Hamlet Of Arctic Bay

Supplementary Questionnaire for Water Licence Application

I. GENERAL

1. Date: *June 25 2002*

2. Applicant: *Hamlet of Arctic Bay*
Municipality

3. Contacts: *David Parker - Government of Nunavut- Community Government and Transportation*
Name of Contact
Snr. Municipal Planning Engineer
Position
(867) 975-5311
Telephone #
(867) 979-5811
Fax #

4. Municipal Status: ☐ Village ☐ Town
☑ Hamlet ☐ Settlement Corporation

5. Is this a ?
☑ New Application
☐ Renewal -▸ Water Licence # _____

I. ATTACHMENTS

1. Attach up- to- date detailed map(s) showing the locations of the: *(see Appendix A for the following)*

a. water intake; *(not available)*
b. water storage and treatment facilities;*(not available)*
c. fuel and chemical storage; *(not available)*
d. sewage treatment facilities (lagoon, honey bag pit, wetland); *(Figure 1)*
e. wastewater treatment area and discharge outlets;
f. solid waste disposal areas and drainage patterns; *(see engineered drawing 101)*
g. hazardous waste disposal area; *(engineered drawing 101)*
h. access roads; *(Figure 1)*
i. existing water bodies/courses and any changes to these water bodies/courses that have or may occur as a result of water use or waste disposal facilities, locations of environmental monitoring sites. (Outline drainage basin); *(Figure 2, 3)*
j. Areas around the community used for recreation, camping, fishing, etc.*(Not available)*
k. abandoned and/or restored water treatment, sewage, and solid waste disposal facilities. *(Not applicable)*

Are maps attached? ☑ Yes ☐ No
If no, please indicate when they will be available.

Who has provided or prepared these maps ? *Dillon Consulting Limited*

III. WATER SUPPLY

Water Source

1. Type of source: ☑ Lake ☐ River ☐ Well ☐ Other _____

2. Name of water source and alternative, if any.

Marcil Lake _____
Primary Source

_____
Secondary Source

3. Usual break-up & freeze-up period: *Mid-June* _____ *November* _____
Break-up Freeze-up

Water Storage

1. Type of water storage facility. (check where applicable)
☐ Reservoir/Pond ☐ Storage tank ☐ None
☐ Other _____
Description

2. If "reservoir" checked:
Is the reservoir lined? ☐ Yes ☐ No

What type of liner? _____ When was it installed? _____

Water Treatment

1. What is the quality of the water, and provide water quality results.

Summer:	☐ good	☐ fair	☐ poor
Fall:	☐ good	☐ fair	☐ poor
Winter:	☐ good	☐ fair	☐ poor
Spring:	☐ good	☐ fair	☐ poor

Describe. *NOT AVAILABLE*

3. Type of water treatment.
☐ Filtration and chlorination

☑ Chlorination only - *sodium hypochlorite (bleach) is added*

☐ None

☐ Other _____

Description

Water Use And Distribution

1. Volume of water use:

Distribution	Estimated number of people on the system **A**	Estimated average water consumption (Litres/capita/day) **B**	Total water consumption (Litres/day) **A x B**
PIPED			
TRUCKED	~ 700	71.63	50, 147.65 *
		TOTAL	

* *Based on total water consumption figure (1,554, 577 L/month) for May 2002 (Appendix B)*

General Condition of the water supply facilities

1. General condition of the:

a. Water supply facility

☑ Satisfactory ☐ Unsatisfactory

If unsatisfactory, explain.

Based on July 24, 2001 inspection report, the water supply facility is well-kept. However at that time, the use of the generator to activate the intake pump was of concern due to freeze- up of supply lines.

b. Storage facility

☐ Satisfactory ☐ Unsatisfactory

If unsatisfactory, explain.

Not applicable. Water is distributed entirely by trucked delivery to holding tanks in each of the buildings.

c. Distribution system

☑ Satisfactory ☐ Unsatisfactory

If unsatisfactory, explain.

_____

Modifications

1. Are there any changes *planned* for the water supply system?
   ☑ No ☐ Yes
   If yes, please attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

2. Are changes needed to the water supply, storage or treatment facilities? Describe.
   No.

Identification

Are there signs identifying drinking water sources presently used by the municipality ?
☑ No ☐ Yes

IV. SEWAGE DISPOSAL

1. What type(s) of sewage treatment is used ?
   ☑ Lagoon *(surrounded by a permeable dyke)*
   ☐ Mechanical system
   ☐ Wetland
   ☐ Honey bag
   ☐ Combination/Other: describe

Lagoon *(if applicable)*

1. Has there been any operating problems with the lagoon?
   ☑ Yes ☐ No
   If yes, describe
   Portions of the dyke become clogged and the sewage has breached it and leaks through the southern berm at an uncontrolled rate.

Mechanical System *(if applicable)*

1. Describe (type, specifications, operation and maintenance program for the mechanical wastewater treatment system).
   Not applicable

2. Are sludges produced ?
   ☐ Yes ☑ No
   If yes, describe how the sludges are disposed of:

Wetland*(if applicable)*

1. Describe the Wetland wastewater treatment system.
   Not applicable for the current site. See ***pg. 22, Sewage Disposal*** *for proposed treatment system.*

Honey Bag Pit

1. Does the municipality use a honey bag pit?
   ☑ Yes ☐ No
   If yes, describe the location, drainage, and operation/maintenance of the site:
   Bagged sewage collected daily by the Hamlet and dumped to the honey bag site (100 m^2) located within the solid waste site boundaries.

Commercial, Industrial and/or Hazardous Wastes

1. Are there any sources of commercial or industrial *liquid* waste being discharged or deposited to the wastewater treatment system that may affect the quality of the effluent or leachate produced? *(The municipality should be aware that any commercial or industrial discharge has to be approved by the municipality)*

☐ Yes ☑ No

If yes, indicate sources, types and quantities.

Sewage Discharge

1. Are fish, shell fish and other wildlife harvested in or near the discharge area ?

☐ Yes ☑ No

If yes, indicate species harvested, and level of harvest.

General Condition of the sewage treatment facilities

1. General condition of the:

a. Sewage collection system

☑ Satisfactory ☐ Unsatisfactory

If unsatisfactory, explain.

---

b. Discharge control system

☐ Satisfactory ☑ Unsatisfactory

If unsatisfactory, explain.

See p.6, section VI, "Sewage Disposal, Lagoon" *regarding breaching of berms. July 2001 inspection report (Appendix B) revealed severe erosion of the decant structure, allowing unimpeded effluent of discharge high in suspended solids and ammonia (exceeding CCME guidelines for Protection of Freshwater Aquatic Life).*

c. Dams, diversion dykes, berms

☐ Satisfactory ☑ Unsatisfactory

If unsatisfactory, explain.

See "b" above

Modifications

1. Are there any changes *planned* in the sewage treatment facilities?
   ☐ No ☑ Yes
   If yes, please attach a copy of the plan, or describe changes. Provide information on the implementation schedule.
   Dillon, 2002. Arctic Bay Wetland Sewage Treatment Facility: Proposed Project Plan to begin summer 2002.

2. Does the municipality or residents believe changes are needed to the sewage treatment facilities? Describe.
   Provided that the proposed sewage treatment is implemented as soon as possible, the community has no further concerns.

Abandonment and Restoration

1. List and describe abandoned or restored sewage treatment facilities. Indicate their location on a map.
   Not applicable.

Identification

Are there signs identifying past and present sewage disposal sites ?
☐ No ☑ Yes *(applies only to current site)*

V. SOLID WASTE DISPOSAL

1. Briefly describe how solid wastes are collected and delivered to the disposal area.
   Solid waste is collected 3 times/week and deposited in landfill about 2.5 km south west of the Hamlet (See Drawing 101-attached).

2. Is the solid waste site fenced? ☐ Yes ☑ No
   No fence
3. Is the fence adequate? ☐ Yes ☑ No

   If no, describe
   As of 2001 inspection report, there was no fence around the solid waste site.

Waste Reduction

1. Does the municipality burn garbage ?
   ☑ Yes ☐ No
   If yes, describe how and when this is done.
   Solid waste is burned at the end of each day and compacted monthly.

2. Has the municipality considered measures for waste reduction such as recycling or reuse?
   ☑ Yes ☐ No
   If yes, describe
   The Hamlet have examined the potential options of a recycling program however no plan has been implemented yet.

Animal Carcasses Pit

1. Does the municipality have an area for the disposal of animal carcasses ?
   ☐ Yes ☑ No *(no designated area in Reid Crowthers report, 1997 report)*
   If yes, describe the location, drainage and operation/maintenance of the site

Bulky Scrap Metal Waste Disposal Area

1. Does the municipality have a scrap metal or bulky waste disposal area?
   ☑ Yes ☐ No
   If yes, briefly describe its location and operation plan.
   Stored in a separate 800m^2 area south west of disposal site.

Commercial, Industrial and/or Hazardous Wastes Disposal Area

1. Are there any commercial or industrial waste being discharged or deposited in the solid waste disposal area? *(The municipality should be aware that any discharge of commercial or industrial waste has to be approved by the municipality)*
   ☐ Yes ☑ No

If yes, please indicate sources, types and quantity.

2. Will the municipality use a hazardous waste disposal area?
☑ Yes ☐ No
If yes, describe its:

a. Location
Within solid waste site boundaries (Figure 1). Batteries are stored in a sealift container until proper disposal.

b. Structure
The Hamlet has designated specific areas (a sea can acts as a container) to store hazardous wastes until the appropriate time to be shipped away.

c. Operation and maintenance (describe special handling/disposal methods for these wastes)
Not applicable at this time. The Hamlet is aware that there is a need for operation and maintenance of these wastes.

General Condition of the Solid Waste Disposal Area

1. General condition of the:

a. Solid waste disposal area
☑ Satisfactory ☐ Unsatisfactory

If unsatisfactory, explain.

Modifications

1. Are there any changes planned for the solid waste disposal area?
☐ No ☑ Yes
If yes, attach a copy of the plan, or describe changes. Provide information on the implementation schedule.
The 2001 inspection report indicated that the installation of a perimeter fence is to occur once the ongoing work at the bulk metal disposal site and sewage disposal site are completed.

2. Are changes needed to the solid waste disposal area? Describe.
Install a perimeter fence.

Abandonment and Restoration

1. List and describe abandoned or restored solid waste facilities.
Indicate their location on a map.
Not applicable.

Identification

Are there signs identifying past and present solid waste disposal sites ?
☐ No ☑ Yes *(for present site only)*

VI. INSPECTION AND MONITORING

1. When were municipal facilities inspected by:

☑ Indian and Northern Affairs Inspector	Date: July 2001, September 2000
☐ Municipal and Community Affairs	Date:
☐ Other:	Date:

2. Is there a system in place for reporting spills?
☑ Yes ☐ No
If yes, describe.
The Hamlet uses it's limited people (water truck drivers) and equipment resources (spill pads) that are available in the event of a spill. A report is filed and reported.

3. Is there a contingency plan for clean up of spills?
☐ Yes ☑ No
If yes, describe.

4. Have any spills occurred in the past five years?
☐ Yes ☑ No
If yes, describe and show on a map the locations of the spills. What action has been taken to clean the affected areas?
No spills reported in 2000 and 2001 inspection report. See NWT Hazardous Materials Spill Database report (Appendix B)

Monitoring Program

1. Is water sampling and analysis done ?
☐ No ☑ If Yes, answer the questions a to e

a. Briefly describe how samples are taken and sent to the laboratory.

b. Briefly describe any monitoring done for wastewater effluent and leachate.
Samples taken during the 2001 inspection from the vicinity of the intake station indicate that all tested parameters meet the Guidelines for Drinking Water Quality except for turbidity which was 1.2 NTU above the aesthetic objective.

c. Who is responsible for water sampling ?

Philippe Lavallee
Name
Water Resources Officer - INAC
Position
(867) 979- 4815
Telephone #
Fax #
Level of training

d. Laboratory performing analysis of samples.
Taiga Environmental Laboratory
Name
4601-52nd Ave. Box 1500, Yellowknife, NT X1A 2R3
Address
(867) 669-2788
Telephone #
(867) 669-2718
Fax #

e. Are any changes planned in the water quality monitoring program?
☐ Yes ☑ No
If yes, describe.

VII. PUBLIC CONCERNS

1. What concerns does the municipality or residents have regarding the municipal water supply or waste disposal facilities? List the concerns and describe what steps have been taken to address those concerns.

The municipality and the residents did have concerns with seepage from sewage facilities. However, the community has been consulted about the proposed sewage treatment plans and they approve.

VIII. PUBLIC HEALTH *(To be filled by the Regional Environmental Health Officer)*

1. Date: *July 3 2002*

2. Municipality: *Arctic Bay*

3. Contact:

Philip Lavallee
Environmental Health Officer Contact
(867) 975 -4815
Telephone #

Fax #

4. Have there been any problems or health/environmental concerns with drinking water ?
☐ Yes ☑ No *(refer to inspection report 2000-2001)*
If yes, describe

5. Have there been any problems or health/environmental concerns with sewage disposal/treatment?
☑ Yes ☐ No
If yes, describe

There are some environmental concerns with the discharge effluent that is leaking through the southern berm at an uncontrolled rate. Samples taken indicate that ammonia and phenols exceed the Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life. However, the results from a Microtox samples taken in 2001 indicate no toxicity in sewage effluent discharge.

6. Have there been any problems or health/environmental concerns with solid waste disposal?

☑ Yes ☐ No
If yes, describe

A Microtox sample taken during 2001 inspection report from the leachate of the solid waste facilities revealed no toxicity. A runoff sample from the bulky metal wastes disposal site reveal that copper and zinc concentrations slightly exceed the Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life.

Monitoring Program (same as p. 12, Monitoring Program)

1. Does the Regional Health Board perform water quality sampling?
   ☐ No ☐ If Yes, answer questions (a) to (e)

a. Briefly describe the sampling methodology.

_____

_____

b. Briefly describe any monitoring of wastewater effluent and leachate.

_____

_____

c. Who is responsible for sampling ?

_____
Name

_____
Position

_____
Telephone #

_____
Fax #

_____
Level of training

d. Laboratory performing analysis of samples.

_____
Name

_____
Address

_____
Telephone #

_____
Fax #

e. Are any changes planned in the water quality monitoring program?
   ☐ Yes ☐ No
   If yes, describe.

_____

IX. TECHNICAL INFORMATION *(Assistance from the Regional Municipal and Community Affairs Office)*

1. Date: *June 25 2002*

2. Municipality: *Arctic Bay, NU*

3. Contact: *David Parker*
MACA Representative/Position
(867) 975-5311
Telephone #
(867) 979-5811
Fax #

4. Population (according to most recent census results): *646 (Population Count for 2001 census)*

5. Estimated growth rate over next 5 years: *1.1 % based on 2002-2007 Nunavut Bureau of Statictics population projections (Appendix B)*

6. Has any baseline data collection and evaluation been undertaken with respect to the physical, biological, and chemical characteristics of the main water bodies in the area?
☑ No ☐ Yes
If yes, provide details below:

Prepared by	Title	Completion Date

If no, are such studies being planned?
☑ No ☐ Yes (If yes, when and by whom):

7. Have Elders been consulted in the collection of baseline data on main water bodies in the area?
☑ No ☐ Yes.
If yes, specify.

8. Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project?
☐ No ☑ Yes *(included in Appendix C of application package)*
If yes, provide details below.

Prepared by Title Completion Date

Dillon 2002. Arctic Bay Wetland Sewage Treatment Facility: Proposed Project Plan

Dillon 1999. Wetland Concept Design, Arctic Bay, NT

If no, are such studies being planned?

☐ No ☐ Yes. If yes, specify:

Attachments

1. Attach detailed plan or drawing(s) of the present *solid waste disposal area*. Include the following information: ***Most of the current information regarding solid waste facilities is not available (See 1997 Reid Crowther report attached)***

   a. details of pond size and elevation;
   b. details of all retaining structures (dimensions, materials of construction, etc.);
   c. details of the drainage basin, and existing and proposed drainage modifications; *(Figure 2)*
   d. details of all decant, siphon mechanisms etc., including sewage treatment facilities;
   e. details regarding direction and path of wastewater flow from the area;
   f. distance from watercourses and fish bearing waters;
   g. location and construction of liners;
   h. leachate and groundwater collection systems; and
   i. control structures.

2. Attach detailed plan or drawing(s) of the present *sewage treatment system*. The drawing(s) should include the following: ***(Unless otherwise stated, please see attached Dillon engineering drawing 101)***

   a. details of all retaining structures (dimensions, materials of construction, etc.);
   b. details of the drainage basin, and existing and proposed drainage modifications;
   c. details regarding direction and path of wastewater flow from the area;
   d. indications of the distance from watercourses and fish bearing waters;
   e. all sources of seepage presently encountered near these areas, including volumes (m^3/day) and directions. *(Dillon 1999 report)*

Are drawings for the solid waste disposal area and sewage treatment system attached?

☑ Yes ☐ No

If Yes, who has provided them ?

Dillon Consulting Limited

If no, indicate when they will be available

Hydrology

1. Effects on surface water flow:

Are any stream channels altered? ☑ Yes ☐ No

Is the natural storage or water level of any lake or pond changed? ☐ Yes ☐ No

Are there changes in water flow downstream of the project? ☐ Yes ☐ No

Is a storage reservoir created in a natural channel? ☐ Yes ☐ No

If yes to any of the above, briefly describe the expected change in flow or storage:

At the proposed sewage treatment site, drainage redirection berms (Drawing 101) will be used to redirect flow adjacent to ephemeral streams to prevent additional hydraulic loading.

2. Drainage Area:

What is the drainage area? *1* km^2

What is the average elevation of the drainage basin? *50m* metres

Is the drainage basin outlined on an attached map? ☐ Yes ☑ No

Describe the drainage basin characteristics, (vegetation, general soil type, lakes, swamps and permafrost areas, etc.)

The highest point of land (60 m) begins at the solid waste site and decreases gradually towards the ocean. All drainage from runoff through precipitation and small ephemeral watercourses to the right of the sewage site ultimately drain towards Arctic Bay. The vegetation surrounding the present lagoon system is dominated by sedges, cotton grasses and willows.

3. Channel characteristics:

Is the course of any channel changed? ☑ Yes ☐ No

If yes, describe measures to maintain stream bed and bank stability.

The ephemeral watercourses surrounding the sewage treatment site will redirected. *See* ***page 21****,* *changes to the sewage facilities.*

4. Will the cross-section of any watercourse be changed? ☐ Yes ☑ No

If yes, describe the change and its effect on the flow capacity of the channel.

Water Supply

1. What is the rate of withdrawal from the source? *50* m^3/day.

2. Is water drawn from the source ☑ intermittently ☐ continuously

3. If it is drawn intermittently, during what month(s) is it drawn? *3 times/week every month*

4. For what period is it drawn (days/weeks/months)? *Approximately 20 minutes*

5. What is the rate of flow of source (if river) or size (if lake)? 3,000,000 m^3

6. At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn.
Marcil Lake has ample capacity to provide water to Arctic Bay which pumps approximately 18, 250 m^3/year from the lake. Marcil Lake is fed by a large river and has a recharge flow of 12.2 million m^3 annually (MACA, 1987).

Water Intake

1. Please provide short descriptions of the following:
   a. freshwater intake facility
   The intake facility (pumphouse and truckpad) is located at the mouth of the river on the north shore of Marcil Lake. In winter, the water is drawn through a hole in the ice.

   b. operating capacity of the pumps
   1, 155 L/minute

   c. intake screen size
   Hamlet to provide

Water Storage

1. Type of water storage facility (check where applicable)
   ☐ Reservoir/Pond ☐ Storage tank ☐ None
   ☐ Other _____
   Description

2. If "reservoir":

Is the reservoir lined? ☐ Yes ☐ No
What type of liner? _____ When was it installed? _____

3. Is a dam or dyke being used to store or alter the flow of water? ☐ Yes ☐ No

4. What are the dimensions of the dam or dyke?
Length: _____ Width: _____ Height: _____
U/S slope: _____ D/S slope: _____

5. Does the proposed dam create a reservoir in a natural watercourse?
☐ Yes ☐ No
If yes, what is the storage capacity and surface area of the reservoir?
_____ m^3 _____ ha.

6. Will the dam or dyke affect fish migration or movement ?
☐ Yes ☐ No
If yes, describe all measures for compensation of fish habitat lost due to the dam or dyke, and mitigations for fish migration or movement.

_____

_____

Water Treatment

1. Indicate the capacity of the treatment facility. _____ L/min *(not applicable)*

2. What is the capacity of the water storage facility. *3,000,000 m^3*

3. Describe the method of water treatment (i.e., backwash, flocculation, sedimentation, chemicals used), and provide the results of the most recent bacteriological and chemical analysis. Attach a diagram, if possible.
Sodium hypochlorite (bleach) is added to the water trucks. See inspection reports (Appendix B).

_____

4. Are there any changes planned in the water treatment facilities?
☑ No ☐ Yes
If yes, attach a copy of the plan or indicate changes and include an implementation schedule. Include excerpt from MACA Capital Plan if available.

_____

_____

_____

Sewage Disposal

1. Indicate the level of sewage treatment:
☑ primary ☐ secondary ☐ tertiary
Pre-treatment (if applicable): ☐ screening ☐ maceration
Lagoons (if applicable): ☐ anaerobic ☐ aerobic ☐ facultative

2. Indicate the capacity of the sewage treatment facility *600* m^3

3. Based on current population projections, the facility will meet the needs of the community until the year *2000 (current sewage generation rate exceeds the holding capacity of existing lagoon)* .

4. Average depth of the wastewater lagoon *0.5* m.

5. What is the design freeboard? _____ m. (*not available, sewage is currently breaching the site)*

6. Indicate the retention time of the sewage while in the treatment facility *30 (summer)* days.

7. Indicate the estimated rate of discharge of wastewater_____ L/sec.*(not available*)

8. Indicate the location of the discharge point *Sewage breaches over southern berm* .

9. Is the discharge: ☐ seasonal ☐ continuous
If the discharge is seasonal, during what month(s) is it done? _____
What is the duration of the discharge (days/weeks/months) ? _____

10. Are there any changes planned in the sewage disposal facilities?
☐ No ☑ Yes
If yes, attach a copy of the plan or indicate changes and include an implementation schedule.
Dillon 1999. Wetland Treatment Conceptual Design, Arctic Bay, NT (attached)
Include excerpt from MACA Capital Plan if available.

_____

_____

_____

Solid Waste Disposal

1. Indicate the capacity of the disposal area *Not available* m^3.

2. The *average* depth of the solid waste disposal site *Not available* m.

3. The current facility will meet community needs until the year *2009* .

4. Do any natural watercourse enter the solid waste disposal area? What methods are used to decrease the amount of runoff water entering these areas?

No natural watercourses enter the solid waste area. Runoff from the bulky metal wastes disposal is channelled alongside the access road.

5. Indicate the volume of water that may enter these areas from any source(s) and attach all pertinent details of the diversions.

Source	Volume (m^3/day)
Precipitation	*130 mm year*

6. Please describe any diversions of watercourses:
Not applicable.

7. Are there any changes planned in the solid waste disposal facilities?
☐ No ☑ Yes
If yes, attach a copy of the plan or indicate changes and include an implementation schedule. Include excerpt from MACA Capital Plan if available.
The Hamlet has initiated some changes as outlined in the Reid Crowther 1997 report (attached). For instance, there has been considerable improvements to the bulky metal wastes and that only some consolidation and burial work remain to be undertaken (2001 inspection report, Appendix B)

Other

1. Describe any additional details on the existing municipal facilities which should be considered by the Nunavut Water Board during it review.

APPENDIX A

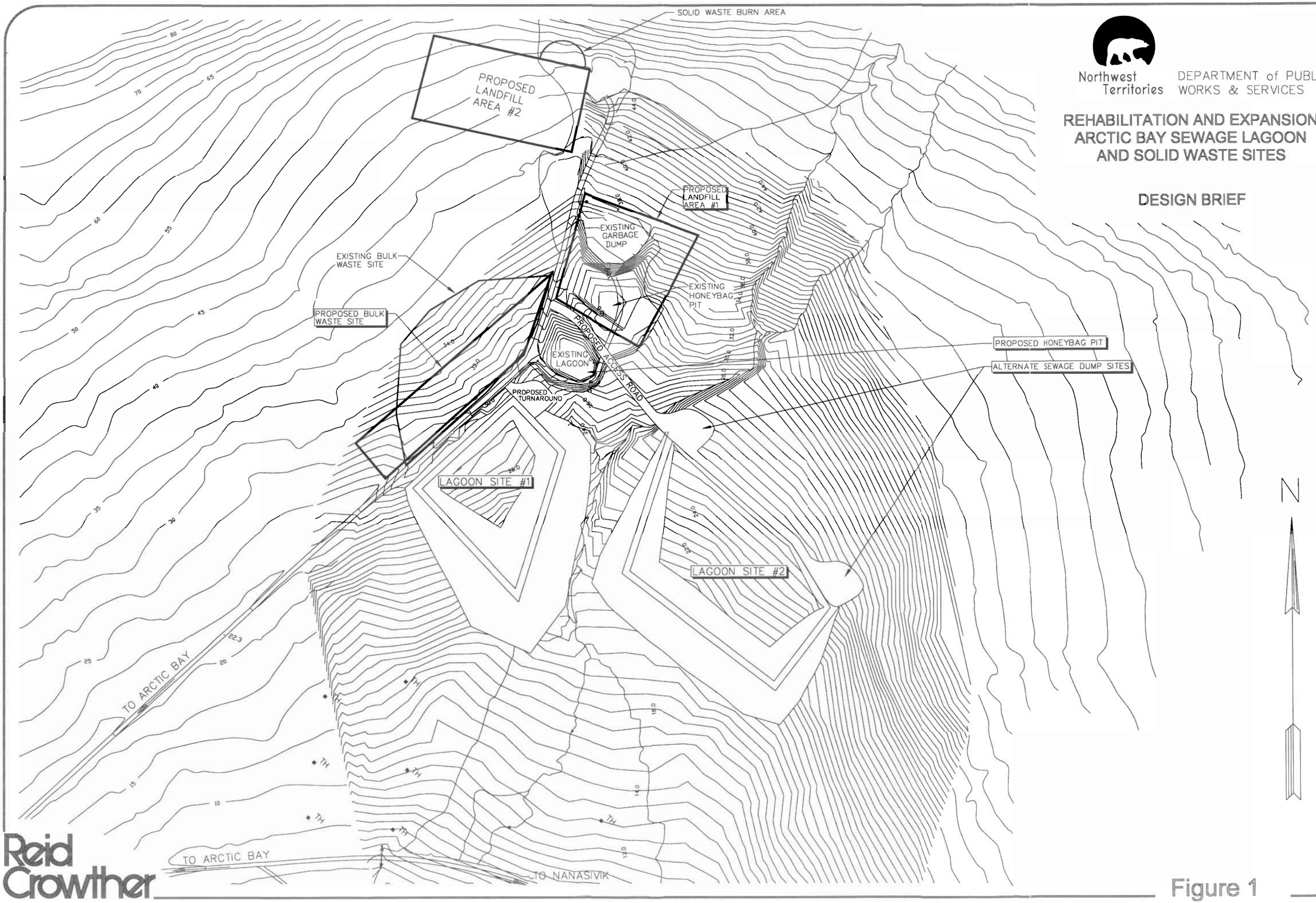
Figure 1
Figure 2
Figure 3
Figure 4

Northwest Territories

DEPARTMENT of PUBLIC WORKS & SERVICES

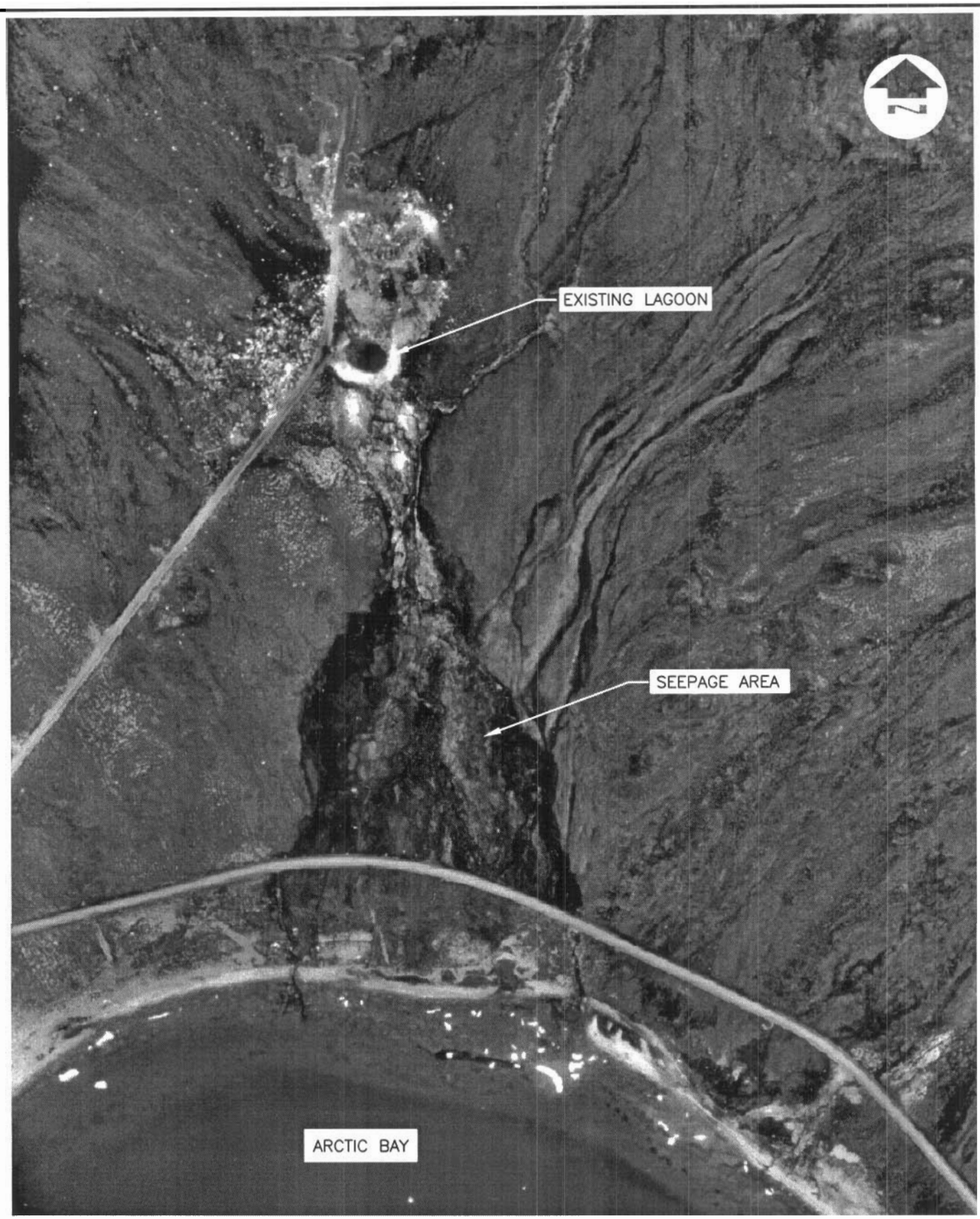
REHABILITATION AND EXPANSION ARCTIC BAY SEWAGE LAGOON AND SOLID WASTE SITES

DESIGN BRIEF



Reid Crowther

Figure 1



EDIT DATE: 02/19/02 ACAD FILE: 41cbp g:\cad\029971\fig2.dwg

DILLON CONSULTING

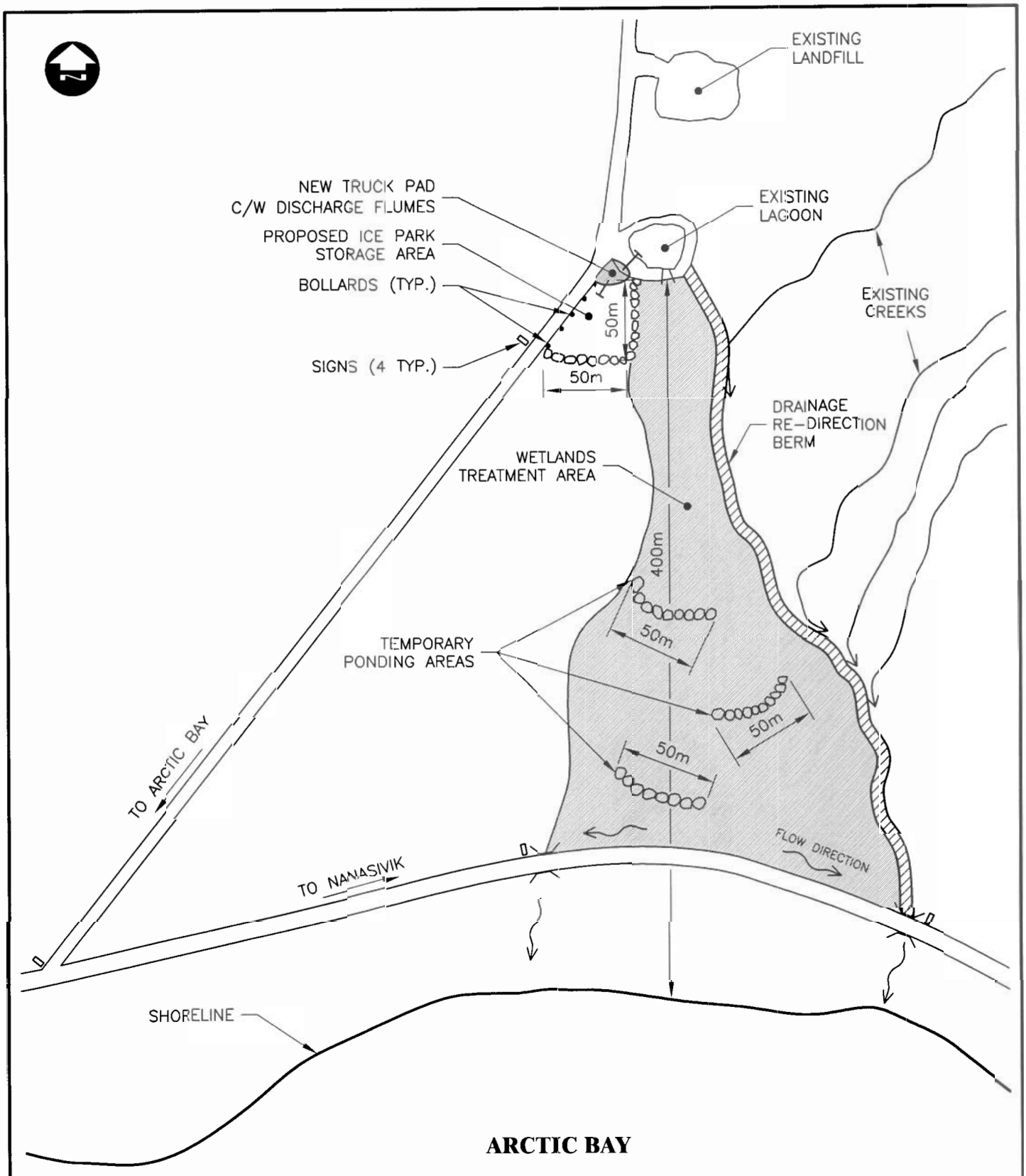
PROJECT
EXISTING SEWAGE TREATMENT LAGOON

TITLE
ARCTIC BAY WETLANDS SEWAGE TREATMENT
CONCEPTUAL DESIGN - PROJECT PLAN

PROJECT NUMBER
02-9971

DATE
FEBRUARY 2002

FIGURE NUMBER
FIG 2



EDIT DATE: 02/19/02 ACAD FILE: 41cbp g:\cad\029971\fig3
BASE NAME: a.dwg LOG FILE: na

APPROXIMATE SCALE 1:3000

DILLON CONSULTING

PROJECT: PROPOSED WETLANDS TREATMENT SYSTEM

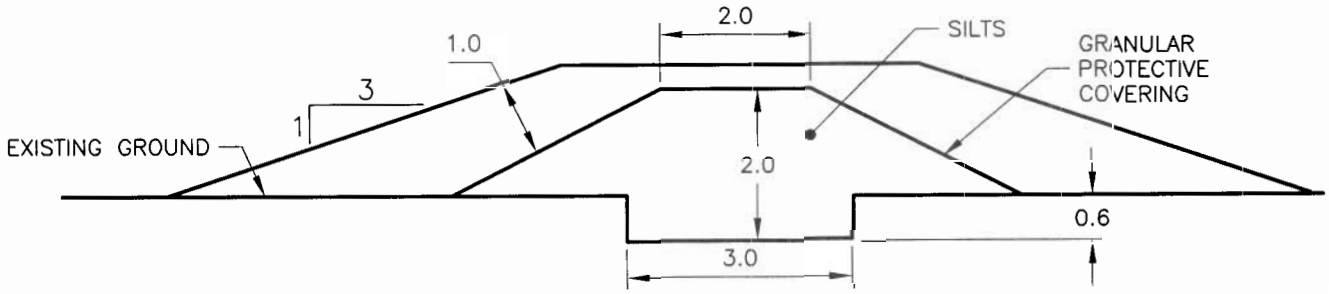
PROJECT NUMBER: 02-9971

DATE: FEBRUARY 2002

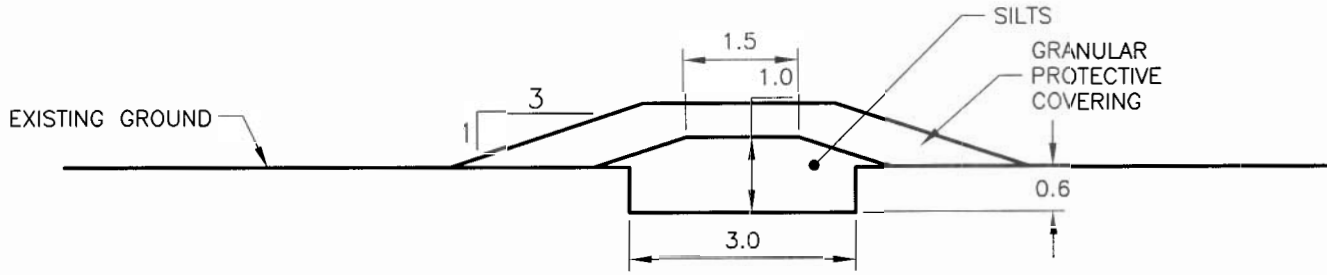
TITLE: ARCTIC BAY WETLANDS SEWAGE TREATMENT CONCEPTUAL DESIGN – PROJECT PLAN

FIGURE NUMBER: 3

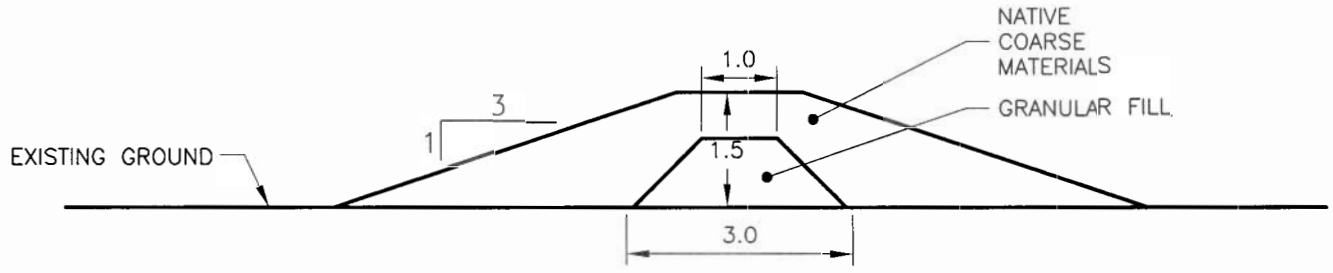
PROPOSED ICE PACK STORAGE AREA BERM:



PROPOSED PONDING AREA BERMS:



PROPOSED DRAINAGE RE-DIRECTION BERM:



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DILLON CONSULTING

PROJECT
CROSS SECTION OF BERM CONSTRUCTION

TITLE
ARCTIC BAY WETLANDS SEWAGE TREATMENT
CONCEPTUAL DESIGN – PROJECT PLAN

PROJECT NUMBER
02-9971

DATE
FEBRUARY 2002

FIGURE NUMBER
4

APPENDIX B

Population Projections
Water Truck Delivery Figures May 2002
INAC 200-2001 Inspection Reports
NWT Spill Report

ᓄᓇᕗᑦ: ᓄᓇᓖᑦ ᐃᓄᖏᑦᑕ ᐃᓄᒃᓂᖏᓐᓄᑦ ᓇᓚᐅᑦᑖᖅᓯᒪᔾᔭᑏᑦ

Nunavut: Community Population Projections

Le Nunavut: Projections pour la population par communautés

2000 – 2020

Nunavut Bureau of Statistics
Bag 800
Iqaluit, Nunavut X0A 0H0
www.stats.gov.nu.ca

Nunavut: Community Population Projections

	2000	2005	2010	2015	2020
Nunavut	27,688	31,317	35,114	39,335	43,824
Arctic Bay	730	819	916	1,019	1,094
Arviat	1,690	1,929	2,198	2,517	2,855
Baker Lake	1,470	1,624	1,777	1,957	2,148
Bathurst Inlet	X	X	X	X	X
Bay Chimo	X	X	X	X	X
Cambridge Bay	1,418	1,581	1,752	1,939	2,137
Cape Dorset	1,213	1,354	1,501	1,662	1,829
Chesterfield Inlet	372	420	476	528	583
Clyde River	771	867	982	1,095	1,214
Coral Harbour	845	955	1,078	1,219	1,376
Gjoa Haven	984	1,084	1,173	1,290	1,435
Grise Ford	145	147	155	165	173
Hall Beach	635	734	829	934	1,052
Igloolik	1,379	1,562	1,736	1,922	2,131
Iqaluit	4,762	5,606	6,477	7,456	8,391
Kimmirut	450	506	573	636	706
Kugaaruk	582	664	756	867	979
Kugluktuk	1,389	1,556	1,720	1,893	2,076
Nanisivik	230	223	220	205	191
Pangnirtung	1,506	1,687	1,870	2,074	2,280
Pond Inlet	1,314	1,532	1,761	1,999	2,233
Qikiqtarjuaq	522	599	668	737	811
Rankin Inlet	2,277	2,527	2,791	3,120	3,633
Repulse Bay	615	702	797	903	1,012
Resolute Bay	243	253	263	275	288
Sanikiluaq	702	796	896	1,008	1,108
Taloyoak	804	904	1,016	1,147	1,294
Whale Cove	312	351	397	442	491

Notes: Population projections produced by Statistics Canada and the Nunavut Bureau of Statistics include people in the population who are residents of Nunavut and do NOT have a home elsewhere in Canada from which they are temporarily absent. Therefore, temporary residents such as construction crews, residents in mining camps, etc. are not included in the population projections.

Data are suppressed for (a) communities with a population of 100 or less and (b) 'unorganized areas' -- but they are included in the Nunavut total.

Released by the Nunavut Bureau of Statistics *March 2000*

ᓄᓇᕗᑦ: ᓄᓇᓖᑦ ᐃᓄᖏᑦᑕ ᐃᓄᕐᓂᖏᓐᓄᑦ ᓇᓚᐅᑦᑖᕐᓯᒪᔾᔪᑎᑦ

	2000	2005	2010	2015	2020
ᓄᓇᕗᑦ	27,688	31,317	35,114	39,335	43,824
ᐃᒃᐱᐊᕐᔪᒃ	730	819	916	1,019	1,094
ᐊᕐᕕᐊᑦ	1,690	1,929	2,198	2,517	2,855
ᖃᒪᓂᑦᑐᐊᖅ	1,470	1,624	1,777	1,957	2,148
ᕿᓐᖓᐅᑦ	X	X	X	X	X
ᐅᒥᖕᒪᒃᑑᖅ	X	X	X	X	X
ᐃᖃᓗᒃᑑᑦᑎᐊᖅ	1,418	1,581	1,752	1,939	2,137
ᑭᙵᐃᑦ	1,213	1,354	1,501	1,662	1,829
ᐃᒡᓗᓕᒑᕐᔪᒃ	372	420	476	528	583
ᑲᖏᖅᖢᒑᐱᒃ	771	867	982	1,095	1,214
ᓴᓪᓖᑦ	845	955	1,078	1,219	1,376
ᐅᖅᓱᖅᑑᖅ	984	1,084	1,173	1,290	1,435
ᐊᐅᔪᐃᑦᑐᖅ	145	147	155	165	173
ᓴᓂᕋᔭᒃ	635	734	829	934	1,052
ᐃᒡᓗᓕᒃ	1,379	1,562	1,736	1,922	2,131
ᐃᖃᓗᐃᑦ	4,762	5,606	6,477	7,456	8,391
ᑭᒻᒥᕈᑦ	450	506	573	636	706
ᑯᒡᒐᕐᔪᒃ	582	664	756	867	979
ᖁᕐᓗᖅᑑᖅ	1,389	1,556	1,720	1,893	2,076
ᓇᓂᓯᕕᒃ	230	223	220	205	191
ᐸᖕᓂᖅᑑᖅ	1,506	1,687	1,870	2,074	2,280
ᒥᑦᑎᒪᑕᓕᒃ	1,314	1,532	1,761	1,999	2,233
ᕿᑭᖅᑖᕐᔪᐊᖅ	522	599	668	737	811
ᑲᖏᖅᖠᓂᖅ	2,277	2,527	2,791	3,120	3,633
ᓇᐅᔮᑦ	615	702	797	903	1,012
ᖃᐅᔪᐃᑦᑐᖅ	243	253	263	275	288
ᓴᓂᑭᓗᐊᖅ	702	796	896	1,008	1,108
ᑕᓗᕐᔪᐊᖅ	804	904	1,016	1,147	1,294
ᑎᑭᕋᕐᔪᐊᖅ	312	351	397	442	491

ᑐᓴᒃᓴᑦ: ᐃᓄᐃᑦ ᐅᓄᕐᓂᖏᑦᑕ ᓇᓚᐅᑦᓵᖅᑕᐅᓂᖏᑦ ᓴᖅᑭᑕᐅᓚᐅᖅᑐᑦ ᑲᓇᑕᒥ ᓈᓴᖅᓯᒪᑎᐊᖅᑕᖅᑐᓕᕆᔨᒃᑯᑦ ᐊᒻᒪ ᓄᓇᕗᑦ ᓈᓴᐃᓯᒪᕕᒃᑯᑦ ᐃᓚᐅᓪᓗᑎᒃ ᐃᓄᐃᓄᑦ ᐅᓄᕐᓂᖏᑦ ᓄᓇᖅᑲᖅᑐᑦ ᓄᓇᓄᒥ ᐊᒻᒪ ᐊᖏᕐᕿᒃᑲᓐᖏᑦᑐᑦ ᓯᓚᑖᓂ ᑲᓇᑕᐅᕐ ᐊᐅᓪᓚᖅᓯᒪᕕᖕᒥᓂ. ᑕᐃᒪᐃᒻᒪᑦ, ᓄᓇᖃᖃᐃᓐᓇᖅᐸᒃᑐᑦ ᓲᕐᓗ ᐃᒡᓗᓕᐅᖅᑏᑦ, ᐅᔾᔨᕐᕋᓂᐊᕐᕕᖏᓐᒥᑦᑐᓪᓗ ᐊᓯᖏᓪᓗ ᐃᓚᐅᑎᑕᐅᓐᖏᑦᑐᑦ ᐃᓄᐃᑦ ᐅᓄᕐᓂᖏᑦᑕ ᓈᓴᖅᑕᐅᓯᒪᓂᖏᓐᓂ.

ᑐᑭᓯᒋᐊᕈᑎᒃᓴᑦ ᐱᔭᐅᔪᖅᑦ (ᐃ) ᓄᓇᓕᖕᓂᑦ ᐃᓄᒃᖅᑐᓂᒃ 50-ᓂᒃ ᑐᖓᓕᑕᓂᓘᓐᓃᑦ ᐊᒻᒪ (ᐅ) ᐋᖅᑭᒃᑕᐅᓯᒪᓐᖏᑦᑐᓄ ᓄᓇᐃᑦ -- ᑭᓯᐊᓂ ᐃᓚᐅᑎᑕᐅᔪᑦ ᓄᓇᕗᑦ ᐅᓄᕐᓂᖏᓐᓄᑦ.

ᓄᓇᕗᑦ: ᓄᓇᓖᑦ ᐃᓄᖏᑦᑕ ᐃᓄᕐᓂᖏᓐᓄᑦ ᓇᓚᐅᑦᑖᖅᓯᒪᔾᔭᑏᑦ

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ᓄᓇᕗᑦ	27,688	28,410	29,154	29,885	30,601	31,317	32,036	32,774	33,530	34,311	35,114
ᐃᒃᐱᐊᕐᔪᒃ	730	747	763	782	801	819	837	855	876	894	916
ᐊᕐᕕᐊᑦ	1,690	1,736	1,784	1,833	1,883	1,929	1,982	2,033	2,088	2,142	2,198
ᖃᒪᓂᑦᑐᐊᖅ	1,470	1,501	1,534	1,563	1,594	1,624	1,655	1,683	1,712	1,745	1,777
ᕿᓐᖓᐅᑦ	X	X	X	X	X	X	X	X	X	X	X
ᐅᒥᖕᒪᒃᑑᖅ	X	X	X	X	X	X	X	X	X	X	X
ᐃᖃᓗᒃᑑᑦᑎᐊᖅ	1,418	1,449	1,484	1,517	1,550	1,581	1,609	1,642	1,679	1,715	1,752
ᑭᓐᖓᐃᑦ	1,213	1,240	1,268	1,298	1,327	1,354	1,382	1,412	1,441	1,471	1,501
ᐃᒡᓗᓕᒑᕐᔪᒃ	372	382	391	401	409	420	431	443	452	465	476
ᑲᖏᖅᖢᒑᐱᒃ	771	789	812	830	848	867	890	913	937	959	982
ᓴᓪᓖᑦ	845	865	888	911	933	955	978	1,003	1,024	1,049	1,078
ᐅᖅᓱᖅᑑᖅ	984	1,005	1,023	1,045	1,063	1,084	1,102	1,117	1,136	1,154	1,173
ᐊᐅᔪᐃᑦᑐᖅ	145	146	147	146	146	147	149	151	151	153	155
ᓴᓂᕋᔭᒃ	635	656	677	696	714	734	754	771	790	810	829
ᐃᒡᓗᓕᒃ	1,379	1,417	1,456	1,495	1,529	1,562	1,594	1,627	1,660	1,701	1,736
ᐃᖃᓗᐃᑦ	4,762	4,930	5,108	5,278	5,438	5,606	5,768	5,936	6,108	6,289	6,477
ᑭᒻᒥᕈᑦ	450	461	474	485	496	506	519	530	546	560	573
ᑰᒑᕐᔪᒃ	582	601	616	631	648	664	682	701	719	737	756
ᖁᕐᓗᖅᑑᖅ	1,389	1,422	1,456	1,490	1,522	1,556	1,585	1,618	1,653	1,686	1,720
ᓇᓂᓯᕕᒃ	230	225	224	226	225	223	222	220	221	221	220
ᐸᖕᓂᖅᑑᖅ	1,506	1,539	1,575	1,613	1,651	1,687	1,722	1,756	1,792	1,831	1,870
ᒥᑦᑎᒪᑕᓕᒃ	1,314	1,361	1,405	1,443	1,489	1,532	1,574	1,624	1,668	1,714	1,761
ᕿᑭᖅᑕᕐᔪᐊᖅ	522	537	551	566	582	599	614	629	641	654	668
ᑲᖏᖅᖠᓂᖅ	2,277	2,327	2,376	2,432	2,483	2,527	2,576	2,629	2,683	2,734	2,791
ᓇᐅᔮᑦ	615	630	648	664	682	702	720	738	757	777	797
ᖃᐅᓱᐃᑦᑐᖅ	243	246	247	249	251	253	252	255	257	260	263
ᓴᓂᑭᓗᐊᖅ	702	722	740	758	776	796	816	834	853	873	896
ᑕᓗᕐᔪᐊᖅ	804	825	847	866	886	904	925	947	968	992	1,016
ᑎᑭᕋᕐᔪᐊᖅ	312	321	328	336	344	351	358	367	378	388	397

ᑐᓴᒃᓴᑦ: ᐃᓄᐃᑦ ᐅᓄᕐᓂᖏᑦᑕ ᓇᓚᐅᑦᓵᖅᑕᐅᓂᖏᑦ ᓴᖅᑭᑕᐅᓚᐅᖅᑐᑦ ᑲᓇᑕᒥ ᓈᓴᖅᓯᒪᒋᐊᖃᖅᑐᓂᐊᕈᑎᒃᑯᑦ ᐊᒻᒪᓗ ᓄᓇᕗᑦ ᓈᓴᐃᓯᒪᕕᒃᑯᑦ ᐃᓚᐅᓪᓗᑎᒃ ᐃᓄᐃᓄᑦ ᐅᓄᕐᓂᖏᑦ ᓄᓇᖃᖅᑐᑦ ᓄᓇᓄᒥ ᐊᒻᒪᓗ ᐊᖏᕐᖃᖓᖏᑦᑐᑦ ᓯᓚᑖᓂ ᑲᓇᑕᐅᑉ ᐊᐅᓪᓚᖅᓯᒪᕕᖏᓐᓂ. ᑕᐃᒪᐃᒻᒪᑦ, ᓄᓇᖃᖃᐃᓐᓇᖅᐸᒃᑐᑦ ᓲᕐᓗ ᐃᒡᓗᓕᐅᖅᑏᑦ, ᐅᔾᔨᕈᓯᐊᕐᕕᖔᑦᑐᓪᓗ ᐊᓯᖏᓪᓗ ᐃᓚᐅᑎᑕᐅᖏᑦᑐᑦ ᐃᓄᐃᑦ ᐅᓄᕐᓂᖏᑦᑕ ᓈᓴᖅᑕᐅᓯᒪᓂᖏᓐᓂ.

ᑐᑭᓯᒋᐊᕈᑎᒃᓴᑦ ᐱᔭᐅᔭᖅᑦ (ᐃ) ᓄᓇᓕᖕᓂᑦ ᐃᓄᒃᖃᖅᑐᓂᒃ 50-ᓂᒃ ᑐᖕᒐᑕᓂᓘᓐᓃᑦ ᐊᒻᒪᓗ (ᐅ) ᐋᖅᑭᒃᑕᐅᓯᒪᙱᑦᑐᑦᓄ ᓄᓇᐃᑦ -- ᑭᓯᐊᓂ ᐃᓚᐅᑎᑕᐅᔪᑦ ᓄᓇᕗᑦ ᐅᓄᕐᓂᖏᓐᓄᑦ.

Nunavut: Community Population Projections

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Nunavut	27,688	28,410	29,154	29,885	30,601	31,317	32,036	32,774	33,530	34,311	35,114
Arctic Bay	730	747	763	782	801	819	837	855	876	894	916
Arviat	1,690	1,736	1,784	1,833	1,883	1,929	1,982	2,033	2,088	2,142	2,198
Baker Lake	1,470	1,501	1,534	1,563	1,594	1,624	1,655	1,683	1,712	1,745	1,777
Bathurst Inlet	X	X	X	X	X	X	X	X	X	X	X
Bay Chimo	X	X	X	X	X	X	X	X	X	X	X
Cambridge Bay	1,418	1,449	1,484	1,517	1,550	1,581	1,609	1,642	1,679	1,715	1,752
Cape Dorset	1,213	1,240	1,268	1,298	1,327	1,354	1,382	1,412	1,441	1,471	1,501
Chesterfield Inlet	372	382	391	401	409	420	431	443	452	465	476
Clyde River	771	789	812	830	848	867	890	913	937	959	982
Coral Harbour	845	865	888	911	933	955	978	1,003	1,024	1,049	1,078
Gjoa Haven	984	1,005	1,023	1,045	1,063	1,084	1,102	1,117	1,136	1,154	1,173
Grise Ford	145	146	147	146	146	147	149	151	151	153	155
Hall Beach	635	656	677	696	714	734	754	771	790	810	829
Igloolik	1,379	1,417	1,456	1,495	1,529	1,562	1,594	1,627	1,660	1,701	1,736
Iqaluit	4,762	4,930	5,108	5,278	5,438	5,606	5,768	5,936	6,108	6,289	6,477
Kimmirut	450	461	474	485	496	506	519	530	546	560	573
Kugaaruk	582	601	616	631	648	664	682	701	719	737	756
Kugluktuk	1,389	1,422	1,456	1,490	1,522	1,556	1,585	1,618	1,653	1,686	1,720
Nanisivik	230	225	224	226	225	223	222	220	221	221	220
Pangnirtung	1,506	1,539	1,575	1,613	1,651	1,687	1,722	1,756	1,792	1,831	1,870
Pond Inlet	1,314	1,361	1,405	1,443	1,489	1,532	1,574	1,624	1,668	1,714	1,761
Qikiqtarjuaq	522	537	551	566	582	599	614	629	641	654	668
Rankin Inlet	2,277	2,327	2,376	2,432	2,483	2,527	2,576	2,629	2,683	2,734	2,791
Repulse Bay	615	630	648	664	682	702	720	738	757	777	797
Resolute Bay	243	246	247	249	251	253	252	255	257	260	263
Sanikiluaq	702	722	740	758	776	796	816	834	853	873	896
Taloyoak	804	825	847	866	886	904	925	947	968	992	1,016
Whale Cove	312	321	328	336	344	351	358	367	378	388	397

Notes: Population projections produced by Statistics Canada and the Nunavut Bureau of Statistics include people in the population who are residents of Nunavut and do NOT have a home elsewhere in Canada from which they are temporarily absent. Therefore, temporary residents such as construction crews, residents in mining camps, etc. are not included in the population projections.

Data are suppressed for (a) communities with a population of 50 or less and (b) 'unorganized areas' -- but they are included in the Nunavut total.

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Le Nunavut: Projections pour la population par communautés

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
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Arctic Bay	730	747	763	782	801	819	837	855	876	894	916
Arviat	1,690	1,736	1,784	1,833	1,883	1,929	1,982	2,033	2,088	2,142	2,198
Baker Lake	1,470	1,501	1,534	1,563	1,594	1,624	1,655	1,683	1,712	1,745	1,777
Bathurst Inlet	X	X	X	X	X	X	X	X	X	X	X
Bay Chimo	X	X	X	X	X	X	X	X	X	X	X
Cambridge Bay	1,418	1,449	1,484	1,517	1,550	1,581	1,609	1,642	1,679	1,715	1,752
Cape Dorset	1,213	1,240	1,268	1,298	1,327	1,354	1,382	1,412	1,441	1,471	1,501
Chesterfield Inlet	372	382	391	401	409	420	431	443	452	465	476
Clyde River	771	789	812	830	848	867	890	913	937	959	982
Coral Harbour	845	865	888	911	933	955	978	1,003	1,024	1,049	1,078
Gjoa Haven	984	1,005	1,023	1,045	1,063	1,084	1,102	1,117	1,136	1,154	1,173
Grise Ford	145	146	147	146	146	147	149	151	151	153	155
Hall Beach	635	656	677	696	714	734	754	771	790	810	829
Igloolik	1,379	1,417	1,456	1,495	1,529	1,562	1,594	1,627	1,660	1,701	1,736
Iqaluit	4,762	4,930	5,108	5,278	5,438	5,606	5,768	5,936	6,108	6,289	6,477
Kimmirut	450	461	474	485	496	506	519	530	546	560	573
Kugaaruk	582	601	616	631	648	664	682	701	719	737	756
Kugluktuk	1,389	1,422	1,456	1,490	1,522	1,556	1,585	1,618	1,653	1,686	1,720
Nanisivik	230	225	224	226	225	223	222	220	221	221	220
Pangnirtung	1,506	1,539	1,575	1,613	1,651	1,687	1,722	1,756	1,792	1,831	1,870
Pond Inlet	1,314	1,361	1,405	1,443	1,489	1,532	1,574	1,624	1,668	1,714	1,761
Qikiqtarjuaq	522	537	551	566	582	599	614	629	641	654	668
Rankin Inlet	2,277	2,327	2,376	2,432	2,483	2,527	2,576	2,629	2,683	2,734	2,791
Repulse Bay	615	630	648	664	682	702	720	738	757	777	797
Resolute Bay	243	246	247	249	251	253	252	255	257	260	263
Sanikiluaq	702	722	740	758	776	796	816	834	853	873	896
Taloyoak	804	825	847	866	886	904	925	947	968	992	1,016
Whale Cove	312	321	328	336	344	351	358	367	378	388	397

N.B. Les projections pour la population produites par Statistique Canada et le Bureau de la statistique du Nunavut comprennent des personnes qui sont résidentes du Nunavut et qui n'ont PAS de résidences ailleurs au Canada desquelles elles sont absentes. Il s'ensuit que les projections pour la population ne tiennent pas compte des résidents temporaires tels les membres d'une équipe de construction, les travailleurs des chantiers miniers, etc.

Les données sont supprimées pour (a) les communautés qui comptent moins de 50 habitants et (b) les régions "non-organisées". Par contre, le total pour le Nunavut tient compte de ces données.

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