and average provincial growth rate projections from Statistics Canada (Statistics Canada, 2000), a growth rate of 1.4% was determined. Table 1 shows the projected population of the Hamlet for the next 20 years.

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Table 1: Whale Cove Projected Population

Year	Projected Population
2006	353
2007	358
2008	363
2009	368
2010	373
2011	378
2012	384
2013	389
2014	395
2015	400
2016	406
2017	411
2018	417
2019	423
2020	429
2021	435
2022	441
2023	447
2024	453
2025	460
2026	466
2027	473
2028	479

The Municipal and Community Affairs (MACA) planning guidelines suggest that the increase in the projected per capita water use in a community of less than 2000 people should be calculated using the following formulae.

$$\text{RWU} \times (1.0 + (0.0023 \times \text{Population}))$$

Where the RWU (residential water use is estimated to be 90 L per capita (Lpcd)) and the factor $0.00023 \times \text{population}$ represents the commercial and industrial water use.

This equation was used to produce projected water use requirements for the next 10 years (Table 2). Detailed calculations are included in Appendix C.

The table indicates that in 2008 the annual consumption is approximately $12,958 \text{ m}^3$ and that in 10 years the annual volume of water consumption for the community will be $15,287 \text{ m}^3$. The current licence states that the allowable water use for the community is $30,000 \text{ m}^3$ per year.

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Table 2: Projected Water Use Requirements

Year	Projected Population	Projected Daily Consumption m ³	Projected Annual Consumption m ³
2006	353	34	12,538
2007	358	35	12,729
2008	363	36	12,958
2009	368	36	13,189
2010	373	37	13,420
2011	378	37	13,651
2012	384	38	13,883
2013	389	39	14,116
2014	395	39	14,349
2015	400	40	14,583
2016	406	41	14,817
2017	411	41	15,051
2018	417	42	15,287

1.7 Health and Safety

Health and safety of workers and the public is the first priority while operating the Water Supply Facility. The requirements of the Nunavut Safety Act must be followed at all times. All actions and operations must be undertaken with safety as the first priority.

Template forms to assist staff in operating the facility, planning and costing the short term and long term use of the facility are included in Appendix D.

1.8 Training

Staff training is an important aspect of the operation of a Water Supply Facility. Staff must be adequately trained to follow this O&M Plan and operate the facility. This O&M Plan is dependent on sufficient site specific training to allow staff to operate the facility.

1.9 Land Use Planning

The Fish Lake drainage basin should be recognized in community land use plans and zoning. The drainage basin should be classified as a sensitive area where land uses must be restricted to prevent impacts to the lake water supply.

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1.10 Impact on Fish Lake

The estimated withdrawal rate of approximately 15,000 m³/year by year 2018 and a licensed withdrawal rate of 30,000 m³, can be compared to the estimated volume of 880,000 m³ and a recharge rate of approximately 300,000 m³.

This indicates the water taking in 10 years is only 50 percent of the licensed withdrawal rate and only 10 percent of the recharge rate. The withdrawal of water of Hamlet usage is unlikely to cause a significant impact on the lake.

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2.0 Operation and Maintenance for Environmental Protection

2.1 Overview

The Hamlet of Whale Cove provides trucked water services for the Community's residents, businesses, and institutions. The community obtains its potable water from Fish Lake, located approximately 3.5 km north of the community (Figure 2). The water supply system consists of a pumphouse, a water intake pipe, berm and truck fill station (Figure 3). Photographs of the facility taken in September 2008 are included in Appendix E.

2.2 Water Supply Facility Design

The raw water source is Fish Lake. The NWB Water Licence contained in Appendix A, identifies the maximum water withdrawal rate from Fish Lake.

The surface water intake was constructed using a single vertically mounted drum screen and inclined shaft casing. The intake was installed at a depth of 6 m. A submersible pump is mounted on a skid and located inside the casing about 15 m from the intake. The skid can be removed from the casing for servicing by means of a wire pull arrangement. The 100 mm diameter un-insulated, heat traced HDPE discharge line is carried inside the 300 mm diameter, 120 m long, HDPE insulated casing. The casing is ballasted and protected by a granular berm and riprap.

The pump house is 3.5 m by 7 m and is divided into two rooms. One room contains hypochlorinator facilities and the steel discharge line from the intake casing to the truckfill arm. The second room contains an emergency diesel electric generator. The pump house gets its power from the NWTPC power plant in the community.

Water for the hypochlorite-mixing tank is supplied from the discharge line. The hypochlorite feed pump is controlled by the flow rate of water supplied to the water trucks. Chlorine is injected into water as water is filled into the water trucks. The chlorine is supplied to the main line by a tube and chlorine injector. The design flow rate of the injection system provides 0.5 mg/L residual chlorine. This rate at the pumphouse allows for consumption and volatilization of the chlorine during delivery to the homes and storage at the homes. The estimated chlorine residual at the point of domestic supply is 0.2 mg/L for the typical truck delivery system. To prepare for future fluoridation, a supply fitting on the steel water discharge line was installed and space was reserved on the pump room floor for fluoridation equipment.

An overhead truckfill arm is used to supply the water to the water trucks. The truckfill arm has a flexible downspout, with thaw capability controlled by a manually activated heat trace. The pump fills the trucks at a rate of 1000 L/min.

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2.3 Water Supply Facility Operational Procedures

The following water distribution operational procedures shall be carried out by the Hamlet of Whale Cove on a daily basis (weather dependent):

- Residential, institutional, and commercial water storage tanks shall be filled from Hamlet-operated water delivery vehicles, with water obtained from the Hamlet Water Supply Facility
- Daily water usage volumes obtained from the Hamlet Water Supply Facility, as well as trip counts shall be recorded on the recording form attached in Appendix D
- In the event of an accident, a spill of petroleum products or a fire during water distribution operations, *the Hamlet of Whale Cove Environmental Emergency Response Plan* (separate document) shall be implemented.

2.4 Water Supply Facility Truckfill Station General Operational Procedures

The following general operational procedures are to be carried out by the Hamlet of Whale Cove during water treatment and truckfill operations at the Hamlet Water Supply Facility:

- Untreated water from the lake shall be transferred by submersible pump to the water distribution vehicles through the truckfill station, at a rate of approximately 1,000 L/min (minimum recommended for fire protection)
- The monitoring level of treatment shall be primary and secondary disinfection, through the addition of sodium hypochlorite
- The chlorine feed system shall be inspected daily
- Water being transferred to the distribution vehicles shall be dosed with sodium hypochlorite at a rate sufficient that a free chlorine residual of 0.2 mg/L, after thorough mixing and 20 minutes of contact time is maintained, in accordance with the Public Health Act (1992) and associated Regulations
- Chlorine residuals shall be monitored daily, or as directed by a Public Health Inspector (as defined by the Public Health Act (1992))
- Facility generators and associated fuel storage shall be monitored daily
- The fuel storage tank containment shall have collected water drained from it daily to prevent corrosion.

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These general operational procedures are for guidance and are not to be considered as the legal requirements to operate the facility, to treat, and supply drinking water for human consumption. The training, procedures, and guidelines for operating the system and complying with the regulations for provision of drinking water are provided elsewhere.

2.5 Periodic and Seasonal Maintenance Procedures

The following general procedures shall be undertaken by the staff of the Hamlet of Whale Cove during periodic and seasonal maintenance operations at the Water Supply Facility:

- The roadway and truck pad shall be maintained by snow clearing in the winter and grading in the summer, and repaired as necessary
- Ditches and drainage channels at the Water Supply Facility shall be inspected during the summer for erosion and repaired as necessary
- Site warning signage, which identifies the boundaries of the Water Supply Facility shall be inspected weekly, and repaired or replaced as necessary
- The truck fill station at the Water Supply Facility shall be inspected for damage or displacement weekly, and repaired as necessary
- Any airborne litter shall be removed from the Water Supply Facility to the Hamlet landfill weekly, or as required
- The berms at the Water Supply Facility shall be inspected during the summer for erosion and settlement weekly, and repaired as necessary
- No motorized vehicles should be operated in the lake or on the ice of the lake due to risk of fuel spills
- If the lake is used for fishing, no motorized augers shall be used and there should be no materials that could contaminate the water brought onto the ice of the lake.

Forms to assist site staff in conducting the inspections and data recording are included in Appendix D.

The activities described above shall be completed by the staff of the Hamlet and details of any repairs shall be reported in the Annual Report submitted to the Nunavut Water Board, in compliance with the Hamlet's Water License.

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2.6 Water Intake System Monitoring Procedures

All water sampling completed by the Hamlet of Whale Cove shall be in accordance with the *Hamlet of Whale Cove Environmental Monitoring Program and Quality Assurance/Quality Control (QA/QC) Plan* (separate document).

Daily monitoring of residual chlorine levels shall be undertaken, to facilitate and confirm the maintenance of a free chlorine residual in treated water in accordance with the *Public Health Act* (1992) and associated Regulations.

2.6.1 Water License Requirements

As outlined in the NWB water license, regular monitoring of the quantities of water obtained from the Water Supply Facility is required.

As part of the general conditions, the licence requires that monthly and annual quantities in cubic metres of fresh water obtained be recorded and reported in the Annual Reports. It also requires that meters, devices or other such methods to record the volume of water used be installed, operated and maintained by the Licensee. The Licensee must maintain the Facilities to the satisfaction of the Inspector.

A Surveillance Station will be established at the intake of the raw water supply before treatment (WHA-1). Monthly and annual quantities of raw water pumped will be measured and recorded in the official operations logbook on a form similar to that presented in Appendix D.

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3.0 Emergency Response and Contingencies

In the event of an emergency, guidance regarding containment and site emergency response can be obtained from the following sources (Table 1):

Table 1: Emergency Contacts

Contact	Location	Telephone Number	Fax Number
INAC – Water/Wastewater Resources Manager	Iqaluit	(867) 975-4550	(867) 979-6445
Hamlet of Whale Cove – SAO	Whale Cove	(867) 896-9917	(867) 896-9058
Government of Nunavut (Regional Engineer)	Rankin Inlet	(867) 645-8159	(867) 645-8196
Environment Canada – Inspector	Iqaluit	(867) 975-4644	(867) 975-4594
Fire Department	Whale Cove	(867) 896-9192	-
RCMP Detachment	Whale Cove	(867) 896-0123	-
Community Health Center	Whale Cove	(867) 896-9916	(867) 896-9115

Contingency plans are designed to provide site staff with direction and options when there is an unexpected event or accident.

The Environmental Emergency Contingency Plan, Hamlet of Whale Cove (prepared as a separate document) provides procedures and direction in the case of a spill or environmental emergency.

In the event of a contaminant being released into the lake, the operator would be required to contact the Nunavut Spill Hot-line and the regional Environmental Health Officer of Health Canada. The operator would based on consultation with these offices determine the required course of action to be taken.

As outlined in the Environmental Emergency Contingency Plan, the health and safety of workers and the public are the first priority.

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4.0 Reporting

The Nunavut Water Board License in Part B: General Conditions include the requirement to file an Annual Report with the NWB no later than March 31st of each calendar year. The report shall include:

- Tabular summaries of all data generated under the "Monitoring Program"
- The monthly and annual quantities in cubic metres of freshwater obtained from all sources
- The monthly and annual quantities in cubic metres of each and all waste discharged
- A summary of modifications and/or major maintenance work carried out on the Water Supply Facilities, including all associated structures
- A list of unauthorized discharges and summary of follow-up action taken
- A summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year
- A summary of any studies, reports and plans (i.e. Operation and Maintenance, Abandonment and Restoration, QA/QC) requested by the Board that relate to water use or reclamation, and a brief description of any future studies planned
- Any other details on water use requested by the Board by November 1st of the reporting year.

The format of the NWB Annual Report is included in Appendix F.

The creation of the report can be greatly simplified by staff regularly filling in and filing the Site Forms included in Appendix D. The forms include:

- Form 1 – Monthly Water Delivery Log – describing the day to day delivery of water and site activities
- Form 2 – Water Supply Facility Monthly Inspection Form – to document the inspection and observation of the site operations and infrastructure
- Form 3 – Water Supply Facility Planning Form – which provides a list of items to be discussed by the site foreman and Hamlet Council related to short term and long term water supply and treatment decision making.

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In addition to these forms, there would be sampling information and analytical data collected. The Monitoring Plan and QA/QC Plan (prepared as a separate document) outlines sample collection and analytical data handling protocols. Using the forms and following the procedures provided herein should make submitting the Annual Monitoring Report relatively straight forward.

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5.0 References

Department of Municipal and Community Affairs, Government of Northwest Territories, October 1996. *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories*. Queen's Printer: Yellowknife, Northwest Territories.

Environment Canada, Canadian Climate Data 1985-2007, Whale Cove A Weather Station.

http://climate.weatheroffice.ec.gc.ca/climateData/monthlydata_e.html?timeframe=3&Prov=XX&StationID=1727&Year=2007&Month=1&Day=1. Accessed Nov 10, 2008.

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Nunavut Water Board. 1 Sept 2002. *Hamlet of Whale Cove Water License NWB3WHA0207*. Gjoa Haven, Nunavut.

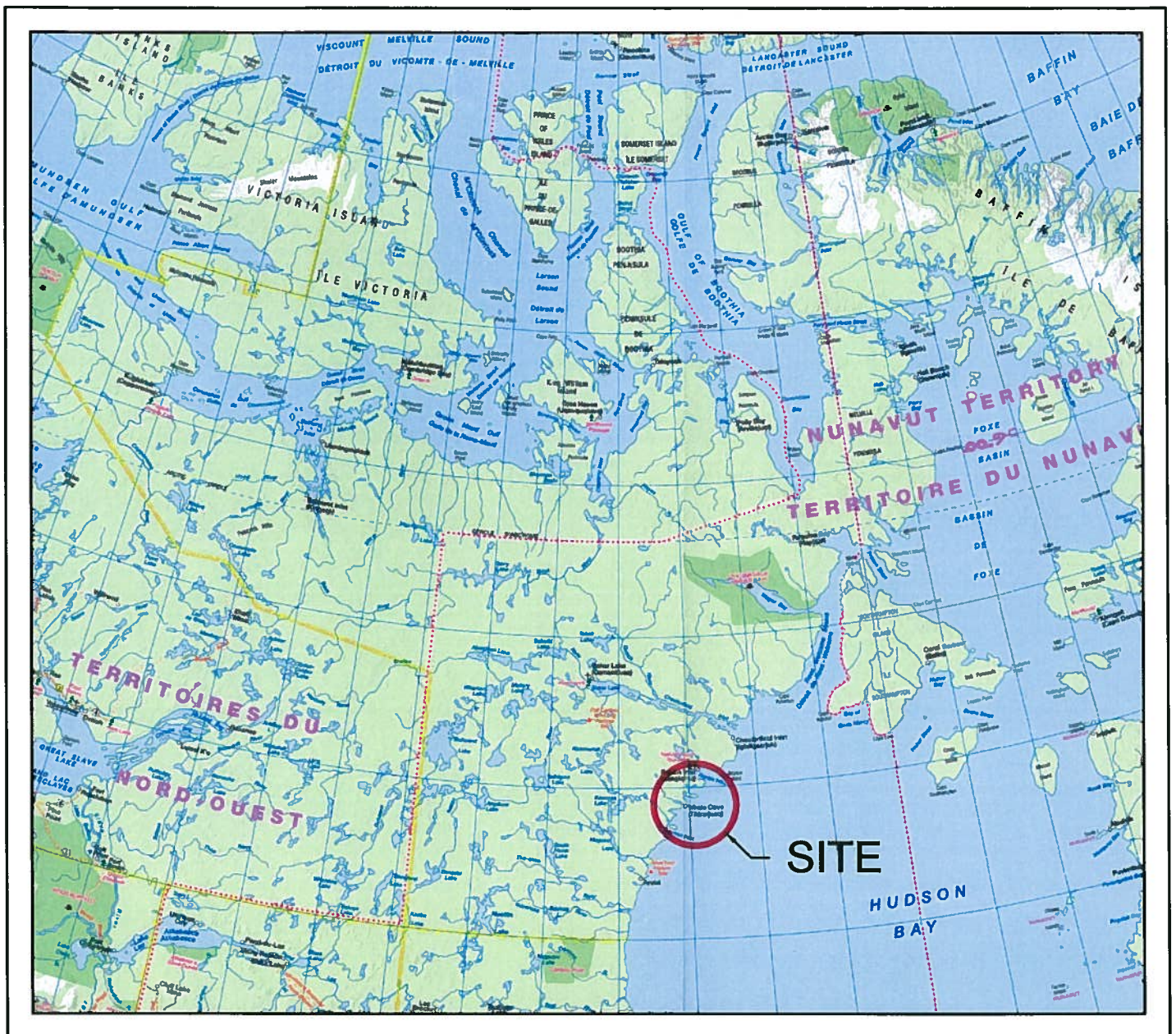
Nuna Burnside Engineering & Environmental Ltd., (2008). *Environmental Emergency Contingency Plan, Hamlet of Whale Cove*.

Nuna Burnside Engineering & Environmental Ltd., (2008). *Environmental Monitoring Program and Quality Assurance/Quality Control Plan, Hamlet of Whale Cove*.

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Figures



Map Reference:
Map Art Publishing

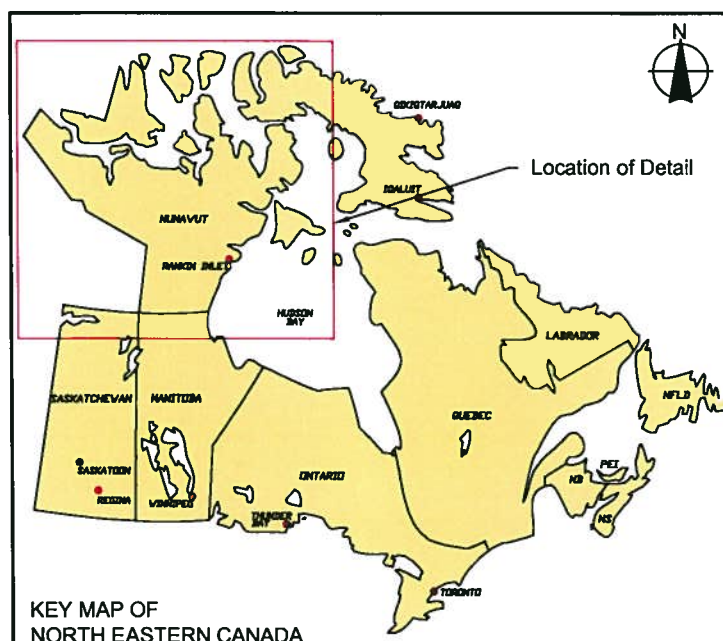


FIGURE 1 - SITE LOCATION MAP

HAMLET OF WHALE COVE WHALE COVE, NUNAVUT

WATER SUPPLY FACILITY OPERATIONS & MAINTENANCE PLAN

November 2008

Project Number: N-O14851

Prepared by: C. Sheppard

Verified by: J. Walls

burnside

14851 WATER SUPPLY O&M PLAN SL.dwg

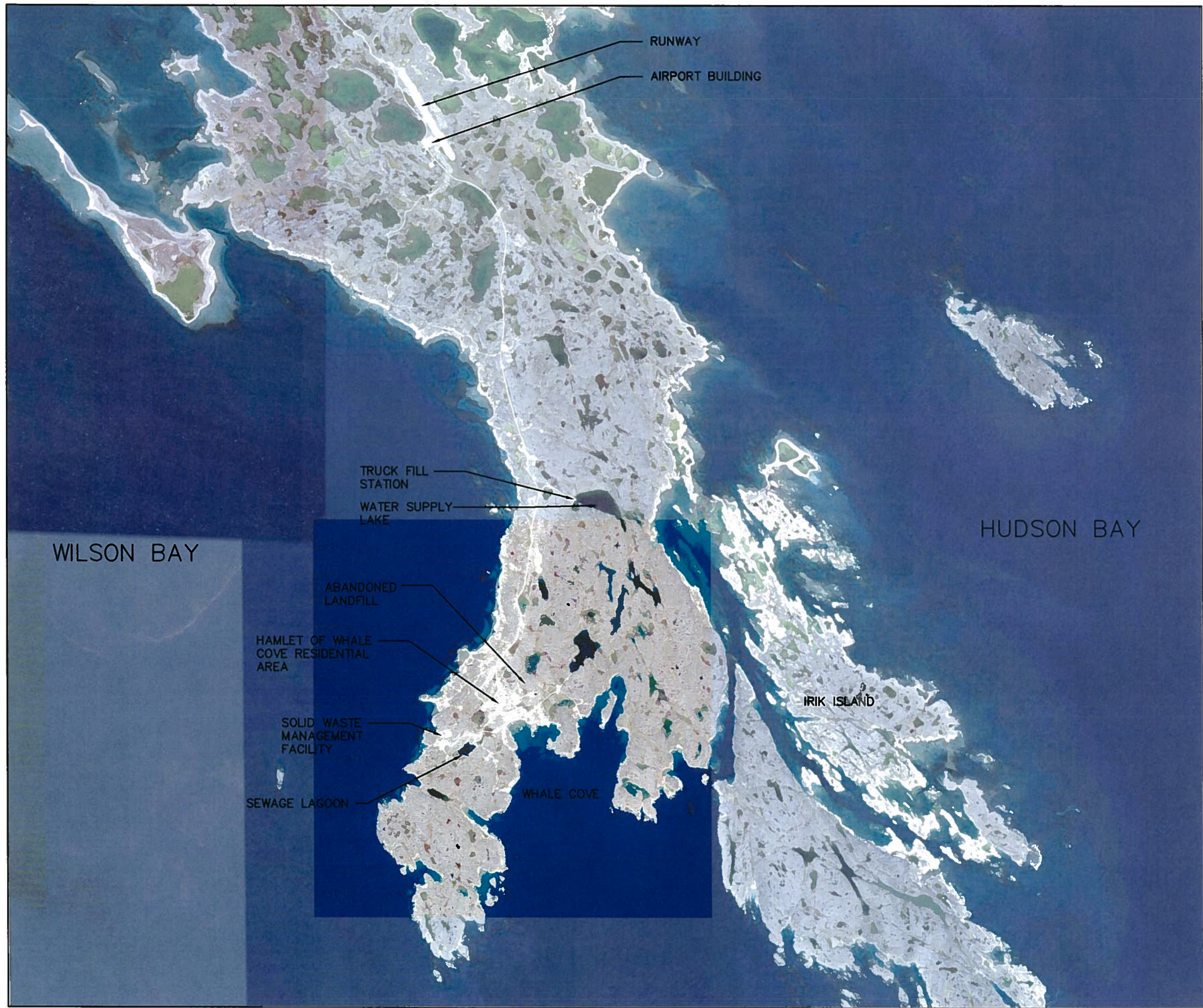
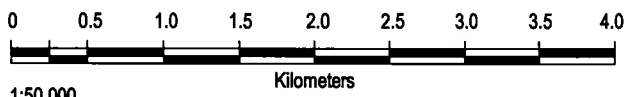
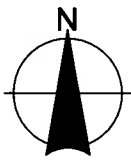


FIGURE 2
HAMLET OF WHALE COVE
WHALE COVE, NUNAVUT
WATER SUPPLY FACILITY O&M PLAN

COMMUNITY PLAN

Satellite Image Source:
 Background colour satellite image obtained from Google Earth Pro.



1:50,000
 November 2008
 Project Number: N-O14851
 Prepared by: C. Sheppard

Projection: UTM Zone 15
 Datum: NAD83
 Verified by: J. Walls



FIGURE 3

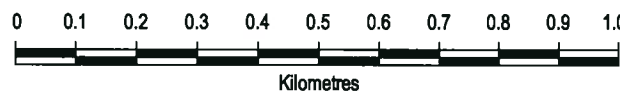
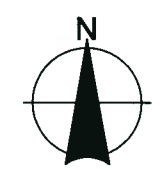
**HAMLET OF WHALE COVE
WHALE COVE, NUNAVUT
WATER SUPPLY FACILITY O&M PLAN**

WATER SUPPLY FACILITY

LEGEND

----- INTERPRETED SURFACE WATER
DRAINAGE DIVIDE

Satellite Image Source:
Background colour satellite image obtained from Google Earth Pro.



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November 2008
Project Number: N-Q14851
Prepared by: C. Sheppard
Projection: UTM Zone 17
Datum: NAD83
Verified by: J. Walls



Appendix A
Nunavut Water Licence



P.O. Box 119
GJOA HAVEN, NU X0B 1J0
TEL: (867) 360-6338
FAX: (867) 360-6369

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

File No: NWB3WHA0207

September 18, 2002

Imalda Angooteluk
Senior Administrative Officer
Hamlet of Whale Cove
P.O. Box 120
Whale Cove, Nunavut X0C 0J0
Email: hamwhale@arctic.ca

RE: NWB Licence No. NWB3WHA0207

Dear Imalda:

Please find attached Licence No. NWB3WHA0207 issued to the Hamlet of Whale Cove by the Nunavut Water Board (**Motion #: 2002-10**) pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*. The terms and conditions of the attached Licence related to water use and waste disposal are an integral part of this approval.

Sincerely,

Philippe di Pizzo
Executive Director

Enclosure: Licence No. **NWB3WHA0207**

cc: Paul Smith, DIAND Iqaluit
C. Bodykevich, DIAND Inspector
Tongola Sandy, KIA
Gladys Joudrey, NIRB
Josee Gallipeau, NWMBBoard
P. Pacholek, EC
P. Partridge, DSD
J. DeGroot, DFO



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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

DECISION

LICENCE NUMBER: NWB3WHA0207

This is the decision of the Nunavut Water Board (NWB) with respect to an application for a Licence dated 02 April 2002, made by:

Hamlet of Whale Cove

to allow for the use of water and disposal of waste for the Hamlet at Whale Cove, Nunavut.


With respect to this application, the NWB gave notice to the public that the Hamlet had filed an application for a water licence.

DECISION

After having been satisfied that the application was exempt from the requirement for screening by the Nunavut Impact Review Board in accordance with S. 12.3.2 of the *Nunavut Land Claim Agreement* (NLCA), the NWB decided that the application could go through the regulatory process. After reviewing the submission of the Applicant and written comments expressed by interested parties, the NWB, having given due regard to the facts and circumstances, the merits of the submissions made to it and to the purpose, scope and intent of the *Nunavut Land Claims Agreement* and of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA), decided to waive the requirement to hold a public hearing and furthermore to delegate its authority to approve the application to the Chief Administrative Officer pursuant to S. 49(a) of the NWNSRTA and determined that:

Licence Number NWB3WHA0207 be issued subject to the terms and conditions contained therein. (Motion #: 2002-10)

SIGNED this _____ day of September, 2002 at Gjoa Haven, NU.



Philippe di Pizzo
Chief Administrative Officer

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I. INTRODUCTION

Following an application filed by the Hamlet of Whale Cove on April 2, 2002 to the Nunavut Water Board, the Board conducted an initial assessment of the Hamlet's request for a municipal water licence for water use and waste disposal activities within the Hamlet. The assessment was conducted so that the Nunavut Water Board could make a fully informed decision on the application. The application was referred for review and comments to Federal, Territorial and local organizations. Based upon the results of this initial assessment and the technical review, including consideration of any potential accidents, malfunctions, or cumulative environmental effects that the overall project might have in the area, the Board concluded that this application was complete and could go through the regulatory process.

In accordance with the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* S. 55.1 and Article 13 of the *Nunavut Land Claims Agreement*, public notice of the application was posted. No public concerns were expressed, and the NWB waived the requirement to hold a public hearing for the application. Authority to approve the application was delegated to the Chief Administrative Officer pursuant to S. 13.7.5 of the *Agreement*. After considering and reviewing the comments submitted by interested parties, the NWB has issued licence NWB3WHA0207.

II. GENERAL CONSIDERATIONS

Term of the Licence

In accordance with the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* S. 45, the NWB may issue a licence for a term not exceeding twenty-five years. The NWB believes that a term of five years is appropriate. Because this is the first licence issued to the Hamlet by the Nunavut Water Board, a 5-year licence will allow enough time for the Hamlet to establish a consistent compliance record. The 5-year licence will allow the Licensee to properly carry out the terms and conditions of the licence and to ensure that sufficient time is given to permit the Licensee to develop, submit, and implement the plans required under the licence to the satisfaction of the NWB.

Annual Report

The requirements imposed on the Licensee in this licence are for the purpose of ensuring that the NWB has an accurate annual update of municipal activities during a calendar year. This information is maintained on the public registry and is available to any interested parties upon request. Refer to attached standard form for completing Annual Report (see Attachment I).

Regulated Parameters

Effluent quality criteria imposed in this Licence are consistent with the *Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories* (Northwest Territories Water Board; 1992), and follow advice received from both the Department of Indian and Northern Affairs and Environment Canada.

Operation and Maintenance Manual (O&M)

The purpose of an Operation and Maintenance Manual is to assist Hamlet staff in the proper operation and maintenance of their waste disposal facilities. The manual should demonstrate to the Nunavut Water Board that the Hamlet is capable of operating and maintaining all waste disposal sites adequately. The Plan should be completed using the *Guidelines for the Preparation of an s and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories* (Duong and Kent, 1996; see Attachment II).

Abandonment and Restoration (A&R)

To ensure that all future abandoned facilities are reclaimed in an appropriate manner, the NWB has imposed the requirement for the submission of Abandonment and Restoration Plans. These plans should be submitted when the Licensee files preliminary design drawings for the construction of new facilities to replace existing ones.

Surveillance Network Program

The Surveillance Network Program (SNP) is a monitoring program established to collect data on water quality to assess the effectiveness of treatment for protection of public health and to assess potential impacts to the environment associated with the municipal facilities. As this is the first Municipal Water Licence issued to the Hamlet by the Board, minimum requirements have been imposed, but additional sampling may be required by an Inspector.

Quality Assurance/Quality Control (QA/QC) Plan

The requirements to develop a QA/QC Plan imposed on the Licensee in this licence are for the purpose of ensuring the NWB that samples taken in the field as part of the SNP will maintain a high quality, so as to accurately represent the physical and chemical nature of the samples being taken.

LICENCE NWB3WHA0207

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

HAMLET OF WHALE COVE

(Licensee)

of

WHALE COVE, NUNAVUT, X0C 0J0

(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water for a period subject to restrictions and conditions contained within this licence:

NWB3WHA0207

Licence Number

NUNAVUT 05

Water Management Area

WHALE COVE, NUNAVUT

Location

WATER USE AND WASTE DISPOSAL

Purpose

MUNICIPAL UNDERTAKINGS

Description

30,000 CUBIC METRES ANNUALLY

Quantity of Water Not to be Exceeded

SEPTEMBER 1, 2002

Date of Licence

AUGUST 31, 2007

Expiry Date of Licence

Dated this _____ of September 2002 at Gjoa Haven, NU.



Philippe di Pizzo
Chief Administrative Officer

PART A: SCOPE AND DEFINITIONS

1. Scope

- a. This Licence allows for the use of water and the disposal of waste for municipal undertakings at the Hamlet of Whale Cove, Nunavut (62°11'N, 92°35'W);
- b. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be subject to such requirements; and;
- c. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. Definitions

In this Licence: **NWB3WHA0207**

“Act” means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*;

“Amendment” means a change to original terms and conditions of this licence requiring correction, addition or deletion of specific terms and conditions of the licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

“Analyst” means an Analyst designated by the Minister under Section 85 (1) of the *Act*;

“Appurtenant undertaking” means an undertaking in relation to which a use of waters or a deposit of waste is permitted by a licence issued by the Board;

“Average Concentration” means the arithmetic mean of the last four consecutive analytical results for contained in composite or grab samples collected from the Waste Facility’s final discharge point;

“Average Concentration For Faecal Coliforms” means the geometric mean of the last four consecutive analytical results for faecal coliforms contained in composite or grab samples collected from the Waste Facility’s final discharge point;

“Board” means the Nunavut Water Board established under the *Nunavut Land Claims Agreement*;

“Chief Administrative Officer” means the Executive Director of the Nunavut Water Board;

“Commercial Waste Water” means water and associated waste generated by the operation of a commercial enterprise, but does not include toilet wastes or greywater;

“Effluent” means treated or untreated liquid waste material that is discharged into the environment from a structure such as a settling pond or a treatment plant;

“Freeboard” means the vertical distance between water line and crest on a dam or dyke’s upstream slope;

“Grab Sample” means a single water or wastewater sample taken at a time and place representative of the total discharge;

“Greywater” means all liquid wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet wastes;

“Inspector” means an Inspector designated by the Minister under Section 85 (1) of the *Act*;

“Licensee” means the holder of this Licence;

“Modification” means an alteration to a physical work that introduces new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion, and changes to the operating system that are consistent with the terms of this Licence and do not require amendment;

“Nunavut Land Claims Agreement” (NLCA) means the “Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada,” including its preamble and schedules, and any amendments to that agreement made pursuant to it;

“Sewage” means all toilet wastes and greywater;

“Sewage Disposal Facilities” comprises the area and engineered lagoon and decant structures designed to contain sewage as described in the Application for Water Licence filed by the Applicant on April 2, 2002;

“Solid Waste Disposal Facilities” comprises the area and associated structures designed to contain solid waste (landfill site) as described in the Application for Water Licence filed by the Applicant on April 2, 2002;

“Surveillance Network Program” means a monitoring program established to collect data on surface water and groundwater quality to assess impacts to the environment of an appurtenant undertaking.

“Toilet Wastes” means all human excreta and associated products, but does not include greywater;

“Waste” means, as defined in S.4 of the *Act*, any substance that, by itself or in combination with other substances found in water, would have the effect of altering the quality of any water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means;

“Waste Disposal Facilities” means all facilities designated for the disposal of waste, and includes the Sewage Disposal Facilities, Solid Waste Disposal Facilities, and Bagged Toilet Waste Disposal Facilities, as described in the Application for Water Licence filed by the Applicant on April 2, 2002; and

“Water Supply Facilities” comprises the area and associated intake infrastructure at Fish Lake, as described in the Application for Water Licence filed by the Applicant on April 2, 2002.

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report with the Board not later than March 31st of the year following the calendar year reported which shall contain the following information:
 - i. tabular summaries of all data generated under the “Surveillance Network Program”;
 - ii. the monthly and annual quantities in cubic metres of fresh water obtained from all sources;
 - iii. the monthly and annual quantities in cubic metres of each and all waste discharged;
 - iv. a summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and

facilities;

- v. a list of unauthorized discharges and summary of follow-up action taken;
 - vi. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;
 - vii. a summary of any studies, reports and plans (e.g., Operation and Maintenance, Abandonment and Restoration, QA/QC) requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned;
 - viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and
2. The Licensee shall comply with the “Surveillance Network Program” described in this Licence, and any amendments to the “Surveillance Network Program” as may be made from time to time, pursuant to the conditions of this Licence.
 3. The “Surveillance Network Program” and compliance dates specified in the Licence may be modified at the discretion of the Board.
 4. Meters, devices or other such methods used for measuring the volumes of water used and waste discharged shall be installed, operated and maintained by the Licensee to the satisfaction of an Inspector.
 5. The Licensee shall, within ninety (90) days after the first visit of the Inspector, post the necessary signs, where possible, to identify the stations of the “Surveillance Network Program.” All signage postings shall be in the Official Languages of Nunavut, and shall be located and maintained to the satisfaction of an Inspector.
 6. The Licensee shall immediately report to the 24-Hour Spill Report Line (867-920-8130) any spills of Waste, which are reported to or observed by the Licensee, within the municipal boundaries or in the areas of the Water Supply or Waste Disposal Facilities.
 7. The Licensee shall ensure a copy of this Licence is maintained at the municipal office and at the site of operation at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

(i) Chief Administrative Officer:

Executive Director
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369

(ii) Inspector Contact:

Water Resources Officer
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4298
Fax: (867) 979-6445

(iii) Analyst Contact:

Taiga Laboratories
Department of Indian and Northern Affairs
4601 - 52 Avenue, P.O. Box 1500
Yellowknife, NT X1A 2R3
Telephone: (867) 669-2781
Fax: (867) 669-2718

8. The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain all fresh water from Fish Lake using the Water Supply Facilities or as otherwise approved by the Board.
2. The annual quantity of water used for all purposes shall not exceed 30,000 cubic metres.
3. The Licensee shall maintain the Water Supply Facilities to the satisfaction of the Inspector.

4. The water intake hose used on the water pumps shall be equipped with a screen with a mesh size sufficient to ensure no entrainment of fish.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall direct all piped and pumpout Sewage to the Sewage Disposal Facilities or as otherwise approved by the Board.
2. All Effluent discharged from the Sewage Disposal Facilities at "Surveillance Network Program" Station Number WHA-3 shall meet the following effluent quality standards:

Parameter	Maximum Average Concentration
Faecal Coliforms	1×10^6 CFU/dl
BOD ₅	120 mg/L
Total Suspended Solids	180 mg/L
Oil and grease	No visible sheen
pH	between 6 and 9

3. A Freeboard limit of 1.0 metre, or as recommended by a qualified geotechnical engineer and as approved by the Board, shall be maintained at all dykes and earthfill structures associated with the Sewage Disposal Facilities.
4. The Licensee shall advise an Inspector at least ten (10) days prior to initiating any decant of the sewage lagoon.
5. The sewage lagoon shall be maintained and operated in such a manner as to prevent structural failure.
6. The Licensee shall maintain the Sewage Disposal Facilities to the satisfaction of an Inspector.
7. The Licensee shall dispose of and contain all solid wastes at the Solid Waste Disposal Facilities or as otherwise approved by the Board.

8. The Licensee shall implement measures to ensure hazardous materials and/or leachate from the Solid Waste Disposal Facility does not enter water.

PART E: CONDITIONS APPLYING TO MODIFICATION AND CONSTRUCTION

1. The Licensee shall submit to the Board for approval design drawings stamped by a qualified engineer registered in the Nunavut prior to the construction of any dams, dykes or structures intended to contain, withhold, divert or retain water or wastes.
2. The Licensee may, without written approval from the Board, carry out modifications to the Water Supply and Waste Disposal Facilities provided that such modifications are consistent with the terms of this Licence and the following requirements are met:
 - i. the Licensee has notified the Board in writing of such proposed modifications at least sixty (60) days prior to beginning the modifications;
 - ii. said modifications do not place the Licensee in contravention of the Licence or the *Act*;
 - iii. the Board has not, during the sixty (60) days following notification of the proposed modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and
 - iv. the Board has not rejected the proposed modifications.
3. Modifications for which all of the conditions referred to in Part E, Item 1, have not been met may be carried out only with written approval from the Board.
4. The Licensee shall provide as built plans/drawings of the modifications referred to in this Licence within ninety (90) days of completion of the modifications.

PART F: CONDITIONS APPLYING TO OPERATION AND MAINTENANCE

1. The Licensee shall, before September 1, 2003 submit to the Board for approval, a plan for the Operation and Maintenance of the Sewage and Solid Waste Disposal Facilities in accordance with "*Guidelines for preparing an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities*" (October 1996).

2. The Licensee shall implement the Plan specified in Part F, Item 1 as and when approved by the Board.
3. The Licensee shall revise the Plan referred to in Part F, Item 1, if not acceptable to the Board. The revised Plan shall be submitted to the Board for approval within thirty (30) days of notification of the Board decision.
4. If, during the period of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:
 - i. employ the appropriate contingency plan as provided for in the Operation and Maintenance Plan;
 - ii. report the incident immediately via the 24-Hour Spill Reporting Line at (867) 920-8130 and to an Inspector; and
 - iii. submit to an Inspector a detailed report on each occurrence not later than thirty (30) days after initially reporting the event.

PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit to the Board for approval an Abandonment and Restoration Plan at least six (6) months prior to abandoning any facilities and the construction of new facilities to replace existing ones. The Plan shall include, but not be limited to where applicable:
 - i. water intake facilities;
 - ii. the water treatment and waste disposal sites and facilities;
 - iii. petroleum and chemical storage areas;
 - iv. any site affected by waste spills;
 - v. leachate prevention;
 - vi. an implementation schedule;
 - vii. maps delineating all disturbed areas, and site facilities;
 - viii. consideration of altered drainage patterns;

- ix. type and source of cover materials;
 - x. future area use;
 - xi. hazardous wastes; and
 - xii. a proposal identifying measures by which restoration costs will be financed by the Licensee upon abandonment.
2. The Licensee shall implement the plan specified in Part G, Item 1 as and when approved by the Board.
 3. The Licensee shall revise the Plan referred to in Part G, Item 1 if not approved. The revised Plan shall be submitted to the Board for approval within thirty (30) days of receiving notification of the Board's decision.
 4. The Licensee shall complete the restoration work within the time schedule specified in the Plan, or as subsequently revised and approved by the Board.

PART H: CONDITIONS APPLYING TO THE SURVEILLANCE NETWORK PROGRAM

1. The Licensee shall maintain Surveillance Stations at the following locations:

<u>Station Number</u>	<u>Description</u>
WHA-1	Raw Water supply prior to treatment
WHA-2	Runoff from the Solid Waste Disposal Facilities
WHA-3	Effluent discharge from the Sewage Disposal Facilities

2. The Licensee shall sample monthly at Surveillance Stations WHA-2 and WHA-3 during the months of May to August, inclusive.
3. The Licensee shall analyze samples collected at Station Number WHA-2 and WHA-3 for the following parameters:

BOD	Faecal Coliforms
pH	Conductivity
Total Suspended Solids	Ammonia Nitrogen
Nitrate-Nitrite	Oil and Grease (visual)
Total Phenols	Sulphate
Sodium	Potassium
Magnesium	Calcium
Total Arsenic	Total Cadmium
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel
Total Zinc	

4. Additional sampling and analysis may be requested by an Inspector;
5. The Licensee shall conform to the Quality Assurance/Quality Control (QA/QC) Plan which shall be provided to the Licensee by the NWB within 60 days of the issuance of this licence;
6. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board;
7. All analyses shall be performed in a Canadian Association of Environmental Analytical Laboratories (CAEAL) Certified Laboratory, or as otherwise approved by an Analyst;
8. The Licensee shall measure and record in cubic metres the monthly and annual quantities of water pumped from Surveillance Network Program Station Number WHA-1 for all purposes;
9. The Licensee shall measure and record the annual quantities of sewage solids removed from the Sewage Disposal Facility;
10. The Licensee shall, unless otherwise requested by an Inspector, include all of the data and information required by the "Surveillance Network Program" in the Licensee's Annual Report, as required *per* Part B, Item 1; and

11. Modifications to the Surveillance Network Program may be made only upon written approval of the Chief Administrative Officer.

Appendix B
Climate Data

Whale Cove Climate Data

Whale Cove Climate Station Data Summary (1985-2007)

Total Precipitation (mm) 1985-2007

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (mm)
1985			60.0	23.8	2.1	40.3	62.5	127.5	146.6		201.6	111.0	775.4
1986	14.8	1.0	10.6	2.2	48.8	26.8	13.9	73.3	40.8	101.4	16.2	35.4	385.2
1987	29.8	26.8	46.8	83.8	1.4	139.4	25.0	66.6	13.2	25.2	25.8	19.4	503.2
1988	2.6			17.6		36.1		28.2	32.2		62.5	29.8	209.0
1989	7.2	20.8	50.6	45.0	42.6	9.2	61.0	38.2	46.0	9.6	3.0	0.6	333.8
1990	26.6			21.2	32.8	61.0	65.6	53.2	24.6	34.4		16.8	336.2
1991	41.2	44.4	33.0	46.6	21.2	4.8	4.0	50.5	259.2	78.4	15.4	33.8	632.5
1992	24.0	4.4	16.6	8.8	11.8	50.9	7.4	38.8	54.0	16.6	22.0	23.8	279.1
1993	47.8	12.2	2.8	16.6	19.2	17.9	24.2	61.5	54.2	12.6	32.8	23.2	325.0
1994	6.2	3.0	20.0	41.8	26.0	33.7	10.2	70.8	78.6	36.4	44.2	33.8	404.7
1995	25.8	10.4	9.2	32.1	16.0	12.2	89.7	111.8	53.6	40.6	21.2	22.6	445.2
1996	13.8	9.1	13.8	2.4	2.6	31.6	17.8	85.6	40.8	15.6	10.0	7.6	250.7
1997	0.4	3.2	6.0	6.2	2.8	24.7	17.0	26.6	13.2	17.6	3.6	7.2	128.5
1998	5.8	4.0	4.8	13.2	6.4	11.2	60.8	43.0	51.8	22.6	18.0	3.2	244.8
1999	8.4	9.0	3.2	9.0	7.6	22.2	59.2	59.8	34.4	16.2	32.2	18.2	279.4
2000	10.6	16.8	17.3	5.8	2.2	4.0		92.5	40.0	20.0	2.2	11.6	223.0
2001	17.4	12.0	17.5	7.4	14.6	22.2	60.6	86.4	9.6	38.6	14.4	23.6	324.3
2002	22.6	5.2	1.8	16.8	15.6	20.6	47.6	98.8	22.8	28.0	7.2	2.2	289.2
2003	17.2	3.6	13.2	2.6	33.8	50.6	33.8	65.0	21.0	38.2	30.8	24.2	334.0
2004	2.4	11.8	6.2	18.8	3.4	22.6	33.6	42.4	63.8	22.0	25.4	4.4	256.8
2005	2.4	9.8	15.0	16.8	29.3	22.6	43.6	8.8	23.9	16.6	25.4	8.8	223.0
2006	16.2	3.6	3.4	9.4	13.8	47.0	51.0	40.2	19.4	58.4	18.6	19.4	300.4
2007	14.4	21.8	10.0	18.3	18.2	37.0	30.4	66.6	43.8	18.0			
Average	16.3	11.6	17.2	20.3	16.9	32.5	39.0	62.4	51.6	31.8	30.1	21.8	340.2

Average Temperature Values 1985-2007

Month	Mean Max Temp	Mean Temp	Mean Min Temp	Extreme Max Temp	Extreme Min Temp
Jan	-26.8	-30.3	-33.9	-13.4	-40.6
Feb	-25.6	-29.4	-33.1	-12.3	-40.6
Mar	-19.3	-23.9	-28.4	-4.9	-38.5
Apr	-9.9	-14.6	-19.3	-0.1	-30.9
May	-1.9	-5.1	-8.3	5.2	-19.9
Jun	6.6	3.5	0.4	15.8	-4.5
Jul	13.6	9.8	5.9	22.2	1.6
Aug	12.5	9.7	6.8	21.0	3.1
Sep	6.3	4.4	2.4	13.7	-3.4
Oct	-1.1	-3.5	-5.8	6.2	-16.6
Nov	-12.4	-16.2	-19.8	-1.0	-30.1
Dec	-19.9	-23.7	-27.5	-6.4	-36.7

Environment Canada, Monthly Data, Whale Cove A, Nunavut Station, Accessed Nov 21, 2008

http://climate.weatheroffice.ec.gc.ca/climateData/monthlydata_e.html?timeframe=3&Prov=XX&StationID=1727&Year=2007&Month=1&Day=1



Appendix C

Water Use Calculations

Water Requirements for the Hamlet of Whale Cove, Nunavut

Planning Year	Calendar Year	Projected Population ₁	Projected Water Consumption ²	Projected Total Consumption Volume		
			[Lpcd]	[Litres/day]	[m3/day]	[m3/year]
	2006	353	97.3	34349	34	12538
	2007	358	97.4	34873	35	12729
0	2008	364	97.5	35503	36	12958
	2009	370	97.7	36134	36	13189
	2010	376	97.8	36766	37	13420
	2011	382	97.9	37401	37	13651
	2012	388	98.0	38036	38	13883
5	2013	394	98.2	38673	39	14116
	2014	400	98.3	39312	39	14349
	2015	406	98.4	39952	40	14583
	2016	412	98.5	40594	41	14817
	2017	418	98.7	41237	41	15051
10	2018	424	98.8	41881	42	15287
	2019	430	98.9	42527	43	15523
	2020	437	99.0	43283	43	15798
	2021	444	99.2	44041	44	16075
	2022	451	99.3	44800	45	16352
15	2023	458	99.5	45562	46	16630
	2024	465	99.6	46326	46	16909
	2025	472	99.8	47092	47	17188
	2026	479	99.9	47859	48	17469
	2027	486	100.1	48629	49	17750
20	2028	493	100.2	49401	49	18031
	2029	500	100.4	50175	50	18314
	2030	507	100.5	50951	51	18597
	2031	515	100.7	51840	52	18922
	2032	523	100.8	52732	53	19247
25	2033	531	101.0	53627	54	19574
	2034	539	101.2	54524	55	19901
	2035	547	101.3	55424	55	20230
	2036	555	101.5	56326	56	20559
	2037	563	101.7	57231	57	20889
30	2038	571	101.8	58139	58	21221

- Notes:
- 1) Population in 2006 taken from Statistics Canada 2006 Census of Population. A population growth of 1.4% was applied to the subsequent years.
 - 2) The projected water consumption rate is based on the Nunavut water usage formula for municipalities with a population of less than 2000 people $[90 \text{ L/c/d} \times (1 + 0.00023 \times \text{population})]$ (MACA, 1988).

Hydrology Calculations, Hamlet of Whale Cove

Annual Precipitation (m/year)	0.3402
Evapotranspiration (m/year)	0.200

*Canadian Climate Data 1985-2007, Environment Canada, Whale Cove Weather Station

* specific values for Whale Cove were not available, estimated using several references, see below.

Fish Lake Drainage Basin

Lake Drainage Area (m ²)	2,130,000
Total Precipitation in Drainage Basin (m ³ /year)	724,626
Evapotranspiration (m ³ /year)	426,000
Net Recharge of Lake (m ³ /year)	298,626

Evapotranspiration Rates

Location	Value (mm)	Reference
Arviat, Nunavut	203	FSC Architects & Engineers, 2003
Mackenzie Basin, Yukon	241	Serrereze et al, 2003
Lena Basin, Russai	182	Serrereze et al, 2003
Knob Lake, Quebec	280	Church, 1974
Boot Creek, Inuvik, NWT	75	Church, 1974
Mackenzie River Basin, Yukon	216	Yi Yip, 2008
Average	200	

References:

- FSC Architects & Engineers, 2003. Design Concept for Arviat Sewage Lagoon prepared for Department of Community Government and Transportation, Government of Nunavut.
- Church, M. 1974. Hydrology and Permafrost with Reference to Northern North America. In Proceedings: Workshop Seminar on Permafrost Hydrology, 7-20. Ottawa: Canadian National Committee, In Hydrological Decade (IHD).
- Yi Yip, Q.K. 2008. Climate Impacts on Hydrometric Variables in Mackenzie River Basin. University of Waterloo, Waterloo, 2008.
- Serreze, M.C., D.H. Bromwich, M.P. Clark, A.J. Etringer, T. Zhang and R. Lammers, 2003. Large-scale hydro-climatology of the terrestrial Arctic drainage system. Journal Geophysical Research, 108 1029/2002JD000919



Appendix D

Site Forms

Form 1
Monthly Water Delivery Log
Hamlet of Whale Cove

Month: _____

Truck #: _____

Date	Number of Trips	Volume per Trip	Total Daily Volume (liters)	Comments and Concerns
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				

Date	Number of Trips	Volume per Trip	Total Daily Volume (liters)	Comments and Concerns
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
Monthly Totals				

14851_O&M Plan WIS Form 1 2008-11-26 11:14 AM

Form 2
Monthly Water Supply Facility Inspection Form
Hamlet of Whale Cove

Inspected By: _____ Date: _____

Wind Direction: _____ Temperature: _____

Precipitation: _____ Ground Cover: _____

Issues and Conditions	Description/Condition/Problems	Action/Maintenance Required
Health and Safety (dangers and concerns)		
Signs		
Access Road and Truck Pad (condition, drainage, snow, surface, etc.)		
Wildlife		
Water Intake Screen		
Berm		
Chlorine Feed System		

Issues and Conditions	Description/Condition/Problems	Action/Maintenance Required
Facility generator and Fuel Storage Tank		
Truckfill Station		
Equipment (water truck, pump, etc.)		
Ice		
Litter		
Other Issues and Concerns		

Form 3
Water Supply Facility Planning
Hamlet of Whale Cove

Prepared By: _____

Date: _____

Water Supply Facility Planning Issue	Current Operations	To Do Items and Schedule
Health and Safety		
Site Inspection Results/Concerns		
Current Volumes		
Water Treatment Process		
Annual Reporting		
Nunavut Water Board License Requirements		

Water Supply Facility Planning Issue	Current Operations	To Do Items and Schedule
Flow Monitoring		
Staffing		
Equipment		
Costs		
Other Issues/Concerns		

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Appendix E

Site Photographs



Photo 1: Fish Lake pump house and truck fill station



Photo 2: Fish Lake pump house



Photo 3: Berm over intake pipe, looking east.



Photo 4: Intake pipe.

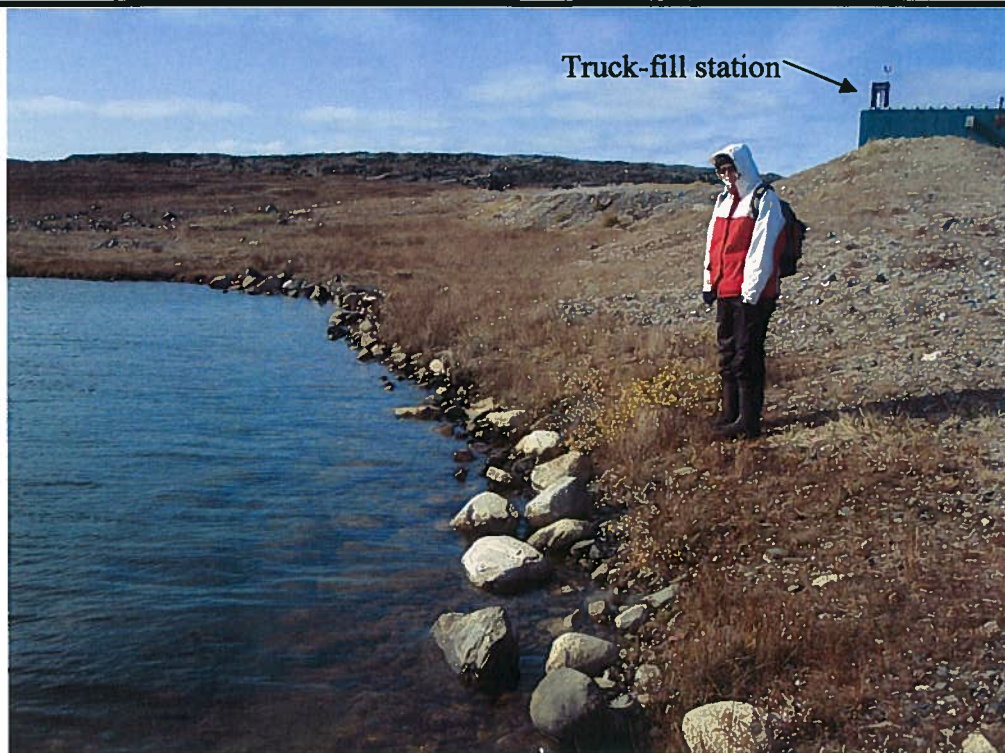


Photo 5: Fish Lake shore line, looking west.



Photo 6: Fish Lake



Photo 7: Water around pump house fuel storage tank



Photo 8: Valve to empty water from containment around fuel storage tank

Appendix F

Annual Monitoring Report Format

NWB Annual Report

Year being reported:

Select



License No:

Issued Date:

Expiry Date:

Project Name:

Licensee:

Mailing Address:

Name of Company filing Annual Report (if different from Name of Licensee please clarify relationship between the two entities, if applicable):

General Background Information on the Project (*optional):

Licence Requirements: the licensee must provide the following information in accordance with

Select



Select



A summary report of water use and waste disposal activities, including, but not limited to: methods of obtaining water; sewage and greywater management; drill waste management; solid and hazardous waste management.

Water Source(s):

Water Quantity:

	Quantity Allowable Domestic (cu.m)
	Actual Quantity Used Domestic (cu.m)
	Quantity Allowable Drilling (cu.m)
	Total Quantity Used Drilling (cu.m)

Waste Management and/or Disposal

☐ Solid Waste Disposal☐ Sewage☐ Drill Waste☐ Greywater☐ Hazardous☐ Other:

Additional Details:

A list of unauthorized discharges and a summary of follow-up actions taken.

Spill No.: (as reported to the Spill Hot-line)

Date of Spill:

Date of Notification to an Inspector:

Additional Details: (impacts to water, mitigation measures, short/long term monitoring, etc)

Revisions to the Spill Contingency Plan

Select

Additional Details:

Revisions to the Abandonment and Restoration Plan

Select

Additional Details:

Progressive Reclamation Work Undertaken

Additional Details (i.e., work completed and future works proposed)

Results of the Monitoring Program including:

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where sources of water are utilized;

Select

Additional Details:

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where wastes associated with the licence are deposited;

Select

Additional Details:

Results of any additional sampling and/or analysis that was requested by an Inspector

Select ▼

Additional Details: (date of request, analysis of results, data attached, etc)

Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

Select ▼

Additional Details: (Attached or provided below)

Any responses or follow-up actions on inspection/compliance reports

Select ▼

Additional Details: (Dates of Report, Follow-up by the Licensee)

Any additional comments or information for the Board to consider

Date Submitted:

Submitted/Prepared by:

Contact Information:

Tel:	
Fax:	
email:	