• Hamlet of Cape Dorset

Quality Assurance / Quality Control Plan

Project Name
Water Licence Compliance – Hamlet of Cape Dorset

Type of Document
Final

Project Number
OTT-00209248-A0

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Date Submitted
August 13, 2013

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Appendices

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1 Introduction

The purpose of this document is to provide guidance to ensure that environmental monitoring program samples collected in the field are done so with a high degree of quality, in order to ensure that they accurately reflect the physical and chemical nature of the matrix being tested.

1.1 Background

The Hamlet of Cape Dorset (Hamlet) is located on Dorset Island in the Hudson Straight (Figure 1, Appendix A).

The water supply for the Hamlet is Tee Lake located approximately 1 km south of the Hamlet. Water is conveyed to the truck fill station through a 1.3 km transmission main. Water is drawn into the pump house at Tee Lake via a single inclined shaft intake. The pump house contains heating equipment, provided to avoid freeze of the transmission water main linking the pump house and water treatment plant. The truck fill station is located adjacent to the Hamlet and is comprised of a truck fill station and water storage tank. This facility provides water treatment through chlorination, equipment for truck loading and freeze prevention for the water storage tank.

The 2001 Sewage Disposal Facility is comprised of a 3-tier series of lagoons and decant structures designed to contain sewage. The facility is located approximately 730 metres to the west of the community. It is located along a natural valley directly to the south east of the 2001 Sewage Disposal Facility and the solid waste facility. Sewage is disposed of at cell #1 and during the summer months naturally decants into cell #2, followed by cell #3, finally discharging to the environment from the outlet structure of sewage lagoon #3. During the winter months, when the decant and outlet structures are frozen, water is pumped from one sewage lagoon cell to the subsequent cell on an as required basis. Due to capacity issues, this sewage treatment facility sewage must be decanted during the winter months as the facility does not provided sufficient over winter storage to meet the requirements of the Hamlet.

The 2007 Sewage Disposal Facility is a single-cell sewage lagoon built in 2007. It was built in a natural valley between two hills. It was created through the construction of the main berm on the western limits of the sewage lagoon and a berm on the northeast corner, which is the location of the truck discharge point. The sewage treatment facility incorporates a natural wetlands located to the west of the facility, including Pee Lake, a wetlands and the rocky drop off referred to as the waterfalls in the water licence. There is a gravel access road traversing both sides of the rocky hills connecting and providing access to the lower berm. The sewage lagoon has never been commissioned due to concerns of leaking through the main berm.

The Emergency Sewage Disposal Facility is located approximately 500 m west of the town site along the access route to the solid waste site and the 2001 Sewage Disposal Facility. The facility is the old sewage lagoon and is currently maintained for use during adverse wind conditions, at which time the sewage discharge point for the 2001 Sewage Disposal Facility is non operational due to health and safety concerns for the operators.

The Solid Waste Disposal site is located approximately 700 m to the west of the Hamlet, adjacent to the 2001 Sewage Disposal Facility. A bulk metal waste dump is located along to the road to the 2001 Sewage Disposal Facility. It is approximately 300 m west of the town.

The Nunavut Water Board (NWB) issued a Class B Water Licence (3BM-CAP0810) to the Hamlet on March 7, 2008. The water licence governs water use and waste disposal within the Hamlet. A copy of the Water Licence is provided in Appendix B.

1.2 Monitoring and Regulatory Requirement Program

Condition 20 of Part H of the water licence issued to the Hamlet requires that the Hamlet submit to the NWB for approval, a Quality Assurance / Quality Control (QA/QC) Plan prepared in accordance with "*Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "B" Licensees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan"* (Department of Indian and Northern Affairs Canada, July 1996), herein referred to as "The Guidelines".

1.3 Objectives

The objectives of this QA/QC plan are to: i) to ensure the reliability of the data collected during monitoring activities at the locations specified in the Hamlet's water licence, and ii) satisfy the requirement of the water licence.

1.4 Scope of Work

This QA/QC Plan covers the environmental monitoring undertaken at the Hamlet's truck fill station, solid waste disposal site, 2001 Sewage Disposal Facility, Emergency Sewage Disposal Facility, and 2007 Sewage Disposal Facility (Figures 2 and 3).

1.5 Definitions

The following definitions that are relevant to this plan include:

Quality Assurance is a system that ensures that quality control procedures are correctly performed and documented.

Quality Control refers to the established procedures observed both in the field and in the laboratory, designed to ensure that the resulting end data meet intended quality objectives.

Trip Blank is a sample of clean water that was prepared by the analytical laboratory and shipped to the sample site in the cooler along with the empty sample bottles. This trip blank sample remains unopened and is transported back to the laboratory with the monitoring program samples. The trip blanks is analyzed by the laboratory along with the monitoring program samples. The purpose of the trip blank is the assess contamination introduced during shipping and field handling procedures.

CALA refers to the Canadian Association for Laboratory Accreditation, formally known as the Canadian Association for Environmental Analytical Laboratories (CAEAL).

Chain of Custody Documentation refers to the documentation that accompanies samples sent to an analytical laboratory. It is a legal document which ensures that the sample taken at a specific site is the same sample received in the laboratory. It also provides information on the sample condition and integrity as received by the laboratory.

2 Field Sampling

2.1 Sampling Procedures

All sampling, sample preservation and analyses is to be conducted in accordance with methods described in the current edition of *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association, American Water Works Association, and Water Environment Federation, most current edition).

To obtain meaningful results from the analyses, the following six factors are of particular importance:

- Sample collection as per schedule and location.
- Correct usage of container/sample bottle for parameter being tested.
- Correct labelling of sample bottles and filling out record/field sheet.
- Correct procedure for field sampling.
- Proper and timely shipment of samples to the laboratory.
- Timely delivery of samples to the laboratory from the air cargo facility.

2.2 Sampling Collection

Refer to the *Environmental Monitoring Program Checklist*, found in Appendix C for specific details on the sampling locations, equipment and sampling methods.

2.2.1 Locations

The water licence issued to the Hamlet (3BM-CAP0810) by the NWB specifies twenty-four monitoring stations across the existing licensed facilities. It is noted that the stations 6 to 18 and 21-24 are related to P lake sewage lagoon 2017 and these are currently abandoned because this facility has been abandoned.

- **Station CAP-1** is a raw water supply (from Tee Lake) volume monitoring location.
- **Station CAP-2** is a run-off sampling location from the Solid Waste Disposal Facility.
- **Station CAP-3** is a wastewater influent sampling location at the active (at the time of sampling) Wastewater Facility.
- **Station CAP-4** is an effluent discharge sampling location from the 2001 Sewage Disposal Facility.
- **Station CAP-5** is an effluent discharge sampling location from the Emergency Sewage Disposal Facility.
- Station CAP-6 is an effluent discharge sampling location from the 2007 Sewage Disposal Facility, at the Final Point of Control.
- Station CAP-7 is a wastewater influent sampling location to P-Lake.
- Station CAP-8 is a sampling location in the centre of P-Lake.
- Station CAP-9 is a sampling location midway between the centre of P-Lake (CAP-8) and the effluent discharge of P-Lake (CAP-10).

- Station CAP-10 is an effluent discharge sampling location from P-Lake (if flow is negligible a sample from the immediate upstream area within P-Lake shall be obtained).
- Station CAP-11 is an effluent discharge sampling location from the Wetland area.
- Station CAP-12 is a sampling location located at the top of the waterfall on the Wetland Pathway.
- Station CAP-13 is a sampling location located midway down the waterfall on the Wetland Pathway.
- Station CAP-14 is a sampling location located at the bottom of the cliff (Final Discharge Point).
- Station CAP-15 a Control Point sampling location (small lake) located between the Lagoon and Tee Lake.
- Station CAP-16 is a monitoring well located up gradient of the 2007 Sewage Disposal Facility.
- Station CAP-17 is Monitoring Well No. 1, located down gradient of the 2007 Sewage Disposal Facility.
- Station CAP-18 is Monitoring Well No. 2, located down gradient of the 2007 Sewage Disposal Facility.
- **Station CAP-19** is a monitoring well located up gradient of the Solid Waste Disposal Facility.
- **Station CAP-20** is a monitoring well located down gradient of the Solid Waste Disposal Facility.
- Stations CAP-21 to CAP-24 are thermistor stations.

The following table includes the geographic coordinates for the eight monitoring stations described above.

Table 1 –Geographic Coordinates for the active Monitoring Stations for NWB Licence 3BM-CAP0810

Monitoring Station	Latitude	Longitude
CAP-1	**N 64° 13’ 30.4”**	**W 76° 32’ 53.2”**
CAP-2	**N $64^0$13’40’’**	**W$76^0$34’22.8’’**
CAP-3	**N 64° 13’ 40.8”**	**W 76° 34’ 29.5”**
CAP-4	**N 64° 13’ 44.9”**	**W 76° 34’ 42.4”**
CAP-5	**N 64° 13’ 49.3”**	**W 76° 34’ 23.7”**
CAP-19	**N 64° 13’ 47.5”**	**W 76° 33’ 53.8”**
CAP-20	**N 64° 13’ 59.4”**	**W 76° 34’ 06.5”**

2.2.2 Sampling Equipment

Dedicated latex or nitrile gloves (i.e., one pair per sample) are to be used during sample handling. Dedicated sampling equipment such as sampling poles (see photo below for an example) are to be cleaned with soap and water after each sample is collected to prevent cross-contamination.

Environmental monitoring samples collected for analysis of selected chemical parameters are to be placed directly into new pre-cleaned, laboratory-supplied sample bottles. All monitoring samples are to be placed in clean coolers for transportation to the subcontract laboratory. The samples are transported/submitted under Chain of Custody documentation. Included on a Chain of Custody form is the client information, the sample information, the analyses requested, the relevant regulations, the turnaround time for the analytical results, comments, and temperature of the samples at the time they arrived in the laboratory. An example of a completed Chain of Custody form is included in Appendix D.

2.2.3 Sampling Methods

Please see Appendix E for the Environmental Monitoring Program Schedule. As a general recommendation, please refrain from using insect repellant, disinfection hand gel or other chemical products before and during sample collection. Also, please refrain from smoking during sample collection.

2.2.3.1 *Wastewater Sampling*

Wastewater influent samples are collected from the active sewage disposal facility (Station CAP-3) beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge. Wastewater influent samples are collected from the lagoon by immersing the sample bottle into the lagoon neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with influent wastewater and the sample bottle is raised neck first to prevent sample spillage.

Effluent discharge samples are collected from the 2001 Sewage Disposal Facility (Station CAP-4), following the same schedule and methodology described above for Station CAP-3.

Effluent discharge samples are collected from the Emergency Sewage Disposal Facility (Station CAP-5), following the same schedule and methodology described above for Station CAP-3.

Effluent discharge samples are collected from the Final Point of Control at the 2007 Sewage Disposal Facility (Station CAP-6), following the same schedule and methodology described above for Station CAP-3.

Wastewater influent samples are collected from P-Lake (Station CAP-7), following the same schedule and methodology described above for Station CAP-3.

Wastewater samples are collected from the centre of P-Lake (Station CAP-8), following the same schedule and methodology described above for Station CAP-3.

Wastewater samples are collected from a location (Station CAP-9) midway between the centre of P-Lake (Station CAP-8) and the effluent discharge of P Lake (Station CAP-10). These samples are collected following the same schedule and methodology described above for Station CAP-3.

Wastewater effluent discharge samples are collected from P-Lake (Station CAP-10). If flow is negligible, then the samples are collected from a location located immediately upstream within P-Lake. These samples are collected following the same schedule and methodology described above for Station CAP-3.

Wastewater effluent discharge samples are collected from the Wetland area (Station CAP-11), following the same schedule and methodology described above for Station CAP-3.

Wastewater effluent discharge samples are collected from the top of the waterfall on the Wetland Pathway (Station CAP-12), following the same schedule and methodology described above for Station CAP-3.

Wastewater effluent discharge samples are collected from midway down the waterfall on the Wetland Pathway (Station CAP-13), following the same schedule and methodology described above for Station CAP-3.

Wastewater effluent discharge samples are collected from the Final Discharge Point, located at the bottom of the cliff (Station CAP-14), following the same schedule and methodology described above for Station CAP-3.

Wastewater effluent discharge samples are collected from a Control Point (Station CAP-15) sampling location (small lake) located between the Lagoon and Tee Lake, following the same schedule and methodology described above for Station CAP-3.

2.2.3.2 *Landfill Runoff Sampling*

Landfill runoff is collected once monthly during periods of observed flow from Station CAP-2. Runoff samples are collected from the receiving water body by immersing the sample bottle into the runoff stream neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with runoff and the sample bottle is raised neck first to prevent sample spillage.

2.2.3.3 *Groundwater Sampling*

Groundwater samples are collected from a monitoring well located up gradient of the 2007 Sewage Disposal Facility (Station CAP-16), as well as from Monitoring Well No. 1 (Station CAP-17) and Monitoring Well No. 2 (Station CAP-18), located down gradient of the 2007 Sewage Disposal Facility. Groundwater samples are collected once annually in the summer, prior to commencing discharge from the 2007 Sewage Disposal Facility, giving due consideration to adequate ground thaw and obtaining representative groundwater samples. Groundwater samples should be collected using dedicated sampling tubing with Waterra™ foot valves (or bailers). Well purging should not be undertaken due to the potential limited availability of groundwater in the monitoring wells. Instead, samples should be collected of all available groundwater present in the monitoring wells.

Groundwater samples are collected from a monitoring well located up gradient of the Solid Waste Disposal Facility (Station CAP-19), as well as from a monitoring well located down gradient of the Solid Waste Disposal Facility (Station CAP-20). Groundwater samples are collected once annually in the summer, giving due consideration to adequate ground thaw and obtaining representative groundwater samples. Groundwater samples should be collected in the same manner as described above (i.e., for Stations CAP-16 to CAP-18).

2.3 Sample Handling

All water samples are to be collected in laboratory-supplied containers with the proper preservative, where applicable. A complete list of parameter handling and preservatives can be found in Appendix C.

All sample containers are to be tightly sealed and properly labelled with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed. The outside of the bottles are to be cleaned with soap and water after sampling and dried off prior to placing the samples in the cooler. The samples are to be stored on ice in a cooler until delivery to the laboratory. A chain of custody form is to be filled out completely and is used to track the samples and placed in the cooler with the samples, in a ziplock bag. Keep the last page of the Chain of Custody and give it to the Hamlet Foreman for their records.

The following checks are generally performed by the laboratory upon receipt:

- Verification of the integrity and condition of all sample coolers.
- Verification of the integrity and condition of all sample containers.
- Checks for leakage, cracked or broken closures or containers, evidence of grossly contaminated container exteriors or shipping cooler interiors, and obvious odours, etc.
- Verification of receipt of complete documentation for each container.
- Verification that sample identification numbers on sample transmittal forms corresponds to sample identification numbers on the sample containers.
- Verifications that holding times were met and samples were kept cool during transit.

2.4 Quality Assurance and Quality Control Program

Cross contamination is a common source of error in sampling procedures. QC samples help identify when and how contamination might occur. There are various types of QC samples. For the purposes of the Hamlet's environmental monitoring, **exp** recommends the collection and analyses of blind duplicate QA/QC samples.

Exp recommends the following number of quality control samples based on the total number of samples collected:

- 10% blind duplicates.

If the total number of samples collected is less than ten, include at a minimum, one blind duplicate.

It is essential to account for the number of blind duplicate samples to be submitted when placing the bottle order with the contract laboratory.

3 Laboratory Analysis

3.1 Laboratory Accreditation

As indicated in the Guidelines, the Hamlet should use an analytical laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA); formally known as the Canadian Association for Environmental Analytical Laboratories (CAEAL) for the monitoring program for NWB Licence 3BM-CAP0810. Appendix F includes a copy of the laboratory's CALA accreditation certificate and a list of the parameters for which they are certified.

3.2 Method Detection Limits

The method detection limits (MDLs) are provided on the contract laboratory's Certificates of Analysis.

4 Reporting Requirements

4.1 General Submissions

As a condition of NWB Licence 3BM-CAP0810 (Appendix B), the Hamlet is required to submit an Annual Report to the NWB, no later than March 31st of the year following the calendar year reported. Among other requirements, the annual report is required to include tabular summaries of all analytical data generated under the Monitoring Program (compared to the Maximum Average Concentrations – provided in Part D of the NWB Licence 3BM-CAP0810 – where applicable).

5 References

Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "B" Licensees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan, Department of Indian and Northern Affairs Canada, July 1996.

Standard Methods for the Examination of Water and Wastewater, American Public Health Association, American Water Works Association, and Water Environment Federation, 22nd Edition, 2012.

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Appendix A: Figures

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• INDUSTRIALINFRASTRUCTURESUSTAINABILITY •

scale NTS	CLIENT: CAPE DORSET, NUNAVUT	project no. OTT-00209248-A0
date 27/05/13	TITLE: LOCATION PLAN	FIG 01
drawn by M.KELLEY		

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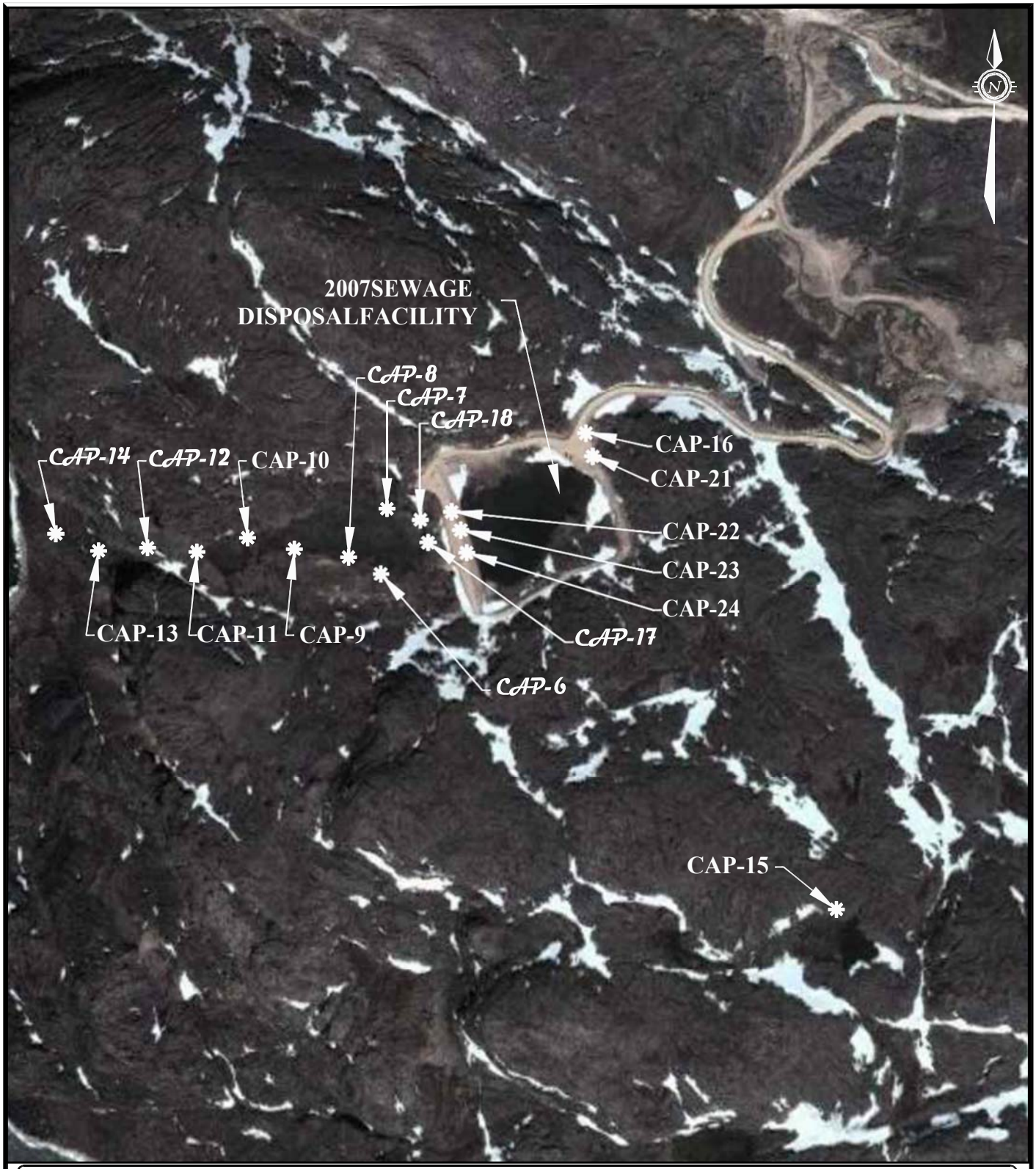
scale NTS	CLIENT: CAPE DORSET, NUNAVUT	project no. OTT-00209248-A0
date 27/05/13		
drawn by M.KELLEY	TITLE: MONITORING STATION LOCATIONS	FIG 02



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scale NTS	CLIENT: CAPE DORSET	project no. OTT-00209248-A0
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drawn by M.KELLEY	TITLE: MONITORING STATION LOCATIONS	FIG 03

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Appendix B:
Hamlet of Cape Dorset's Water Licence

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Ottawa Canada K1A 0H4

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AVR 2 1 2008

Mr. Thomas Kabloona
Interim Chair
Nunavut Water Board
PO Box 119
GJOA HAVEN NU XOB 1JO

Nunavut Water Board

.. •. ·; 2008

Public Registry

Dear Mr. Kabloona:

This is in response to your letter of March 7, 2008, regar ding water licence number 38M--CAP0810 for the Hamlet of Cape Dorset, Nunavut, and the Nunavut Water Board's reasons for decision. 1 would like to thank the Nunavut Water Board for its work in the development of this licence

I recognize the challenges faced by both the Nunavut Water Board and the joint proponents, the Government of Nunavut and the --lamlet of Cape Dorset, in finalizing the application for this licence, in the preparation tor the pubhc heanr1gs. and in the drafting of this water licence. Moreover, I recognize the i1nportance of improving Cape Dorset's sewage treatn1ent infrastructure.

With this letter, I am approving water licence number 38M-CAP0810 for the Hamlet of Cape Dorset However, Iwould like to make some observations regarding two aspects of the water licence. In making this approval I have assun1ed that water Hcence number 3BM-CAP0810 renews then amends Cape Dorset's previous water licence number 3BM-CAP0207 which has expired. Indian and Northern Affairs Canada's enforcement activities will be based on this understanding. Additionally, conditions of licence number 3BM-CAP0810 (section 25.ii) could be interpreted to require departmental inspectors to evaluate the proponent's work in confirming the geotechnical assun1ptions made in the design of the wastewater facility for Cape Dorset. The lin1its of the Oepartinenfs role in fulfilling such a condition would be to confirm whether the validation work required by the water licence is being conducted. Any evaluations of whether the pro1ect's design assu111ptions were accurate would be the role of the proponent

.../2

Again, Ithank the Nunavut Water Board for its efforts 1..3nd energies in the development of the Hamlet of Cape Dorset water licence

Sincerely,

Chuck Strahl

Fncl:

c.c., The Honourable Levinia Brown, MLA
His Worship Fred Schell

WATER LICENCE NO: 3BM-CAP08 l0

TABLE OF CONTENTS

ANNEX B

LICENCE 3BM-CAP0810

Pursuant to the *Nunavut Ji'atr:rs and :Yunav1a Surjl1cl' Righi.'> f'ribun11! ,,l._:1* and the *,-Jgrecrnent Betn·cf:r1 tht· Inuit of .the ,Vunu l11l Settlement Area and Her tfaj wiy 1h11 Qu.cen in Right of Cunadil.* the Nunavut \\fater Board, hereinafter referred to as the Board, hereby)?rants to

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I,iccnce Nu1nber 3B"l-C\l'0810

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D<:scription **MUNICIPAL UNDERTAKINGS**

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PART A: SCOPE, DEFINITIONS AND ENFORC .MENT

1. Scope

a. CJ'his I .icence allows for the use of water and the disposal of waste for municipal unde1lak ings at the Han1let of Cape Dorset, Nunavut (Latitude 64°14'N and Longitude 76°32'W);

b. This Licence is issued subject to the condi tions 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 sueh waste may enter any waters. W henever new Regulations are made or existing Regulations are amended by the Govcnior in Council under the *Nunavut Waters and Nunavut ,)urface Rights Tribunal Act,* or other statutes imposi ng more stringent cond itions relating to the quantity or type of waste tliat may be so deposited or under which any such \.Vaste may be so deposited, this Licence shall be deemed, upon pron1ulgation of such Regulations, to be subject to such requirements; and

<.::. Compliance with the tem1s and cond itions of this Licence does not absolve the Licensee fron1 responsibility for compliance with the requirenicnts of all applicable Federal, Territorial and Municipal legislation.

2. Defi1 1itions

"Act" means the *Nuna vut Waters and Nunavut ,)urjace 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; nlodifications inconsistent \Vith the terms of the set ter1ns and conditions of the I .icence;

"Analyst" means an A nal yst designated by the Minister under Section 85 (1) of the *Act;*

"Appu rtena n t undertaking" means an undertaking in relation to which a use of waters or a deposit of waste is pen1 littcd by a licence issued by the Hoard;

"Average (:01lcentration" means the arith1nctie mean of the last fOur consecutive analytical results for contai ned in composite or grab samples collected from the Waste Disposal facility's final di:;;;chargc poi nt;

"Average Concentration For Faecal Coliforms" means the geo1netric 1nean of the last four consecutive analytical resul ts for faecal col iforn1s contained in composite or grab san1pl es collected from the Wastt.: Disposal Facility's final discharge point;

"Board" means the Nunavut Water Hoard established nndt.:r Lhe *Nunavut Land Claims Agreement;*

"Chief Administrative Officer" 1neans the Execu tive Director of the Nunavut Water Board;

"Comoosite Sample" means a water or wastewater san1plc rnadc up of four *(*4) samples taken at regular periods over a 24 hour period ;

"Efll1lent" m1.::ans treated or untreated liquid waste n1ateria1 that is discharged into the environment from a structure such as a settling pond or a treatment plant;

"Engi neer" n1cans a professional engineer registered to practice in Nunavut in accordance with the *Engineering, Geological anti Geophysical Act (Nunavut)* S."N.W."I'. 1998, c.38, s.5;

"Fi1lal Discharge Point" means the discharge location point where the effluent from the 2007 Sewage Disposal Faci lities enters fish habitat or fish bearing ¥,1aters

".Final Poi11t of Control" means the di scharge location at the 2007 Sewage f)isposal Facilities August 27, 2007 subtnission prepared by Dillon C:onsulting including ten appendices, to be conilrmed by an Inspector;

"Freeboard" means the vertical distance between water line and crest on a dam or dyke's upstrean1 slope;

"Geotechnical Engineer" means a proiCssional engineer registered with t1lc Association of Professional Engi neers, Geologist and Geophysicists of Nu navut and whose principal field of special ization with the engineering properties of earth materials in deal ing with n1an-rnadc structures and earthworks that will be built on a site. 'l'hesc can include shallow and deep foundations, retaining walls, dams, and en1bankn1ents;

"'Grab Sam ple" means a single v.-·ater or wastewater sample taken at a tin1c and place representative of the total discharge;

"Grey\\'ater" n1eans all liquid \Vastes fron1 shov.-·ers, ba ths, sinks, kitche lls and don1cst ic washing facilities, but docs not include toi let wastes;

"Inspector" n1cans an Inspector designated by Lhe Minister under Section 85 (I) of the

Act;

"Licensee" means the holder of this Licence;

"'Modifica tion" 1ncans an alteration to a physical v.'ork that introduces ne\v structure or l:liminatt:s an existing structure and does not alter the purpose or function of the \Vork, bu t does not include an expansion, and changes to the operating systl:m tha t are consistent wi th the te1n1s of this Licence an<l <lo not require amendment;

"Monitoring Program" means a mon itoring program established to collect data on surface water and groundwater quality to assess impacts to the freshwater aquatic environ1nent of an appurt<.:nant undertaking;

"Nunavut Land Claims Agreement" (NLCA) ml:ans the *"Agreement Between the Tnuit of the Nunavut Settlement Area and Her Majesty the Queen in right o.f (:anal/a",* i ncluding its preamble and schedules, and any an1end1nents to tl1at agreement made pursuant to it;

"Sewage" 1neans all toilet wastes and greywater;

"Sewage Disposal Facilities" includes the facilities licensed in 200 I , 2004 and 2007;

"Emergency Sel-vage Disposal Facility" comprises the area designed to contain and treat sewage as described in the Water License Amendment Application filed hy the Applicant on August 16, 2004, and illustrated on the "Cape Dorset Sewage Laguun Rehabilitation Site Plan (August 2004)"

"2001 Sewage Disposal 'acilities" comprises the Three 'l'ier Lagoon which comprises the area and engineered lagoon and decant structu res designed to contain sewage as described in the Application for Water J ,icenec lile<l by the Applicant on April 19, 2001;

"2007 Sewage Disposal Facilities" comprises the engineered lagoon and decant structures constructed in 2007 and illustrated in thi..: Record Drawings No.'s 100 and 101 of Project N-05-4319-3000 prepared by Dillon Consulting and subtnittcd November 13, 2007;

..Solid Waste Disposal Facilities" con1priscs the area and associated structurt:s designed tu contain solid waste (landfi ll site) as described in the A pplication for Water Licence filed by the A ppl icant on April 19, 2001;

"Toilet Wastes" means all human excreta and associated products, but does not incl ude greywater;

"Waste" means, as defined in S.4 of the *Act ,* any substance that, by itself or in combination with other substances found in \\-'ater, would have the effect of altering the quality of any water to which the substance is added to an extent that is detri1nenta l to its use by people or by any ani1nal, fish or plant, or any water that would have tha t 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 Disoosal Facilities" means all facilities designated for the disposal of waste, and includes the 2001, 2004 and 2007 Sewage J)isposal Facil ities, Solid Waste Disposal Facil it ies, and Bagged 'J'oilet Waste Disposal Facilities, as described in the Application for Water Licence filed by the Applicant on April 19, 2001 and subsequently in the application dated July 7, 2005;

"'Water Suooly Facilities" comprises the area and associated intake infrastructure at Tee Lake, as described in the Application for Water Licence fi led by tlie Applicant on April 19, 2001;

3. Enforcemen t

ı. Failure to co1nply with this Licence v.ill be a violation of the *Act,* subjecting the Licensee to the eniOrcement measures and the penalties provided for in the *Act;*

ii. All inspection and enforcen1ent services regarding this Licence will be provided by lnspectors appointed under the *Act;* and

111. For the purpose of enforcing this Licence an<l with respect to the use of water and deposit or d ischarge of waste by the Licensee, Inspectors appoi nted under the *Act,* hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

tv. 'l'he Licensee shall, in relation to any application to renew or amend the Licence, have in place a Plan for Compliance approved by the Board in writing, to achieve full compliance with the conditions of this Licence, or a Plan for f:o111pliance must he subn1itted at the time of Application, in order for the Application to be decn1ed complete.

PART B: GE:-.IERAL CONDITIOl'iS

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 fo\1o\ving information;

i. tabular summaries of all data gencratt.:d undt.:r the Monitoring Program;
ii. the monthly and annual quantities in cubic metres of fresh water obtained from all sou rces;
111t. the monthly and annual q uanti ties in cubic metres of each and all wastt.: discharged;
iv. a su1nn1ary of 1nodifications and/or major 1naintenance work ca1Tied out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities;
v. a list of unauthori zed di scharges and su1nmary of follow-up action taken;
vi. a summary of any abandonment and rc::>tor.:ttion work completed during the year and an outline of any work anticipated for the following year;
v1i. a sumn1ary of any studies, reports and plans (i.e. C>perations and Mai ntenance, Abandonn1cnt and Restoration, *QN QC)* req uested by the Board that relate to water use and waste disposal or reclamation, and a brief description of any future studies planned; and
vui. any other details on water use or waste disposal requested by the Board by Noven1ber lst of the year being reported.

2. The Licensee shall comply with the Monitoring Progran1 descri bed in t1lis Licence, and any an1endments to the Monitoring Progra1n as may be made from time to time, pursuant to the conditions of this Licence.

3. 'fhe Monitoring Progra1n and con1pliancc dates specified in the Licence may be modified at the discretion of the Board.

4. Meters, devices or other such n1ethods used tor n1casuring the volumes of water used and waste discharged shall be installed, opera ted and maintained by the Licensee.

5. The Licensee shall, within ninety (90) days after the lirst visit by the Inspector following issuance of this J ,icence, post the necessary signs, to identify the stations of the Monitori1 lg Program. All signage postings shall be in the Official J ,anguagcs of N unavut.

6. The Licensee shall suhn1i t to the Hoard, iOr approval in writing, within the lesser of ninety (90) days or tl1c tiling of any application in relation to the J ,icence, a PlanOr C. on1pliance tha t clearly demonstrates the ways and means the I .ice1lsee will undertake to achieve full compliance with the conditions of this Licence.

7. The Licensee shall, fOr all Plans submitted under this I.icence, include a proposed timctablc for implementation. Plans suhn1i tted, cannot be undertaken without subsequent written Board approval and direct ion. TlH.: Bo<trd may alter or modify a Plan if necessary to achieve the legislative objectives a nd will notify the Licensee in \vriting of acceptance, rejection or alterat ion of the Pl<tn.

8. f<'.very Plan to be carried out pursuant to the tem1s and {.;Undi Lions of this Licence shall becornc a part of this Licence, and any additional tenns and condition inlposed upon approval of a **Plan** by the Board become part of this Licence. A **11** terrns and conditions of the Licence should be conten1plated in the dcvclopn1cnt of a Plan where appropriate.

9. 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 1nunicipal bou ndaries or in the areas of the Water Supply or Waste Disposal 'Faci lities.

10. The Licensee shall ensure a copy of this ɹ ,icence is n1aintained at the municipal office at all times. Any con1n1un ication witl1 respect to this Licence shall be made in writing to the attention of:

Manager of Iiccnsing:
Nunavut Water Board
P.O. Box 119
Gjoa Ilaven, NlJ XOB 1.TO
Telephone: (867) 360-6338
Fax: (867) 360-6369
Email: Iic ensi_11g(,;nu n."1Y.LlJ. :;Jerhoard. org:

Inspector Contact:
Water Resources Officer
Nunavut District, Nunavut Region
P.(). Hox 100
Iqaluit, NU XOA 01 l0
Telephone: (867) 975-42'15
Fax: (867) 979-6445

Analy,'it Co11tact:
Taiga Laboratories
Department of Indian and Northern Affairs
4(101 – 52 Avenue, P.O. Box 1500
Yellowknife, NT XI A 2R3
Telephone: (867) (1(19-2781
Fax: (867) 669-2718

11. ·rhe Licensee shall submit one paper copy and one electronic copy of al l reports, studies, (Ind plans to the Board. Reports or studies submitted to the Hoard hy the Licensee shall incl ude a detai1ed executive su1nn1ary in lnuktitut.

12. The Licensee shal l ensure that any document(s) or corrcspun<lcnce submitted by the

l,icensec to tl1c Board, is received by the Hoard and niaintain on file a copy of the acknowledgment of receipt issued by the Manager of Licensing.

13. ·r1lis Licence is not assignable except as provided in Section 44 of the Act.

PART C: CONDITIONS APPLYING TO WATER USE

I . The Licensee shall obtain all fresh water from the ·ree Lake using the Water Supply Facilities or as otherwise approved hy the Board in \vriting.

2. The annual quantity of water used for all purposes shal1 not exceed 70,000 cubic metres.

3. The Licensee shall equip all water intake hoses with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not becon1e impinged on the screen.

4_ The Licensee shall not remove any material fron1 bel ow tlle ordinary high water n1ark of any water body u nless otherwise approved by t1 lc Board in writing.

5. The Licensee shalt not cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

6. Sediment and erosion control measures shall be in1plemcnted prior to and 1naintained during the operation to prevent entry of sediment into water.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. Licensee shall locate areas designated for waste disposal at a minin lun1 distance of thirty (JO) metres fron1 the ordinary high water niark of any water body such that the quality, quantity or llow of water is not i n1paircd, unless otherwise approved by the Hoard in writing.

2. Subject to the conditions in the l .icencc regarding co1nn1issioning, the Licensee shall direct all Sewage to the 2007 Sewage Disposal Faci l i ties or as othetwise approved by the Board in writing.

3. The 1.icensel: shall provide notice to an Inspector at lea st ten (I O) days prior to initiating any dl:cant of the 2001 and 2007 Sewage Disposal Facilities.

4. All Effluent discha rge from the 2001 Sewage Disposal Facility at Monitoring Progran1 Station *CJ\P-3* and the Emergency Se\vagc Disposal Faci l ity a t Monitoring Progran1

Station CAP-4, shall meet the following effluent quality limits:

Parameter	**Maximum** Average **Co11centration**
BODs	120 mg/L
Total Suspended Solids	180mf/L
Faecal ColilOrrns	I x 10 CFU/IOOmL
Oil and grease	No visible sheen
pH	bet\veen *(1* and *9*

5. All Effi uent discharged from the 2007 Sewage Disposal Facilities at Monitoring Program Station CAP-5 shall meet the follo\ving effluent quality limits:

Parameter	**Maximum** Average **Gncentration**
BODs	80 mg/L
Total Suspended Solids	!OO mf'.L
Faecal Colifonns	I x IO C:FU/IOOmL
Oil and grease	No visible sheen
pH	between 6 and 9

6. Tue Licensee sl1a ll maintain at all tin1es, a frecboard of at least 1.0 1netre, or as recon1 1ncndcd by a qualified Geotechnical Engineer with notice in w1iting provided to the Board, for all dams, dykes or other structures intended to contain, withhold, divert or retain water or wastes.

7. 'fhc Sewage Disposal Faci l ities shall be maintained and operated in such a manner as to prevent structural failure.

8. A 11 E1ll ucnt discharged fron1 the 2007 Sewage Disposal Facility at the Pinal Discharge Poin t at Monitoring Station CAP-14 and effluent discharge from Monitori ng Stations CAP-3 and ('A P-4 prior to the point of entry at the ocean, , shall be den1onstra ted to be non-acutely toxic under the following tests tu be conducted once ann ually, approximately n1id-way through the discharge period:

   1. Acute lethal i ty tu Rainbow Trout, ()11corhynchus mykiss (as per Environment Canada 's Environmental Protection Series Biological Test Method EPS/I /RM/13); or

ii. Acute lethality to the crustacean, J >aph nia n1agna (as per Environment ('anada's Environmental Protection Series Biological Test Method RPS/1/RM/14).

9. The Licensee shall dispose of and contain al l solid wastes at the Solid Waste l>isposal Facilities or as otherwise approved by the Board in writing.

10. 'J'he Licensee shall implement appropriate erosion and diversion control methods, to minimize surface water intrusion and leachate generation at the Solid Waste Storage Facil ity.

11. . 'f he Licensee shall segregate and securely store all haLardous materials and/or hazardous waste within the Sol id Waste Disposal Facility in a manner as to prevent the deposit of deleterious substances into any water.

PART E: CONDIT I ONS APPLYING TO MODIFICATION AND CONSTRUCTION

1. The Licensee shall submit to the Hoard, for approval in writing, design drawings stamped by a qualified engineer registered in Nunavut prior to the construction of any dams, dykes or structures intended tu i:ontain, withhold, divert or retain water or wastes.

2. The Licensee n1ay, wi thout written approval from the Hoard, carry out modifications to the Water Supply and Waste Disposal Faci li ties provided that such niodifications are consisti.:nl with the terms of this J,iccncc and the following requi re1ncnts are met:

i. the I .icensee has notified the Board in writing of such proposed modifica tions at least sixly (60) days prior to beginning the modifications;

tl. these n1odifications do not place the I .icensee in contravention of the Licence or the Act;

iii. the Board has not, during the sixty (60) days following notification of the proposed n1odifications, infollned the Lici.:nsee that review of the proposal will require more than sixty (<iO) days; and

1v. the Board has not reji.:i:ted the proposed n1oclificalions.

3. Modifications for which all of the conditions referred to in Part E, Item 2, have not bci.:n rnet tnay be carried out only with written approval fro1n the Board.

4. Thi.: Licensee shall provid e as-built plans and dra w ings of the Modifications referred to in this Part withi11 ni nety (90) days of completion uf the Modification. Thi.:se plans and

drav,:ings shall be stan1pcd by an Enginccr.

5. The Licensee shall, within sixty (60) days. of issuance of this Licence, provide a summary report along with revised stan1ped as-built plans and record drawings of the 2007 Sewage Disposal Fai:i1ity, to reflect the clarifications and omissions identified through the Licence application review and detailed in the attached Schedule 1.

6. All activities shall be von<lucted in such a way as to minimize i1npacts on surface drainage and the Licensee shall immediately unde1take correcti ve n1easu rcs to restore natural surface drainage in the event of any in1pacts on surface drainage

7. 'fhc Licensee shall ensure that sediment and erosion control measures are in1plcmcnte<l prior to and maintained during the operation to prevent tl1c release of sediment and minimize erosion duri ng const1ll ction acti vities.

8. The Licensee shall designate an area for the deposition of excavated and stockpiled materials that is at least thirty (30) n1etres above the ordinary high water mark of any water body and in sucl1 a n1anncr as to prevent sediment from entering any surrounding water body.

9. The Licensee shall ensure t1lat both (a) fill material used in construction, and (b) tl1at the ground to be constructed upon, are free of contaminants. If contaminated soils are identified, notification shall be made in the Licensee's annual report. All conta111inated soils shall be treated and di sposed of in accordance with Part F, Ttem 2, or as otherwise approved by tl1e Board in writing.

PART F: CONDITIONS APPLYING TO OPERATION ANT> MAINTENANCE

1. . The Licensee shall submit to the Hoard, 10r approval in writing, withi n ninety (90) <lays of issuance of the Licence and prior to commissioning of the 2007 Sewage Disposal Faci lities, a revised *Operation and Maintenance Manual, Sewage Treatn1ent ,);1stefn, Hamlet q/' (,'ape Dorset, November* 7, *2007.*]he revision shall include the requiren1cnts uf Schedule 2.

2. The Licensee shall subrnit Lo the Board, for approval in writing, within ninety (90) days of issuance uf the Licence, an Operation and Maintenance Manual for the Water Supply Facilities and the Solid Waste Disposal Facilities prepared in accordance V.'ith the *"Guidelinesfor Preparing an Operation and Maintenance Manual for 3ewage and So/hi Waste J)iSf){JSrl I Facilities" , October 1996.* Tht: Plan shall include a speci fic section addressi ng \vast c management and the p roper d iversion and segregation of wastes, Lhe storage, transport and disposal of haza rdous \vastes materials.

3. The Licensee .shall i1nplcn1cnt t1lc Manuals specified in Pat1F, Items 1 and 2, following approval in writing by the Board.

4. The Licensee shall provi de notification i11 'Writing to the Board, in accordance with Part E, Item 2, of changes to the approved Operdtion and Ma intenance Plan under Part F, Iten1 1 , with respect to the waste\vater storage and decanting operations and procedures. For any potential significant in1pact of such change to the geothermal regime within and under the berms or lagoon flour, notice shall be accon1panied by the Geotechnical Engineer's supporting documentation and further geotechnical analysis.

5. An inspel'.tion of all engineered facilities related to the n1a nagetnent of water and waste shall be carried out annually in July, by a Geotechnical Engineer in accordance with the <_:anadian IJan1 Association, Datn Safety Guidelines, November 2007, where applicable. This inspection shall include the access road al ign n1ent with respect to water resources and the diversion and passage of water through (.;Ulvcrts. Th(.; engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a covering letter from the Licensee outlining an implementation plan addressing each of the Engineer's recon1mendations.

6. The Licensee shall perform a visual operations inspection of all engineered facilities related to the manage1nent of water and waste on a week ly basis or tnore frequently as req uested by an Inspector, to assess the general operating conditions and integrity of the containment structures. The records of these inspections are to be maintained and made avai lahle to ai1 Inspector upon request during the J ,icence tern1.

7. The Licensee shall review the Manual(s) referred to in this Part if there are changes in operation and/or technology and tnodify the Manual(s) accord ingly. Revisions to the Board approved Manua l(s) arc to be submitted in the form of an Addendum to be incl uded with the Annual Report under Part B, Item 1.

8. If, during the period of this I ,icenee, an u nauthorized d iseharg(.; of waste occurs, or if such a discharge is 10rcsei..:ablc, the Lici..:nsi..:i..: shall:

   t. en1ploy the appropriate contingency plan as pro·vided 10r in the Operation and Mai ntenance Manual;
   11. report the incident immedia tely via the 24-Ilour Spill Reporting Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and
   iii. submit to the Inspector, a detai led report on each Ol:C urrence, no later than thirty (30) days a lter initially reporting the event, that provides the necessary information on the location (including the GPS coord i nates), i ni t ial response action, remediatioru'clean-up, status of response (ongoi ng, con1plctc), proposed disposal options for dealing with con tan1i nated n1atcrials and preventative measures to be impletnented.

PART G: CONDITIONS APPLYl1'G TO A BA N DON MENT, RESTORATION AND CLOSURE

1. The Licensee shall submit to the Hoard, for approval in writing, within ninety (90) days of issuance of the Licence, a Jctailcd Final Abandonment and Restoration Plan fOr the 2001 Sewage Disposal Facility and the Emergency Sewage Disposal Facility. The Plan sl1ould incorporate, where applicable, the appropriate sections as described in Part G, Item 2.

2. 'J'he 1,icensee shall submit to the Board, for approval in writing, withi11 six (6) months of issuance of this Licence, a prel i1ni nary or conceptual Abandon ment and Restoration Plan for the l-Iamlel of Cape Dorst.:t, Water and Waste Dispo:::;al Fat.:ilities and all associatt.:<l structures not covered under Part G, Item 1, with end objectives to return the site to pre-use conditions. The Plan shall include the following (where applicah le):

   L water intake facilities;
   ii. the water treatment and waste disposal sites and facilities:
   iii. petrol eun1 and chemical storage areas;
   iv. any silt.: a11Cctcd by wastt.: spills;
   v. leachate prevention;
   vl. an imple1nentation and co1npletion schedule;
   v11. n1a ps delineating all dist urbed areas, and site tacilities;
   VIII. consideration of altered drainage patterns;
   ix. type and source of cover n1aterials
   x. future area use;
   xi. hawr<lous wastes; and
   XII. a proposal identifying n1easures by which restoration costs will be financed by the Licensee upon abandonn1ent.

3. The Lit.:t.:nsee shall submit to the Board, for approval in writing, six ((,) n1onths prior to the planned decommissioning of any licensed faci lity and the construction of new facilities to replace existi ng ones, a Final Abandonmt.:nt and Restoration Plan for the faci1ities being decomrnissiont.:<l.

4. The Licensee shall implement t he Plan(s) specified in Part G, Item I and 3, follo\ving approval in v.'riti ng by the Boa rd .

5. The Licensee shall review the Plan(s) refetTed to i n th is Pa rt if Lhere are changes in opera tion and/or technology and modify the Plan accordingly. RL:visions to the Board approved Plan(s) are to be sub1n itted in the tOrtn of an Addt.:n<lum to be included with the Annual Report under Part H, !tern 1.

6. The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee's operations.

7. The Licensee shall complete the restoration \.\'ork wi thin tht: time schedule specified in the Plan, or as subsequently revised and approved by the Board.

8. Tut.: Licensee :shall compIch.: all restoration work prior to the expiry of this Licence.

PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM

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

Monitoring Program Station Number	Descrin tion	Status
CAP-I	Raw Water supply prior to treatn lent	Active (Vol ume)
CAP-2	Runoff from the Solid Waste Disposal Facilities	Active
CAP-3	Influent of Wastewater to Wastewater Facilities (active at the tirne of san1olinoi	New
CAP-4	Effluent Discharge from the 2001 Sewage D_! nosal Facilities	Active I 1in(.;lu<lin!o! volume)
CAP-5	Effiuent discharge from the Emergency Sewage Disnosal Faci lities	Acti ve (including vol ume)
c_:A P-6	E lllucnt dis(.;harge from the 2007 Sewage Disposal Facilities - Final Point of Control	Active (includ ing vol ume)
CAP-7	Point of influent of wastewater to P-Lake	New
CAP-8	(_'entrc of P-Lake	New
CAP-9	Location midway betwccr1 the Cen tre of P-1 .ake (Stat ion 8) and the effluent tlis(.;harge of P-Lake	New

Monitoring Program Station Number	I>cscriotion	Status
CAP-lO	Effluent discharge from P-Lake; note, if flow is neghgihle a sa111ple from the i1runed iate upstream area within P-Lake shall be obtained	New
CAP-11	Effluent discha rge fro1n Wetland area	New
CAP-12	Wetland Pathway at the top of the waterfal l	New
CAP-13	Wetland Pathway at mid-way down waterfall	New
CAP-14	Welland Pathway at bottom of cliff – final Discharge Point	
CAP-15	(ontrol point using a small lake located between the Lal!oon and Tee Lake	New
('A P-1(1	Mon itoring well located up gradient of the 2007 Sewage Disposal Facilitv	Ncw
CAP-17	Monitoring Well No. 1 located down gradient of the 2007 Sewage Disposal Facilitv	New
CAP-18	Monitori11g Wdl Nu.2 located down gradient of the 2007 Sewage Disposal Facilitv	New
CAP 19	Monitoring well located up gradient of the Solid Waste Disposal F_aci lities	New
CAP-20	Monitoring well located down gradient of the Solid Waste Disposal Faci lities	New
CA P-21	'111ern1istor stations	Proposed with final descriptio11 to be provided
CAP-22	A s above	
CAP-23	As above	
CAP-24	As above	

2. 'J'he L i censee shall samph: at Monitoring Program Stations ('AP-3 through CAP-15 inclusi ve, one \Veek prior to the proposed d ischarge dah;, once at the beginning of discharge and \Veekly thereafter unt il cessation of discharge. Samples shall be analyzed for the follo\ving paran1eters:

Biochemical Oxygen Den land (HC)J),)

Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)
Total Suspended Solids
pH
Conductivity
Oil and Grease (visual)

Fecal Culiforms
Nitrate-Nitrite
Total Phosphorus
Magnesiun1
Sodium
Chloride
Total Hardness

Ainrnonia Nitrogen
Total Phenols
c.alcium
Potassium
Sulphate
Total Alkalinity

Total Trdce Metals as determined by a standard IC:P Scan (to include at a minimum, the following elements: A l, Sb, Ha, He, (d, (r, (o, Cu, Fe, Pb, Li, Mn, Mo, Ni, Se, Sn, Sr, l'1, 'l'i, LJ, V, Zn),

Total Arsenic
Total Mercury
T'otal Organic (arbon (TOC)

J. If the discharge at Station t:A P-4, (AP-5 or CAP-6 has been suspended for n1ore than 48 hours and subsequently rt:slarted, the sampling sequence descri bed in Part H, Item 2 of the Monitoring Program shall be repeated for these Stations.

4. The Licensee shall san1ple rnontl1ly at Munitoring Program Station f:AP-2 during periods of ohserved ±low. Samples shall be analyzed for the followi ng pararnetcrs:

BODs	Fecal c_:oli±Orn1s
pH	(_onductivity
·rotal	Suspended Solids Ainn1011ia Nitrogen
Nitrate-Nitrite	Oil and Cirease
Total Phenols	'['otal Alkalinity
Total Hardness	Calcium
Magnesi um	Potassium
Sodium	Sulphate
Total Arsenic	'fota1 Cadmi um
Total (opper	Total Chromium
Total Iron	Total Lead
l'otal Mercu ry	Total Nickel

5. 'l'he J,icensee shall report all results of n on-acute toxicity testing as required under Part D, Ttl.:m 8 wit11in the Annual Report as per Parl B, Ite1n 1.

6. 'The Licensee shall install ther1nistors for the purpose of validating assumptions made in the geothenna l analyses for the 2007 Sewage Disposal 1"aci lities as recommended by the Geotechnical Engineer of record and agreed upon by the Licensee, subject to a 1ninin1un1 of three 20 to 25 metre deep thennistors installed in crest of the west berm and at least one thermistor of that depth in the cast bcrn1.

7. The resul ts of tllcr1nistor 1nonitoring required under Part II, Item 6, shall be submitted to the Board for approval in writing, prior to comn lissioning of the 2007 Sewage Disposal Facility. The results shall includl: an Engineer's Report, validating the assumptions of the geothern1al analysis through adequate monitoring of the thermal regi1ne for the r:ast and West Berms and downstream foundations

8. The Licensee shall not commission the 2007 Sewage 1 lisposal Facility until the requi rements of Part H, Item 6 and Item 7 have been completed and approved.

9. The Licensee shall, within ni1lety (90) days of issuance of this Licence, provide a cremperature Monitoring Program and lmpleml:ntation Plan for ongoing collection of ground ten1peratures within each berm structure and foundation of the 2007 Sewage Disposal Facility through the i nstallation of thermistors. This Plan shall take into consideration the follo\ving:

   i. Locations of them1i stors, to be incorporated into the Monitoring Station Table under Part H, Item 1;
   ii. Appropriate thermistor configuration, overall <lL-pth and spacing of bead locations to provide the level of data collection that will capture any extreme variations in tenlperatu re and provide the infonnation needed to validate the assumptions n1ade in the geothermal analysis.
   iii. The frequency of temperature readings shall be such to allow the determination of the maxin1u1n freeze and thaw of the berm and underlying native materials and provide adequate data tOr tbern1al 1nodeli ng of the bem1s.
   1v. This :frequency may be reviewed and adjusted upon collection of adcq uat\.: data and as recommended by the Geotechnical Engineer in order to assess the berms through them1al n1odeling and provide an assessment with respect to benn stability and potential seepage.
   v. This information is to be rl:portl:d along \vith the rt:sul ts of the annual geotechnical inspection as required under Part Γ, Item 6.
   vi. An impleme lltation schedule that \Viii allow collection of data for confinnation of core-trench freeze-back.

10. The Licensee shall implcn1ent the Plan specified in Part II, Item 9 following approval by the Board in writing.

11. The Licensee shall review the Plan(s) referred to in this Part if there arc changes i n operation and/or technology and n1odify the Plan accordingly. Revisions to the Board approved Plan(s) are to be submitted in the l0rn1 of an Addendum to he included with the Annual R eport under Part B, Item 1.

12. The Licensee shall install groundwater n1onitoring wells at the 2007 Sewage Disposal Faci lity to obtain at least one monitoring season of data prior to the expiry of the I .icence. At least one groundwater monitoring well shall be located upstream of the 2007 Sewage Disposal Facility iOr background data collection, at least one groundwater monitoring well shall be located do\vnstrcam of the landfill and at least one groundwater monitoring well shall be located downstream of the metals d un1p.

13. The Licensee shall sample at Monitoring Program Stations CAP-16, CAP-17 and CAP-18 once annually in the summer, prior to con1n1encing discharge from the 2007 Sewage Disposal Facility, giving due considera tion to adeq uate grou nd tl1aw and obtai ning a representative groundwater sample. Samples shall be analyzed for parameters identified in Part H, Itcrn 4.

14. The Licensee shall install groundwater monitoring at the Solid Waste Disposal Facilities wells to obtain at least one 1nonitoring season of data prior to the expiry of the Licence, At lease one groundwater rnonitoring wel l shal l be located upstrean1 of the Solid Waste Disposal Facilities for background data collection and at least one grou ndwater 1nonitoring well shall be located downstream of the Solid Waste Disposal Facilities .

15. The Licensee shall sample at Monitoring Program Stations t:A P-19 and t:A P-20 once annually in the summer season, giving due consideration to adeq uate ground thaw and obtaining a representative groundwater sample. Samples shall be analyzed for parameters identified in Part H, lte1n 4.

16. The Licensee shall measure and record in cubic metres, the monthly and annual quan tities of water pun1ped for all purposes at Monitoring Progran1 Station (,'A P-1.

17. The Licensee sl1all n1easu rc and record in cubic n1ctres (a) tlle rr1onthly and annual quantities of ra\v sewage offloaded from trucks and the number of days of use for the 2001 Sewage Disposal f acility and the Emergency Sewage Disposal Facility, and (b) the n1onthl y and annual quan ti ties of raw se,vage offloaded fron1 t1l1cks at the 2007 Sewa ge Disposal Facil ity.

18. The Licensee shall measure and record the annual quantities of se'\\'age solids removed from the Sewage Disposal Facilities.

19. 'J'he I"icensee shall conduct additional sampling and analysis as n1ay be requested by an Inspector.

20. The Licensee shall revise the "(Juidelines for Wastewater Sampling, ()ctober 27, 2007" and submit to the Board Or approval by an Analyst in writi ng a Quality Assurance/Quality (,'ontrol (QA/QC) PlanOr the Hamlet of Cape Dorst:t, within ni nety (90) days of issuance of this Licence. The Plan shall use as a guide the docum1;:nt *"Qualiy Assurance and Quality (ontrol Guiclelines for use b_v (:lass "H " Licensees in C'ollection of Representative Water 'umpLes in the Field, and for Subn1ission q/·a QA/QC Plan, July 1996 ".* The Plan shall address tl1e use of field blanks, replicate sampling and certified rciCrcnce material i11 order to assess accuracy, precision and field contamination.

21. '\'he [,icensee shall implement the Pla n referred to in Part I-I, Item 20 following approval in writing by t he Analyst.

22. All sampling, sampli.: preservation and analyses shall be i.:onductcd in accordance with n1ethods prescribed in the current edition of *,)tandard Methods for the Examination qf Waler and Wastewater,* or by such other methods approved by the Board.

23. All analyses shall be pi.:ri0 ln1cd in a (_'anadian Association of Environmental Analytical f_,aboratories ((;AEAL) Certified Laboratory, or as otherwise approved by an Analyst.

24. The Licenst::c shall include all of the data and information rt::quirt::<l by the "Monitoring Program" in the Licensee's Annual Report, as requi red *j)Cr* Part B, Item 1 or as otherwise requested by an Inspector.

25. I-ler Majesty in the right of (_anada shall:
    t. Monitor the Licensee's installation of ther1nistors and notify the Board when the instal lation of thermistors is complete and in conipliance witl1 Pa1 1 H, lte1n 6;
    tL Mo1litor the l,icensee's validation of the assumptions of the geothermal analysis through adi.:q uate monitoring of the them1al regime for the East and West Berms and downstream foundations under Part H, Item 7, and notify the Board when satisfied the assumptions of the geothermal analysis have been validated; and
    111. Monitor the 2007 Waste Disposal Facility and notify the Board immediatt:ly if the Pro_jt:ct is con1missioned prior to the co1npletion of i. and ii., or in contravention of any other condition of the Licence.

SCHEDULE I CONDITIONS APPLYING TO MODIFICATIONS AND CONSTRUCTION

List of drawing deficiencies identified by B(;(; for revision and submissio ll.
Please refer to Technical Memorandum "Cape Dorset Sewage lagoon-Review of 1'inal Suh1nissions, January 8, 2008", or the final intervention memo dated January 8, 2008 for further clarification.

The record set of drawings fails to include a signature block for A M EC:. It was noted that the original design drawings issued by J)i l lon in the December 21, 2006 design report, revision 5, marked "Issued for Construction" incl uded a signature hlock "Reviewed by AMEC" on l)rawing 1 1 1, which is the equivalent of Drawing 1 12 of the Record llrawings

1. At a minimum, AMEC is to provide a signature block for the following drawings:
   - Drawing 101- sl1ows location of test pits carried ou t for geotechnical investigation::.·.
   - Drawi1 lg 109- shows longitudinal geological sections along cut-off trench.
   - l)rawing 110- shows typical earthworks sections for the access road and berm.
   - Drawing 112- shows lagoon bem1 sections

2. The as-bui lt dra\vings n lust identify the areas where field changes were niade from the original design drawings, preferably in the form of a revision bubble and a brief note in the revisions section of the titlt.: block.

List of Dral'l'ing altera tions and request for rationale for the change.

R ecord drawing 100 the alignment of tht.: access roads between the hast and West Berms, on the north and south sides of the lagoon was changed from the original design. TI1e road be1ms were originall y designed to deflect runoff fron1 entering the lagoon.

3. rxplanation is required as to the rationale for changing the alignni ent of the road henns and how the as-huilt berm details in the drawing prevents runoff from entering the lagoon.

Record Drawing 109 there is up to lm of un frozen fill used to level the ground surface under both the East and West he1l 1l s. 'fhis leveling course of material has not been sho\vn as a separate zone in Lhe bt.:rm sct.:tions presented in Record [)rav,ri ng 1 12.

4. A description for record dra\ving 1 12 is req uired of Lhc material used int.:luding gra in si7e gradation curve.

Record Drawing 109 shows that the berm contours at the north end of the West Berm have been modified ifon1 the original design drawings. (,'rest widened from 41n to 25m to accommodate what appears to he a vehicle turnaround on the downstream side of the bern1.

5. Additional as-built cross-sections of this area are to be provided along with geothermal analysis that there is sufficient fill thickness over the abutment to ensure Lhat t1le (_T('I, tie-in to the cut-off trench remains frozen.

Record Drawing 11O shows typical road sections. ()n July 30, 2007, the GN CGS provided a revised ditch detail fOr the road

6. l'his revised ditch detail is requested as part of the as-built drawing details for [)rawing 110

7. Additional information is requested providing further details as to how seepage through the active zone under the berm will be prevented.

The llamlet of Cape Dorset noted a problem during the October 1, 2007 ·rechnical Meeting/Pre-Hearing, with seepage into the lagoon through the active zone with the as-constructed detail. Record J)rawing 112 indicates that the material used to hackfi.11 the cut-off trench is a "Sand", the same material as used for the berm.

8. Further clarification is req uested on how the issue of seepage is being resolved.

In the original Dcsig11 Drawi ng 1 1 1, f)etail 4 showed the liner embedmcnt 101lgitudi nal section in the abutments. This Detail was absent fron1 Record Drawing 112. The cut-off lrcnch n1ust extend sufficient distance into the abutment so that any "end-run" seepage through the active Lone is prevented. It is not clear from the as-built information if the extent of the cut-off trench satisfies this criterion.

9. l"herefore the as-built liner embedmen t details 10r the abut1nent areas of the East and West Henns are therefore requested to be included for Record Drawing 112.

In Record Drawing 112, tht.: erc:st deta il of the ernergency overflow weir section was changed. ·rhis change notice v,ras transmitted to the contractor by Dillon on J ul y 21, 2007. The as-built deta il shows the geo-web and the GCL in one layer, with no brran ular or otl1er 1naterial between the two. Dillon initiated this n1odification to address a previous concern raised by BGC thal \vater could seep under the GCL in the en1crgency spi 11way and potentially lift the liner. It is still not clear how the above modification prevents this problem ifom occu rring.

10. l)esi gn change rationale 1s requested that provides an explanation as to the change fi'orr1 Lhc original drawing, change to n1eet H(i(."s concern and then further change to what appears to be potentially i nadequate construction.

SCH :DULE 2 CONDITIONS A PPLYING TO MONITO RING AND MAINTENANCE

A revised *Operation un1i Maintenance Manual, ,Sewage Treatment S)·steni, Ha1n let Q/' Cal1e Dorset, Noveniher 7, 2007* shall include the following requirements:

i. Expansion of Section 3.4.5 to include tenns and conditions for the disposal or sludge as provided for in the Draft Guidelines for Discharge of Don1estic Wastewater in Nunavut, 2000;

ii. Section 3.4.6 should include a description of the installation of thermistors req u ired u nder Part H, Iten1 6, inc luding the number, locations and depths of thermistor beads used to monitor the berms, and a description of the method and frequency of monitoring requirements;

IIL Section 3.4.6 should include a description of the installation of monitoring wells required under Part H, lten1 7, including the number, locations and depths of thermistor beads used to moni tor the bcrtns, and a description of the method and frequency of nionitoring requirements

I v. Description of the details of any repairs, upgrades and nlaintenance required for the use of part or all of the 2001 Sewage Disposal Facility or 1-<:merge1lcy Sewage Disposal Facility;

v. Include a contingency plan for tl1c operation of the 2007 Sewage Di sposal Facility duri11g periods where accessibility to the facility is limited and alternative nieasures are required for the handli ng of sewage. This may include operation and mai11tcnanee of any older facility or portion oi that would be retained as the contingency;

VI. Provision for the monitoring of effluent discharges fron1 the 2001 Sewage Disposal Facility and the 1-:1nergency Sewage Disposal Facility;

VII. Inspection program for the 2001 Se\vage Disposal Pacility, the Emergency Sewage Disposal f acility and 2007 Sewage Disposal Faci lity, detailing the frequency and i nspection requirements by the operator(s) of tht,; facility;

VIII. Appendix (_ of the ()&M Manual to include forms to document lht,; rceomtnendations and follow up „...·ork required as a result of the annual geotechnical inspection.

1x. Section 4 – Spill Contingency Plan be revised to con1prehensively address specific recommendations provided d11ring the review process by GN l)o:as follows:

a. The date the contingency plan was prepared.

b. The namt: and address of the person i n charge, n1anagement or control. This is an on-site person responsible for managing the facility. Tl1is person would be i n itial l y responsible for clean-up activities.

c. Tht: narr1c and address of the O\vner if different fro1n the person in charge. This is the person ultimately responsible fOr the f'a c il lty, usuall y the o\vner.

d. The name, job title and 24 hour tch.:phonc nu rnber fi.)f the persons responsi ble for activating the contingency plan. This ensures the cmployc L: Jiscoveri ng the spil l can activate a response and provides a 24 hour point of contact for the au thority

investigating the spill.

e. A description of the facility including the location, size and storage capacity. This is important if persons are unfamiliar with the facility or area. The description could include a map and/or diagrams.

f. A site map that is intended to illustrate the facilities relationship to other areas that may be affected by the spill. The map should be to scale arid be large enough to include the location of your facility, nearby buildings or facilities, roads, culverts, drainage patters, and any nearby bodies of water.

g. The steps to be laken to rt..:port, contain, and clean up and dispose of a contaminant in the case of a spill.

1. . Reporting: Notification of all parties involved. This can include internal and external reporting procedures as well as a copy of the spill report;
2. Clean up: Removal of the contaminant !Tom the environment, a detailed of actual containment and clean up techniques. (2 steps: contain and remediate; be aware of fire);
3. Disposal: Is the treatn1e11t of the contan1inant such that it is no longer a threat to the environment. Plans may inel udt.: lot.:ation of disposal sitt.:s approved to accept wastes, means of storage prior to disposal and other approvals required. (Waste Manifest document).

h. The means by whit.:h the i:ontingcncy plan is activated. This should outlini: internal company procedures to activate appropriate response equipment and personnel.

ı. A description of the training provided to employees to respond to a spill. A sound training program is necessary when dealing with an emergency situation.

j. An inventory and the location of response and clean up equipn1ent available to in1plen1cnt the plan. This includes your equipment as well as any to be used by another person responding to the spill on your behalf.

k. SPILL KIT (FUEL)The kit can include but not limited to the following: shovel, pick-axe, drun1s, bootns, absorhent pad/sheet, disposable protective gloves/coveralls, sorbcnt and cotltainmcnt materials, an<l disposal bags.

l. A list of local contractors or clean up specialists who may be called upon to assist in responding to spills. A list of emergency nu1nbers such as fire, ainbulance and police.

x. Section 4 – describe the measures to be implemented for a spill during the collection and transportation of wastewater. This spill response is to be expanded to include spill scenarios resulting fron1 the leakage or Bilurc of a containment structure for the Sewage Disposal Facililii:s; and

xı. Appendix B to include specific reference to rnonitoring stations and required frequency of san1pling and the analyses required by the Licence.

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

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NUNAVUT IMALIRIYIN KATIMAYINGI
NUNAVUT WATER BOARD
OFFICE DES EAUX DU NUNAVUT

File No: 3BM-CAP0810

March 7, 2008

Honorable Chuck Strahl, P.C., M.P.
Minister of Indian Affairs & Northern Development
and Federal Interlocutor for Metis and Non-Status Indians
21st Floor, 10 Wellington
Gatineau, Quebec K1A 0H4

By Courier, Email and Regular Mail

Subject: Licence 3BM-CAP0810 – Cape Dorset, Nunavut

Dear Minister:

Please find enclosed an amended Licence 3BM-CAP0810 duly issued by the Nunavut Water Board (NWB).

The amendment to this Licence authorizes the Hamlet of Cape Dorset, to dispose of waste in relation the disposal, treatment and discharge of sewage effluent for municipal operations at Cape Dorset. This Type B Licence is being sent to you for your approval in accordance with Section 56(1) of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (Act) as the Board determined pursuant to subsection 51(2) of the Act that it is in the public interest to hold a public hearing on the amendment application.

As set out in the Board's Reasons for Decision, attached for your information, this decision was particularly difficult for the Board. The Board has concluded that the current sewage lagoon system has failed. At the same time, construction of the new sewage lagoon was completed prior to the Public Hearing. The new sewage lagoon appears to have been built without environmental assessment, and certainly without this Board's regulatory review and approval.

Without the benefit of environmental assessment or regulatory direction, the evidence supports that the new sewage lagoon, has been built in a location with unfavourable geological characteristics; the integrity of the design is seriously questioned by technical reviewers; and the facility has not been constructed in accordance with construction drawings, omitting design elements essential to mitigating the design risks (i.e. thermistors installations). Furthermore, the new lagoon is accessible only by

a road that the Board believes is likely to prove unusable during winter months, forcing continued reliance on the existing lagoon.

While the new lagoon system poses serious risks, the Board is satisfied that with appropriate conditions these risks can be mitigated. Moreover, this is likely the only mechanism for the Hamlet to come into compliance with the Act and the terms of the Licence. Accordingly, the Board has decided that the optimum benefit for the residents of Nunavut is derived from a decision to issue the amendment to the Licence.

The Board's decision relies heavily on the need for mitigating risks posed by the new lagoon system and has set out corresponding conditions in the amended Licence, including specified responsibilities of the Her Majesty in right of Canada pursuant to 70(2) of the Act. The Board believes these conditions are essential to achieving optimum benefit for the residents of Nunavut and asks that the Minister approve this Licence only if INAC inspectors are committed to comply with the responsibilities specified in the Licence and pursuant to the Act.

Through the conditions set out in the Licence, the Board will carefully monitor the Hamlet's efforts to come into compliance with the Licence. If at any point the Board determines that future failure to comply with key conditions set out in the Licence such that the balance of the benefit to the residents of Nunavut changes, the Board is prepared to exercise its authority pursuant to clause 43(1)(c)(iii) of the Act to recommend cancellation of the licence if the Board determines it is in the public interest to do so.

If your office wishes to receive a full Records of Proceedings please contact our head office. The Licence is in your hands to be considered in accordance with section 56 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*.

Please contact the undersigned in writing should you have any questions regarding this matter.

Sincerely,

Thomas Kabloona
A/Chair

Attachment: Licence No: 3BM-CAP0810 and Decision

c.c. Cape Dorset Distribution List
NWB Public Registry

WATER LICENCE NO: 3BM-CAP0810

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LICENCE 3BM-CAP0810

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 CAPE DORSET
(Licensee)

of **P.O. BOX 30, CAPE DORSET, NUNAVUT X0A 0C0**
(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:

Licence Number **3BM-CAP0810**

Water Management Area **NUNAVUT 05**

Location **CAPE DORSET, NUNAVUT**
Latitude 64°14'N and Longitude 76°32'W

Purpose **WATER USE AND WASTE DISPOSAL**

Description **MUNICIPAL UNDERTAKINGS**

Quantity of Water Not to Exceed **70,000 CUBIC METRES ANNUALLY**

Date of Licence **MARCH 7, 2008**

Expiry Date of Licence **MARCH 1, 2010**

Thomas Kabloona,
Nunavut Water Board
A/Chair

APPROVED BY:

Minister of Indian and Northern Affairs Canada

DATE LICENCE APPROVED:

PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

1. Scope

a. This Licence allows for the use of water and the disposal of waste for municipal undertakings at the Hamlet of Cape Dorset, Nunavut (Latitude 64°14'N and Longitude 76°32'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

"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 Disposal 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 Disposal 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;

"Composite Sample" means a water or wastewater sample made up of four (4) samples taken at regular periods over a 24 hour period;

"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;

"**Engineer**" means a professional engineer registered to practice in Nunavut in accordance with the *Engineering, Geological and Geophysical Act (Nunavut)* S.N.W.T. 1998, c.38, s.5;

"Final Discharge Point" means the discharge location point where the effluent from the 2007 Sewage Disposal Facilities enters fish habitat or fish bearing waters;

"Final Point of Control" means the discharge location at the 2007 Sewage Disposal Facilities August 27, 2007 submission prepared by Dillon Consulting including ten appendices, to be confirmed by an Inspector;

"Freeboard" means the vertical distance between water line and crest on a dam or dyke's upstream slope;

"Geotechnical Engineer" means a professional engineer registered with the Association of Professional Engineers, Geologist and Geophysicists of Nunavut and whose principal field of specialization with the engineering properties of earth materials in dealing with man-made structures and earthworks that will be built on a site. These can include shallow and deep foundations, retaining walls, dams, and embankments;

"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;

"Monitoring Program" means a monitoring program established to collect data on surface water and groundwater quality to assess impacts to the freshwater aquatic environment of an appurtenant undertaking;

"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**" includes the facilities licensed in 2001, 2004 and 2007;

"**Emergency Sewage Disposal Facility**" comprises the area designed to contain and treat sewage as described in the Water License Amendment Application filed by the Applicant on August 16, 2004, and illustrated on the "Cape Dorset Sewage Lagoon Rehabilitation Site Plan (August 2004)"

"2001 Sewage Disposal Facilities" comprises the Three Tier Lagoon which 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 19, 2001;

"2007 Sewage Disposal Facilities" comprises the engineered lagoon and decant structures constructed in 2007 and illustrated in the Record Drawings No.'s 100 and 101 of Project N-05-4319-3000 prepared by Dillon Consulting and submitted November 13, 2007;

"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 19, 2001;

"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 2001, 2004 and 2007 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 19, 2001 and subsequently in the application dated July 7, 2005;

"Water Supply Facilities" comprises the area and associated intake infrastructure at Tee Lake, as described in the Application for Water Licence filed by the Applicant on April 19, 2001;

3. Enforcement

i. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the *Act*;

ii. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and

iii. For the purpose of enforcing this Licence and with respect to the use of water and deposit or discharge of waste by the Licensee, Inspectors appointed under the *Act,* hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

iv. The Licensee shall, in relation to any application to renew or amend the Licence, have in place a Plan for Compliance approved by the Board in writing, to achieve full compliance with the conditions of this Licence, or a Plan for Compliance must be submitted at the time of Application, in order for the Application to be deemed complete.

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 Monitoring 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 following year;
vii. a summary of any studies, reports and plans (i.e. Operations and Maintenance, Abandonment and Restoration, QA/QC) requested by the Board that relate to water use and waste disposal or reclamation, and a brief description of any future studies planned; and
viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported.

2. The Licensee shall comply with the Monitoring Program described in this Licence, and any amendments to the Monitoring Program as may be made from time to time, pursuant to the conditions of this Licence.

3. The Monitoring 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.

5. The Licensee shall, within ninety (90) days after the first visit by the Inspector following issuance of this Licence, post the necessary signs, to identify the stations of the Monitoring Program. All signage postings shall be in the Official Languages of Nunavut.

6. The Licensee shall submit to the Board, for approval in writing, within the lesser of ninety (90) days or the filing of any application in relation to the Licence, a Plan for Compliance that clearly demonstrates the ways and means the Licensee will undertake to achieve full compliance with the conditions of this Licence.

7. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted, cannot be undertaken without subsequent written Board approval and direction. The Board may alter or modify a Plan if necessary to achieve the legislative objectives and will notify the Licensee in writing of acceptance, rejection or alteration of the Plan.

8. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of this Licence, and any additional terms and condition imposed upon approval of a Plan by the Board become part of this Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.

9. 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.

10. The Licensee shall ensure a copy of this Licence is maintained at the municipal office at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

Manager of Licensing:
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369
Email: licensing@nunavutwaterboard.org

Inspector Contact:
Water Resources Officer
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

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

11. 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.

12. The Licensee shall ensure that any document(s) or correspondence submitted by the

Licensee to the Board, is received by the Board and maintain on file a copy of the acknowledgment of receipt issued by the Manager of Licensing.

13. This Licence is not assignable except as provided in Section 44 of the Act.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain all fresh water from the Tee Lake using the Water Supply Facilities or as otherwise approved by the Board in writing.

2. The annual quantity of water used for all purposes shall not exceed 70,000 cubic metres.

3. The Licensee shall equip all water intake hoses with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen.

4. The Licensee shall not remove any material from below the ordinary high water mark of any water body unless otherwise approved by the Board in writing.

5. The Licensee shall not cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

6. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. Licensee shall locate areas designated for waste disposal at a minimum distance of thirty (30) metres from the ordinary high water mark of any water body such that the quality, quantity or flow of water is not impaired, unless otherwise approved by the Board in writing.

2. Subject to the conditions in the Licence regarding commissioning, the Licensee shall direct all Sewage to the 2007 Sewage Disposal Facilities or as otherwise approved by the Board in writing.

3. The Licensee shall provide notice to an Inspector at least ten (10) days prior to initiating any decant of the 2001 and 2007 Sewage Disposal Facilities.

4. All Effluent discharge from the 2001 Sewage Disposal Facility at Monitoring Program Station CAP-3 and the Emergency Sewage Disposal Facility at Monitoring Program

Station CAP-4, shall meet the following effluent quality limits:

Parameter	Maximum Average Concentration
BOD_5	120 mg/L
Total Suspended Solids	180 mg/L
Faecal Coliforms	1 x 10^4 CFU/100mL
Oil and grease	No visible sheen
pH	between 6 and 9

5. All Effluent discharged from the 2007 Sewage Disposal Facilities at Monitoring Program Station CAP-5 shall meet the following effluent quality limits:

Parameter	Maximum Average Concentration
BOD_5	80 mg/L
Total Suspended Solids	100 mg/L
Faecal Coliforms	1 x 10^4 CFU/100mL
Oil and grease	No visible sheen
pH	between 6 and 9

6. The Licensee shall maintain at all times, a freeboard of at least 1.0 metre, or as recommended by a qualified Geotechnical Engineer with notice in writing provided to the Board, for all dams, dykes or other structures intended to contain, withhold, divert or retain water or wastes.

7. The Sewage Disposal Facilities shall be maintained and operated in such a manner as to prevent structural failure.

8. All Effluent discharged from the 2007 Sewage Disposal Facility at the Final Discharge Point at Monitoring Station CAP-14 and effluent discharge from Monitoring Stations CAP-3 and CAP-4 prior to the point of entry at the ocean, , shall be demonstrated to be non-acutely toxic under the following tests to be conducted once annually, approximately mid-way through the discharge period:

   i. Acute lethality to Rainbow Trout, Oncorhynchus mykiss (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/13); or

ii. Acute lethality to the crustacean, Daphnia magna (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/14).

9. The Licensee shall dispose of and contain all solid wastes at the Solid Waste Disposal Facilities or as otherwise approved by the Board in writing.

10. The Licensee shall implement appropriate erosion and diversion control methods, to minimize surface water intrusion and leachate generation at the Solid Waste Storage Facility.

11. The Licensee shall segregate and securely store all hazardous materials and/or hazardous waste within the Solid Waste Disposal Facility in a manner as to prevent the deposit of deleterious substances into any water.

PART E: CONDITIONS APPLYING TO MODIFICATION AND CONSTRUCTION

1. The Licensee shall submit to the Board, for approval in writing, design drawings stamped by a qualified engineer registered in 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. these 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 2, have not been met may be carried out only with written approval from the Board.

4. The Licensee shall provide as-built plans and drawings of the Modifications referred to in this Part within ninety (90) days of completion of the Modification. These plans and

drawings shall be stamped by an Engineer.

5. The Licensee shall, within sixty (60) days of issuance of this Licence, provide a summary report along with revised stamped as-built plans and record drawings of the 2007 Sewage Disposal Facility, to reflect the clarifications and omissions identified through the Licence application review and detailed in the attached Schedule 1.

6. All activities shall be conducted in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake corrective measures to restore natural surface drainage in the event of any impacts on surface drainage

7. The Licensee shall ensure that sediment and erosion control measures are implemented prior to and maintained during the operation to prevent the release of sediment and minimize erosion during construction activities.

8. The Licensee shall designate an area for the deposition of excavated and stockpiled materials that is at least thirty (30) metres above the ordinary high water mark of any water body and in such a manner as to prevent sediment from entering any surrounding water body.

9. The Licensee shall ensure that both (a) fill material used in construction, and (b) that the ground to be constructed upon, are free of contaminants. If contaminated soils are identified, notification shall be made in the Licensee's annual report. All contaminated soils shall be treated and disposed of in accordance with Part F, Item 2, or as otherwise approved by the Board in writing.

PART F: CONDITIONS APPLYING TO OPERATION AND MAINTENANCE

1. The Licensee shall submit to the Board, for approval in writing, within ninety (90) days of issuance of the Licence and prior to commissioning of the 2007 Sewage Disposal Facilities, a revised *Operation and Maintenance Manual, Sewage Treatment System, Hamlet of Cape Dorset, November 7, 2007*. The revision shall include the requirements of Schedule 2.

2. The Licensee shall submit to the Board, for approval in writing, within ninety (90) days of issuance of the Licence, an Operation and Maintenance Manual for the Water Supply Facilities and the Solid Waste Disposal Facilities prepared in accordance with the *"Guidelines for Preparing an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities"*, *October 1996*. The Plan shall include a specific section addressing waste management and the proper diversion and segregation of wastes, the storage, transport and disposal of hazardous wastes materials.

3. The Licensee shall implement the Manuals specified in Part F, Items 1 and 2, following approval in writing by the Board.

4. The Licensee shall provide notification in writing to the Board, in accordance with Part E, Item 2, of changes to the approved Operation and Maintenance Plan under Part F, Item 1, with respect to the wastewater storage and decanting operations and procedures. For any potential significant impact of such change to the geothermal regime within and under the berms or lagoon floor, notice shall be accompanied by the Geotechnical Engineer's supporting documentation and further geotechnical analysis.

5. An inspection of all engineered facilities related to the management of water and waste shall be carried out annually in July, by a Geotechnical Engineer in accordance with the Canadian Dam Association, Dam Safety Guidelines, November 2007, where applicable. This inspection shall include the access road alignment with respect to water resources and the diversion and passage of water through culverts. The engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a covering letter from the Licensee outlining an implementation plan addressing each of the Engineer's recommendations.

6. The Licensee shall perform a visual operations inspection of all engineered facilities related to the management of water and waste on a weekly basis or more frequently as requested by an Inspector, to assess the general operating conditions and integrity of the containment structures. The records of these inspections are to be maintained and made available to an Inspector upon request during the Licence term.

7. The Licensee shall review the Manual(s) referred to in this Part if there are changes in operation and/or technology and modify the Manual(s) accordingly. Revisions to the Board approved Manual(s) are to be submitted in the form of an Addendum to be included with the Annual Report under Part B, Item 1.

8. 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 Manual;
   ii. report the incident immediately via the 24-Hour Spill Reporting Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and
   iii. submit to the Inspector, a detailed report on each occurrence, no later than thirty (30) days after initially reporting the event, that provides the necessary information on the location (including the GPS coordinates), initial response action, remediation/clean-up, status of response (ongoing, complete), proposed disposal options for dealing with contaminated materials and preventative measures to be implemented.

PART G: CONDITIONS APPLYING TO ABANDONMENT, RESTORATION AND CLOSURE

1. The Licensee shall submit to the Board, for approval in writing, within ninety (90) days of issuance of the Licence, a detailed Final Abandonment and Restoration Plan for the 2001 Sewage Disposal Facility and the Emergency Sewage Disposal Facility. The Plan should incorporate, where applicable, the appropriate sections as described in Part G, Item 2.

2. The Licensee shall submit to the Board, for approval in writing, within six (6) months of issuance of this Licence, a preliminary or conceptual Abandonment and Restoration Plan for the Hamlet of Cape Dorset, Water and Waste Disposal Facilities and all associated structures not covered under Part G, Item 1, with end objectives to return the site to pre-use conditions. The Plan shall include the following (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 and completion 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.

3. The Licensee shall submit to the Board, for approval in writing, six (6) months prior to the planned decommissioning of any licensed facility and the construction of new facilities to replace existing ones, a Final Abandonment and Restoration Plan for the facilities being decommissioned.

4. The Licensee shall implement the Plan(s) specified in Part G, Item 1 and 3, following approval in writing by the Board.

5. The Licensee shall review the Plan(s) referred to in this Part if there are changes in operation and/or technology and modify the Plan accordingly. Revisions to the Board approved Plan(s) are to be submitted in the form of an Addendum to be included with the Annual Report under Part B, Item 1.

6. The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee's operations.

7. The Licensee shall complete the restoration work within the time schedule specified in the Plan, or as subsequently revised and approved by the Board.

8. The Licensee shall complete all restoration work prior to the expiry of this Licence.

PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM

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

Monitoring Program Station Number	Description	Status
CAP-1	Raw Water supply prior to treatment	Active (Volume)
CAP-2	Runoff from the Solid Waste Disposal Facilities	Active
CAP-3	Influent of Wastewater to Wastewater Facilities (active at the time of sampling)	New
CAP-4	Effluent Discharge from the 2001 Sewage Disposal Facilities	Active (including volume)
CAP-5	Effluent discharge from the Emergency Sewage Disposal Facilities	Active (including volume)
CAP-6	Effluent discharge from the 2007 Sewage Disposal Facilities – Final Point of Control	Active (including volume)
CAP-7	Point of influent of wastewater to P-Lake	New
CAP-8	Centre of P-Lake	New
CAP-9	Location midway between the Centre of P-Lake (Station 8) and the effluent discharge of P-Lake	New

Monitoring Program Station Number	Description	Status
CAP-10	Effluent discharge from P-Lake; note, if flow is negligible a sample from the immediate upstream area within P-Lake shall be obtained	New
CAP-11	Effluent discharge from Wetland area	New
CAP-12	Wetland Pathway at the top of the waterfall	New
CAP-13	Wetland Pathway at mid-way down waterfall	New
CAP-14	Wetland Pathway at bottom of cliff – Final Discharge Point	
CAP-15	Control point using a small lake located between the Lagoon and Tee Lake	New
CAP-16	Monitoring well located up gradient of the 2007 Sewage Disposal Facility	New
CAP-17	Monitoring Well No.1 located down gradient of the 2007 Sewage Disposal Facility	New
CAP-18	Monitoring Well No.2 located down gradient of the 2007 Sewage Disposal Facility	New
CAP 19	Monitoring well located up gradient of the Solid Waste Disposal Facilities	New
CAP-20	Monitoring well located down gradient of the Solid Waste Disposal Facilities	New
CAP-21	Thermistor stations	Proposed with final description to be provided
CAP-22	As above	
CAP-23	As above	
CAP-24	As above	

2. The Licensee shall sample at Monitoring Program Stations CAP-3 through CAP-15 inclusive, one week prior to the proposed discharge date, once at the beginning of discharge and weekly thereafter until cessation of discharge. Samples shall be analyzed for the following parameters:

Biochemical Oxygen Demand (BOD_5)

Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)
Total Suspended Solids
pH
Conductivity
Oil and Grease (visual)

Fecal Coliforms
Nitrate-Nitrite
Total Phosphorus
Magnesium
Sodium
Chloride
Total Hardness
Ammonia Nitrogen
Total Phenols
Calcium
Potassium
Sulphate
Total Alkalinity

Total Trace Metals as determined by a standard ICP Scan (to include at a minimum, the following elements: Al, Sb, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Li, Mn, Mo, Ni, Se, Sn, Sr, Tl, Ti, U, V, Zn),

Total Arsenic
Total Mercury
Total Organic Carbon (TOC)

3. If the discharge at Station CAP-4, CAP-5 or CAP-6 has been suspended for more than 48 hours and subsequently restarted, the sampling sequence described in Part H, Item 2 of the Monitoring Program shall be repeated for these Stations.

4. The Licensee shall sample monthly at Monitoring Program Station CAP-2 during periods of observed flow. Samples shall be analyzed for the following parameters:

BOD_5	Fecal Coliforms
pH	Conductivity
Total	Suspended Solids Ammonia Nitrogen
Nitrate-Nitrite	Oil and Grease
Total Phenols	Total Alkalinity
Total Hardness	Calcium
Magnesium	Potassium
Sodium	Sulphate
Total Arsenic	Total Cadmium
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel

5. The Licensee shall report all results of non-acute toxicity testing as required under Part D, Item 8 within the Annual Report as per Part B, Item 1.

6. The Licensee shall install thermistors for the purpose of validating assumptions made in the geothermal analyses for the 2007 Sewage Disposal Facilities as recommended by the Geotechnical Engineer of record and agreed upon by the Licensee, subject to a minimum of three 20 to 25 metre deep thermistors installed in crest of the west berm and at least one thermistor of that depth in the east berm.

7. The results of thermistor monitoring required under Part H, Item 6, shall be submitted to the Board for approval in writing, prior to commissioning of the 2007 Sewage Disposal Facility. The results shall include an Engineer's Report, validating the assumptions of the geothermal analysis through adequate monitoring of the thermal regime for the East and West Berms and downstream foundations

8. The Licensee shall not commission the 2007 Sewage Disposal Facility until the requirements of Part H, Item 6 and Item 7 have been completed and approved.

9. The Licensee shall, within ninety (90) days of issuance of this Licence, provide a Temperature Monitoring Program and Implementation Plan for ongoing collection of ground temperatures within each berm structure and foundation of the 2007 Sewage Disposal Facility through the installation of thermistors. This Plan shall take into consideration the following:

    i. Locations of thermistors, to be incorporated into the Monitoring Station Table under Part H, Item 1;
    ii. Appropriate thermistor configuration, overall depth and spacing of bead locations to provide the level of data collection that will capture any extreme variations in temperature and provide the information needed to validate the assumptions made in the geothermal analysis.
    iii. The frequency of temperature readings shall be such to allow the determination of the maximum freeze and thaw of the berm and underlying native materials and provide adequate data for thermal modeling of the berms.
    iv. This frequency may be reviewed and adjusted upon collection of adequate data and as recommended by the Geotechnical Engineer in order to assess the berms through thermal modeling and provide an assessment with respect to berm stability and potential seepage.
    v. This information is to be reported along with the results of the annual geotechnical inspection as required under Part F, Item 6.
    vi. An implementation schedule that will allow collection of data for confirmation of core-trench freeze-back.

10. The Licensee shall implement the Plan specified in Part H, Item 9 following approval by the Board in writing.

11. The Licensee shall review the Plan(s) referred to in this Part if there are changes in operation and/or technology and modify the Plan accordingly. Revisions to the Board approved Plan(s) are to be submitted in the form of an Addendum to be included with the Annual Report under Part B, Item 1.

12. The Licensee shall install groundwater monitoring wells at the 2007 Sewage Disposal Facility to obtain at least one monitoring season of data prior to the expiry of the Licence. At least one groundwater monitoring well shall be located upstream of the 2007 Sewage Disposal Facility for background data collection, at least one groundwater monitoring well shall be located downstream of the landfill and at least one groundwater monitoring well shall be located downstream of the metals dump.

13. The Licensee shall sample at Monitoring Program Stations CAP-16, CAP-17 and CAP-18 once annually in the summer, prior to commencing discharge from the 2007 Sewage Disposal Facility, giving due consideration to adequate ground thaw and obtaining a representative groundwater sample. Samples shall be analyzed for parameters identified in Part H, Item 4.

14. The Licensee shall install groundwater monitoring at the Solid Waste Disposal Facilities wells to obtain at least one monitoring season of data prior to the expiry of the Licence, At lease one groundwater monitoring well shall be located upstream of the Solid Waste Disposal Facilities for background data collection and at least one groundwater monitoring well shall be located downstream of the Solid Waste Disposal Facilities .

15. The Licensee shall sample at Monitoring Program Stations CAP-19 and CAP-20 once annually in the summer season, giving due consideration to adequate ground thaw and obtaining a representative groundwater sample. Samples shall be analyzed for parameters identified in Part H, Item 4.

16. The Licensee shall measure and record in cubic metres, the monthly and annual quantities of water pumped for all purposes at Monitoring Program Station CAP-1.

17. The Licensee shall measure and record in cubic metres (a) the monthly and annual quantities of raw sewage offloaded from trucks and the number of days of use for the 2001 Sewage Disposal Facility and the Emergency Sewage Disposal Facility, and (b) the monthly and annual quantities of raw sewage offloaded from trucks at the 2007 Sewage Disposal Facility.

18. The Licensee shall measure and record the annual quantities of sewage solids removed from the Sewage Disposal Facilities.

19. The Licensee shall conduct additional sampling and analysis as may be requested by an Inspector.

20. The Licensee shall revise the "Guidelines for Wastewater Sampling, October 27, 2007" and submit to the Board for approval by an Analyst in writing a Quality Assurance/Quality Control (QA/QC) Plan for the Hamlet of Cape Dorset, within ninety (90) days of issuance of this Licence. The Plan shall use as a guide the document *"Quality Assurance and Quality Control Guidelines for use by Class "B" Licensees in Collection of Representative Water Samples in the Field, and for Submission of a QA/QC Plan, July 1996".* The Plan shall address the use of field blanks, replicate sampling and certified reference material in order to assess accuracy, precision and field contamination.

21. The Licensee shall implement the Plan referred to in Part H, Item 20 following approval in writing by the Analyst.

22. 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.

23. All analyses shall be performed in a Canadian Association of Environmental Analytical Laboratories (CAEAL) Certified Laboratory, or as otherwise approved by an Analyst.

24. The Licensee shall include all of the data and information required by the "Monitoring Program" in the Licensee's Annual Report, as required *per* Part B, Item 1 or as otherwise requested by an Inspector.

25. Her Majesty in the right of Canada shall:
    i. Monitor the Licensee's installation of thermistors and notify the Board when the installation of thermistors is complete and in compliance with Part H, Item 6;
    ii. Monitor the Licensee's validation of the assumptions of the geothermal analysis through adequate monitoring of the thermal regime for the East and West Berms and downstream foundations under Part H, Item 7, and notify the Board when satisfied the assumptions of the geothermal analysis have been validated; and
    iii. Monitor the 2007 Waste Disposal Facility and notify the Board immediately if the Project is commissioned prior to the completion of i. and ii., or in contravention of any other condition of the Licence.

SCHEDULE 1 CONDITIONS APPLYING TO MODIFICATIONS AND CONSTRUCTION

List of drawing deficiencies identified by BGC for revision and submission.
Please refer to Technical Memorandum "Cape Dorset Sewage lagoon-Review of Final Submissions, January 8, 2008", or the final intervention memo dated January 8, 2008 for further clarification.

The record set of drawings fails to include a signature block for AMEC. It was noted that the original design drawings issued by Dillon in the December 21, 2006 design report, revision 5, marked "Issued for Construction" included a signature block "Reviewed by AMEC" on Drawing 111, which is the equivalent of Drawing 112 of the Record Drawings

1. At a minimum, AMEC is to provide a signature block for the following drawings:

- Drawing 101- shows location of test pits carried out for geotechnical investigations.
- Drawing 109- shows longitudinal geological sections along cut-off trench.
- Drawing 110- shows typical earthworks sections for the access road and berm.
- Drawing 112- shows lagoon berm sections

2. The as-built drawings must identify the areas where field changes were made from the original design drawings, preferably in the form of a revision bubble and a brief note in the revisions section of the title block.

List of Drawing alterations and request for rationale for the change.

Record drawing 100 – the alignment of the access roads between the East and West Berms, on the north and south sides of the lagoon was changed from the original design. The road berms were originally designed to deflect runoff from entering the lagoon.

3. Explanation is required as to the rationale for changing the alignment of the road berms and how the as-built berm details in the drawing prevents runoff from entering the lagoon.

Record Drawing 109 – there is up to 1m of unfrozen fill used to level the ground surface under both the East and West berms. This leveling course of material has not been shown as a separate zone in the berm sections presented in Record Drawing 112.

4. A description for record drawing 112 is required of the material used including grain size gradation curve.

Record Drawing 109 – shows that the berm contours at the north end of the West Berm have been modified from the original design drawings. Crest widened from 4m to 25m to accommodate what appears to be a vehicle turnaround on the downstream side of the berm.

5. Additional as-built cross-sections of this area are to be provided along with geothermal analysis that there is sufficient fill thickness over the abutment to ensure that the GCL tie-in to the cut-off trench remains frozen.

Record Drawing 110 shows typical road sections. On July 30, 2007, the GN CGS provided a revised ditch detail for the road

6. This revised ditch detail is requested as part of the as-built drawing details for Drawing 110

7. Additional information is requested providing further details as to how seepage through the active zone under the berm will be prevented.

The Hamlet of Cape Dorset noted a problem during the October 1, 2007 Technical Meeting/Pre-Hearing, with seepage into the lagoon through the active zone with the as-constructed detail. Record Drawing 112 indicates that the material used to backfill the cut-off trench is a "Sand", the same material as used for the berm.

8. Further clarification is requested on how the issue of seepage is being resolved.

In the original Design Drawing 111, Detail 4 showed the liner embedment longitudinal section in the abutments. This Detail was absent from Record Drawing 112. The cut-off trench must extend sufficient distance into the abutment so that any "end-run" seepage through the active zone is prevented. It is not clear from the as-built information if the extent of the cut-off trench satisfies this criterion.

9. Therefore the as-built liner embedment details for the abutment areas of the East and West Berms are therefore requested to be included for Record Drawing 112.

In Record Drawing 112, the crest detail of the emergency overflow weir section was changed. This change notice was transmitted to the contractor by Dillon on July 21, 2007. The as-built detail shows the geo-web and the GCL in one layer, with no granular or other material between the two. Dillon initiated this modification to address a previous concern raised by BGC that water could seep under the GCL in the emergency spillway and potentially lift the liner. It is still not clear how the above modification prevents this problem from occurring.

10. Design change rationale is requested that provides an explanation as to the change from the original drawing, change to meet BGC's concern and then further change to what appears to be potentially inadequate construction.

SCHEDULE 2 CONDITIONS APPLYING TO MONITORING AND MAINTENANCE

A revised *Operation and Maintenance Manual, Sewage Treatment System, Hamlet of Cape Dorset, November 7, 2007* shall include the following requirements:

i. Expansion of Section 3.4.5 to include terms and conditions for the disposal of sludge as provided for in the Draft Guidelines for Discharge of Domestic Wastewater in Nunavut, 2000;
ii. Section 3.4.6 should include a description of the installation of thermistors required under Part H, Item 6, including the number, locations and depths of thermistor beads used to monitor the berms, and a description of the method and frequency of monitoring requirements;
iii. Section 3.4.6 should include a description of the installation of monitoring wells required under Part H, Item 7, including the number, locations and depths of thermistor beads used to monitor the berms, and a description of the method and frequency of monitoring requirements
iv. Description of the details of any repairs, upgrades and maintenance required for the use of part or all of the 2001 Sewage Disposal Facility or Emergency Sewage Disposal Facility;
v. Include a contingency plan for the operation of the 2007 Sewage Disposal Facility during periods where accessibility to the facility is limited and alternative measures are required for the handling of sewage. This may include operation and maintenance of any older facility or portion of, that would be retained as the contingency;
vi. Provision for the monitoring of effluent discharges from the 2001 Sewage Disposal Facility and the Emergency Sewage Disposal Facility;
vii. Inspection program for the 2001 Sewage Disposal Facility, the Emergency Sewage Disposal Facility and 2007 Sewage Disposal Facility, detailing the frequency and inspection requirements by the operator(s) of the facility;
viii. Appendix C of the O&M Manual to include forms to document the recommendations and follow up work required as a result of the annual geotechnical inspection.
ix. Section 4 – Spill Contingency Plan be revised to comprehensively address specific recommendations provided during the review process by GN DoE as follows:

    a. The date the contingency plan was prepared.
    b. The name and address of the person in charge, management or control. This is an on-site person responsible for managing the facility. This person would be initially responsible for clean-up activities.
    c. The name and address of the owner if different from the person in charge. This is the person ultimately responsible for the facility, usually the owner.
    d. The name, job title and 24 hour telephone number for the persons responsible for activating the contingency plan. This ensures the employee discovering the spill can activate a response and provides a 24 hour point of contact for the authority

investigating the spill.

e. A description of the facility including the location, size and storage capacity. This is important if persons are unfamiliar with the facility or area. The description could include a map and/or diagrams.

f. A site map that is intended to illustrate the facilities relationship to other areas that may be affected by the spill. The map should be to scale and be large enough to include the location of your facility, nearby buildings or facilities, roads, culverts, drainage patters, and any nearby bodies of water.

g. The steps to be taken to report, contain, and clean up and dispose of a contaminant in the case of a spill.
    1. Reporting: Notification of all parties involved. This can include internal and external reporting procedures as well as a copy of the spill report;
    2. Clean up: Removal of the contaminant from the environment, a detailed of actual containment and clean up techniques. (2 steps: contain and remediate; be aware of fire);
    3. Disposal: Is the treatment of the contaminant such that it is no longer a threat to the environment. Plans may include location of disposal sites approved to accept wastes, means of storage prior to disposal and other approvals required. (Waste Manifest document).

h. The means by which the contingency plan is activated. This should outline internal company procedures to activate appropriate response equipment and personnel.

i. A description of the training provided to employees to respond to a spill. A sound training program is necessary when dealing with an emergency situation.

j. An inventory and the location of response and clean up equipment available to implement the plan. This includes your equipment as well as any to be used by another person responding to the spill on your behalf.

k. SPILL KIT (FUEL)The kit can include but not limited to the following: shovel, pick-axe, drums, booms, absorbent pad/sheet, disposable protective gloves/coveralls, sorbent and containment materials, and disposal bags.

l. A list of local contractors or clean up specialists who may be called upon to assist in responding to spills. A list of emergency numbers such as fire, ambulance and police.

x. Section 4 – describe the measures to be implemented for a spill during the collection and transportation of wastewater. This spill response is to be expanded to include spill scenarios resulting from the leakage or failure of a containment structure for the Sewage Disposal Facilities; and

xi. Appendix B to include specific reference to monitoring stations and required frequency of sampling and the analyses required by the Licence.

Appendix C:
Environmental Monitoring Program Checklist, Summary of Sample Bottle Requirements

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HAMLET OF CAPE DORSET
ENVIRONMENTAL MONITORING PROGRAM CHECKLIST

PRE-SAMPLING ACTIVITIES		
Bottle Order	At least two weeks before upcoming environmental sampling (see Environmental Monitoring Program Schedule in Appendix E), send a request to the contract laboratory for the appropriate sample sets (bottles) for the required sampling test groups (see Conditions 2 & 4 of Part H of Nunavut Water Board Licence 3BM-CAP0810)	☐
Personal Protective Equipment	Ensure that the required personal protective equipment (PPE), such as latex gloves, is on hand before commencing the environmental monitoring program.	☐
Bottle Shipment	Ensure that the bottle shipment has arrived from the contract laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing or broken bottles to the contract laboratory as soon as possible, so that replacement bottles may be shipped.	☐
Sampling Location Inspections	Perform an initial inspection of all routinely-monitored sampling locations before the commencement of the monitoring program. Make note of any equipment damage or conditions that may prevent the collection of the environmental monitoring program samples.	☐
GENERAL SAMPLING INSTRUCTIONS		
Prevention of Cross-Contamination	Ensure that any laboratory provided sampling instructions are strictly followed. Latex or nitrile gloves should be worn during sampling and should be replaced with fresh gloves after all sample containers are filled at each sampling location. Dedicated sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination. As a general recommendation, please refrain from using insect repellant, disinfection hand gel or other chemical products before and during sample collection. Also, please refrain from smoking during sample collection.	☐
Sample Care (including Packing of Cooler)	All sample containers should be tightly sealed and properly labelled with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed. The outside of the bottles should be cleaned with soap and water and dried prior to placing the samples in the cooler. The samples should be stored on ice in a cooler until delivery to the laboratory. A chain of custody form should be filled out completely and be used to track the samples and placed in the cooler with the samples, in a ziplock bag. Keep the last page of the Chain of Custody and give it to the Hamlet Foreman for their records.	☐
RAW WATER SUPPLY		
Sampling Station CAP-1	Station CAP-1 (see Figure 2) is a raw water supply (from Tee Lake) volume monitoring location. The water licence does not require the collection of any water samples from this location. Measure and record (in m^3) the monthly and annual quantities of water pumped from Station CAP-1.	☐
SOLID WASTE DISPOSAL FACILITIES		
Sampling Station CAP-2	Landfill runoff is collected once monthly during periods of observed flow (see Schedule in Appendix E for timing and list of parameters to be sampled). Runoff samples are collected from the receiving water body (see Figure 2) by immersing the sample bottle into the runoff stream neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with runoff and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-19	A groundwater sample is collected from a monitoring well located up gradient of the Solid Waste Disposal Facility (see Figure 2) once annually in the summer (see Schedule in Appendix E for timing and list of parameters to be sampled), giving due consideration to adequate ground thaw and obtaining a representative groundwater sample. The groundwater sample should be collected using dedicated sampling tubing with a Waterra™ foot valve (or bailer). Well purging should not be undertaken due to the potential limited availability of groundwater in the monitoring well. Instead, a sample should be collected of all available groundwater present in the monitoring well.	☐
Sampling Station CAP-20	A groundwater sample is collected from a monitoring well located down gradient of the Solid Waste Disposal Facility (see Figure 2) once annually in the summer (see Schedule in Appendix E for timing and list of parameters to be sampled), giving due consideration to adequate ground thaw and	☐

	obtaining a representative groundwater sample. The groundwater sample should be collected using dedicated sampling tubing with a Waterra™ foot valve (or bailer). Well purging should not be undertaken due to the potential limited availability of groundwater in the monitoring well. Instead, a sample should be collected of all available groundwater present in the monitoring well.	
ACTIVE SEWAGE DISPOSAL FACILITY		
Sampling Station CAP-3	Wastewater influent samples are collected from the active sewage disposal facility (see Figure 2) beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater influent samples are collected from the lagoon by immersing the sample bottle into the lagoon neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with influent wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
2001 SEWAGE DISPOSAL FACILITIES		
Sampling Station CAP-4	Effluent discharge samples are collected from the 2001 Sewage Disposal Facility (see Figure 2), beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater effluent samples are collected from the receiving water body by immersing the sample bottle into the effluent stream neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with effluent wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
EMERGENCY SEWAGE DISPOSAL FACILITIES		
Sampling Station CAP-5	Effluent discharge samples are collected from the Emergency Sewage Disposal Facility (see Figure 2), beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater effluent samples are collected from the receiving water body by immersing the sample bottle into the effluent stream neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with effluent wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
2007 SEWAGE DISPOSAL FACILITIES		
Sampling Station CAP-6	Effluent discharge samples are collected from the Final Point of Control at the 2007 Sewage Disposal Facility (see Figure 3), beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater effluent samples are collected from the receiving water body by immersing the sample bottle into the effluent stream neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with effluent wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-7	Wastewater influent samples are collected from P-Lake (see Figure 3), beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater influent samples are collected from P-Lake by immersing the sample bottle into P-Lake neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with influent wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-8	Wastewater samples are collected from the centre of P-Lake (see Figure 3), beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater samples are collected from P-Lake by immersing the sample bottle into P-Lake neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-9	Wastewater samples are collected from a location midway between the centre of P-Lake (Station CAP-8) and the effluent discharge of P Lake (Station CAP-10), beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater samples are collected from P-Lake (see Figure 3) by immersing the sample bottle into P-	☐

	Lake neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with wastewater and the sample bottle is raised neck first to prevent sample spillage.	
Sampling Station CAP-10	Wastewater effluent discharge samples are collected from P-Lake (see Figure 3). If flow is negligible, then the samples are collected from a location located immediately upstream within P-Lake. These samples are collected beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater effluent samples are collected from the receiving water body by immersing the sample bottle into water body neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with effluent wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-11	Wastewater effluent discharge samples are collected from the Wetland area (see Figure 3) beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater effluent samples are collected from the wetland by immersing the sample bottle into the wetland neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with effluent wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-12	Wastewater effluent discharge samples are collected from the top of the waterfall on the Wetland Pathway (see Figure 3) beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater effluent discharge samples are collected from the waterfall by immersing the sample bottle into the waterfall neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with effluent discharge wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-13	Wastewater effluent discharge samples are collected from midway down the waterfall on the Wetland Pathway (see Figure 3) beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater effluent discharge samples are collected from the waterfall by immersing the sample bottle into the waterfall neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with effluent discharge wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-14	Wastewater effluent discharge samples are collected from the Final Discharge Point (see Figure 3), located at the bottom of the cliff, beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater effluent discharge samples are collected from the water body by immersing the sample bottle into the water body neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with effluent discharge wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-15	Wastewater effluent discharge samples are collected from a Control Point sampling location (small lake) located between the Lagoon and Tee Lake (see Figure 3), beginning one week prior to the proposed discharge date, once at the beginning of the discharge and weekly thereafter until the cessation of discharge (see Schedule in Appendix E for timing and list of parameters to be sampled). Wastewater effluent discharge samples are collected from the lake by immersing the sample bottle into the lake neck first to a depth of 5 to 10 cm (if possible). The sampling container is filled with effluent discharge wastewater and the sample bottle is raised neck first to prevent sample spillage.	☐
Sampling Station CAP-16	A groundwater sample is collected from a monitoring well located up gradient of the 2007 Sewage Disposal Facility (see Figure 3) once annually in the summer, prior to commencing discharge from the 2007 Sewage Disposal Facility, giving due consideration to adequate ground thaw and obtaining a representative groundwater sample (see Schedule in Appendix E for timing and list of parameters to be sampled). The groundwater sample should be collected using dedicated sampling tubing with a Waterra™ foot valve (or bailer). Well purging should not be undertaken due to the potential limited availability of groundwater in the monitoring well. Instead, a sample should be collected of all available groundwater present in the monitoring well.	☐
Sampling Station CAP-17	A groundwater sample is collected from Monitoring Well No.1 located down gradient of the 2007 Sewage Disposal Facility (see Figure 3) once annually in the summer, prior to commencing	☐

	discharge from the 2007 Sewage Disposal Facility, giving due consideration to adequate ground thaw and obtaining a representative groundwater sample (see Schedule in Appendix E for timing and list of parameters to be sampled). The groundwater sample should be collected using dedicated sampling tubing with a Waterra™ foot valve (or bailer). Well purging should not be undertaken due to the potential limited availability of groundwater in the monitoring well. Instead, a sample should be collected of all available groundwater present in the monitoring well.	
Sampling Station CAP-18	A groundwater sample is collected from Monitoring Well No.2 located down gradient of the 2007 Sewage Disposal Facility (see Figure 3) once annually in the summer, prior to commencing discharge from the 2007 Sewage Disposal Facility, giving due consideration to adequate ground thaw and obtaining a representative groundwater sample (see Schedule in Appendix E for timing and list of parameters to be sampled). The groundwater sample should be collected using dedicated sampling tubing with a Waterra™ foot valve (or bailer). Well purging should not be undertaken due to the potential limited availability of groundwater in the monitoring well. Instead, a sample should be collected of all available groundwater present in the monitoring well.	☐
POST-SAMPLING ACTIVITIES		
Sample Shipment	See **Sample Care** section for sampling handling and cooler packing instructions. Ensure all samples are shipped to the contract laboratory immediately after the completion of the environmental monitoring event to ensure that the hold times are respected for the various parameters. Follow-up with the contract laboratory on the day after the samples were shipped to ensure that the samples were collected from the air cargo facility and received by the contract laboratory for analysis.	☐
Analytical Results	Ensure that the analytical results for the environmental monitoring program samples are received within the specified turn-around time. Follow-up with the contract laboratory if the results are not provided as expected to ensure timely reporting to the Nunavut Water Board (as required by Water Licence 3BM-CAP0810).	☐

Checklist Performed By:

Name	Signature	Date

Sample Bottle Requirements for Parameters Listed in Conditions 2 & 4 of Part H of Nunavut Water Board Licence No. 3BM-CAP0810

Parameter	Recommended Sample Container	Preservative	Hold Time
Alkalinity	250 mL plastic	None	14 days
Anions (Br, Cl, F, NO_3, NO_2, PO_4, SO_4)	250 mL plastic	None	5/28 Days
Biochemical Oxygen Demand (BOD_5)	500 mL plastic	None	4 days
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	500 mL plastic	None	4 days
Carbon, Total Organic (TOC)	250 mL plastic	H_2SO_4 (pH < 2)	10 days
Conductivity	250 mL plastic	None	28 days
Dissolved ICPMS, ICP Metals	250 mL plastic	None - if not field filtering	60 days
Total ICPMS, ICP Metals - NOT FILTERED	250 mL plastic	HNO_3 (pH < 2)	30 days
Nitrogen - Ammonia (NH_3 - N) / Total Kjeldahl Nitrogen (TKN)	250 mL plastic	H_2SO_4 (pH < 2)	10 days
Phenolics - Total	120 mL amber glass	H_2SO_4 (pH < 2)	30 days
Solids - (TS, TSS, TDS)	500 mL plastic	None	7 days
Microbiological (incl. faecal coliforms)	300 mL plastic - Sterilized	$Na_2S_2O_3$	48 hours
Total Hardness	500 mL plastic	None	28 days

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Appendix D:
Completed Example of Chain of Custody Documentation

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:m9 Client committed. *Quality assured*

D OReg 153104 (1_ 2_ 3_ 4_ 5_ 6 }
D MISA Guidelines
D Provincial Water Quality Objectives
D Sewer Use By-Law:

O ODWS (Non Regulatory)
O 0.Reg 558 Leachate Analysis Disposal
[¥other: ___

Turnaround Time Requested

Rush 24 Hr D 1001. Surcharge
Rush 48 Hr D 50% Surcharge
Rush 72 Hr D 25% Surcharge
5-7 Day tandard
Specific Date: _____

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ANALYSES REQUESTED Print Test in Boxes)

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Sample Submission Information

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Shipping Information

Courier (Caduceon account) D
Drop Off D
# of Pieces

Reporting and Invoicing

D Email Results
Invoice by Email

LABORATORY USE ONLY

ate(yy-mm-dd) Received:
Time Received:
Laboratory Prepared Bottles: D YES D NO

Date(yy-mm-dd): I.Y Z, Time: 1'2:{j) Caduceon (Pick-up) D I Invoice by Mail Page J of J

• Sample Matrix Legend: WW=Waste Water SW=Surface Water GW=Groundwater LS=Liquid Sludge SS=Solid Sludge S=Soil Sed=Sediment PC=Paint Chips F=Filter

Laboratory Locations/Shipping Addresses

Kingston Lab. 285 Dalton Ave., Kingston, ON K7K 6Z1, Tel: (613) 544-2001 Fax: (613) 544-2770 Email: contactkingston@caduceonlabs.com

Ottawa Lab. 2378 Holly Lane, Ottawa, ON KW 7P1, Tel: (613) 52&-0123 Fax: (613) 526-1244 Email: contactottawa@caduceonlabs.com

Peterborough Lab· #206-160 Charlotte St., Peterborough, ON K9J 2T8, Tel: (705) 748-1506 Fax: (705) 748-6514 Email: contacipeterborough@caduceonlabs.com

Windsor Lab· #5-3201 Marentette Ave., Windsor, ON N8X 4G3, Tel: (519) 966-9541 Fax: (519) 966-9567 Email: contactwlndsor@caduceonlabs.com

Moncion Lab -150 Lutz St., Moncion, NB E1C 5E9, Tel: (506) 855-6472 Fax: (506) 855-8294 Email: contactmoncton@caduceonlabs.com

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Appendix E:
Environmental Monitoring Program Schedule

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Cape Dorset Monitoring Program Schedule
Nunavut Water Board Licence No. 3BM-CAP0810

Monitoring Station ID	Location Description	Month												
		January	February	March	April	May	June	July	August	September	October	November	December	Annual
CAP-1	Raw water supply from Tee Lake	V	V	V	V	V	V	V	V	V	V	V	V	V
CAP-2	Runoff from Solid Waste Disposal Facilities					LR[1]	LR[1]	LR[1]	LR[1]	LR[1]				
CAP-3	Influent of Wastewater to Wastewater Facilities (active at the time of sampling)					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-4	Effluent discharge from the 2001 Sewage Disposal Facilities	V	V	V	V	V, WW[2]	V, WW[2]	V, WW[2]	V, WW[2]	V, WW[2]	V	V	V	V
CAP-5	Effluent discharge from the Emergency Sewage Disposal Facilities	V	V	V	V	V, WW[2]	V, WW[2]	V, WW[2]	V, WW[2]	V, WW[2]	V	V	V	V
CAP-6	Effluent discharge from the 2007 Sewage Disposal Facilities - Final Point of Control	V	V	V	V	V, WW[2]	V, WW[2]	V, WW[2]	V, WW[2]	V, WW[2]	V	V	V	V
CAP-7	Point of influent of wastewater to P-Lake					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-8	Centre of P-Lake					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-9	Location midway between the Centre of P-Lake (Station 8) and the effluent discharge of P-Lake					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-10	Effluent discharge from P-Lake (note: if flow is negligible a sample from the immediate upstream area within P-Lake shall be obtained)					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-11	Effluent discharge from Wetland Area					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-12	Wetland Pathway at the top of the waterfall					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-13	Wetland Pathway at mid-way down waterfall					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-14	Wetland Pathway at bottom of cliff - Final Discharge Point					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-15	Control point using a small lake located between the Lagoon and Tee Lake					WW[2]	WW[2]	WW[2]	WW[2]	WW[2]				
CAP-16	Monitoring well located up gradient of the 2007 Sewage Disposal Facility								GW[3]					
CAP-17	Monitoring Well No. 1 located down gradient of the 2007 Sewage Disposal Facility								GW[3]					
CAP-18	Monitoring Well No. 2 located down gradient of the 2007 Sewage Disposal Facility								GW[3]					
CAP-19	Monitoring well located up gradient of the Solid Waste Disposal Facilities								GW[3]					

Cape Dorset Monitoring Program Schedule
Nunavut Water Board Licence No. 3BM-CAP0810

Monitoring	Location	Month												
Station ID	Description	January	February	March	April	May	June	July	August	September	October	November	December	Annual
CAP-20	Monitoring well located down gradient of the Solid Waste Disposal Facilities								GW[3]					
CAP-21	Thermistor Station													
CAP-22	Thermistor Station													
CAP-23	Thermistor Station													
CAP-24	Thermistor Station													

Test Groups		
V	Volume (m^3)	
LR	Landfill Runoff	(Biochemical Oxygen Demand (BOD_5), pH, Total Suspended Solids (TSS), nitrate-nitrite, total phenols, total hardness, magnesium, sodium, total arsenic, total copper, total iron, total mercury, faecal coliforms, conductivity, ammonia nitrogen, oil & grease (visual), total alkalinity, calcium, potassium, sulphate, total cadmium, total chromium, total lead, total nickel)
WW	Wastewater Effluent	(Biochemical Oxygen Demand (BOD_5), Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), Total Suspended Solids (TSS), pH, conductivity, oil & grease (visual), faecal coliforms, nitrate-nitrite, total phosphorus, magnesium, sodium, chloride, total hardness, ammonia nitrogen, total phenols, calcium, potassium, sulphate, total alkalinity, total trace metals (including Al, Sb, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Li, Mn, Mo, Ni, Se, Sn, Sr, Tl, Ti, U, V, Zn), total arsenic, total mercury, Total Organic Carbon (TOC))
GW	Groundwater	(Biochemical Oxygen Demand (BOD_5), pH, Total Suspended Solids (TSS), nitrate-nitrite, total phenols, total hardness, magnesium, sodium, total arsenic, total copper, total iron, total mercury, faecal coliforms, conductivity, ammonia nitrogen, oil & grease (visual), total alkalinity, calcium, potassium, sulphate, total cadmium, total chromium, total lead, total nickel)

[1] Sample monthly during periods of observed flow.

[2] TBD by operational staff - samples to be collected one week prior to proposed discharge date, once at the beginning of discharge and weekly thereafter until cessation of discharge.

[3] Once annually in the summer, given due consideration to adequate ground thaw and obtaining a representative groundwater sample.

Appendix F:
Subcontract Laboratory Accreditation & Supporting Documentation

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CALA

Directory of Laboratories

Canadian Association for Laboratory Accreditation Inc.

CALA

Membership Number: 2644
Laboratory Name: Caduceon Environmental Laboratories (Ottawa)
Parent Institution: Caduceon Enterprises Inc.
Address: 2378 Holly Lane Ottawa ON K1V 7P1
Contact: Mr. Greg Clarkin
Phone: (613) 526-0123
Fax: (613) 526-1244
Email: gclarkin@caduceonlabs.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served:
Revised On: May 9, 2013
Valid To: October 25, 2015

Scope of Accreditation

Air (Inorganic)
Metals - Air Filter (012)
D-ICP-02; modified from APHA 3120 B
ICP - DIGESTION
Cadmium
Chromium
Cobalt
Copper
Iron
Lead
ManQanese
Molybdenum
Nickel
Zinc

Air (Inorganic)
Total Suspended Particulates - Air Filter (018)
A-TSP-01; modified from MOEE E3288A
GRAVIMETRIC
Total Suspended Particulates

Dustfall
Total/Insoluble Dustfall - Dustfall (020)
A-DF-01 ; modified from MOEE DF-E3043A
FILTRATION - GRAVIMETRIC
Insoluble Dustfall
Total Dustfall

t "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Acf' (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the GALA via the Internet at

Fluoride Candles
Fluoride - Candles (019)
A-FISE-01; modified from MOEE FSIE-1983D
DIGESTION - ISE
Fluoride

Oil (Organic)
Polychlorinated Biphenyls (PCB) - Oil (040)
C-PCB-01; modified from EPA 8081
GC/ECD - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260

Solids (Inorganic)
Anions - Soils, Biosolids (069)
A-IC-01; modified from APHA 4110 C
ION CHROMATOGRAPHY - EXTRACTION
Chloride
Nitrate
Nitrite
Sulphate

Solids (Inorganic)
Boron (Hot Water Soluble) - Soil (098)
D-ICP-02; MOE-LaSB E3470
ICP/AES - EXTRACTION
Boron

Solids (Inorganic)
Conductivity - Soil, Sediments (099)
A-COND0-03; SM 2510 B & MOE-LaSB E 3138
CONDUCTIVITY METER - EXTRACTION
Conductivity

Solids (Inorganic)
Extractable Anions - Leachate (090)
A-IC-01; modified from EPA 1311, APHA 4110-C
ION CHROMATOGRAPHY - TCLP
Nitrate
Nitrite

Solids (Inorganic)
Extractable Metals - Leachate (091)
D-ICP-01; modified from EPA 1311/APHA 3120 B
ICP/AES - TCLP
Arsenic
Barium
Beryllium
Boron
Cadmium
Chromium
Lead
Nickel
Silver
Zinc

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Solids (Inorganic)
Extractable Metals - Leachate (092)
D-ICPMS-01; modified from EPA 1311/EPA 200.8
ICP/MS - TCLP
Antimony
Arsenic
Selenium
Uranium

Solids (Inorganic)
Extractable Metals - Leachate (093)
D-HG-02; modified from EPA 1311/SM 3112 B
COLD VAPOUR AA - TCLP
Mercury

Solids (Inorganic)
Flash Point - Soil, Solid Waste (096)
C-FPCC-01; modified FROM ASTM 093-10
CLOSED CUP FLASH POINT TESTER
Flashpoint

Solids (Inorganic)
Hexavalent Chromium - Soil (094)
D-CRVI-02; modified from EPA 3060A EPA 7196 A
COLORIMETRIC - MANUAL
Chromium (VI)

Solids (Inorganic)
Mercury - Soil, Solid Biosolids (017)
D-HG-01; modified from EPA 7471A
COLD VAPOUR AA - DIGESTION
Mercury

Solids (Inorganic)
Metals - Soil, Solid Biosolids (015)
D-ICP-02; modified from EPA 6010
ICP/OES - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
MaQnesium
ManQanese
Molybdenum
Nickel
Potassium
Silver
Sodium
Strontium

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Tin
Titanium
TunQsten
Vanadium
Zinc

Solids (Inorganic)
pH - Soil, Sediment, Solid Sludge (100)
A-pH-03; SM 4500 H & MOE-LaSB E3137
pH METER - EXTRACTION
pH

Solids (Inorganic)
Total Metals - Soils, Biosolids (070)
D-ICPMS-01; modified from EPA 6020
ICP/MS - DIGESTION
Antimony
Arsenic
Selenium
Silver
Thallium
Uranium

Solids (Organic)
Extractable Volatile Organic Compounds (VOC) - Leachate (089)
C-VOC-01; modified from EPA SW-846 METHOD 1311, 5030/8260
GC/MS - PURGE AND TRAP - TCLP
1,1-Dichloroethylene
1,2-Dichlorobenzene
1,2-Dichloroethane
1,4-Dichlorobenzene
Benzene
Carbon tetrachloride
Chlorobenzene
Chloroform
Dichloromethane
Methyl ethyl ketone
Tetrachloroethylene
Trichloroethylene
Vinyl chloride

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (075)
C-PHCS-01; modified from CCME CWS REF. METHOD & MOE E3398
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (097)
C-PHCS-01; modified from CCME CWS REF. METHOD & MOE E3398
GRAVIMETRIC
F4: Gravimetric

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Solids (Organic)
Polychlorinated Biphenyls (PCB) - Soil (053)
C-PCB-02; modified from EPA 8000/8081
GC/ECD - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260

Solids (Organic)
Volatile Organic Compounds (VOC) - Soil (063)
C-VOC-02; modified from EPA 8260
GC/MS - PURGE AND TRAP
1,1 - Dichloropropene
1,1-Dichloroethane
1,1-dichloroethylene
1,1,1-Trichloroethane
1,1,1,2 - Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2 - Dibromo - 3 - chloropropane
1,2-dichlorobenzene
1,2-dichloroethane
1,2-Dichloropropane
1,2,3 - Trichlorobenzene
1,2,3 - Trichloropropane
1,2,4 - Trichlorobenzene
1,2,4 - Trimethylbenzene
1,3 - Dichloropropane
1,3-Dichlorobenzene
1,3,5-Trimethylbenzene
1,4-dichlorobenzene
2 - Chlorotoluene
2 - Hexanone (MBK)
2,2 - Dichloropropane
4 - Chlorotoluene
Acetone (2-Propanone)
Benzene
Bromobenzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene

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Ethylene Dibromide
Hexachlorobutadiene
Hexane
Isopropylbenzene
Isopropyltoluene
m/p-xylene
Methyl Ethyl Ketone
Methyl isobutyl Ketone
Methyl t-butvl ether
n - Butvlbenzene
Naphthalene
a-xylene
Propylbenzene
sec - Butylbenzene
Styrene
tert - Butylbenzene
TetrachloroethVlene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

Solids (Organic)
Volatile Petroleum Hydrocarbons (VPH) - Soil (073)
C-GR0-01; modified from CCME CWS REF. METHOD & MOE E3398
GC/FID - PURGE AND TRAP
F1: C6-C10

Water (Inorganic) OSDWA t
Alkalinity - Water (088)
A-ALK-03; modified from APHA 2320 8
AUTO TITRIMETRIC
Alkalinity (pH 4.5)

Water (Inorganic) OSDWA t
Ammonia - Water, Wastewater, Liquid Biosolids (055)
A-NH3-01; modified from MOEE RNDNP-E3364, SDNP-E3366
AUTO COLOR
Ammonia
Ammonia - Nitroqen

Water (Inorganic)
Ammonia - Water, Wastewater, Liquid Biosolids (103)
A-NH3-01; modified from MOEE RNDNP-E3364, SDNP-E3366
COLORIMETRIC - DISCRETE
Ammonia

Water (Inorganic) OSDWA t
Anions - Water, Wastewater, Liquid Biosolids (002)
A-IC-01; modified from APHA 4110 C
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate
Nitrite

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Sulfate

Water (Inorganic) OSDWA t
Biochemical Oxygen Demand (BOD) - Water (008)
C-BOD-01; modified from APHA 5210 B
D.O. METER
BOD (5 day)
CBOD (5 day)

Water (Inorganic) OSDWA t
Carbon - Water (054)
C-OC-01; modified from APHA 5310C, EPA 415.1
IR-UV-PERSULFATE
Orqanic Carbon

Water (Inorganic) OSDWA t
Chemical Oxygen Demand (COD) - Water (083)
C-COD-01; modified from APHA 5220 D
COLORIMETRIC
COD

Water (Inorganic) OSDWA t
Colour - Water (027)
A-COL-01; modified from APHA 2120 C
SPECTROPHOTOMETRI C
True Colour

Water (Inorganic) OSDWA t
Conductivity - Water (003)
A-COND-01 ; modified from APHA 2510 B
CONDUCTIVITY METER
Conductivity (25"C)

Water (Inorganic) OSDWA t
Conductivity - Water (087)
A-COND-02 ; modified from APHA 2510 B
AUTO CONDUCTIVITY METER
Conductivity (25"C)

Water (Inorganic) OSDWA t
Dissolved and Extractable Metals - Water (004)
D-ICP-01; modified from APHA 3120 B
ICP
Aluminum
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Maqnesium
Manqanese
Molybdenum

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Nickel
Potassium
Silicon
Silver
Sodium
Strontium
Tin
Titanium
TunQsten
Vanadium
Yttrium
Zinc
Zirconium

Water (Inorganic) OSDWA t
Dissolved Metals - Water (049)
D-ICPMS-01; modified from EPA 200.8
ICP/MS
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Copper
Lead
Molybdenum
Selenium
Silver
Thallium
Uranium
Vanadium

Water (Inorganic)
Hexavalent Chromium - Water (095)
D-CRVI-01; modified from MOE - HEXCR-E3056
COLORIMETRIC - MANUAL
Chromium (VI)

Water (Inorganic) OSDWA t
Mercury - Water, Wastewater (025)
D-HG-02; modified from APHA 3112 B
COLD VAPOUR AA - DIGESTION
Mercury

Water (Inorganic)
Nitrate + Nitrite - Water (102)
A-N023-01; modified from SM 4500-N03-F
COLORIMETRIC - DISCRETE ANALYZER
Nitrate plus Nitrite

Water (Inorganic)
Nitrite - Water (101)
A-N02-01 ; modified from SM 4500-N02-B
COLORIMETRIC - DISCRETE ANALYZER
Nitrite

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Water (Inorganic) OSDWA t
Nitrogen - Water, Wastewater, Liquid Biosolids (033)
A-TKN-01; modified from MOEE RTNP-E3367
AUTO COLOR - DIGESTION
Total Kjeldahl Nitroqen

Water (Inorganic)
Orthophosphate - Water (104)
A-P04-01; modified from MOEE RNDNP-E3364, SDNP-E3366
COLORIMETRIC - DISCRETE
Phosphate

Water (Inorganic) OSDWA t
pH - Water (005)
A-pH-01; modified from APHA 4500 H
pH METER
pH

Water (Inorganic) OSDWA t
pH - Water (086)
A-pH-02; modified from APHA 4500H+ B
AUTO - pH METER
pH

Water (Inorganic) OSDWA t
Phenols - Water (056)
C-PHEN-01; modified from MOE ROPHEN-E3179
AUTO, 4-AAP
Total Phenolics

Water (Inorganic) OSDWA t
Phosphate - Water (058)
A-P04-01; modified from MOEE RNDNP-E3364, SDNP-E3366
AUTO COLOR
Phosphate

Water (Inorganic)
Total Metals - Water, Wastewater, Liquid Biosolids (067)
D-ICP-01; modified from APHA 3120 B
ICP/AES - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Maqnesium
Manqanese
Molybdenum

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Nickel
Potassium
Silver
Sodium
Strontium
Tin
Titanium
Tum:isten
Vanadium
Yttrium
Zinc
Zirconium

Water (Inorganic)
Total Metals - Water, Wastewater, Liquid Biosolids (071)
D-ICPMS-01; modified from EPA 6020
ICP/MS - DIGESTION
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Copper
Lead
Molybdenum
Selenium
Silver
Vanadium

Water (Inorganic) OSDWA t
Total Phosphorus - Water, Wastewater, Liquid Biosolids (057)
A-TP-01; modified from MOEE RTNP-E3367
AUTO COLOR - DIGESTION
Total Phosphorus

Water (Inorganic) OSDWA t
Total Suspended Solids (TSS) - Water (009)
A-TSS-01; modified from APHA 2540 D
GRAVIMETRIC
Total Suspended Solids

Water (Inorganic) OSDWA t
Turbidity - Water (026)
A-TURB-01; modified from APHA 2130 B
NEPHELOMETRY
Turbidity

Water (Microbiology) OSDWA t
Coliforms - Water (050)
B-ECTC-01; modified from MICROMFDC-E3407
MEMBRANE FILTRATION (DC)
Backround Bacteria
Escherichia coli (E. coli)
Total Coliforms

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Water (Microbiology) OSDWA t
Escherichia coli (E. coli) - Water (010)
B-MFEC-01; modified from MFMICRO-E3371
MEMBRANE FILTRATION (EC)
Escherichia coli (E. coli)

Water (Microbiology) OSDWA t
Fecal (Thermotolerant) Coliforms - Water (065)
B-MFFC-01; modified from MFMICRO-E3371
MEMBRANE FILTRATION (mFC)
Fecal (Thermotolerant) Coliforms

Water (Microbiology) OSDWA t
Heterotrophic Plate Count (HPC) - Water (021)
B-HPC-01; modified from APHA 9215 C
SPREAD PLATE
Heterotrophic Plate Count (HPC)

Water (Microbiology) OSDWA t
Total Coliforms - Water (066)
B-MFTC-01; modified from MFMICRO-E3371
MEMBRANE FILTRATION (mENDO)
Backqround Counts
Total Coliforms

Water (Organic) OSDWA t
Glycols - Water (085)
C-GLYCOL-01; modified from EPA 8015 B
DIRECT INJECTION GC-FID
Diethylene Glycol
Ethylene Glycol
Propylene Glycol

Water (Organic) OSDWA t
Petroleum Hydrocarbons (PHC) - Water (072)
C-GR0-01; modified from MOE E3421
GC/FID - PURGE AND TRAP
F1: C6-C10

Water (Organic) OSDWA t
Petroleum Hydrocarbons (PHC) - Water (074)
C-PHCW-02; modified from MOE E3421
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Water (Organic) OSDWA t
Volatile Organic Compounds (VOC) - Water (041)
C-VOC-01; modified from EPA 8260 and 5030
GC/MS - PURGE AND TRAP
1,1-Dichloroethane
1,1-dichloroethylene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromo-3-chloropropane

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1,2-dichlorobenzene
1,2-dichloroethane
1,2-Dichloropropane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-dichlorobenzene
2-Chlorotoluene
2-Hexanone (MBK)
2,2-Dichloropropane
4-Chlorotoluene
4-Isopropyl Toluene
Acetone (2-Propanone)
Benzene
Bromobenzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexachlorobutadiene
Hexane
Isopropyl Benzene
m/P-xylene
Methyl Ethyl Ketone
Methyl isobutyl Ketone
Methyl t-butyl ether
n-Butylbenzene
n-Propylbenzene
Naphthalene
a-xylene
Sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene

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Trichlorofluoromethane
Vinyl Chloride

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