



Hamlet of Aklavik  
Box 88, Aklavik, NT X0E 0A0

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Inuvialuit Water Board  
PO Box 2531  
Inuvik, NT  
X0E 0T0

Re: Letter of Oct. 20/2014

Please consider this as my responses to your letter of Oct. 20/2014 requesting further information.

1. No public consultation or data gathering has been completed to obtain feedback from the community for this 2014 water licence renewal.
2. Attached to this you will find a copy of the Solid Waste Site Evaluation.
3. There are no existing engineering drawings for the existing solid waste facility.
4. There are no drawings or specifications for this work. The hamlet staff built this without drawings.
5. Talking with my Foreman he has not maintained a record of site visits he has, however we will start keeping records as per the Operation and Maintenance Plan to ensure we are in compliance.
6. Solid Waste Facility:
  - A. We currently do not cover the solid waste site.
  - B. Currently we use a d6 dozer to level and compact solid waste material approximately once every 2-3 weeks depending on need.
  - C. Hamlet Foreman does inspect solid waste site on a continual basis at least once per week.
  - D. There are low berms around the bulky metal waste and honeybag areas, to control runoff from these areas.
  - E. Berms and drainage ditches are used for runoff and drainage control.
  - F. There is no storage and treatment system for contaminated drainage water at the solid waste facility. Contaminated drainage due to spills is handled according to the Hamlet's Spill Plan as attached to the Background Report.
  - G. The landfill is surrounded by trees which help keep windblown debris contained.
  - H. Hazardous wastes are separated somewhat from the other wastes. The solid waste facility does not have a separate bermed area for storage of hazardous waste. Segregation of waste at the landfill has been improving and the Hamlet will continue to improve the separation and organization of hazardous wastes. At this time we have not considered sending the Hazardous material out for final disposal, however will look into this approach over the next while.

I. The solid waste facility is inspected on a weekly basis and the regular residential type waste is leveled weekly to ensure volumes are not out of control of natural elements, ie: wind, or animal intervention.

7. Through the Dillon report on the solid waste site evaluation states the Hamlet has approximately 6 years of life expectancy of the current facility and with through compaction and management of the facility we are estimating we can get another 3-5 years of useable life out of this facility. As for the future solid waste facility we have not really started any real planning for this as we need to firstly get approvals from GNWT to occupy the land and then to build a road and construct a bridge to the area that has been informally designated as the new solid waste facility. Of course all this needs substantial dollars to complete each of these items, however the Hamlet needs to get the land within the Community Boundaries before any type of expenditures can start to be considered.

8. It is my understanding that the Sewage Treatment Plan and the Solid Waste O & M Plan have been combined into the KBL Environmental LTD.'s document of July 30, 2012 called the Operation and Maintenance Plan for the Solid Waste Site and Lagoon. Copy of which has been submitted previously.

9. The Hamlet shall provide a preliminary abandonment and restoration plan for the solid waste facility and the sewage treatment facility once we start our planning process for the new facility.

10. The Hamlet's solid waste and sewage generation has not changed significantly from the previous term of the water licence, therefore no new impacts are expected from continued use of the facility. No studies have been completed to verify this. The Hamlet has not hired a consultant to assess the effects on the wetland from lagoon discharges. However, as described in the Background Report, based on available information, the lagoon effluent meets the water quality requirements in the current Water Licence.

11. Spill Contingency Plan:

A. Distribution List:

Dept. of MACA Lorrie Fyfe – 867-777-7120

NWT Water Board – Mardy Semmler – 867-678-2942

Hamlet of Aklavik – Foreman Dean Arey – 867-978-2351

Dept. of Lands GNWT – Conrad Baetz – 867-777-8901

Dept. of Lands GNWT – Don Arey – 867-777-8906

Gwich'in Land and Water Board – Paul Sullivan – Chair – 867-777-7960

B. Hamlet Environmental Policy – Attached

C. At present, we only store waste oil at the solid waste facility, and will update Table 1.2 if and when other hazardous material will be accepted at the facility.

D. Updated contact information within Section 4.2 Off-Site Resources attached:

E. as per attached:

In closing I hope this information assists in determining our licence. If you require any further information please feel free to contact me.

Yours Truly

A handwritten signature in blue ink, appearing to read "Fred Behrens". The signature is fluid and cursive, with a long horizontal stroke at the end.

Fred Behrens  
SAO Aklavik

## **Section 5**

### **Training Program**

Much the same as the Hamlet did during the Mock airport disaster training exercise held in April 2014. We will notify all relevant regulators of any and all mock spill exercises we will hold and a record of all staff training and when the training takes place will be documented and installed in each staff member's personal file. Along with any certificates the staff may earn from the exercises or any other training we have staff participate in.

## 4.2 Off-Site Resources

|                                           |              |                   |  |
|-------------------------------------------|--------------|-------------------|--|
| Hamlet of Aklavik                         | SAO          | 867-978-2351      |  |
| Hamlet of Aklavik                         | Foreman      | 867-978-2351      |  |
| Aklavik Health Centre                     |              | 867-978-2516/2361 |  |
| Inuvialuit Land Administration            | Main Office  | 867-977-7100      |  |
| NWT 24 hour Spill Line                    |              | 867-920-8130      |  |
| NWT Emergency Services - MACA             | Manager      | 867-873-7554      |  |
| RCMP Aklavik                              |              | 867-978-1111      |  |
| Environmental Health Officer              |              | 867-777-7250/7220 |  |
| Tele-Care Health Line                     |              | 888-255-1010      |  |
| Volunteer Fire Dept. Aklavik              |              | 867-978-2222      |  |
| Dept. of Lands GNWT                       | Conrad Baetz | 867-777-8901      |  |
| Dept. of Lands GNWT                       | Don Arey     | 867-777-8906      |  |
| Environment and Natural Resources Aklavik | Ian McLeod   | 867-978-2248      |  |
|                                           |              |                   |  |
|                                           |              |                   |  |
|                                           |              |                   |  |

# The Hamlet of Aklavik

## Environment Policy

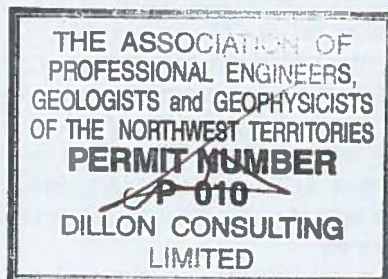
### Policy:

1. The Hamlet shall maintain and manage its Disposal Site in accordance with the Operation and Maintenance Plan of the Hamlet of Aklavik.
2. The Hamlet will provide collection of regular household and light commercial waste from all Hamlet residents and businesses within the boundaries of the Hamlet.
3. Recycling initiatives will be encouraged and a program will be implemented being modified as more and more products are being accepted by the GNWT Dept. of EN&R's recycling program.
4. A household Hazardous Special Waste collection program will be organized annually for use by our residents.
5. The Hamlet shall endeavour to educate all residents, visitors and property owners to the different programs and services offered within the Hamlet geared to waste collection, disposal and diversion.
6. The Hamlet shall attempt to participate in all funding programs offered through the Government of the NWT and various other sources for projects improving effectiveness and efficiency and increasing waste diversion.
7. The Hamlet will attempt to ensure all hazardous material is contained and safe from accidental spillage and educate the residents as to what must be done in the event of a hazardous material spill within the community boundaries.
8. To protect the environment and residents from harmful material that may be within the Municipal Boundaries

**Hamlet of Aklavik -  
Solid Waste Site  
Evaluation**

*Final Report*

*March 2009*



Hamlet of Aklavik Solid Waste Site Evaluation

Hamlet of Aklavik

08-9461-2010

Colin Joyal, P.Eng. - Project Manager

*Submitted by*  
**Dillon Consulting Limited**

R:\PROJECTS\DRAFT\089461 Aklavik\2010 Landfill  
Site\Report\Aklavik Solid Waste Site Evaluation FINAL.doc

(In reply, please refer to)

**Our File: 08-9461-2010**



March 10, 2009

Hamlet of Aklavik  
Box 88  
Aklavik, NWT X0E 0A0

Attention: Mrs. Evelyn Storr

4920  
47<sup>th</sup> Street  
Suite 303  
Box 1409  
Yellowknife  
Northwest Territories  
Canada  
X1A 2P1  
Telephone  
(867) 920-4555  
Fax  
(867) 873-3328

**Aklavik Solid Waste Site Evaluation Final Report**

Dear Mrs. Storr:

We are pleased to provide you with the final report entitled "Hamlet of Aklavik Solid Waste Site Evaluation - Final Report". This report is submitted in accordance with our proposal dated May 13, 2008.

The report outlines the solid waste management needs for the community, regulatory requirements and evaluation of five system options. The five system options along with order of magnitude cost estimates are presented for comparative purposes and further consideration by the community.

If you have any questions, please do not hesitate to call me at 1-867-920-4555 ext. 4103 or [cjoyal@dillon.ca](mailto:cjoyal@dillon.ca).

Yours sincerely,

**DILLON CONSULTING LIMITED**

A handwritten signature in blue ink, appearing to read "Colin Joyal".

Colin Joyal, P.Eng.  
Project Manager

**Dillon Consulting  
Limited**



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## **EXECUTIVE SUMMARY**

Aklavik's existing solid waste disposal facility has been experiencing operational problems in recent years, in particular related to the frequently occurring floods and drainage issues around the community. The landfill site is reported to be nearing its capacity. In 2008 the Hamlet of Aklavik retained Dillon Consulting Limited to complete a work program to evaluate the current landfill site and to identify opportunities and limitations of the existing site and what requirements need to be fulfilled for the siting of a new landfill based on the community's twenty-year requirements.

We participated in a community meeting at the start of the project and key points brought forward in this meeting related to the solid waste issues were:

- Existing Water Licence is coming up for renewal. Landfill O&M Manual is still outstanding;
- Community wants alternate landfill sites to be identified;
- Concerns raised with the existing system:
  - Spread of garbage spreading beyond the area and into small creeks;
  - Maintenance of the facility; and
  - Control of waste being deposited;

A site investigation was completed by Dillon along with the Hamlet Foreman on June 3, 2008. This information along with site survey data, mapping, INAC inspection reports and relevant regulations and guidelines were reviewed.

Several significant issues related to the existing site are identified in the report. The most significant issues relate to the protection of public health and the environment. Rehabilitating the existing site to comply with the current relevant regulations would be very challenging and not feasible where regulations address site location requirements. It is recommended that the community investigate a new site for solid waste disposal and discontinue operation of this facility allowing site closure to proceed as soon as possible.

Several actions should be implemented immediately to improve site conditions and meet regulatory requirements where possible;

1. Develop an Operations and Maintenance Manual for the site;
2. Segregate incoming waste materials into separate areas such as; domestic waste, bulky waste, and household hazardous wastes;
3. Discontinue accepting hazardous wastes such as contaminated soil without proper testing and storage and treatment facilities;
4. Develop a proper household hazardous waste (HHW) storage and handling program to deal with HHW such as empty propane cylinders, waste batteries, paint containers etc.;

## **1 INTRODUCTION AND BACKGROUND**

The Hamlet of Aklavik is located on the Peel channel of the Mackenzie River Delta, 113 km south of the Arctic Coast. According to the 2006 Census, the population is 594, of which 545 are aboriginal. Traditionally, Gwich'in and Inuvialuit gathered in Aklavik to trade goods. In 1912, the Hudson's Bay Company set up a post across the channel to trade for furs. Today, Aklavik is accessible by air, barge or winter ice roads.

Aklavik's existing solid waste disposal facility has been experiencing operational problems in the recent years, in particularly related to the frequently occurring floods and drainage issues around the community. The landfill site is reported to be nearing its capacity. In May 2008, Aklavik retained Dillon Consulting Limited (Dillon) to evaluate the current landfill site and to identify opportunities and limitations of the existing site or what requirements need to be fulfilled for the siting of a new landfill based on the community's twenty-year requirements.

In June 2008, Dillon completed a site visit and a topographical survey to assess the suitability of the existing site and collect site data. This report summarizes legislative landfill site requirements, site development constraints and the current site condition. It also presents five (5) system options for consideration by the community.

### **1.1 Scope of Work**

Currently, the solid waste disposal site in Aklavik is reportedly nearing its design capacity. This study is intended to investigate the current capacity of the site, to evaluate the site, and look into the potential to expand the site along with reviewing the requirements for siting a new landfill based on the Community's twenty-year requirements.

The scope of work for the Solid Waste Site Evaluation includes the following:

- Complete a site visit and provide site inspection report;
- Identify requirements needed to apply for permits from the water board (if required);
- Identify whether a topographic and/or geotechnical survey is required and, if required, include costing information;
- Recommend if the current site is to be expanded or a new site is required; and,
- Recommend solutions to deal with current solid waste site issues and provide alternatives where required.

- Community Plan (1997);
- Zoning Map (1997); and,
- Aklavik Street Name Map.
- The Aklavik Road and Drainage Report, October 2005, by DoT;
- Baseline hydraulic inventory;
- Northwest Territories Water Licence No. N3L3-0570 (effective June 30, 1999; expires June 30, 2009);
- INAC Water Licence Inspection Reports (2004, 2005, 2007); and,
- Anecdotal information regarding problem areas and historic drainage patterns derived from interviews with community representatives.

#### **1.4 Community Meeting**

A meeting with Dillon and members of the Hamlet council and staff was held on June 3, 2008. The minutes to this meeting are included in Appendix A. Key points brought forward in this meeting related to the solid waste issues were:

- Existing Water Licence is coming up for renewal. Landfill O&M Manual is still outstanding;
- Community wants alternate landfill sites to be identified;
- Concerns raised with the existing system:
  - Garbage spreading beyond the area and into small creeks;
  - Maintenance of the facility;
  - Control of waste being deposited; and,
  - Approval for Dillon to collect additional survey data for the existing site.

B, Item 8, and in the *Guidelines for Planning, Design, Operations and Maintenance of Modified Solid Waste Sites* has not been prepared for the site.

Residents have complained about smoke from the open burning of waste. This practice was stopped in 2002 and reportedly only wood, clean paper and cardboard is burned. However, residents continuously complain about issues regarding the dirtiness and accumulation of waste piles at the site.

Groundwater and surface water monitoring is not required for the solid waste site as part of the water licence requirements.

Indian and Northern Affairs Canada (INAC) conducts inspections at the site. During the last inspection in October 2007 (INAC, 2007) the following concerns were noted in the report:

- Burning of non-segregated waste is no longer allowed;
- An updated O&M manual has not been submitted to the regulator;
- Signage is present, but additional signage is needed;
- Spillage of used oil was noticed in the waste oil storage area;
- Hazardous waste areas are becoming permanent storage areas;
- Berm for honey bag pit should be lengthened and maintained so it surrounds the whole pit; and,
- A sheen was noticed on the water in the wetland area and ditch along the road outside of the berm on the east side of the bulky metal waste area.

Other notable concerns from past reports include:

- Considerable wind blow debris is escaping the site (INAC, 2004) (INAC, 2005)
- Poor segregation of materials (INAC, 2004)
- Numerous lead acid batteries are disposed in various areas at the site. (INAC, 2004)
- Asbestos containing materials were buried at the site. This location has been marked. (INAC, 2004)(INAC, 2005)
- Open burning was occurring at the site (INAC, 2004)

### **2.3 Landfill Operation**

Residential waste from the community is collected three times per week Monday, Wednesday and Friday and disposed at the landfill site. Wastes are generally not inspected, weighed or segregated. Currently, the site is filled above ground using the area method. There is no evidence if below grade landfilling was used in the past. The waste is pushed three times per week but not compacted. There is no evidence of cover usage. Equipment available for the waste management operation are one loader, one dozer, one grader and two dump trucks. Waste materials disposed at the site include the following:

Table 2.1: Summary of Issues Related to Existing Landfill Site

| ISSUE                                                                  | TYPE                                               | COMMENTS                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Potential flooding of landfill and site access road                    | Operational                                        | GNWT Guidelines recommend site development beyond 1 in 200 year return levels                                                                                                                                                                                                                                               |
| Proximity to Airport<br>-Site is approximately 1.5 km from the airport | Regulatory                                         | Minimum recommended setback for siting a new facility is 3 km from landfill to airport (Soberman, 1990)                                                                                                                                                                                                                     |
| Proximity to surface water                                             | Regulatory<br>(Environmental Protection Act)       | The landfill is very close to a number of water bodies including Clearing Lake Sewage Lagoon, and Pump Lake (which potentially has connectivity to surface water ditches within the Hamlet). Flood levels would overtop the landfill. The required setback of 30 m from high water level of fish bearing waters is not met. |
| Inadequate signage and clear segregation of materials                  | Operational                                        | Issue identified in 2007 INAC inspection report                                                                                                                                                                                                                                                                             |
| Landfill contains improperly disposed hazardous waste materials        | Regulatory<br>(Environmental Protection Act)       | Inspection report (INAC, 2004) references asbestos waste materials deposited in the landfill                                                                                                                                                                                                                                |
| Current Water Licence will expire shortly                              | Regulatory                                         | NTWB Licence No. N3L3-0570 expires June 30, 2009                                                                                                                                                                                                                                                                            |
| Landfill includes the disposal of honey bags                           | Regulatory                                         | Bagged toilet waste disposal is permitted in the water licence however the berm required maintenance.                                                                                                                                                                                                                       |
| No updated O&M Manual                                                  | Regulatory                                         | Issue identified in 2007 INAC inspection report and required in Water Licence.                                                                                                                                                                                                                                              |
| Complaints of open burning                                             | Regulatory (NWT Fire Protection Act & Regulations) | Controlled burning of clean wood and paper only is permitted                                                                                                                                                                                                                                                                |
| Complaints of dirtiness and waste accumulation                         | Operational                                        |                                                                                                                                                                                                                                                                                                                             |

covering an area approximately 50m by 100m wide. Placing a 1.5m thick lift of waste in this area would provide space for a volume of approximately 7,500 m<sup>3</sup>. Using the waste generation estimates described in section 3.2, this would provide capacity for approximately 6 years of waste (from the date of survey in June 2008).

Once a new facility is operational, the existing site must be closed to ensure the long term protection of the environment. Site closure includes development of a closure plan for approval by the water board (at least 6 months prior to closure) and should include the following information

- Future land use;
- Leachate prevention and monitoring;
- An implementation schedule;
- Mapping which shows all disturbed areas, borrow materials areas, and site facilities;
- Consideration of altered drainage patterns;
- Type and source of cover materials;
- Identification and removal of hazardous wastes including waste oil; and
- Contaminated site remediation

(GNWT, 2003)

The site should be capped with 600 mm of material and graded to ensure positive drainage. While development of a closure plan is not part of the scope of this assignment, the footprint of the site is estimated to be 13,000m<sup>2</sup> thus requiring approximately 7,800 m<sup>3</sup> of cover material (clayey material).

## **2.6 Recommendations for Existing Landfill Site**

As outlined above, there are several significant issues related to the existing site. The most significant issues relate to the protection of public health and the environment. Rehabilitating the existing site to comply with the current relevant regulations would be very challenging and not feasible where regulations address site location requirements. It is recommended that the community investigate a new site for solid waste disposal and discontinue operation of this facility and initiate site closure as soon as possible.

Several actions should be implemented immediately to improve site conditions and meet regulatory requirements where possible;

1. Develop an Operations and Maintenance Manual for the site;
2. Segregate incoming waste materials into separate areas such as; domestic waste, bulky waste, and household hazardous wastes. This can be achieved through effective use of signage, regular site maintenance and public education;
3. Discontinue accepting hazardous wastes such as contaminated soil without proper testing and storage and treatment facilities;



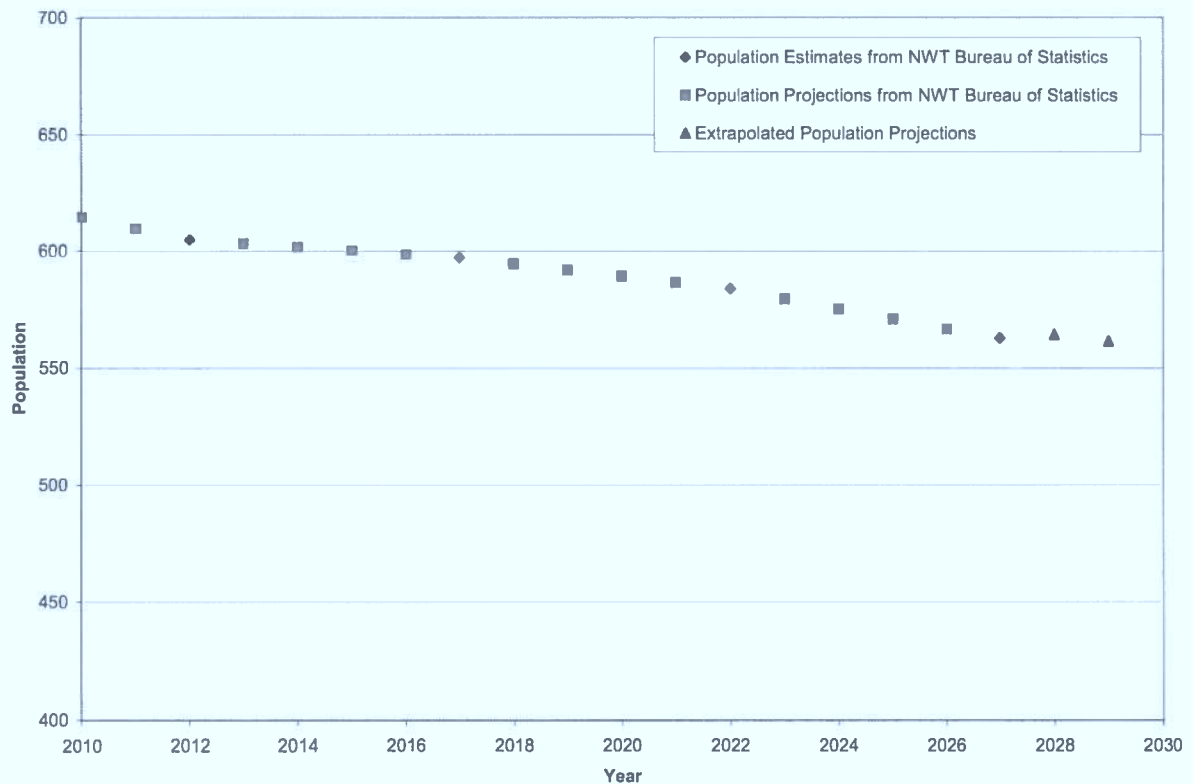
### 3 SOLID WASTE SYSTEM REQUIREMENTS

Solid waste management system requirements have been evaluated for the Hamlet of Aklavik to develop waste management requirements for a 20 year planning horizon.

#### 3.1 Population Projections

Predicted population values were attained from the NWT Bureau of Statistics (Appendix D) and are illustrated in Figure 3-1. The solid waste management system is to be designed for a 20-year planning horizon. Population projections were available up to 2021; therefore values extrapolated from this data were used to estimate the population up to 2029.

Figure 3-1: Population Projections for Aklavik, NT



The population of Aklavik has been declining over the past years. Based on the recent numbers, the bureau of statistics has projected that the population will steadily decrease. Population projections from the Community of Aklavik Community Plan (Aklavik, 1997) indicate different population trends than the

### 3.3 Solid Waste Facility Operations

To minimize public health and environmental hazards, a solid waste landfill is used for land disposal of refuse. This is done by periodically spreading the refuse into thin layers, compacting the refuse, and then applying granular cover material. A sanitary landfill requires daily cover of compacted refuse. A modified landfill decreases the frequency of cover placement to once a month or even once a year. In northern climates where covering of refuse daily is impractical due to severe winter weather and in small communities that do not have staff and equipment dedicated to disposal operations, a modified landfill operation is the generally accepted standard. Operations for northern community landfills are recommended as follows:

- Compaction rates of 1:3 or better are achieved by working appropriate heavy equipment over the waste 3 – 5 times;
- Compaction is undertaken once a week or with collection frequency;
- Intermediate cover material is applied in 100 mm thick layers in the spring and fall (or more often if feasible); and,
- Final cover material is applied in a 600 mm thick layer on top of the landfill for closure.

The following three landfilling methods are commonly utilized in northern communities:

- The Area Method;
- The Depression Method; and,
- The Trench Method.

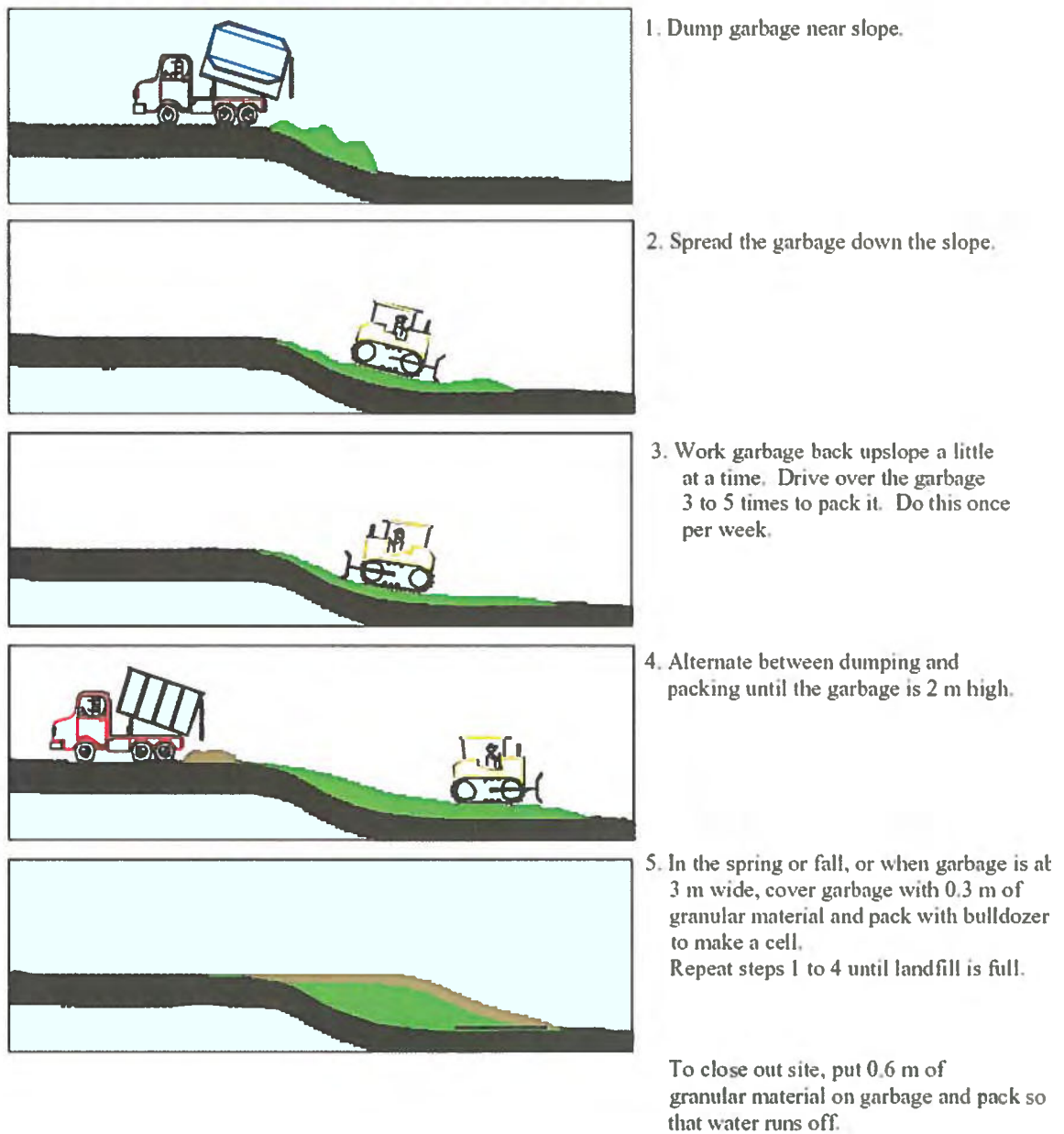
#### *Area Method*

The area method is selected where rock, a high water table, or permafrost prevents the excavation of trenches. Wastes are disposed directly on the ground, worked with heavy equipment such as a bulldozer, and packed against a constructed berm. In the area method, waste is emptied out of collection vehicles at the bottom of a short berm. The berm should be 2 m high. Wastes are worked and compacted against the berm. In the spring or fall, or when the compacted garbage is 3 m wide, the compacted wastes are covered with 300 mm of granular material. Dry, sandy material is preferred where available. The process is repeated until the landfill is full.

*Depression Method*

A variation of the area method, the depression method uses a natural slope. Wastes are disposed directly on the ground, worked with heavy equipment such as a bulldozer, and packed against the slope. Soil is added as required and available to provide suitable cover.

**Figure 3-3: Depression Method (GNWT, 2003)**



### **3.4 RECOMMENDED FACILITY OPERATIONS**

Given the high water table in the area around Aklavik, it is deemed that the trench method will not be well suited for use in the area. Similarly, there are not any natural depressions in the area so the depression method is not likely to be used. This leaves the area method as a suitable landfilling method. It is estimated that landfill area approximately 65 m x 100 m is required to accommodate the 20-year disposal need for the Hamlet of Aklavik.

|   | Composite             | Concerns                                                                                                                                                                                               | At Risk                                                                                               | Pathway                                                                                                     |
|---|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| C | Wildlife<br>Conflicts | <ul style="list-style-type: none"> <li>birds</li> <li>animals</li> </ul>                                                                                                                               | humans (plane traffic, nuisance)<br>humans (human / bear conflict)<br>bears (destroyed as a nuisance) | atmosphere<br>direct contact<br>direct contact                                                              |
| D | Transportation        | <ul style="list-style-type: none"> <li>accidents</li> <li>noise</li> <li>dust</li> </ul>                                                                                                               | humans (health)<br>humans (aesth.)<br>humans (aesth.)                                                 | transportation route<br>atmosphere<br>atmosphere                                                            |
| E | Social                | <ul style="list-style-type: none"> <li>site aesthetics</li> <li>compatible land use</li> </ul>                                                                                                         | adjacent land owners<br>adjacent land owners                                                          | reduced enjoyment of life<br>reduced enjoyment of life                                                      |
| F | Economic              | <ul style="list-style-type: none"> <li>waste transport/transfer</li> <li>capital cost</li> <li>operating cost</li> <li>life and capacity</li> <li>land value</li> <li>availability of cover</li> </ul> | taxpayers<br>taxpayers<br>taxpayers<br>taxpayers<br>adjacent land owners<br>taxpayers                 | reduced income<br>reduced income<br>reduced income<br>reduced income<br>reduced net worth<br>reduced income |

#### 4.1 Solid Waste Facility Siting Regulations

A community wishing to develop a new landfill, a lateral expansion or landfill closure must undergo the regulatory process as described in the Guidelines for the Planning, Design, Operation and Maintenance of Modified Solid Waste Sites in the NWT (GNWT, 2003), and submit a project description. Based on the Guidelines, the regulations, criteria and stipulations for the siting of a new landfill are summarized in Table 4.2.

**Table 4.2: Landfill Siting Checklist (GNWT, 2003)**

| Criterion                                                                                                             | Stipulation                                                             | Reference       |
|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------|
| Landfills should be design for a minimum 20-year design life with planning considerations for at least a 40-year life | Solid waste volume model given in guidelines                            | MACA guidelines |
| Areas in flood plain                                                                                                  | Restricted beyond 1 in 200 year return                                  | MACA guidelines |
| Climatic conditions of region; geological and terrain conditions of site                                              | Consider and take in account                                            | MACA guidelines |
| Cover material availability                                                                                           | Where possible, in a location where cover material is readily available | MACA guidelines |

## **4.2 Landfill Constraints**

The solid waste siting constraints for a future site as outlined in Table 4.2 are displayed on the constraint map shown in Appendix B. The constraint map is a useful visual tool for demonstrating areas that may be suitable for development of a landfill site.

Aklavik is known to experience severe flooding conditions. The Community Plan specifies the following:

“Aklavik has been formally designated as a flood risk area under the Canada – NWT Flood Damage Reduction and Flood Risk Mapping Agreement \*May 2, 1979. Council and the Government of the NWT encourage all developers to be aware of flood hazards in the community and to build in accordance with the Agreement” (Aklavik, 1997)

Taking this into consideration, along with the recommendation for the landfill to be situated beyond the 1 in 200 year flood zone, essentially eliminates all potential locations within the Hamlet boundaries. Further options outside of the Hamlet boundaries are identified below.

easier to handle and transport using readily available transfer vehicle (such as gravel trucks from the periodic gravel haul).

Costs of this option would be proportional to the amount of waste generated within the community for disposal. Costs could be reduced and controlled by implementing community procurement, recycling, composting and public education programs. Recyclable materials such as cardboard, metal, tires, cans etc would be segregated from the waste stream and stockpiled separately for shipping to recycling markets when sufficient quantities are present. An evaluation of the economics of the system would also indicate if the operation of a waste baler to decrease the volume of wastes and recyclables for hauling would be advantageous.



Figure 5-1: Example Waste Baler (Kindersley, Saskatchewan)

### 5.3 Option 1B - Storage and Transfer Haul - New Landfill

Similar to Option 1A, a storage and transfer haul option could also be set up with final disposal at a new landfill site. One of the main challenges in siting a landfill for Aklavik is to locate an area that can have reliable access and be outside of the flood zone. The constraint map in Appendix B indicates that the entire area within the Hamlet of Aklavik Municipal Boundary is designated as a flood risk area. Looking beyond the immediate vicinity of the community for a site that is outside of the flood risk area leads to the Mount Gifford area of the Richardson Mountains to the west of the community. There is currently a winter road to this area which is used to access gravel resources approximately 17 km from the Hamlet as shown in Figure 3 in Appendix B.

Road routing and construction would be extremely and challenging and expensive. This road traverses soft terrain with many small lakes and streams and would be subject to flooding and erosion. Planning should include allowances for periods of time when the road is not passable. Waste would have to be stored for periodic transfer hauling to the facility when the access road is passable. The temporary storage site would be relatively small and would be sized to accommodate sufficient waste for the required storage period and would be sited in accordance with the siting requirements. Similar to Option 1A, the need for a waste baler would also be reviewed. Although a specific location for the landfill has

- Waste storage and feed preparation;
- Waste pre-processing;
- Combustion producing hot gases;
- Waste heat or electricity generation (if desired);
- Air-pollution control (if needed); and,
- Residue (ash) handling.

Incinerators occupy relatively little space and are generally housed in a steel building sited relatively close to the community. A by-product of the incineration process is the production of ash. An effective waste screening program is essential to ensure that emissions standards are met and waste ash quality is not compromised.

### 5.7 Evaluation of Waste Management System Options

The advantages and disadvantages of the five (5) waste management system options are presented in Table 5.1.

**Table 5.1: Waste Management System Options – Advantages and Disadvantages**

|                                                           | <b>Advantages</b>                                                                                                                                                                                                                                                                                         | <b>Disadvantages</b>                                                                                                                                                                                                                     |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option 1A - Storage and Transfer Haul – Regional Approach | <ul style="list-style-type: none"><li>• Eliminates the need for the construction and operation of a landfill</li><li>• Eliminates the long term liabilities of landfill ownership</li><li>• Provides incentive for waste reduction and recycling programs</li><li>• Utilizes existing backhauls</li></ul> | <ul style="list-style-type: none"><li>• Requires negotiation with and approval from other regions</li><li>• Issue of waste storage must be addressed</li><li>• Potentially required a waste baler which adds to operating cost</li></ul> |



Table 5.2: Summary Evaluation of Waste Management System Options

|                           | OPTION 1A – STORAGE AND TRANSFER HAUL - REGIONAL APPROACH                                                                                      | OPTION 1B – STORAGE AND TRANSFER HAUL - NEW LANDFILL                                                                                         | OPTION 2 - NEW LANDFILL WITH FLOOD PROTECTION                                                                                                            | OPTION 3 - EXISTING SITE WITH FLOOD PROTECTION                                                    | OPTION 4 – WASTE INCINERATION                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Capital Cost              | <b>Low - Moderate</b> dependent on waste volume, back haul rate, baler requirement & fees.                                                     | <b>Moderate - High:</b> >\$7.5 million, dependent on access road condition and upgrades required.                                            | <b>Moderate:</b> >\$5 million                                                                                                                            | <b>Moderate:</b> >\$5 million                                                                     | <b>Moderate:</b> >\$5 million                                                                                      |
| Operating Cost            | <b>Low - Moderate</b> level of complexity dependent on system requirements (baler).                                                            | <b>High</b> O&M cost to cover maintenance and large waste haul distance.                                                                     | <b>Moderate</b>                                                                                                                                          | <b>Moderate</b>                                                                                   | <b>High</b> O&M cost for fuel, operation, maintenance, & ash disposal.                                             |
| System complexity         | <b>Moderate</b> level of complexity for baler operation & management of system logistics. Offloads regulatory compliance on host municipality. | <b>High</b> level of complexity in access rd construction and design in unfavorable conditions. <b>Low</b> level of operating complexity.    | <b>Low</b> level of complexity. Construction could be completed with local equipment and staff.                                                          | <b>Low</b> level of complexity. Construction could be completed with local equipment and staff.   | <b>High</b> level of system complexity requiring specialized operator and external maintenance.                    |
| Regulatory Considerations | Approval required for temporary waste storage facility, and waste acceptance at host landfill.                                                 | Would be sited to meet all regulatory requirements; however land use approvals are required as it will be outside of the municipal boundary. | Located in flood plain. Approval would be required on flood protection. Land use approvals are required as it will be outside of the municipal boundary. | Will <b>not</b> meet all regulatory requirements.                                                 | Non-standard solution. Challenges to meet emissions standards and potential for ash to be classified as hazardous. |
| Sustainability            | Incentive to promote waste reduction programs                                                                                                  | Large amount of road upgrading. Road will be subject to washouts.                                                                            | Protecting against flood conditions is challenging.                                                                                                      | Potential connectivity to water in community. Protecting against flood conditions is challenging. | Requires waste ash disposal.                                                                                       |

Five (5) waste management system options are presented for consideration by the Hamlet. These options are as follows:

- Option 1A – Storage and Transfer Haul – Regional Approach;
- Option 1B – Storage and Transfer Haul – New Landfill;
- Option 2 - New Landfill with Flood Protection;
- Option 3 - Existing Site with Flood Protection; and,
- Option 4 - Waste Incineration.

Not all of the options presented can meet all of the regulatory requirements identified. The options along with their costs, effectiveness and long term implications should be reviewed. A comparative evaluation of the options is presented in a summary table in Section 5.7. At the meeting with the Municipal Service Committee on January 19, 2009 it was indicated that a new landfill outside of the floodplain in the area of the Richardson Mountains (option 1B) is the preferred option to be further evaluated by the community. This option includes the construction of approximately 17 kilometres of access road at an estimated cost of \$5,000,000 dollars. It is understood that the community has other needs for an access road to the Richardson Mountains, namely for access to granular materials. The overall value for the community must be considered before undertaking a challenging, and costly project such as this.

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**APPENDIX A**

**CORRESPONDENCE**

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**Municipal Service Committee Meeting  
June 03, 2008  
12Noon**

**In Attendance: Mayor, Knute Hansen  
Deputy Mayor, Jerome Gordon  
Councilor Eddie Greenland  
Councilor Dave McLeod  
Councilor Don Storr  
Councilor Greg Wilson**

**Staff: SAO, Evelyn Storr  
Foreman Dean Arey**

**MACA: Lori Fyfe**

**Dillon Contracting: Colin Joyal  
Lance**

**Mayor Knute Hansen called the committee meeting to order at 12:25 pm**

**Motion by Don Storr                      Seconded by Eddie Greenland  
To approve the agenda as presented.**

**Colin of Dillon Contracting gave the committee information as to what they will be doing during their time in the community.**

**He advises the committee that the surveyor Lance will be in the community till Saturday.**

**Colin talked about the landfill site and the responsibilities that the Hamlet has that pertains to their water license and that the water license is coming up for renewal. He advises the committee that there should be an operations and maintenance manual for the landfill site. SAO was has not come across one in the office. Lori will check with INAC on this.**

**Councilor Don Storr asked about the gravel requirements for the work that will come from the outcome of the plan for the drainage and solid waste site.**

**Colin asked about the funds that are available for gravel sources and he was advised that all this information is in the Capital Plan and SAO will provide him with that information.**

**Foreman and Colin will go out after the meeting and look at the source of the gravel that we get.**

# Hamlet of Aklavik – Solid Waste Facility Site Investigation

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## 1. GENERAL INFORMATION

Community: Hamlet of Aklavik

Facility name: Solid Waste Facility

Address: \_\_\_\_\_

Interview conducted by: Colin Joyal – Dillon Consulting Limited

Interview with: Dean Arey - Foreman

Other participants: \_\_\_\_\_

Briefly describe the location of the facility in terms of access roads and nearby landmarks:

North West of the Hamlet, past the tank farm, adjacent to the Lagoon truck dump. Access from

The Hamlet along the airport road parallel to the river bank.

Legal land description: \_\_\_\_\_

Ownership of property: Within Hamlet of Aklavik Municipal Boundary

Leased       Owned by municipality     Owned by operator     Other arrangement  
(describe below)

---

Is there a site plan of the facility?     Yes       No

### 3. LANDFILL LOCATION AND SITING

Describe the access road to the landfill. (e.g. gravel, all weather, distance from public road)

Access along airport road parallel to the river. Road is gravel and subject to flooding as it quite close to the river (approx 30m at the nearest point during summer water levels). The road also services the tank farm and lagoon. After the tank farm, there is a gate to close off access to the landfill and lagoon.

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Is the landfill visible to local residents?  Yes  No

How far is the landfill located from the following  
(all measurements approximate, taken from Google Earth 2008 Tele Atlas) :

Housing: 1,280m in S-E direction  
\_\_\_\_\_  
Airport: 1,425m  
\_\_\_\_\_  
Public roads: 325m to public access road at tank farm  
\_\_\_\_\_  
Right of ways: \_\_\_\_\_  
\_\_\_\_\_  
Surface water: 60m to Pump Lake  
320m to Peel Channel  
\_\_\_\_\_  
Firebreak: \_\_\_\_\_  
\_\_\_\_\_  
Other (e.g. railway): 184 to tank farm  
\_\_\_\_\_

Is the facility located downwind of the community?  Yes  No

Has the landfill received any odor or smoke complaints?  Yes  No  
If yes, describe.

Only when burning garbage. This practice has been stopped since approx 2002. Now only clean wood, clean paper, cardboard is burned and there are no longer complaints.

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**5. OPERATIONS**

Describe how waste is delivered to the landfill.

Residential waste in the community is collected 3 times per week on Monday, Wednesday and Fridays. There is approximately 2-3 loads per day.

Describe the procedure to check and approve what type of waste is brought to the landfill.

Wastes are not inspected

Describe the procedure to track the amount of waste brought to the landfill.

Waste quantities are not measured.

List the different companies that bring waste for disposal to the landfill. (e.g. Company X, Company Y)

- All waste in the Community is collected by the community 3 times per week.
- No other companies bring waste to the site

Are the different sources of waste listed above mixed together when disposed in the landfill?

Yes       No

If no, describe how the waste is disposed separately.

What equipment is used for on-site landfill operations? (e.g. bulldozer, pick-up truck, etc.)

- Loader 250 WA Komatsu
- Cat D6 (rented from K&B as and when)
- Grader 710A Champion
- Dump truck 6m3
- Dump truck (rented from K&B as and when)

Describe the landfill design. (e.g. area method, depression method, trench method)

The site is currently being filled using the area method. It is unclear if trenches were used in the past. There are not any trenches or depressions used at the site.

generally seeps by fall.

A berm was constructed around the bulky metals area in 2007. Aside from this, there is no evidence of management of surface water or snow at the site. There is ponding of water in the waste areas.

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Describe how the landfill operates in winter conditions.

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How many employees work at the landfill?

The community foreman is responsible for the landfill operation and is supported by one operator.

---

What facilities are provided for employees at the site? (e.g. office, washroom, etc.)

- none
- 

Who is responsible for worker safety at the site?

- SAO
- 

Describe any worker training/qualification programs that are provided.

No  
First Aid  
Heavy Equipment Operator Training (MACA SOCG)

---

Describe the emergency response procedure and equipment available at the site (e.g. fire extinguishers, communications, etc.). Please provide a copy of any documentation.

- none
- 

Describe the procedure for reporting accidents or emergency situations.

- There is no Landfill O&M manual or Community emergency plan
  - Fire department supports staff in case of fire.
- 
- 
-



**7. MONITORING AND INSPECTIONS**

Describe the monitoring and reporting programs conducted at the site as part of the landfill due diligence program.

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Is ground water monitoring required at the site?     Yes             No

Is surface water monitoring required at the site?     Yes             No  
If yes, describe the monitoring program.

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Which regulatory agencies conduct inspections at the landfill and how often is this done?

- Indian and Northern Affairs Canada conducts inspections. The last inspection was on October 19, 2007.

Has the facility received any violations from regulatory agencies?     Yes             No  
If yes, please explain.

The 2007 Inspection report noted the following

- Burning of non-segregated waste is no longer allowed.
- An updated O&M manual has not been submitted to the regulator.
- Signage is present, but additional signage is needed.
- Spillage of used oil was noticed in the waste oil storage area.
- Hazardous waste areas are becoming permanent storage areas.
- Berm for honey bag pit should be lengthened and maintained so it surrounds the whole pit.
- A sheen was noticed on the water in the wetland area and ditch along the road outside of the berm on the East Side of the Bulky metal waste area.

Has the facility received any complaints or concerns from the public over the last three years?  
 Yes             No

If yes, please explain and describe how concerns are addressed by the facility.

Many residents do complain about the dirtiness of the site and how much the waste is piling up.

---

**APPENDIX B**

**DRAWINGS**

---

**LEGEND**

- TREE LINE / LIMIT OF SITE
- DEFINED WASTE PILES
- BOUNDARY OF DUMP AND ROAD

| CHANGE | DATE     | DESCRIPTION              | CHECK |
|--------|----------|--------------------------|-------|
| 2.     | 10/25/09 | PRELIMINARY ISSUE        |       |
| 1.     | 1/10/08  | ISSUED FOR CLIENT REVIEW |       |

| REVISIONS |       |         |          |
|-----------|-------|---------|----------|
| DESIGN    | DRAWN | CHECKED | DATE     |
| CEJ       | AJM   |         | FEB 2009 |

**PROJECT**  
AKLAVIK SOLID WASTE SITE

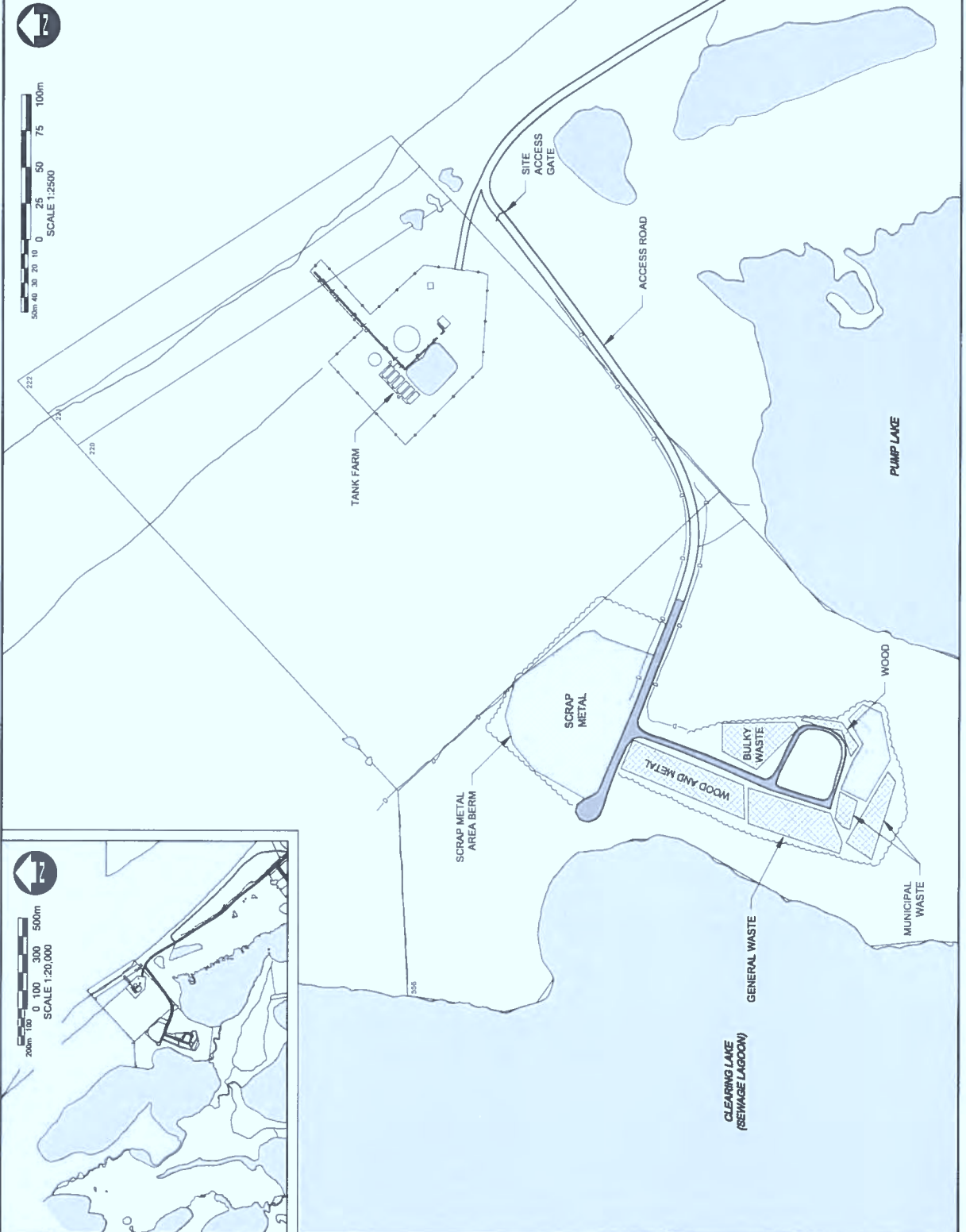
**TITLE**  
SITE LOCATION PLAN

SCALE  
AS SHOWN

DILLON PROJECT NUMBER  
08-0461-2020

CLIENT PROJECT NUMBER  
AKOP01

DRAWING NUMBER  
C100





**LEGEND**

- 90m PUBLIC ROAD SETBACK
- 450m HOUSING & FACILITIES SETBACK
- R1 RESIDENTIAL ZONING
- 3km AIRPORT SETBACK

Aklavik has been formally designated as a flood risk area under the Canada - NWT Flood Damage Reduction and Flood Risk Mapping Agreement "May 2, 1979". Council and the Government of the NWT encourage all developers to be aware of flood hazards in the community and to build in accordance with the Agreement" (Aklavik, 1997)

Existing Solid Waste Site  
Existing Sewage Truck Dump

AIRPORT REFERENCE POINT  
68°13'23.883" N  
135°00'20.003 W

|                                |                  |                            |
|--------------------------------|------------------|----------------------------|
| AKLAVIK SOLID WASTE SITE STUDY |                  | DILLON FILE NO.<br>08-9461 |
| DATE<br>FEB 2008               | DRAWING NO.<br>1 |                            |
| SCALE<br>1:30 000              |                  | HAMILLET OF AKLAVIK, NT    |





PROJECT

**Aklavik Solid Waste Site Study  
Aklavik, Northwest Territories**

TITLE

**Option 1B - Potential Solid Waste Site Location**

PROJECT NUMBER 08-9461

DATE February 2009

FIGURE NUMBER Figure 3



**DILLON  
CONSULTING**

---

**APPENDIX C**

**WATER LICENCE**

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WATER REGISTER: N3L3-0570

June 30, 1998

Ms, Nellie Gruben  
Senior Administrative Officer  
Hamlet of Aklavik  
P.O. Box 88  
AKLAVIK, NT X0E 0A0

Dear Ms. Gruben:

**ISSUANCE OF A "B" TYPE LICENCE**

Attached is a duplicate of Licence No. N3L3-0570 granted to Hamlet of Aklavik by the Northwest Territories Water Board in accordance with the *Northwest Territories Water Act*. The other original of this Licence has been filed with the Department of Indian Affairs and Northern Development in Yellowknife, Northwest Territories.

Also attached are general procedures for the administration of licences in the Northwest Territories. I request that you review these and address any questions to the Board's office.

In conclusion, please be advised that this letter with attached procedures, all inspection reports, and correspondence related thereto are part of the public Water Register, and are intended to keep all interested parties informed of the manner in which the Licence requirements are being met. All Water Register material will be considered when the Licence comes up for renewal or amendment.

The full cooperation of Hamlet of Aklavik is anticipated.

Sincerely,

Gordon Wray  
Chairman  
N.W.T. Water Board

Attachments (2)

6. **Specific clauses of your Licence make reference to the Board, Analyst or Inspector. The contact person, address, phone and fax number of each is:**

**BOARD:** Executive Assistant  
Northwest Territories Water Board  
Box 1500  
YELLOWKNIFE, NT X1A 2R3

Phone No: (867) 669-2772  
Fax No: (867) 669-2719

**ANALYST:** Analyst  
Water Laboratory  
Northern Affairs Program  
Department of Indian Affairs  
and Northern Development  
Box 1500  
4601 - 52nd Avenue  
YELLOWKNIFE, NT X1A 2R3

Phone No: (867) 669-2780  
Fax No: (867) 669-2718

**INSPECTOR:** Inspector  
North Mackenzie/Inuvik District Office  
Northern Affairs Program  
Department of Indian Affairs  
and Northern Development  
P.O. Box 2100  
INUVIK, NT X0E 0T0

Phone No: (867) 777-3361  
Fax No: (867) 777-2090



**PART A: GENERAL CONDITIONS**

**1. Scope:**

- a) This Licence allows for municipal waste disposal at the Hamlet of Aklavik, Northwest Territories. This Licence is issued subject to the conditions contained herein with respect to 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 deposit of such waste may enter any waters.
- b) Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Northwest Territories Waters 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 automatically amended to conform with such Regulations; and
- c) Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of other Federal, Territorial or Municipal legislation.

**2. Definitions:**

In this Licence: **N3L3-0570**

**"Act"** means the *Northwest Territories Waters Act*;

**"Regulations"** mean Regulations proclaimed pursuant to Section 29 of the *Northwest Territories Waters Act*;

**"Board"** means the Northwest Territories Water Board established under Section 10 of the *Northwest Territories Waters Act*;

**"Licensee"** means the holder of this Licence;

**"Inspector"** means an inspector designated by the Minister under Section 35(1) of the *Northwest Territories Waters Act*;


5. **The Surveillance Network Program and compliance dates specified in the Licence may be modified at the discretion of the Board.**
6. **The Licensee shall use waste volume measurement procedures as approved by the Inspector. The procedure to be followed shall be implemented to the satisfaction of the Inspector.**
7. **The Licensee shall immediately report to the Inspector via the 24 Hour Spill Report Line (867 920-8130) any spills of toxic materials which are reported to, or observed by, the municipality within the municipal boundaries or in the area of the waste disposal facilities. A detailed report of each such event shall be submitted to the Inspector not later than fourteen (14) days after the spill is detected.**
8. **The Licensee shall, within sixty (60) days of the issuance of this Licence, post and maintain the necessary signs to identify the stations of the Surveillance Network Program to the satisfaction of the Inspector.**
9. **The Licensee shall, within sixty (60) days of the issuance of this Licence, post signs in the area of the waste disposal facilities to advise the public that these areas are being used for the disposal of municipal wastes. All postings shall be located and maintained to the satisfaction of the Inspector.**
10. **The Licensee shall carry out a reclamation program on all facilities associated with the depositing of waste as it relates to this Licence. This is to be done in a manner that is satisfactory to the Board upon termination of the Licence or renewals of the Licence, upon abandonment of each facility after its use has terminated, or upon abandonment of the operation as a whole. If, during the period of this Licence or renewals thereof, an unauthorized deposit of waste occurs, a reclamation program shall be undertaken.**

9. The Licensee shall implement the plan specified in Part B, Item 7, upon receiving approval from the Board.

**PART C: CONDITIONS APPLYING TO MODIFICATIONS**

1. The Licensee may, without written consent from the Board, carry out modifications to the waste disposal facilities provided that such modifications are consistent with the terms of this Licence and the following requirements are met:
  - a) the Licensee has notified the Board in writing of such proposed modifications at least sixty (60) days prior to the beginning of the modifications;
  - b) such modifications do not place the Licensee in contravention of either the Licence or the Act;
  - c) 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
  - d) the Board has not rejected the proposed modifications.
2. Modifications for which all of the conditions referred to in Part C, Item 1, have not been met, can be carried out only with written consent from the Board.
3. The Licensee shall provide as-built plans and drawings of the modifications referred to in this Licence within ninety (90) days of completion of the modification. These plans and drawings shall be submitted to the Inspector on material that will reproduce with the use of a standard printer.

**NORTHWEST TERRITORIES WATER BOARD**

  
\_\_\_\_\_  
Witness

  
\_\_\_\_\_  
Chairman

4. All analyses shall be performed in a laboratory approved by the Board.

**C. Flow Measurement and Recording Requirements**

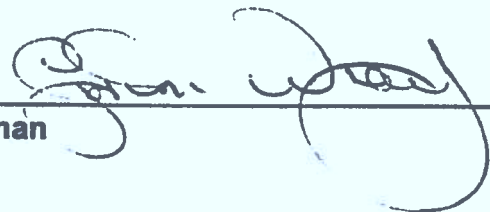
1. The Licensee shall measure and record the monthly quantity of sewage discharged to the Clearing Lake Sewage Lagoon.

**D. Reports**

1. The Licensee shall submit all of the information generated by Part B and Part C of the Surveillance Network Program annually as specified in Part A, Item 3 of the Licence.

**NORTHWEST TERRITORIES WATER BOARD**

  
\_\_\_\_\_  
**Witness**

  
\_\_\_\_\_  
**Chairman**

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**APPENDIX D**

**STATISTICAL PROFILE**

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|                                     | Aklavik | Northwest Territories |
|-------------------------------------|---------|-----------------------|
| <i>Family Structure (2006)</i>      |         |                       |
| Total Family Structure              | 145     | 10,875                |
| Husband-Wife                        | 45      | 5,555                 |
| Common-law                          | 45      | 2,990                 |
| Lone Parent                         | 55      | 2,330                 |
| % Couple Families                   | 62.1    | 78.6                  |
| <i>Tenure (2006)</i>                |         |                       |
| Total                               | 220     | 14,235                |
| Owned                               | 75      | 7,520                 |
| Rented                              | 145     | 6,565                 |
| % Owned                             | 34.1    | 52.8                  |
| <i>% of Households in Core Need</i> |         |                       |
| 1996                                | 23.9    | 19.7                  |
| 2000                                | 32.7    | 20.3                  |
| 2004                                | 32.3    | 16.3                  |

## CRIME

|                            |     |        |
|----------------------------|-----|--------|
| <i>Violent Crimes</i>      |     |        |
| 1999                       | 51  | 2,042  |
| 2000                       | 54  | 1,984  |
| 2001                       | 61  | 2,000  |
| 2002                       | 48  | 2,375  |
| 2003                       | 57  | 2,848  |
| 2004                       | 70  | 2,942  |
| 2005                       | 51  | 2,715  |
| 2006                       | 71  | 2,717  |
| 2007                       | 62  | 3,015  |
| <i>Property Crimes</i>     |     |        |
| 1999                       | 70  | 2,376  |
| 2000                       | 80  | 2,395  |
| 2001                       | 51  | 2,135  |
| 2002                       | 55  | 2,527  |
| 2003                       | 81  | 3,053  |
| 2004                       | 62  | 3,187  |
| 2005                       | 62  | 2,899  |
| 2006                       | 64  | 2,680  |
| 2007                       | 35  | 2,471  |
| <i>Other Criminal Code</i> |     |        |
| 1999                       | 103 | 5,584  |
| 2000                       | 126 | 7,153  |
| 2001                       | 143 | 8,352  |
| 2002                       | 121 | 8,576  |
| 2003                       | 138 | 10,012 |
| 2004                       | 175 | 11,933 |
| 2005                       | 188 | 12,914 |
| 2006                       | 193 | 12,076 |
| 2007                       | 167 | 13,173 |

## Federal Statutes

|      | Aklavik | Northwest Territories |
|------|---------|-----------------------|
| 1999 | -       | 477                   |
| 2000 | 6       | 415                   |
| 2001 | 7       | 432                   |
| 2002 | 3       | 655                   |
| 2003 | 9       | 595                   |
| 2004 | 9       | 632                   |
| 2005 | 11      | 742                   |
| 2006 | 5       | 534                   |
| 2007 | 6       | 657                   |

## Traffic

|      | Aklavik | Northwest Territories |
|------|---------|-----------------------|
| 1999 | 12      | 398                   |
| 2000 | 6       | 327                   |
| 2001 | 6       | 441                   |
| 2002 | 5       | 547                   |
| 2003 | 5       | 633                   |
| 2004 | 7       | 759                   |
| 2005 | 8       | 881                   |
| 2006 | 7       | 829                   |
| 2007 | 8       | 865                   |

## Violent Crime Rate (per 1,000 persons)

|      | Aklavik | Northwest Territories |
|------|---------|-----------------------|
| 1999 | 71.8    | 50.2                  |
| 2000 | 76.5    | 49.0                  |
| 2001 | 89.4    | 49.0                  |
| 2002 | 71.3    | 57.2                  |
| 2003 | 88.9    | 67.4                  |
| 2004 | 112.7   | 68.7                  |
| 2005 | 81.2    | 63.5                  |
| 2006 | 114.3   | 64.1                  |
| 2007 | 98.6    | 70.7                  |

## Property Crime Rate (per 1,000 persons)

|      | Aklavik | Northwest Territories |
|------|---------|-----------------------|
| 1999 | 98.6    | 58.4                  |
| 2000 | 113.3   | 59.1                  |
| 2001 | 74.8    | 52.3                  |
| 2002 | 81.7    | 60.9                  |
| 2003 | 126.4   | 72.3                  |
| 2004 | 99.8    | 74.4                  |
| 2005 | 98.7    | 67.9                  |
| 2006 | 103.1   | 63.2                  |
| 2007 | 55.6    | 58.0                  |

## INCOME SUPPORT

### Beneficiaries (monthly average)

|      | Aklavik | Northwest Territories |
|------|---------|-----------------------|
| 2000 | 156     | 3,040                 |
| 2001 | 102     | 2,425                 |
| 2002 | 77      | 2,200                 |
| 2003 | 102     | 2,152                 |
| 2004 | 101     | 2,073                 |
| 2005 | 87      | 1,924                 |
| 2006 | 98      | 1,925                 |
| 2007 | 111     | 2,035                 |

|                                     | Aklavik | Northwest Territories |                                             | Aklavik | Northwest Territories |
|-------------------------------------|---------|-----------------------|---------------------------------------------|---------|-----------------------|
| <i>Labour Force Profile (2006)</i>  |         |                       | <i>Average Employment Income (\$)</i>       |         |                       |
| % Gov't, Health, Social Serv, Educ  | 50      | 37                    | 1996                                        | 20,143  | 33,556                |
| % Goods Producing                   | 15      | 17                    | 1997                                        | 18,816  | 33,364                |
| % Other Industries                  | 33      | 44                    | 1998                                        | 20,803  | 33,476                |
|                                     |         |                       | 1999                                        | 21,013  | 35,450                |
| <i>Annual Work Pattern (2005)</i>   |         |                       | 2000                                        | 22,307  | 36,187                |
| % Worked                            | 64      | 81                    | 2001                                        | 23,526  | 38,497                |
| % Worked More than 26 weeks         | 54      | 76                    | 2002                                        | 23,985  | 41,428                |
|                                     |         |                       | 2003                                        | 23,107  | 41,904                |
|                                     |         |                       | 2004                                        | 25,400  | 43,969                |
|                                     |         |                       | 2005                                        | 24,757  | 45,843                |
|                                     |         |                       | 2006                                        | 27,403  | 47,856                |
| <b>PERSONAL INCOME</b>              |         |                       |                                             |         |                       |
| <i>Total Income (\$000)</i>         |         |                       | <i>Percent Taxfilers Less than \$15,000</i> |         |                       |
| 1996                                | 8,157   | 822,773               | 1996                                        | 55.0    | 34.9                  |
| 1997                                | 8,050   | 827,162               | 1997                                        | 57.1    | 34.8                  |
| 1998                                | 8,422   | 852,225               | 1998                                        | 52.5    | 34.1                  |
| 1999                                | 8,828   | 886,962               | 1999                                        | 52.5    | 32.8                  |
| 2000                                | 8,928   | 921,079               | 2000                                        | 50.0    | 32.0                  |
| 2001                                | 10,127  | 1,058,019             | 2001                                        | 46.3    | 28.8                  |
| 2002                                | 10,306  | 1,148,300             | 2002                                        | 43.9    | 27.6                  |
| 2003                                | 8,780   | 1,199,686             | 2003                                        | 44.4    | 28.0                  |
| 2004                                | 9,368   | 1,246,589             | 2004                                        | 47.2    | 27.3                  |
| 2005                                | 9,953   | 1,297,842             | 2005                                        | 48.7    | 26.0                  |
| 2006                                | 10,675  | 1,384,602             | 2006                                        | 46.2    | 24.9                  |
| % Change in Total Inc. (1999-2006)  | 20.9    | 56.1                  |                                             |         |                       |
| <i>Average Personal Income (\$)</i> |         |                       | <i>Percent Taxfilers More than \$50,000</i> |         |                       |
| 1996                                | 20,393  | 33,693                | 1996                                        | 10.0    | 25.6                  |
| 1997                                | 19,167  | 33,666                | 1997                                        | 9.5     | 25.6                  |
| 1998                                | 21,055  | 34,378                | 1998                                        | 10.0    | 25.3                  |
| 1999                                | 22,070  | 35,650                | 1999                                        | 12.5    | 28.1                  |
| 2000                                | 22,320  | 36,220                | 2000                                        | 12.5    | 28.2                  |
| 2001                                | 24,700  | 39,186                | 2001                                        | 14.6    | 31.4                  |
| 2002                                | 25,137  | 42,047                | 2002                                        | 14.6    | 34.4                  |
| 2003                                | 24,389  | 42,572                | 2003                                        | 13.9    | 35.1                  |
| 2004                                | 26,022  | 44,080                | 2004                                        | 16.7    | 36.5                  |
| 2005                                | 25,521  | 46,170                | 2005                                        | 17.9    | 38.3                  |
| 2006                                | 27,372  | 48,396                | 2006                                        | 17.9    | 39.9                  |
| <b>FAMILY INCOME</b>                |         |                       |                                             |         |                       |
| <i>Employment Income (\$000)</i>    |         |                       | <i>Average Family Income</i>                |         |                       |
| 1996                                | 6,043   | 710,374               | 1996                                        | 36,222  | 65,506                |
| 1997                                | 5,833   | 713,328               | 1997                                        | 36,478  | 66,367                |
| 1998                                | 6,033   | 724,431               | 1998                                        | 41,044  | 68,948                |
| 1999                                | 6,514   | 772,452               | 1999                                        | 42,625  | 70,463                |
| 2000                                | 6,692   | 805,159               | 2000                                        | 44,781  | 71,864                |
| 2001                                | 7,999   | 935,854               | 2001                                        | 51,606  | 80,225                |
| 2002                                | 7,915   | 1,016,653             | 2002                                        | 51,141  | 87,143                |
| 2003                                | 6,470   | 1,058,922             | 2003                                        | 50,371  | 88,244                |
| 2004                                | 6,858   | 1,101,853             | 2004                                        | 50,387  | 91,362                |
| 2005                                | 7,427   | 1,145,168             | 2005                                        | 53,140  | 96,171                |
| 2006                                | 7,947   | 1,208,376             | 2006                                        | 55,813  | 101,622               |
| % Change in Emp. Inc. (1999-2006)   | 22.0    | 56.4                  |                                             |         |                       |

## SOURCES & NOTES

### Population

*Population and Historical Population:* Bureau of Statistics, GNWT. Estimates are calculated by allocating the demographic components of growth, down to a community level. Sex, age and ethnicity estimates developed by Bureau of Statistics.

*Average Annual Growth Rate:* Bureau of Statistics, GNWT. Average annual growth rate (AAGR) is calculated as:

$$AAGR = \left( \sqrt[11]{\frac{Pop_{2007}}{Pop_{1996}}} - 1 \right) * 100$$

*Population Projections:* Bureau of Statistics, GNWT. Population projections incorporate assumptions regarding fertility, mortality & migration patterns. These assumptions are reflective of historical patterns, as well as recent trends observed for the Northwest Territories.

### Vital Stats

*Number of Births:* Health Statistics Division, Statistics Canada

*Teen Births:* Health Statistics Division, Statistics Canada. Refers to births to women between the ages of 13 to 19.

*Number of Deaths:* Health Statistics Division, Statistics Canada

*Cause of Deaths:* Health Statistics Division, Statistics Canada. Injury deaths are deaths due to accidents, homicide and suicides.

### Household & Families

*Percent of Households with more than 6 People:* Census, Statistics Canada (1981, 1986, 1991, 1996, 2001 & 2006); Bureau of Statistics, GNWT (2004). A household refers to an occupied private dwelling.

*Family Structure:* Census, Statistics Canada. Refers to the classification of census families into husband-wife couples, common-law couples, and lone parent families.

*Tenure:* Bureau of Statistics, GNWT. Refers to whether some member of the household owns or rents the dwelling.

*Percent of Households in Core Need:* Bureau of Statistics, GNWT. If a household has any one housing problem (suitability, adequacy, or affordability) or a combination of housing problems, and the total household income is below the Community Core Need Income Threshold, the household is considered to be in core need. The core need income threshold is an income limit for each community that represents the amount of income a household must have to be able to afford the cost of owning and operating a home or renting in the private market without government assistance.

### Crime

Incidents in a particular detachment may include incidents from surrounding communities.

*Violent Crimes:* Canadian Center for Justice Statistics, Statistics Canada. Refers to incidences of homicides, attempted murder, assaults (including sexual assaults), abduction and robbery.

*Property Crimes:* Canadian Center for Justice Statistics, Statistics Canada. Includes but is not limited to incidences of breaking & entering, theft, position of stolen goods and fraud.

*Other Criminal Code:* Canadian Center for Justice Statistics, Statistics Canada. Includes but is not limited to incidences of offensive weapons, bail violation, disturbing the peace and mischief (property damage).

*Federal Statutes:* Canadian Center for Justice Statistics, Statistics Canada. Includes but is not limited to incidences of possession and trafficking of drugs.

*Traffic:* Canadian Center for Justice Statistics, Statistics Canada. Includes but is not limited to incidences of dangerous operation of motor vehicle and impaired operation of motor vehicle.

*Violent Crime Rates (per 1,000 persons):* Bureau of Statistics, GNWT. Rates are determined using population estimates developed by the Bureau of Statistics.

*Property Crime Rates (per 1,000 persons):* Bureau of Statistics, GNWT. Rates are determined using population estimates developed by the Bureau of Statistics.

### Income Support

Note: Due to program changes in 2007, data prior to this year is not directly comparable.

*Beneficiaries (monthly average):* Department of Education Culture & Employment, GNWT. Refers to the monthly average number of recipients of income support and their dependents, if any, over the year.

*Cases (monthly average):* Department of Education Culture & Employment, GNWT. Refers to the monthly average number of people requesting and receiving social assistance over the year.

*Payments (\$000):* Department of Education Culture & Employment, GNWT. Refers to the total amount of payments over the year. Payments are recorded for the month for which assistance was received.

### Traditional Activities

*Hunted & Fished (%):* Bureau of Statistics, GNWT. Refers to the percent of people 15 years of age or older that hunted or fished during the year.

*Trapped (%):* Bureau of Statistics, GNWT. Refers to the percent of people 15 years of age or older that trapped during the year.

*Households Consuming Country Food:* Bureau of Statistics, GNWT. Refers to the percent of households reporting that most or all (75% or more) of the meat or fish consumed is harvesting in the NWT.



# Aklavik - Statistical Profile

|                                        | Aklavik | Northwest Territories |                                                | Aklavik | Northwest Territories |
|----------------------------------------|---------|-----------------------|------------------------------------------------|---------|-----------------------|
| <b>POPULATION</b>                      |         |                       |                                                |         |                       |
| <i>Population (2007)</i>               |         |                       |                                                |         |                       |
| Total                                  | 629     | 42,637                |                                                |         |                       |
| Males                                  | 349     | 21,951                |                                                |         |                       |
| Females                                | 280     | 20,686                |                                                |         |                       |
| 0 - 4 Years                            | 50      | 3,310                 |                                                |         |                       |
| 5 - 9 Years                            | 41      | 3,201                 |                                                |         |                       |
| 10 - 14 Years                          | 57      | 3,546                 |                                                |         |                       |
| 15 - 24 Years                          | 130     | 6,972                 |                                                |         |                       |
| 25 - 44 Years                          | 159     | 14,060                |                                                |         |                       |
| 45 - 59 Years                          | 96      | 7,898                 |                                                |         |                       |
| 60 Yrs. & Older                        | 96      | 3,650                 |                                                |         |                       |
| Aboriginal                             | 598     | 21,617                |                                                |         |                       |
| Non-Aboriginal                         | 31      | 21,020                |                                                |         |                       |
| <i>Historical Population</i>           |         |                       |                                                |         |                       |
| 1996                                   | 754     | 41,748                |                                                |         |                       |
| 1997                                   | 742     | 41,635                |                                                |         |                       |
| 1998                                   | 737     | 40,816                |                                                |         |                       |
| 1999                                   | 710     | 40,654                |                                                |         |                       |
| 2000                                   | 706     | 40,499                |                                                |         |                       |
| 2001                                   | 682     | 40,822                |                                                |         |                       |
| 2002                                   | 673     | 41,489                |                                                |         |                       |
| 2003                                   | 641     | 42,231                |                                                |         |                       |
| 2004                                   | 621     | 42,822                |                                                |         |                       |
| 2005                                   | 628     | 42,724                |                                                |         |                       |
| 2006                                   | 621     | 42,401                |                                                |         |                       |
| 2007                                   | 629     | 42,637                |                                                |         |                       |
| <i>Ave. Annual Growth Rate (96-07)</i> |         |                       |                                                |         |                       |
| Total Population                       | -1.6    | 0.2                   |                                                |         |                       |
| < 15 Yrs.                              | -5.2    | -1.5                  |                                                |         |                       |
| 60 Yrs. & Older                        | 2.8     | 4.4                   |                                                |         |                       |
| <i>Population Projections</i>          |         |                       |                                                |         |                       |
| 2012                                   | 605     | 44,878                |                                                |         |                       |
| 2017                                   | 597     | 47,038                |                                                |         |                       |
| 2022                                   | 584     | 48,919                |                                                |         |                       |
| <b>VITAL STATS</b>                     |         |                       |                                                |         |                       |
| <i>Number of Births</i>                |         |                       |                                                |         |                       |
| 1996                                   | 12      | 814                   |                                                |         |                       |
| 1997                                   | 14      | 722                   |                                                |         |                       |
| 1998                                   | 13      | 678                   |                                                |         |                       |
| 1999                                   | 2       | 659                   |                                                |         |                       |
| 2000                                   | 7       | 673                   |                                                |         |                       |
| 2001                                   | 12      | 613                   |                                                |         |                       |
| 2002                                   | 11      | 635                   |                                                |         |                       |
| 2003                                   | 6       | 701                   |                                                |         |                       |
| 2004                                   | 8       | 698                   |                                                |         |                       |
| 2005                                   | 13      | 712                   |                                                |         |                       |
|                                        |         |                       | <i>Teen Births</i>                             |         |                       |
|                                        |         |                       | 1996                                           | 3       | 96                    |
|                                        |         |                       | 1997                                           | 3       | 86                    |
|                                        |         |                       | 1998                                           | 2       | 82                    |
|                                        |         |                       | 1999                                           | -       | 83                    |
|                                        |         |                       | 2000                                           | -       | 84                    |
|                                        |         |                       | 2001                                           | 1       | 70                    |
|                                        |         |                       | 2002                                           | 3       | 72                    |
|                                        |         |                       | 2003                                           | 2       | 72                    |
|                                        |         |                       | 2004                                           | 1       | 86                    |
|                                        |         |                       | 2005                                           | 6       | 68                    |
|                                        |         |                       | <i>Number of Deaths</i>                        |         |                       |
|                                        |         |                       | 1996                                           | 3       | 152                   |
|                                        |         |                       | 1997                                           | 6       | 138                   |
|                                        |         |                       | 1998                                           | 5       | 146                   |
|                                        |         |                       | 1999                                           | 5       | 162                   |
|                                        |         |                       | 2000                                           | 6       | 156                   |
|                                        |         |                       | 2001                                           | 11      | 163                   |
|                                        |         |                       | 2002                                           | 5       | 169                   |
|                                        |         |                       | 2003                                           | 6       | 202                   |
|                                        |         |                       | 2004                                           | 5       | 153                   |
|                                        |         |                       | 2005                                           | 5       | 148                   |
|                                        |         |                       | <i>Cause of Death</i>                          |         |                       |
|                                        |         |                       | <i>Injury Deaths (inc. suicides)</i>           |         |                       |
|                                        |         |                       | 1996                                           | 1       | 34                    |
|                                        |         |                       | 1997                                           | 1       | 24                    |
|                                        |         |                       | 1998                                           | -       | 24                    |
|                                        |         |                       | 1999                                           | 2       | 36                    |
|                                        |         |                       | 2000                                           | 1       | 31                    |
|                                        |         |                       | 2001                                           | 2       | 31                    |
|                                        |         |                       | 2002                                           | -       | 24                    |
|                                        |         |                       | 2003                                           | -       | 36                    |
|                                        |         |                       | 2004                                           | 1       | 23                    |
|                                        |         |                       | 2005                                           | -       | 21                    |
|                                        |         |                       | <i>Suicides</i>                                |         |                       |
|                                        |         |                       | 1996                                           | 1       | 4                     |
|                                        |         |                       | 1997                                           | 1       | 6                     |
|                                        |         |                       | 1998                                           | -       | 7                     |
|                                        |         |                       | 1999                                           | 2       | 15                    |
|                                        |         |                       | 2000                                           | 1       | 7                     |
|                                        |         |                       | 2001                                           | 2       | 8                     |
|                                        |         |                       | 2002                                           | -       | 8                     |
|                                        |         |                       | 2003                                           | -       | 10                    |
|                                        |         |                       | 2004                                           | -       | 11                    |
|                                        |         |                       | 2005                                           | -       | 4                     |
|                                        |         |                       | <b>HOUSEHOLDS &amp; FAMILIES</b>               |         |                       |
|                                        |         |                       | <i>% of Households with more than 6 people</i> |         |                       |
|                                        |         |                       | 1981                                           | 27.3    | 13.9                  |
|                                        |         |                       | 1986                                           | 21.1    | 11.5                  |
|                                        |         |                       | 1991                                           | 16.3    | 9.8                   |
|                                        |         |                       | 1996                                           | 14.0    | 8.6                   |
|                                        |         |                       | 2001                                           | 9.1     | 7.2                   |
|                                        |         |                       | 2004                                           | 10.5    | 7.0                   |
|                                        |         |                       | 2006                                           | 6.8     | 6.2                   |

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**APPENDIX E**

**PHOTOGRAPHS**

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**Photo 1: Looking Southeast from Fuel Tank**



**Photo 2: Access Road Looking West**



**Photo 3: Scrap Metal Area Looking Northeast**



**Photo 4: East Edge of Scrap Metal Area Looking North (Note: Berm and Standing Water)**



**Photo 5: Example of Windblown Litter**



**Photo 6: Litter on Shore of Clearing Lake**



**Photo 7: Standing Water in Landfill #1**



**Photo 8: Standing Water in Landfill #2**

West



Photo 10: (west to north)

**North**



**Photo 11: (North to east)**