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NUNAVUT WATER BOARD

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OFFICE DES EAUX DU NUNAVUT

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## **Water Licence Application Supplementary Questionnaire For Municipalities**

## I. GENERAL

1. Date: May 17, 2011
2. Applicant: Hamlet of Baker Lake  
Municipality and Region
3. Contacts: Dennis Zettler  
Name of Contact  
Senior Executive Officer  
Position  
  

<u>867 793-2874</u> Telephone #	<u>867 793-2509</u> Fax #	<u>blsao@qiniq.ca</u> Email
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- Amendment: Andrew Johnson, P.Eng., FSC Architects & Engineers (867) 920-2882  
(andrewj@fsc.ca)  
Arlen Foster, M.I.T., FSC Architects & Engineers (867) 920-2882  
(arlenf@fsc.ca)***
4. Community Status: ☐ Village ☐ Town ☒ City ☒ Hamlet  
☐ Settlement Corporation
5. Indicate the status of the municipality's license on the date of the application.  
☐ New Application  
☐ Renewal  
☒ Water License # 3BM-BAK1015

## II. ATTACHMENTS

1. Attach current or up-to-date detailed map(s) showing the locations of the:
  - a. Raw water intake;
  - b. Water storage and treatment facilities;
  - c. Fuel and chemical storage;
  - d. Sewage treatment facilities (lagoon, honey bag pit, wetland);
  - e. Wastewater treatment area and discharge outlets;
  - f. Solid waste disposal areas and drainage patterns;
  - g. Hazardous waste disposal area;
  - h. Transportation access routes;
  - i. Existing water bodies/courses and any changes to these water bodies/courses that have or may occur as a result of water use or waste disposal facilities, locations of environmental monitoring sites. (Outline drainage basin);
  - j. Traditional use areas outlined on site map and areas around the community used for recreation, camping, fishing, etc.
  - k. Abandoned and/or restored water treatment, sewage, and solid waste disposal facilities.

Are maps attached? ☒ Yes \_\_\_ No (ONLY THOSE ASSOCIATED WITH THE AMENDMENT)

If no, please indicate when they will be available.

Indicate which organization has provided the various maps or diagrams.

**FSC Architects & Engineers**

### **III. WATER SUPPLY (ONCE UPGRADES ARE COMPLETE)**

#### ***Water Source***

1. Type of source: ☒ Lake \_\_\_ River \_\_\_ Well \_\_\_ Other \_\_\_\_\_
2. Name of water source and alternative, if any.  

Baker Lake	None
Primary Source	Secondary Source
3. Usual break-up & freeze-up period: 

May/June	October/November
Break-up	Freeze-up

#### ***Water Intake***

1. Please provide short descriptions for the following:
  - a. Freshwater intake facility  
Amendment issued for upgrades to the facility such that: Freshwater is pumped from Baker Lake through dual intake lines located approximately 180m offshore at a depth of approximately 7-8m below surface. Water is filtered, uv disinfected, & chlorinated before being discharged into distribution trucks.
  - b. Operating capacity of pump used  
1200 LPM
  - c. Intake screen size  
Johnson Intake screen with maximum opening size = 2.5mm

#### ***Water Storage***

1. Type of water storage facility. (Check where applicable)  
\_\_\_ Reservoir/Pond ☒ Storage tank \_\_\_ none  
\_\_\_ Other \_\_\_\_\_ Description:
2. If "reservoir" checked:

Is the reservoir lined? \_\_ Yes \_\_ No

What type of liner? \_\_\_\_\_ When was it installed? \_\_\_\_\_

### ***Water Treatment***

1. Indicate the quality of the water.

Summer:	<input checked="" type="checkbox"/> good	_____ fair	_____ poor
Fall:	<input checked="" type="checkbox"/> good	_____ fair	_____ poor
Winter:	<input checked="" type="checkbox"/> good	_____ fair	_____ poor
Spring:	<input checked="" type="checkbox"/> good	_____ fair	_____ poor

2. Describe.

3. Type of water treatment. (ONCE UPGRADES ARE COMPLETE)

☒ Filtration and chlorination  
\_\_\_\_\_ Chlorination only  
\_\_\_\_\_ None  
☒ Other UV Disinfection  
Description

### ***Water Use And Distribution*** ***(ONCE UPGRADES ARE COMPLETE)***

1. Volume of water use:

Distribution	Estimated number of people on the system <b>A</b>	Estimated average water consumption (Liters/capita/day) <b>B</b>	Total water consumption (Liters/day) <b>A x B</b>
PIPED			
TRUCKED	<b>1900</b>	<b>120</b>	<b>228,000</b>
<b>TOTAL</b>			

### ***General Condition of the water supply facilities*** ***(ONCE UPGRADES ARE COMPLETE)***

1. General condition of the:
- a. Water supply facility  
☒ satisfactory \_\_\_\_\_ Unsatisfactory

If unsatisfactory, explain.

- b. Storage facility  
☒ satisfactory ☒ Unsatisfactory

If unsatisfactory, explain.

- c. Distribution system  
☒ satisfactory ☐ Unsatisfactory

If unsatisfactory, explain.

### ***Modifications***

1. Are there any changes *planned* for the water supply system?  
☐ No ☒ Yes

If yes, please attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

As per this amendment; see attachments.

2. Does the community believe changes needed to the water supply, storage or treatment facilities? Describe. Yes, the Government of Nunavut required the proposed upgrades to the water treatment facility.

### ***Identification***

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

## **IV. SEWAGE DISPOSAL – *NOT APPLICABLE***

1. What type(s) of sewage treatment does the community have?

☐ Lagoon  
☐ Mechanical system  
☐ Wetland  
☐ Honey bag  
☐ Combination/Other: Describe:

### ***Lagoon (if applicable) – NOT APPLICABLE***

1. Has there been any operating problems with the lagoon? ☐ Yes ☐ No  
If yes, describe

***Mechanical System (if applicable) – NOT APPLICABLE***

1. Describe (type, specifications, operation and maintenance program for the mechanical wastewater treatment system).
2. Are sludge's produced ? ☐ Yes ☐ No  
If yes, describe how the sludge's are disposed of:

***Wetland (if applicable) – NOT APPLICABLE***

1. Describe the Wetland wastewater treatment system.

***Honey Bag Pit– NOT APPLICABLE***

1. Does the municipality use a honey bag pit?  
☐ Yes ☐ No  
If yes, describe the location, drainage, and operation/maintenance of the site:

***Commercial, Industrial and/or Hazardous Wastes – NOT APPLICABLE***

1. Are there any sources of commercial or industrial *liquid* waste being discharged or deposited to the wastewater treatment system that may affect the quality of the effluent or leachate produced?  
(*The municipality should be aware that any commercial or industrial discharge has to be approved by the municipality*)  
☐ Yes ☐ No  
If yes, indicate sources, types and quantities.

***Sewage Discharge – NOT APPLICABLE***

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

\_\_\_ Yes \_\_\_ ☒ No

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

***General Condition of the sewage treatment facilities– NOT APPLICABLE***

1. General condition of the:

a. Sewage collection system \_\_\_ Satisfactory \_\_\_ Unsatisfactory  
If unsatisfactory, explain.

b. Discharge control system \_\_\_ Satisfactory \_\_\_ Unsatisfactory  
If unsatisfactory, explain.

c. Dams, diversion dykes, berms \_\_\_ Satisfactory \_\_\_ Unsatisfactory  
If unsatisfactory, explain.

***Modifications***

1. Are there any changes *planned* in the sewage treatment facilities? \_\_\_ No ☒ Yes  
If yes, please attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

***Additional wastewater from filter backwash will be disposed of at the sewage lagoon facility, approximately 190 m<sup>3</sup>/ week (10,000 m<sup>3</sup> annually). See attachments.***

2. Does the municipality or residents believe changes are needed to the sewage treatment facilities? – ***NOT APPLICABLE***  
If yes Describe.

***Abandonment and Restoration– NOT APPLICABLE***

1. List and describe abandoned or restored sewage treatment facilities.

***Identification– NOT APPLICABLE***

Are there signs identifying past and present sewage disposal sites? \_\_\_ Yes \_\_\_ No

**V. SOLID WASTE DISPOSAL– NOT APPLICABLE**

1. Briefly describe how solid wastes are collected and delivered to the disposal area.
2. Is the solid waste site fenced? ☐ Yes ☐ No
3. Is the fence adequate? ☐ Yes ☐ No  
If no, describe:

**Waste Reduction– NOT APPLICABLE**

1. Does the municipality burn garbage?  
☐ Yes ☐ No  
If yes, describe how and when this is done.
2. Has the municipality considered measures for waste reduction such as recycling or reuse?  
☐ Yes ☐ No  
If yes, describe

**Animal Carcasses Pit– NOT APPLICABLE**

1. Does the municipality have an area for the disposal of animal carcasses?  
☐ Yes ☐ No  
If yes, describe the location, drainage and operation/maintenance of the site

**Waste Oil Pit– NOT APPLICABLE**

1. Describe the waste oil storage area.

**Bulky Scrap Metal Waste Disposal Area– NOT APPLICABLE**

1. Does the municipality have a scrap metal or bulky waste disposal area?  
☐ Yes ☐ No  
If yes, briefly describe its location and operation plan.



***Commercial, Industrial and/or Hazardous Wastes Disposal Area– NOT APPLICABLE***

1. Are there any commercial or industrial waste being discharged or deposited in the solid waste disposal area? (The municipality should be aware that any discharge of commercial or industrial waste has to be approved by the municipality)

\_\_\_ Yes \_\_\_ No

If yes, please indicate sources, types and quantity.

2. Will the municipality use a hazardous waste disposal area?

\_\_\_ Yes \_\_\_ No

If yes, describe its:

- a. Location
- b. Structure
- c. Operation and maintenance (describe special handling/disposal methods for these wastes)

***General Condition of the Solid Waste Disposal Area– NOT APPLICABLE***

1. Comment on the general conditions of the:

a. Solid waste disposal area \_\_\_ Satisfactory \_\_\_ Unsatisfactory

If unsatisfactory, explain.

***Modifications– NOT APPLICABLE***

1. Are there any changes planned for the solid waste disposal area?

\_\_\_ No \_\_\_ Yes

If yes, attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

2. Are changes needed to the solid waste disposal area? Describe.

***Abandonment and Restoration – NOT APPLICABLE***

1. List and describe abandoned or restored solid waste facilities. Indicate their location on a map.

***Identification– NOT APPLICABLE***

Are there signs identifying past and present solid waste disposal sites?

\_\_\_ Yes \_\_\_ No

**VI. INSPECTION AND MONITORING– *NOT APPLICABLE***

1. When were municipal facilities inspected by?  
\_\_\_ Indian and Northern Affairs Inspector Date: \_\_\_\_\_  
\_\_\_ Municipal and Community Affairs Date: \_\_\_\_\_  
\_\_\_ Other: \_\_\_\_\_ Date: \_\_\_\_\_
2. Is there a system in place for reporting spills?  
\_\_\_ Yes \_\_\_ No  
If yes, describe.
3. Is there a contingency plan for clean up of spills?  
\_\_\_ Yes \_\_\_ No  
If yes, describe.
4. Have any spills occurred in the past five years?  
\_\_\_ Yes \_\_\_ No  
If yes, describe and show on a map the locations of the spills. What action has been taken to clean the affected areas?

***Monitoring Program– NOT APPLICABLE***

1. Is water sampling and analysis done?  
\_\_\_ Yes \_\_\_ No  
  
If Yes, answer the questions a to e:
  - a. Briefly describe how samples are taken and sent to the laboratory.
  - b. Briefly describe any monitoring done for wastewater effluent and leachate.
  - c. Who is responsible for water sampling?  
Name: \_\_\_\_\_  
  
Position: \_\_\_\_\_  
  
Telephone #: \_\_\_\_\_

Fax #: \_\_\_\_\_

Level of training:

\_\_\_\_\_

- d. Recognized laboratory performing analysis of samples.

Name: \_\_\_\_\_

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

Telephone #: \_\_\_\_\_

Fax #: \_\_\_\_\_

- e. Are any changes planned in the water quality-monitoring program? \_\_\_\_ Yes  
\_\_\_\_ No

If yes, describe.

## **VII. PUBLIC CONCERNS – *NOT APPLICABLE***

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

## **VIII. PUBLIC HEALTH** (*Help may be obtained from the Regional Environmental Health Officer if you have difficulty with this section.*) – ***NOT APPLICABLE***

1. Date: \_\_\_\_\_

2. Municipality: \_\_\_\_\_

3. Contact: (Environmental Health Officer Contact)

\_\_\_\_\_

Telephone # \_\_\_\_\_

Fax #: \_\_\_\_\_

4. Have there been any problems or health/environmental concerns with drinking water?

\_\_\_\_ Yes \_\_\_\_ No

If yes, describe:

5. Have there been any problems or health/environmental concerns with sewage disposal/treatment?  
\_\_\_\_ Yes \_\_\_\_ No  
If yes, describe
6. Have there been any problems or health/environmental concerns with solid waste disposal?  
\_\_\_\_ Yes \_\_\_\_ No  
If yes, describe:

***Monitoring Program– NOT APPLICABLE***

1. Does the Regional Health Board perform water quality sampling?  
\_\_\_\_ Yes \_\_\_\_ No  
If Yes, answer questions (a) to (e)
- a. Briefly describe the sampling methodology.
- b. Briefly describe any monitoring of wastewater effluent and leachate.
- c. Who is responsible for sampling?  
Name: \_\_\_\_\_  
Position: \_\_\_\_\_  
Telephone #: \_\_\_\_\_  
Fax #: \_\_\_\_\_  
Level of training: \_\_\_\_\_
- d. Recognized laboratory performing analysis of samples.  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
Telephone #: \_\_\_\_\_

Fax #: \_\_\_\_\_

e. Are any changes planned in the water quality-monitoring program?

☐ Yes ☐ No

If yes, describe.

**IX. TECHNICAL INFORMATION** (*Assistance may be obtained from the Regional Community Government (CG&T) office if you have difficult with this section*). – **NOT APPLICABLE**

1. Date: \_\_\_\_\_

2. Municipality: \_\_\_\_\_

3. Contact: \_\_\_\_\_

Telephone #: \_\_\_\_\_

Fax #: \_\_\_\_\_

4. Population: \_\_\_\_\_

5. Estimated growth rate over next 5 years: \_\_\_\_\_

6. Has any baseline data collection and evaluation been undertaken with respect to the physical, biological, and chemical characteristics of the main water bodies in the area?

☐ Yes ☐ No

If yes, provide a summary of program details or site title, authors, cities, and dates:

If no, are such studies being planned?

☐ No ☐ Yes (If yes, when and by whom):

7. Have Elders been consulted in the collection of baseline data on main water bodies in the area?

☐ No ☐ Yes

If yes, specify.

8. Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project?

☐ No ☐ Yes

If yes, provide details below.

If no, are such studies being planned?

☐ No ☐ Yes.

If yes, specify:

***Attachments– NOT APPLICABLE***

1. Attach detailed plan or drawing(s) of the present *solid waste disposal area*. Include the following information:
  - a. details of pond size and elevation;
  - b. details of all retaining structures (dimensions, materials of construction, etc.);
  - c. details of the drainage basin, and existing and proposed drainage modifications;
  - d. details of all decant, siphon mechanisms etc., including sewage treatment facilities;
  - e. details regarding direction and path of wastewater flow from the area;
  - f. distance from watercourses and fish bearing waters;
  - g. location and construction of liners;
  - h. leachate and groundwater collection systems; and
  - i. control structures.
2. Attach detailed plan or drawing(s) of the present *sewage treatment system*. The drawing(s) should include the following:
  - a. details of all retaining structures (dimensions, materials of construction, etc.);
  - b. details of the drainage basin, and existing and proposed drainage modifications;
  - c. details regarding direction and path of wastewater flow from the area;
  - d. indications of the distance from watercourses and fish bearing waters;
  - e. all sources of seepage presently encountered near these areas, volumes ( $\text{m}^3/\text{day}$ ) and directions.
  - f. The volume of seepage flow ( $\text{m}^3 / \text{day}$ ); and
  - g. The direction of each flow.
3. Are drawings for the solid waste disposal area and sewage treatment system attached?  
☐ Yes ☐ No

If Yes, who has provided them?

If no, indicate when they will be available.

### ***Hydrology***

1. Effects on surface water flow:

Are any stream channels altered? \_\_\_ Yes ☒ No

Is the natural storage or water level of any lake or pond changed? \_\_\_ Yes ☒ No

Are there changes in water flow downstream of the project? \_\_\_ Yes ☒ No

Is a storage reservoir created in a natural channel? \_\_\_ Yes ☒ No

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

2. Drainage Area:

What is the drainage area? Unknown km<sup>2</sup>

What is the average elevation of the drainage basin? Unknown metres

Is the drainage basin outlined on an attached map? \_\_\_ Yes ☒ No

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

3. Channel characteristics:

Is the course of any channel changed? \_\_\_ Yes ☒ No

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

4. Will the cross-section of any watercourse be changed? \_\_\_ Yes ☒ No

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

### ***Water Supply***

1. What is the rate of withdrawal from the source? 228 m<sup>3</sup>/day

2. Is water drawn from the source \_\_\_ intermittently ☒ \_\_\_ continuously

3. If it is drawn intermittently, during what month(s) is it drawn? \_\_\_\_\_

4. For what period is it drawn (days/weeks/months)? \_\_\_\_\_

5. What is the rate of flow of source (if river) or size (if lake)? 1887 km<sup>2</sup>

6. At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn. Water withdrawal for municipal uses is not expected to impact Baker Lake.

### ***Water Intake***

1. Please provide short descriptions of the following:
  - a. freshwater intake facility  
Once construction of the new facility: Freshwater is pumped from Baker Lake through dual intake lines located approximately 180m offshore at a depth of approximately 7-8m below surface. Water is filtered, uv disinfected, & chlorinated before being discharged into distribution trucks. See attached Issued for Tender Drawings for further information.
  - b. operating capacity of the pumps  
1200 lpm
  - c. intake screen size:  
Johnson Intake screen with maximum opening size = 2.5mm

### ***Water Storage***

1. Is a dam or dyke being used to store or alter the flow of water? \_\_\_ Yes ☒ No
2. What are the dimensions of the dam or dyke?  
Length: \_\_\_\_\_ Width: \_\_\_\_\_ Height: \_\_\_\_\_  
U/S slope: \_\_\_\_\_ D/S slope: \_\_\_\_\_
3. Does the proposed dam create a reservoir in a natural watercourse?  
\_\_\_ Yes ☒ No  
If yes, what is the storage capacity and surface area of the reservoir?  
\_\_\_\_\_ m<sup>3</sup> \_\_\_\_\_ ha.
4. Will the dam or dyke affect fish migration or movement ?  
\_\_\_ Yes ☒ No  
If yes, describe all measures for compensation of fish habitat lost due to the dam or dyke, and mitigation for fish migration or movement.



### ***Water Treatment***

1. Indicate the capacity of the treatment facility. 1200 L/min
2. What is the capacity of the water storage facility 360,000 litres
3. Describe the method of water treatment (i.e., backwash, flocculation, sedimentation, chemicals used), and provide the results of the most recent bacteriological and chemical analysis. Attach a diagram, if possible.  
Water is filtered using four pressure filters, then undergoes UV disinfection followed by chlorination, calcium hypochlorite is added and pumped to storage tank. When distribution is required, the water is pumped to the truck fill arms and into the distribution trucks for delivery. Filters are backwashed routinely with backwash water stored at the facility. The backwash water is then hauled to the sewage lagoon facility for disposal. See attachments.
4. Are there any changes planned in the water treatment facilities?    No ☒ Yes  
If yes, attach a copy of the plan or indicate changes and include an implementation schedule.  
Include excerpt from MACA Capital Plan if available.  
Changes are as per this amendment. See attachments.

### ***Sewage Disposal***

1. Indicate the level of sewage treatment:  
   primary ☒ secondary    tertiary  
Pre-treatment (if applicable):    screening    maceration  
Lagoons (if applicable):    anaerobic    aerobic    facultative
2. Indicate the capacity of the sewage treatment facility 9.7 hectare wetland
4. Based on current population projections, the facility will meet the needs of the community until the year 2050 or greater .
4. Average depth of the wastewater lagoon 2 m.
5. What is the design freeboard? 1 m.
6. Indicate the retention time of the sewage while in the treatment facility  
3 days.
7. Indicate the estimated rate of discharge of wastewater 2 L/sec.
8. Indicate the location of the discharge point: Sewage is discharged from the holding cell to the wetland treatment system.

9. Is the discharge: ☒ seasonal \_\_\_\_\_  
If the discharge is seasonal, during what month(s) is it done? \_\_\_\_\_

What is the duration of the discharge (days/weeks/months) ? 4-5 months annually

10. Are there any changes planned in the sewage disposal facilities?  
☒ No ☐ Yes  
If yes, attach a copy of the plan or indicate changes and include an implementation schedule.

Include excerpt from MACA Capital Plan if available

***Solid Waste Disposal – NOT APPLICABLE***

1. Indicate the capacity of the disposal area \_\_\_\_\_m<sup>3</sup>
2. The *average* depth of the solid waste disposal site \_\_\_\_\_m.
3. The current facility will meet community needs until the year \_\_\_\_\_.
5. Do any natural watercourse enter the solid waste disposal area? What methods are used to decrease the amount of runoff water entering these areas?
5. Indicate the volume of water that may enter these areas from any source(s) and attach all pertinent details of the diversions.

Source

Volume

6. Please describe any diversions of watercourses: \_\_\_\_\_
7. Are there any changes planned in the solid waste disposal facilities? ☐No ☐Yes  
If yes, attach a copy of the plan or indicate changes and include an implementation schedule

***Other – NOT APPLICABLE***

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