

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

PART H: CONDITIONS APPLYING TO THE SURVEILLANCE NETWORK PROGRAM

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

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

- 2 * The Licensee shall sample monthly at Surveillance Stations CAP-2 and CAP-3 during the months of May to August, inclusive.

CONTACT LAB - WHAT BOTTLES ARE NEEDED

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3 The Licensee shall analyze samples collected at Station Number CAP-2 and CAP-3 for the following parameters:

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

23
Woodward

4 Additional sampling and analysis may be requested by an Inspector.

5 The Licensee shall conform to the Quality Assurance/Quality Control (QA/QC) Plan which shall be provided to the Licensee by the NWB within 60 days of the issuance of this licence.

* 6 All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board;

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

File

* 8 The Licensee shall measure and record in cubic metres the monthly and annual quantities of water pumped from Surveillance Network Program Station Number CAP-1 for all purposes;

9 The Licensee shall measure and record the annual quantities of sewage solids removed from the Sewage Disposal Facility;

10 The Licensee shall, unless otherwise requested by an Inspector, include all of the data and information required by the "Surveillance Network Program" in the Licensee's Annual Report, as required per Part B, Item 1, and

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

ANNUAL REPORT FOR THE HAMLET OF CAPE DORSET

YEAR BEING REPORTED: _____

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence NWB3CAP0207 issued to the Hamlet of Cape Dorset.

- i)- iii) tabular summaries of all data generated under the "Surveillance Network Program"; monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

Attached Laboratory results for SNP station CAP-2 and CAP-3

Month Reported	Quantity of Water Obtained from all sources	Quantity of Sewage Waste Discharged
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		
ANNUAL TOTAL		

ANNUAL REPORT FOR THE HAMLET OF CAPE DORSET

Please indicate volumes in cubic metres - 1 cubic meter equals 1000 litres

- iv) a summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities;

- v) a list of unauthorized discharges and summary of follow-up action taken;

- vi) a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;

- vii) a summary of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned;

Part F, Item 1: Operation and Maintenance Manual

Part G, Item 1: Abandonment and Restoration Plan

**ANNUAL REPORT
FOR THE HAMLET OF CAPE DORSET**

viii) any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and

ix) updates or revisions to the approved Operation and Maintenance Plans

ADDITIONAL INFORMATION THAT THE HAMLET DEEMS USEFUL:

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:



Sameh Elsayed, P. Eng., M.A.Sc.
Regional Municipal Planning Engineer
Community Government & Transportation
GOVERNMENT OF NUNAVUT
P.O.Box 330
CAPE DORSET, NU., XOA OCO
PHONE: (867) 897-3616 FAX: (867) 897-3633
EMAIL: selsayed@gov.nu.ca

March 6, 2003

Environment Canada
Environmental Protection Branch
Suite 301, 5204 - 50th Avenue
Yellowknife, Northwest Territories
Canada X1A 1E2

Attention: Mr. Craig Broome
Head of Enforcement, Northern Division

**Re: The Hamlet of Cape Dorset
Long Term Sewage Management Plan**

In March 2002, Environment Canada raised concerns regarding the management of sewage in the Hamlet of Cape Dorset (Community) through the issuance of a Directive outlining specific measures to be taken to prevent the release of a deleterious substance to the Telik Inlet. Concerns stemmed from the use of a former lagoon for the deposition of sewage during a period in which two (2) cells of the existing lagoon were rendered inoperable due to a breach in the water retaining berms. Environment Canada was concerned that the former lagoon was of insufficient capacity to provide adequate treatment and, at the time of the inspection, work was not underway to repair breached berms of the current lagoons.

A letter was sent to EC, dated August 28, 2002 in response to the Directive issued to the Hamlet of Cape Dorset (Hamlet) and the Government of Nunavut (GN). The purpose of the letter was to advise EC that work was in fact proceeding to alleviate concerns over the management of the sewage, including:

- Reconstruction and reinforcement of the sewage lagoon berms that had been breached.
- The construction of drainage ditches to redirect surface water flow around the lagoon cells in an attempt to reduce the likelihood for erosion/breach, and
- The development of a long-term sewage management plan.

The referenced construction work was completed in the summer of 2002 and with the redirection of sewage to the three-cell lagoon; these steps in themselves met the intent of the Directive issued by EC. A site inspection was completed by Mr. Wade Comin, who was the EC inspector at the time. Mr. Comin did not raise any concerns with the work completed by GN.

Currently, all sewage generated by the Community is being directed to the three-cell lagoon. GN and the Hamlet are confident that the work completed in 2002 will ensure that the integrity of the lagoon berms is maintained during spring melt and throughout the open water season. However,

Wade Comin 11

Appendix E
Concept Brief and
Equipment Specification

**Cape Dorset Mechanical Sewage
Treatment Plant
Concept Design Brief - Draft**

February, 2003

Our File: 02-0397-6000

Submitted by:

Dillon Consulting Limited

Cape Dorset Mechanical Sewage Treatment Plant Concept Design Brief

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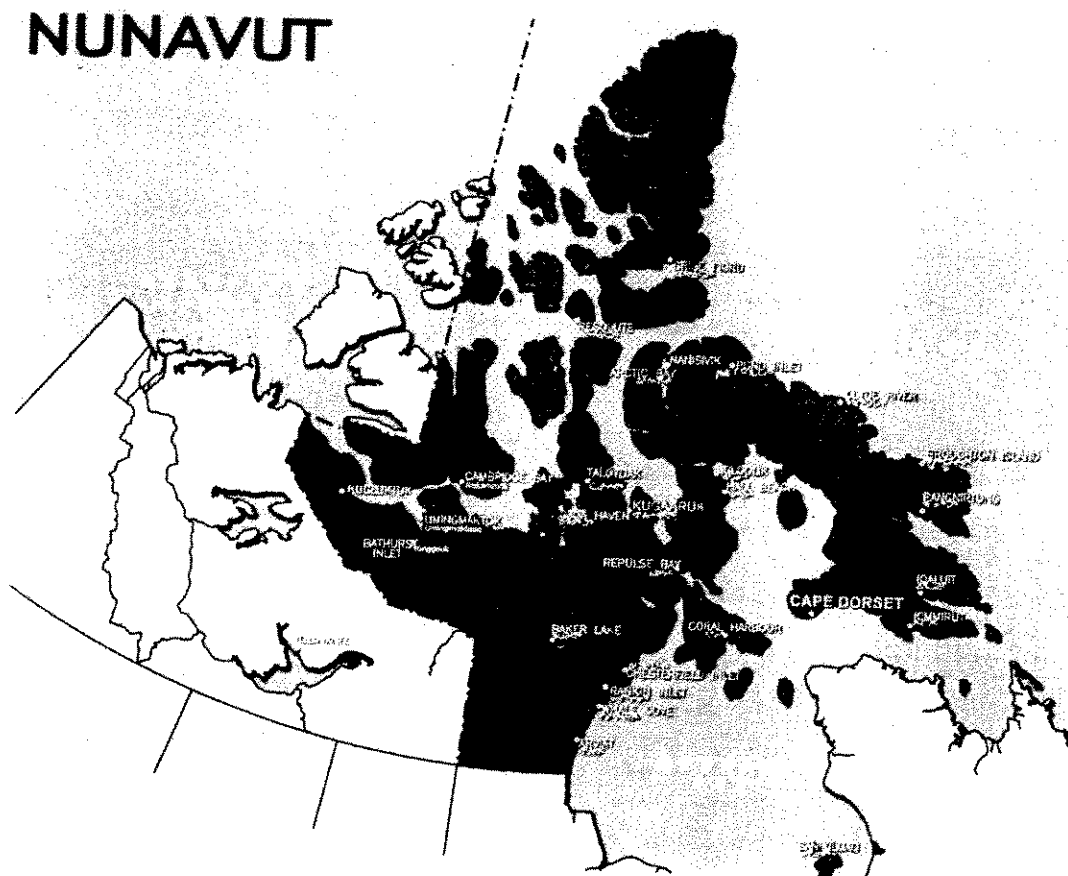
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Appendix A	Cape Dorset Water Licence
Appendix B	Sewage Characteristics – Calculations

1.0 Background

General

The community of Cape Dorset is located on an island off of the coast of the Foxe Peninsula in the south-west corner of Baffin Island, Nunavut. Sewage treatment for this community of approximately 1,400 people consists of a three-cell, tiered facultative lagoon system located as shown in **Figure 1**. Sewage is transported by truck on a continuous, daily basis (week days) to a lagoon facility for treatment.



The existing sewage treatment facility was constructed in the mid 1990's. It is constructed in a sloping valley with eventual ocean discharge. In response to ongoing difficulties with the integrity of the lagoon structures and with eventual treatment capacity limitations anticipated to result from population growth, the Government of Nunavut (GN) has completed studies^{1,2} to determine the best long-term strategy for municipal sewage treatment for the community. The selected strategy is one in which a pre-engineered, prefabricated mechanical treatment process installed at the existing site replaces the existing lagoon facility.


¹ Cape Dorset Sewage Facility Planning Study, March 2001

² Evaluation of Treatment Alternatives????



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 DILLON CONSULTING	PROJECT MECHANICAL SEWAGE TREATMENT PLANT CAPE DORSET, NUNAVUT	PROJECT NUMBER 02-0397
	TITLE EXISTING LAGOON SITE	DATE FEB 03
	FIGURE NUMBER	

Purpose of Concept Brief

The purpose of this Concept Brief is to document background information to support:

- Regulatory review and approval of the long term sewage management plan. The Design Concept Brief forms part of the application package by the GN to the Nunavut Water Board in request of modifications to the existing License NWB3CAPO207.
- Pre-selection of the sewage treatment process equipment through a request for competitive quotations from qualified suppliers. Pre-selection of process equipment is necessary given the limited window of opportunity that exists to meet the sea-lift schedules for the summer of 2003.
- The design of the sewage treatment facility in its entirety including site works, building infrastructure, as well as process and ancillary equipment, by establishing a design basis.

More specifically, sections of this Concept Brief describe;

- The design requirements based on location, population estimates, and sewage generation rates
- The design criteria and assumptions
- System descriptions
- Facility descriptions
- Implementation schedules and strategies

2.0 Regulatory Framework

The Hamlet of Cape Dorset was issued License NWB3CAPO207 from the Nunavut Water Board in September 2002. A copy of this License is attached in **Appendix A** for reference. With respect to the treatment of sewage, the License defines the facility as follows:

"Sewage Disposal Facilities" comprises the area and engineered lagoon and decant structures designed to contain sewage as described in the Application for Water License filed by the Applicant on April 19, 2001.

The proposed change in the "Sewage Disposal Facilities" to that of a mechanical treatment plant results in a need to change the current License. In seeking changes, it must be recognized that:

- Criteria have been set for discharge to the receiving environment (Telik Inlet) under the current License.
- A standard, secondary level mechanical treatment plant has the inherent capability of producing a higher quality effluent than that from a lagoon process. Discharge from the mechanical treatment plant will more than satisfy the requirements of the current License.
- The mechanical treatment plant is proposed for installation at the site of the current "Sewage Disposal Facilities". Effluent from the facility will discharge to the same general location as that of the lagoon facility.

This Concept Brief is complimentary to an Application that will be submitted to the NWB in request for changes to the current License. Requested changes will be limited to describing a different process by which the discharge criteria to the receiving environment are met.

The GN is unaware of any other specific licenses or permits that are required for the operation of the sewage disposal facilities.

3.0 System Design Standards

Design Criteria

The design criteria for a mechanical treatment plant will be completed in accordance with the parameters set out by the GN, "Water and Sewage Facilities Capital Programs". These are as follows:

Table 3-1 Design Horizons

Facility	Design Horizon (Years)	Design Economic Life (Years)	Design Expected Life (Years)
Building	20	20	40
Pumps	10	20	20
Tanks and Pipes	20	20	30

Where the:

- Design horizon is the period used to establish capacity requirements for a facility.
- Design economic life is the period used in the economic analysis to establish the present value (or equivalent capital cost) of a facility.
- Design expected life is the practical maximum expected life of a facility assuming no premature failure, destruction or obsolescence.

Design Standards

The following is a list of the design standards to be used in the development of the water supply system. These are derived from the GNWT "General Terms of Reference for Water and Sanitation" (GTR), and the "National Building Code" (NBC), and "Capital Standards Criteria, September 1993," MACA.

Table 3-2 Sewage Generation Rates

Sewage Generation Rates		
		Reference
Domestic	90 litres per capita per day	MACA
Commercial	$0.00023 \times \text{population}$	MACA
Total Generation per Capita	$90 \times (1.0 + 0.00023 \times \text{pop.})$	MACA
Discount Rates	4%, 8% and 12%	MACA

Table 3-3 Environmental Conditions

Environmental Conditions	
Design Minimum Temp.	-40°C ¹
Degree Days (Below 18°C)	9946 ²
Snow Load SS	4.2 kPa ¹
SR	0.2 kPa ¹
Wind Pressures	1.10 kPa ¹

1. National Building Code of Canada 1995 Appendix C, Data for Nottingham Island, p 497.
2. Canadian Climate Normals for Cape Dorset (1971-2000). Environment Canada website.

Design Parameters

The following are items that have been identified as overriding design parameters for the facility:

- The facility must be simple to operate and maintain by local forces with limited equipment, and parts and materials that are available locally.
- Reliability of the facility is extremely important.
- The facility must be efficient and cost effective.
- All major components must be capable of recovering from a frozen condition, in an operable state, if there is any possibility of freezing.
- Provisions of spares for all equipment is required, particularly components that have bulbs, fuses, relays, timers, etc.
- Standard on-site testing equipment, such as a microscope, weighing scale, settling jars, etc. are to be a requirement of the construction contract.
- Standby power shall be provided (as necessary)
- Fuel storage at the treatment facility must provide for spill containment (if applicable).
- Treated sewage discharged from the facility must be metered.
- Provision for an alarm system which indicates loss of power and low building temperature, is required.