

**Selkirk First Nation**

***TYPE A Municipal Undertaking  
Water Use Licence Application  
Long Term Sewage Disposal Facility***

***Prepared by:  
JC Environmental Consulting***

***April 2007***

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**April 2007**

**MN07-071**

**MN07-071**

**EXHIBIT 1.2**

*Section 1.0 Project Description..... 3*

*Section 2.0 Environmental and Socio-economic Conditions..... 4*

*Section 3.0 Environmental Impacts and Mitigation..... 5*

*Section 4.0 Design Criteria..... 9*

*Section 5.0 Construction Schedule..... 10*

*Section 6.0 Spill Contingency Plan ..... 10*

*Section 7.0 Decommissioning Plans ..... 10*

*Section 8.0 Other Permits and Approvals ..... 11*

*Appendix A- EBA Reports ..... 12*

*Appendix B- Preliminary Design Brief..... 24*

*Appendix C- Map of Project Location ..... 34*

*Appendix D- Spill Response Plan..... 40*

*Appendix E- Culvert Design Drawing..... 55*

*Appendix F- Sewage Pit Design Drawings ..... 57*

*Appendix G- YESAB Recommendations ..... 63*

Y W B

MN07-071

EXHIBIT 1.2

MN07-071

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APPL. NO. MN07-071

## Section 1.0 Project Description

The Selkirk First Nation community of Pelly Crossing, YT has approximately 330 residents in three subdivisions

- Village area 54 residences, 14 commercial & institutional  
Individual water wells & septic fields, one residence trucked water, two residences and Link Building on sewage holding tanks
- Willow Creek 21 residences individual wells & septic fields
- Jon Ra 20 residences in old subdivision trucked water & individual septic fields, Jon Ra expansion area - 5 new homes on individual wells & septic fields with lots for additional 35 homes

The town of Pelly Crossing utilizes septic tanks and fields to collect and dispose of septic waste. Pump outs from tanks are conducted every 2-3 years. Waste from pump outs is disposed of in the existing sewage sludge disposal pit which is located approximately 1 km south of the existing developed area of Pelly Crossing adjacent to the west side of the Klondike Highway. The pit is located at the site of the old YTG land fill site which has been decommissioned. The existing septic pit is too small for current demand, and Selkirk First Nation requires a larger, long term disposal facility.

In 1999, EBA Engineering Consultants had been contracted by Selkirk First Nation to identify a suitable site for the construction of a long-term sewage disposal facility. Work included the collection of existing geotechnical data from EBA files as well as from other previously completed geotechnical report. Site 7, located along the west side of the North Klondike Highway approximately 5 km south of town, was chosen as the preferred site. The terrain is slightly elevated above the surrounding area, is circular in shape, and is glacial in origin. Vegetation is all second growth as a result of a forest fire in the late seventies. A single bore hole was drilled to a depth of 12 meters on site and no groundwater was encountered. Percolation tests were conducted in accordance with Environmental Health Guidelines and revealed the site was suitable for sewage disposal.

Attached are two reports, one prepared by EBA Engineering and one by JC Environmental Consulting. The EBA report provides information on the preferred site 7 (**Appendix A**). The report by JC Environmental contains a design brief on the new long term sewage disposal facility (**Appendix B**).

In August 2006, Selkirk First Nation applied to the Municipal Rural Infrastructure Fund (MRIF) in order to secure funds for the final design, permitting and construction of a new long term sewage disposal facility at the preferred site 7 (**map of location is included in Appendix C**). Selkirk First Nation was

MN07-071

EXHIBIT 1.2

successful in receiving MRIF funds for the project and is now in the design, permitting and licensing stage of the project. Selkirk First Nation hopes to begin construction of the new sewage disposal facility in July 2007.

## **Section 2.0 Environmental and Socio-economic Conditions**

The proposed site of the long term sewage disposal facility is located along the west side of the North Klondike Highway approximately 5 km south of town. The terrain is slightly elevated above the surrounding area, is circular in shape, and is glacial in origin. Vegetation is all second growth as a result of a forest fire in the late seventies. The predominant tree cover is comprised of moderately thick stands of small to medium height poplar with some small spruce, lodge pole pine and willows. A single bore hole was drilled to a depth of 12 meters on site and no groundwater was encountered. Percolation tests were conducted in accordance with Environmental Health Guidelines and revealed the site was suitable for sewage disposal. Access to the site is existing, and consists of an old log haul road. Two test pits were dug in 1998 by EBA along the access road. Soil conditions were as follows: top layer of organic root mat, followed by sand with some silt, then silt with trace amounts of clay then sand again.

The area of the proposed long term sewage facility is located approximately 2 km north of the Lutsaw Wetland Habitat Protection Area (**see Lutsaw Map in Appendix C**). The surrounding landscape is characterized by rolling hills and plateaus separated by deep broad valleys. Geologically, the region has been shaped by glacial activity whose deposits remain in the form of silt, sand and gravel. In some locations a layer of volcanic ash can be seen in the soil and can range up to 30 cm thick. Glacial deposits are typically covered with a thin surface layer of soil and organics. The region is within a zone of discontinuous permafrost. Forest cover in the area is predominately black spruce with dense stands associated with wetter areas. The dryer upland terrain supports mixed stands of white spruce, trembling aspen and balsam poplar. Grass tussocks, sphagnum moss and cranberry are common in the wetlands.

The area forms part of the winter range of the Tatchun caribou herd. The area is frequented by caribou, especially during the late winter period. Previous to the 1995 forest fire, relatively large numbers of caribou were periodically observed on lakes in the wetland. Recent observations suggest these animals now utilize other habitat more frequently outside the wetland as a result of the 1995 forest fire. Moose also use the area for spring calving and during the fall for rutting. Aerial surveys in 1995 and 2000 indicate moose densities are relatively high and stable in the region. Other wildlife inhabiting the area include grizzly and black bear, beaver, muskrat, fox, lynx, wolf, wolverine, martin, mink, squirrel, and rabbit.

The area chosen by Selkirk First Nation for the new long term sewage disposal

Y W B

MN07-071

MN07-071

EXHIBIT 1.2

facility is located in an area with the least amount of impact to water, land and wildlife.

The project area is located approximately 300m off the Klondike highway. The area is not used for commercial or private purposes and there are no traplines in the area. The area is also not considered a hunting or fishing area by Selkirk First Nation residents.

Pelly Crossing's economy is based on a narrow range of activities. The government services, education and health sectors provide most of the market work. The main employer in the community is the Selkirk First Nation government, which provides work for about 20 people. Some people who normally live in Pelly Crossing move elsewhere for at least part of the year to find work.

Currently, many residents of Pelly Crossing, are gaining employment with the Minto Mine, located approximately 30 minutes south of Pelly Crossing. The historic site of Fort Selkirk provides seasonal work for Selkirk First Nation members through a management agreement with the Yukon Heritage Branch. Employees work on restoration and maintenance of the historic townsite and maintenance of the campground.

Traditional activities also play a role in the Pelly Crossing economy. Many people get a significant portion of their food supply from hunting and fishing, and some earn cash through trapping.

### **Section 3.0 Environmental Impacts and Mitigation**

**Clearing Access Road-** Access to the proposed site is existing. The access road will be approximately 300 m long and 10 m wide. Tree and brush clearing will be required as there is some second growth on the existing road. Area is covered primarily with Willows (75%) and small poplar. There are no water bodies nearby or on site. Clearing will be done using chainsaws.

**Effects:**

- a. Potential fuel spills from clearing equipment
- b. Disturbance of soils and vegetation
- c. Potential disturbance of archaeological sites

**Mitigation:**

- a. A Spill Contingency Plan will be in place . Spill Response Plan is included in **Appendix D.**

Y W B

MN07-071

MN07-071

EXHIBIT 1.2

- b. Any sites containing archeological objects or human remains or burial sites discovered in the course of carrying out land use activities will be immediately marked and protected from further disturbance and, as soon as practical, the discovery reported to the Engineer, Land Use Branch. No further activities may be carried out within 30m of the site until the Engineer indicates, in writing, that the activities may be resumed.
- c. Any archaeological resources uncovered during operation shall be reported to the Yukon Archaeology Program, Government of Yukon

**Significance:**

Effects not likely significant provided mitigative measures are implemented and followed.

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**Clearing Site-** clearing trees and shrubs ( predominantly willows with some small polar) will be needed on a 100m x 100m area. Clearing will be done by hand, using chainsaw. Brush will be stockpiled and burned on site during winter 2007. No burning will occur in spring and summer months. There are no water bodies on site.

**Effects:**

- a. There will be a requirement for vegetation removal in the project footprint. Disturbance of wildlife and loss of habitat in the immediate vicinity is possible due to construction activities, although very limited as area is not known for hunting, wildlife refuge, trapping, or recreational use.
- b. Soil quality could be affected by malfunctions or accidents (e.g., fuel spills) that could lead to soil contamination.
- c. Health and safety of contractors, and the public could possibly be at risk as a result of malfunctions and accidents during construction and operations.
- d. Construction activities have the potential to generate noise above normal levels. Noise can be a nuisance for residents.
- e. No archaeological features are known to be present in the construction area. In the event they are discovered; however, the potential for an interaction exists.

**Mitigation:**

- a. Area is not known to have wildlife, recreational or economic values. The site was chosen as the preferred site by Selkirk First Nation due to its low impact on wildlife, economic, traditional, heritage and environmental values.
- b. Spill Contingency Plan will be implemented ( **Appendix D**).
- c. Comply with Occupational Health and Safety Act, Yukon Reg. 2002. Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

Y W B

MNØ7-Ø71

MNØ7-Ø71

EXHIBIT 1.2

- d. There are no nearby residences.
- e. Any archaeological resources uncovered during operation shall be reported to the Yukon Archaeology Program, Government of Yukon.

**Significance:**

Effects not likely significant provided mitigative measures are implemented and followed.

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**Excavation-** Back-hoe and Loader will be used to excavate the three cells of the long term sewage disposal facility. Approximately 3200 cubic meters of material will be excavated. Some excavated material will be used to create low lying berms around disposal pits and some material will be stockpiled for use in decommissioning.

**Effects:**

- a. Potential of fuel spillage/leaks from heavy equipment used.
- b. Increased noise in area of construction.
- c. Potential disturbance of archaeological sites
- d. Health and safety of contractors, and the public could possibly be at risk as a result of malfunctions and accidents during construction and operations.

**Mitigation:**

- a. Heavy equipment will not be re-fueled on site. Equipment will be fueled in Pelly Crossing at gas station. Spill Contingency Plan will be adhered to (attached).
- b. There are no nearby residences
- c. Any archaeological resources uncovered during operation shall be reported to the Yukon Archaeology Program, Government of Yukon. Any sites containing archeological objects or human remains or burial sites discovered in the course of carrying out land use activities will be immediately marked and protected from further disturbance and, as soon as practical, the discovery reported to the Engineer, Land Use Branch. No further activities will be carried out within 30m of the site until the Engineer indicates, in writing, that the activities may be resumed.
- d. Contractor to submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - 1. Results of site specific safety hazard assessment.
  - 2. Results of safety and health risk or hazard analysis for site tasks and operation as identified by the Contractor and found in work plan.
- e. Comply with Occupational Health and Safety Act, Yukon Reg. 2002. Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

Y W B

MNØ7-Ø71

MNØ7-Ø71

EXHIBIT 1.2

**Significance:**

Effects not likely significant provided mitigative measures are implemented and followed.

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**Decommissioning**

Site decommissioning will include:

- Removal of all foreign materials from the site (signs, fencing, scrap metal, etc.);
- Removal of hydraulic structures;
- Fill in and contour the primary and secondary cells;
- Contouring, scarification, and seeding of the site to facilitate re-vegetation;
- During contouring, willows can be dug up and set aside to be planted on top of the contoured lagoon site to assist in reclaiming the area;
- Erection of permanent signage at the location of the facility to indicate the nature of the previous use of the area and to warn users against use of surface/groundwater in the immediate area without treatment (filtering, boiling, etc); and
- Submission of final plans with location of any subsurface features.

**Effects:** no adverse effects likely

**Mitigation:** n/a

**Significance:** n/a

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**Culvert Installation at Access Road-** A culvert is required to be installed in ditch alongside the Klondike Highway, and at the beginning of the access road. Culvert design, provided by Yukon Infrastructure, is included in **Appendix E**.

**Effects:** n/a

**Mitigation:** n/a

**Significance:** n/a

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**Removal of composted sludge to land fill -** It is estimated that composted sludge will be removed from the facility once every 5-10 years, but this is only an estimated as weather and usage will greatly affect rate of removal. Composted sludge will be removed and stockpiled in the local land fill, with other compost materials. Compost can then be used for remediation purposes.

Y W B

MN07-071

MN07-071

EXHIBIT 1.2

**Effects:**

- a. Composted sludge can be used to reclaim roads, gravel pits, dump sites.
- b. No adverse effects expected from removal and utilization of composted sludge

**Mitigation:** n/a

**Significance:** n/a

## **Section 4.0 Design Criteria**

The new long-term sewage-disposal facility design is intended to remove solids from waste stream by mechanical filtration and treatment of liquid filtrate by creation of a bio-film in soils below the pits. The new long-term sewage disposal facility will be comprised of three cells, two treatment cells and one evaporation cell. The two primary treatment cells will be 24m x 24 m and 3m deep. The evaporation pit will also be 24m x 24 m but only 1 m deep. When constructing sewage disposal facilities, it is considered good practice to provide two primary disposal cells in order to allow for maintenance of one cell while using the other cell. Once the sludge layer has occluded the entire sand filter bed in the horizontal plane, discharge should be directed to the second cell and the sludge allowed to compost in place. By mixing native organic soils with the sludge, the waste will rapidly compost and be suitable for land filling within one summer season. It is anticipated that composted sludge removal will take place every 5-10 years, but this is only an estimate, as weather and usage will affect rate of removal. The construction of two pits will also provide considerable excess emergency storage capacity for sewage discharge during winter months should additional septic fields freeze during winter.

Based on historical data, and confirmed by survey of the site, three 24m x 24m pits could be constructed in this area. Assuming a 2:1 side slope and a 3m depth (for the two primary pits) the projected horizontal area will be approximately 200 square meters per pit at half storage with a total storage volume of approximately 650 cubic meters per pit.

Estimated daily dumping quantities are 28m<sup>3</sup>/day. Based on available area and a maximum operating depth of 3m, the design capacity for the proposed facility is summarized as follows:

- Sludge disposal capacity (per pit): 392,000 liters per day  
28 truckloads at 14,000 liters
  - 450 residences
  - Emergency storage\* (both pits): 620 x 2 = 1240 cubic meters  
6 months storage for 7 residences
- \* Emergency storage will be governing criteria for design

Y W B

MN07-071

MN07-071

EXHIBIT 1.2

- Percolation tests indicated a very low infiltration rate of 25mm of water within 30 minutes. This infiltration rate is considered very low and suitable to provide adequate treatment. An evaporation pit will be required in addition to the two primary treatment cells due to the low rate of infiltration. **Design sketches for the proposed facility are appended.**
- Design used is as follows:
  - 20 year sewage production 816,000 liters per year
  - Evaporation: 450mm year
  - Infiltration: 25mm in 30 min
  - Access road length 300m
  - Turn around 15m radius
  - Site area 100m x 100m
  - Volume primary cell excavation 1200 cu. m. (proposed)
  - Volume secondary cell excavation 1200 cu. m. (proposed)
  - Volume evap pit excavation 800 cu. m. (proposed)
  - Fence length 400m

The project components include:

- Clearing road
- Clearing site
- Access Road
- Excavation
- Fencing
- Gate
- Signage
- Sludge removal
- Decommissioning

## **Section 5.0 Construction Schedule**

Selkirk First Nation plans to hire Berdoe Enterprises, based in Carmacks, Yukon, to construct the facility. Clearing of access road and site will be done by Selkirk First Nation staff. Construction is to begin in July 2007 and finish in October 2007.

## **Section 6.0 Spill Contingency Plan**

See Appendix D.

## **Section 7.0 Decommissioning Plans**

The preferred method for decommissioning is to allow the contents to compost in place. The contents should be allowed to thaw and drain and organic soils mixed

Y W B

MNØ7-Ø71

MNØ7-Ø71

EXHIBIT 1.2

with the contents. Nematodes and other organisms in the organics will help to break down the sludge. The perimeter of the pits should be graded to provide positive drainage away from the cells. The off load apron in the vicinity of the discharge chutes should be graded so that any spills drain into the pits.

Site decommissioning will also include:

- Removal of all foreign materials from the site (signs, fencing, scrap metal, etc.);
- Removal of hydraulic structures;
- Fill in and contour the primary and secondary cells;
- Contouring, scarification, and seeding of the site to facilitate re-vegetation;
- During contouring, willows can be dug up and set aside to be planted on top of the contoured lagoon site to assist in reclaiming the area;
- Erection of permanent signage at the location of the facility to indicate the nature of the previous use of the area and to warn users against use of surface/groundwater in the immediate area without treatment (filtering, boiling, etc); and
- Submission of final plans with location of any subsurface features.

## **Section 8.0 Other Permits and Approvals**

Selkirk First Nation has applied to Government of Yukon Lands for Land Tenure/Lease for 20 years on the proposed site of the new sewage disposal facility. A Highway Access permit has also been applied for through Government of Yukon. As well, a YESAA application has been made and a decision is pending. Attached, in Appendix G, are the YESAA Recommendations and Approval to Proceed Notification on the project, as posted on the YESAB website.

Y W B

MN07-071

MN07-071

EXHIBIT 1.2