NEEGAN BURNSIDE

National Assessment of First Nations Water and Wastewater Systems

Quebec Regional Roll-Up Report FINAL

Department of Indian Affairs and Northern Development

January 2011

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Final

Department of Indian and Northern Affairs Canada

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Prepared for:

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Statement of Qualifications and Limitations for Regional Roll-Up Reports

This regional roll-up report has been prepared by Neegan Burnside Ltd. and a team of sub-consultants (Consultant) for the benefit of Indian and Northern Affairs Canada (Client). Regional summary reports have been prepared for the 8 regions, to facilitate planning and budgeting on both a regional and national level to address water and wastewater system deficiencies and needs.

The material contained in this Regional Roll-Up report is:

- preliminary in nature, to allow for high level budgetary and risk planning to be completed by the Client on a national level.
- based on a compilation of the data and findings from the individual community reports prepared and issued for a specific region.
- not proposing to identify the preferred solution to address deficiencies for each community. Rather this report will identify possible solution(s) and probable preliminary costs associated with solution(s) presented in greater detail in the community reports. Community specific studies including more detailed evaluation will be required to identify both preferred solutions and final costs.
- based on existing conditions observed by, or reported to the Consultant. This assessment does not wholly eliminate uncertainty regarding the potential for costs, hazards or losses in connection with a facility. Conditions existing but not recorded were not apparent given the level of study undertaken.
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Risk as it pertains to health and safety issues and building code compliance is based upon hazards readily identifiable during a simple walk through of the water and wastewater facilities, and does not constitute a comprehensive assessment with regard to health and safety regulations and or building code regulations.

The Consultant accepts no responsibility for any decisions made or actions taken as a result of this report.

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1.0 Introduction

The Government of Canada is committed to providing safe, clean drinking water in all First Nations communities, and to ensuring that wastewater services in all First Nations communities meet acceptable effluent quality standards. As part of this commitment, the Government announced the First Nations Water and Wastewater Action Plan (FNWWAP). The plan funds the construction and renovation of water and wastewater facilities, operator training, and public health activities related to water and wastewater on reserves. It also provided for a national, independent assessment – *The National Assessment of First Nations Water and Wastewater Systems* – which will inform the Government's future, long-term investment strategy. This assessment was also recommended by the Senate Standing Committee on Aboriginal Peoples.

The purpose of the *National Assessment* is to define current deficiencies and operational needs, as well as long-term infrastructure development strategies and needs for each community on a sustainable basis.

The objectives of the *National Assessment* are to:

- Identify critical upgrades required for existing public systems to meet INAC'S Level of Service Standards, the Protocol for Safe Drinking Water in First Nations Communities, the Draft Interim Protocol for Wastewater Treatment and Disposal in First Nations Communities, and applicable provincial regulations, codes and standards.

- Complete the Annual Inspection, Risk Assessment and Asset Condition Reporting Systems (ACRS) assessment for water and wastewater assets.

- Conduct an overall community serviceability assessment, considering private on-site, communal and central systems, or combination thereof.

- Prepare Class "D" cost estimates for each of the communities visited. This is a preliminary estimate, based on available site information, indicating the approximate magnitude of cost of the recommended actions, which may be used in developing long-term capital plans and for preliminary discussion of proposed capital projects.

This assessment involved collecting background data and information about each community, undertaking a site visit, and preparing individual community reports for each participating First Nation. The assessment was conducted for each of the eight regions. This report summarizes the findings for the Quebec Region.

1.1 Site Visits

Site visits in the Quebec Region were undertaken by personnel from sub-consultants, Aquatech and Groupe Stavibel Inc. These site visits were undertaken during September and October of 2009 and during May through November of 2010. In addition to the consultant staff, additional participants including the Circuit Rider Trainer (CRT), INAC Representative, Environmental Health Officer (EHO) from Health Canada and Tribal Council Representative were invited to attend the site visits. The additional participants that were able to attend are identified in each community report.

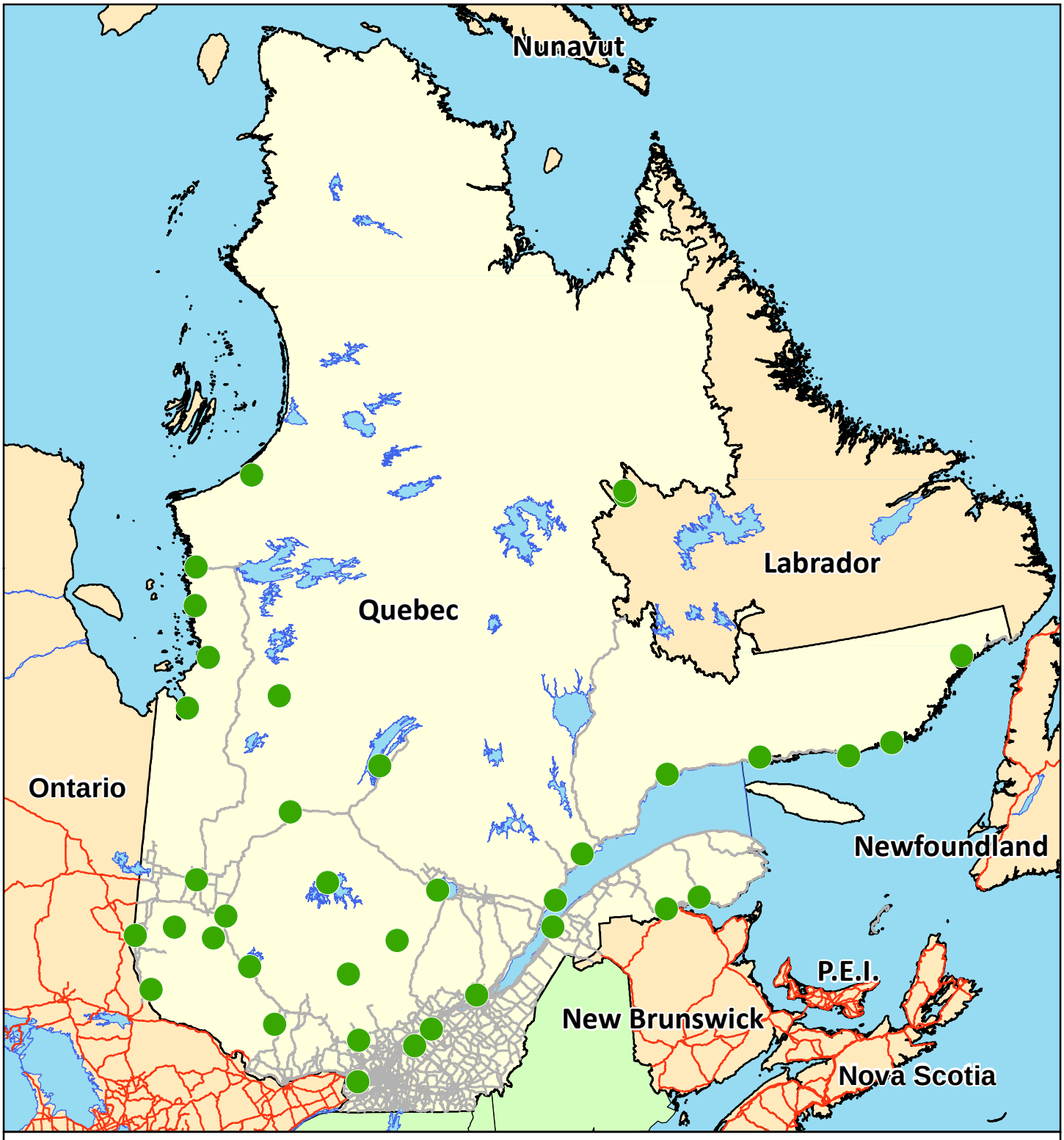
After confirming the various components that the First Nation uses to provide water and wastewater services to the community (i.e. number and types of systems, piping, individual systems, etc.) along with population and future servicing needs (planned development and population growth), an assessment was carried out of the water and wastewater systems, as well as 5% of the individual systems.

1.2 Reporting

Individual Community Reports have been prepared for each First Nation. In cases where the First Nation consisted of more than one community located in geographically distinct areas, a separate report was prepared for each community. In the Quebec Region, there was participation from 37 First Nations, which resulted in the preparation of 39 individual community reports. Note that the report for the Mohawks of Kanesatake First Nation did not undergo the 30 day fact checking review period due to project timelines. Figure 1.1 indicates the location of each First Nation visited as a part of this study.

The reports include an assessment of existing communal systems and existing individual systems, identification of needs to meet Departmental, Federal and Provincial protocols and guidelines, and an assessment of existing servicing of the community along with projections of population and flows for future servicing for the 10 year period. Costing for the recommendations to meet departmental protocol, federal and provincial guidelines, and an evaluation of servicing alternatives along with life cycle costing for each feasible alternative are also included in each report.

An annual water inspection, risk evaluation and ACRS (Asset Condition Reporting System) inspection was completed for each system and are included in the Appendices of each report.



NATIONAL ASSESSMENT OF FIRST NATION WATER AND WASTEWATER SYSTEMS

QC First Nations (Visited)
Quebec Roads
Major National Roads
Major Lakes

Figure 1.1 - Quebec First Nations Visited

N

0 50 100 150 200 250
Kilometers

NOTES

This map has been compiled with data of varying scale and accuracy.This is not a plan of survey.

SOURCES

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Indian and Northern Affairs Canada
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2.0 Regional Overview

The Quebec region includes 37 First Nations. There are 39 water systems (31 First Nation systems and 8 Municipal Type Agreements) and 39 wastewater systems (29 First Nation systems and 10 Municipal Type Agreements).

A First Nation water or wastewater system consists of INAC-funded assets, and serves five or more residences or public facilities. A Municipal Type Agreement, on the other hand, is when First Nations are supplied with treated water from or send their wastewater to a nearby municipality or neighbouring First Nation or corporate entity as outlined in a formal agreement between the two parties.

The First Nation community population ranges from 30 to 7,506 people, and household size ranges from 1.8 to 8.3 people per unit (ppu). The total number of homes is 14,535, and the average household size in the Quebec region is 3.8 ppu.

2.1 Water Servicing

There are a total of 39 water systems serving 37 First Nations. For water treatment, the 39 water systems include:

- 8 systems that receive their water supply through a Municipal Type Agreement (MTA)
- 19 groundwater systems
- 1 GUDI (groundwater under the direct influence of surface water) system
- 11 surface water systems.

For water distribution, the 39 systems include:

- 1 distribution system maintained through a Municipal Type Agreement (MTA)
- 38 distribution systems that are maintained by the First Nation.

The following is a summary of the level of service being provided to the homes within the Quebec Region:

- 91% of the homes (13,207) are piped
- 8% of the homes (1,222) are serviced by individual wells
- 1% of the homes (106) are reported to have no water service.

All of the homes without service are within one First Nation community.

The following table provides an overview of the water systems by system classification, source type, treatment type and storage type.

In general, the treatment system classification reflects the complexity of the treatment process and the distribution classification reflects the size (population) of the community being serviced. The classification used for the Quebec region follows the regulations for Quebec.

Table 2.1 - Water Overview

Classification	No.	% of Total
Small System	1	3%
Level I	12	31%
Level II	12	31%
Level III	6	15%
MTA	8	20%

Source	No.	% of Total
Groundwater	19	49%
Surface Water	11	28%
Groundwater GUDI	1	3%
MTA	8	20%

Storage	No.	% of Total
None	5	13%
Elevated	4	10%
Grade level	5	13%
Underground	25	64%

Treatment	No.	% of Total
None - Direct Use	1	3%
Disinfection Only	8	20%
Greensand Filtration	2	5%
Slow Sand	1	3%
Conventional	16	41%
Membrane Filtration	3	8%
MTA	8	20%

2.2 Wastewater Servicing

There are a total of 39 wastewater systems serving 37 First Nations. The 39 systems include:

- 10 wastewater systems are provided treatment through a Municipal Type Agreement (MTA), which receives and treats the wastewater from the First Nation
- 29 First Nation wastewater treatment systems consisting of 22 aerated lagoons, 5 mechanical plants, and 2 communal septic systems.

For wastewater collection, the 39 systems include:

- 1 wastewater collection system maintained through a Municipal Type Agreement (MTA)
- 38 wastewater collection systems that are maintained by the First Nation.

The following is a summary of the level of service being provided to the homes within the Quebec Region

- 91% of the homes (13,201) are piped
- 8% of the homes (1,228) are serviced by individual septics
- 1% of the homes (106) have no service.

All of the homes without service are within one First Nation community.

The following table provides an overview of the wastewater systems by system classification and treatment type.

Table 2.2 - Wastewater Overview

Classification	No.	% of Total
Small System	2	5%
Level I	23	59%
Level II	4	10%
MTA	10	26%

Treatment	No.	% of Total
Aerated Lagoon	22	56%
Mechanical Treatment	5	12%
MTA	10	26%
Septic System	2	6%

3.0 Preliminary Results and Trends

3.1 Per Capita Consumption and Plant Capacity

Historical flow records were not available for the First Nations serviced by an MTA or for approximately 14% of the First Nation communal water systems. For systems with no available flow data an average per capita demand of 325 L/c/d for piped service was used. The per capita demand for all systems ranged from 15 L/c/d to 638 L/c/d, with an average per capita demand of approximately 319 L/c/d[1].

The range of per capita flow is outlined in Table 3.1. The range includes those systems with an assumed per capita demand of 325 L/c/d for piped services.

Table 3.1 - Range of Per Capita Water Usage Rates

	No. of systems 2009
Less than 250 L/c/d	11
250 L/c/d to 375 L/c/d	15
Greater than 375 L/c/d	13

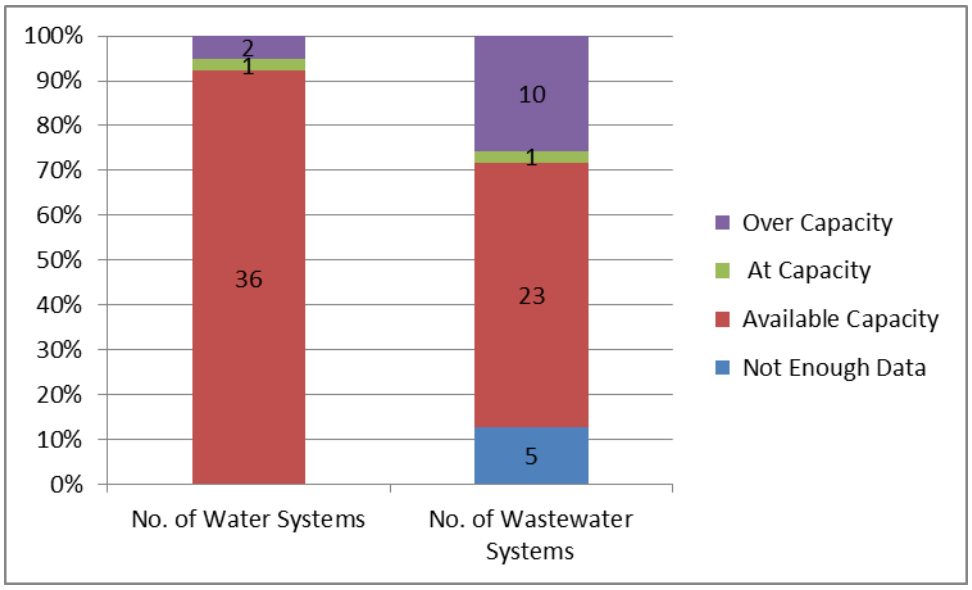
Historical flow data for wastewater was not available for most of the wastewater systems. Therefore, to evaluate the ability of the existing infrastructure to meet the current and projected needs, an average daily flow has been calculated based on the actual or assumed per capita water consumption plus an infiltration allowance of 90 L/c/d for piped flow.

The following figure provides a summary of the plant capacities for the 37 First Nations:

- over capacity – the existing system is unable to meet the current needs
- at capacity – the existing system is able to meet the current needs
- available capacity – the existing system has sufficient capacity to meet more than the current needs
- not enough data – insufficient data was available to determine the actual system capacity.

[1] By comparison, the average per capita consumption across Canada in 2004 was 329 L/c/d, according to Environment Canada data.

Figure 3.1 - Water and Wastewater Treatment Capacities



Based on the data collected, 3 water systems and 11 wastewater systems are operating at or beyond their estimated capacities. The per capita demand based on available records was within typical values for the region for the plants identified as over capacity.

3.2 Distribution and Collection

The household size for the 37 First Nations ranged from 1.8 to 8.3 people per unit (ppu) with an average of 3.8 ppu. The total number of piped connections in the Region has been determined to be 13,207 for water and 13,201 for wastewater. The average length of watermain per connection is approximately 22 m and the average length of sewermain per connection is approximately 20 m.

As the figures below illustrate, there is no real correlation between the size of the community and the length of pipe per connection.

The table below indicates the number of water and wastewater systems that have pipe lengths above and below 30 m/connection. It should be noted that this information was not available for all of the systems.

Table 3.2 - Average water distribution and wastewater collection pipe lengths

	Watermain	Sewer
Average m/connection	22	20
No. of systems with pipe lengths above 30 m/connection	10	10
No. of systems with pipe lengths below 30 m/connection	16	17

Figure 3.2 - Water Distribution: Average Pipe Length per Connection

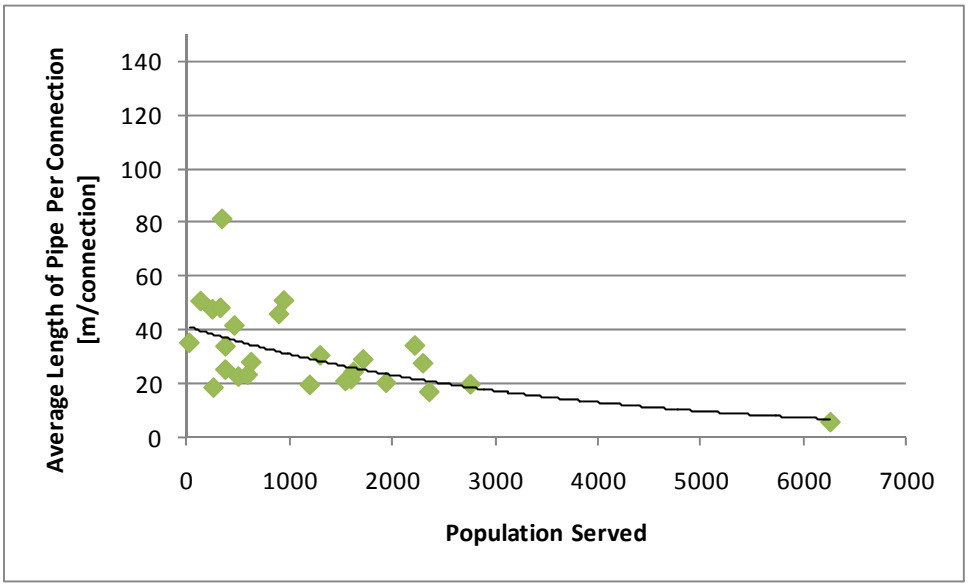
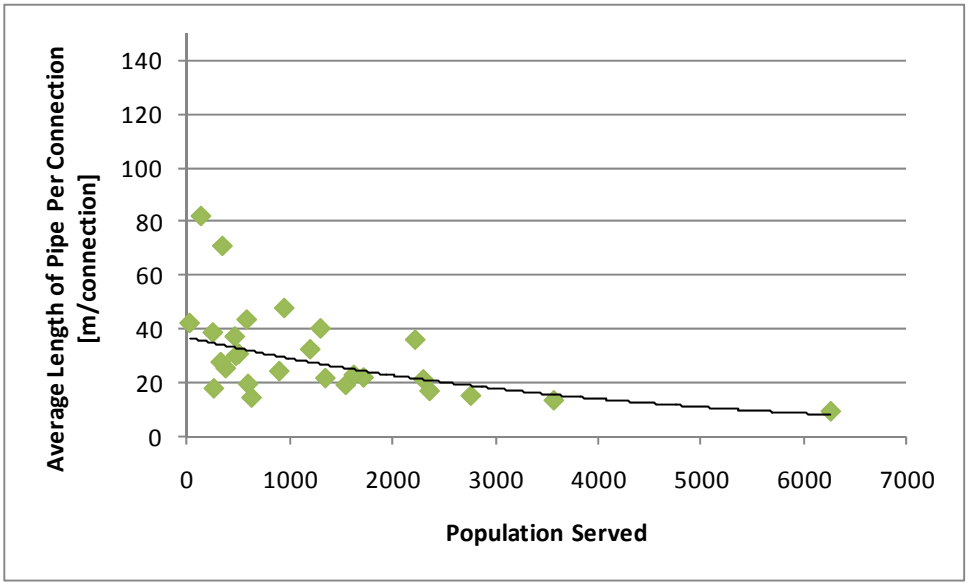


Figure 3.3 - Wastewater Collection: Average Pipe Length per Connection



3.3 Water Risk Evaluation

A risk assessment has been completed for each water system. As stated in the INAC Risk Level Evaluation Guidelines, each facility is to be ranked in risk according to the following categories: Water Source, Design, Operation, Reporting and Operators. The risk levels of all five categories are then used to determine the overall risk for the system.

Each of the five risk categories, as well as the overall risk level of the entire system is ranked numerically from 1 to 10. A risk ranking of 1.0 to 4.0 represents low risk, a risk ranking of 4.1 to 7.0 represents a medium risk, and a risk of 7.1 to 10.0 represents a high risk.
Low, medium and high risks are defined as follows:

- **Low Risk:** These are systems that operate with minor deficiencies. Usually, the systems meet the water quality parameters specified by the appropriate Canadian Guidelines (notably the Guidelines for Canadian Drinking Water Quality (GCDWQ)) for drinking water.
- **Medium Risk:** These are systems with deficiencies, which individually or combined pose a medium risk to the quality of water and human health. These systems would not generally require immediate action, but the deficiencies could be more easily corrected to avoid future problems.
- **High Risk:** These are systems with major deficiencies, which individually or combined pose a high risk to the quality of water and may lead to potential health and safety or environmental concerns. These deficiencies could result in water quality advisories against drinking the water (such as, but not limited to boil water advisories), repetitive non-compliance with guidelines, and inadequate water supplies. Once systems are classified under this category, the region, jointly with the First Nations, are to undertake immediate corrective action to minimize or eliminate deficiencies.

The risk scores were established using INAC's questionnaire and methodology.

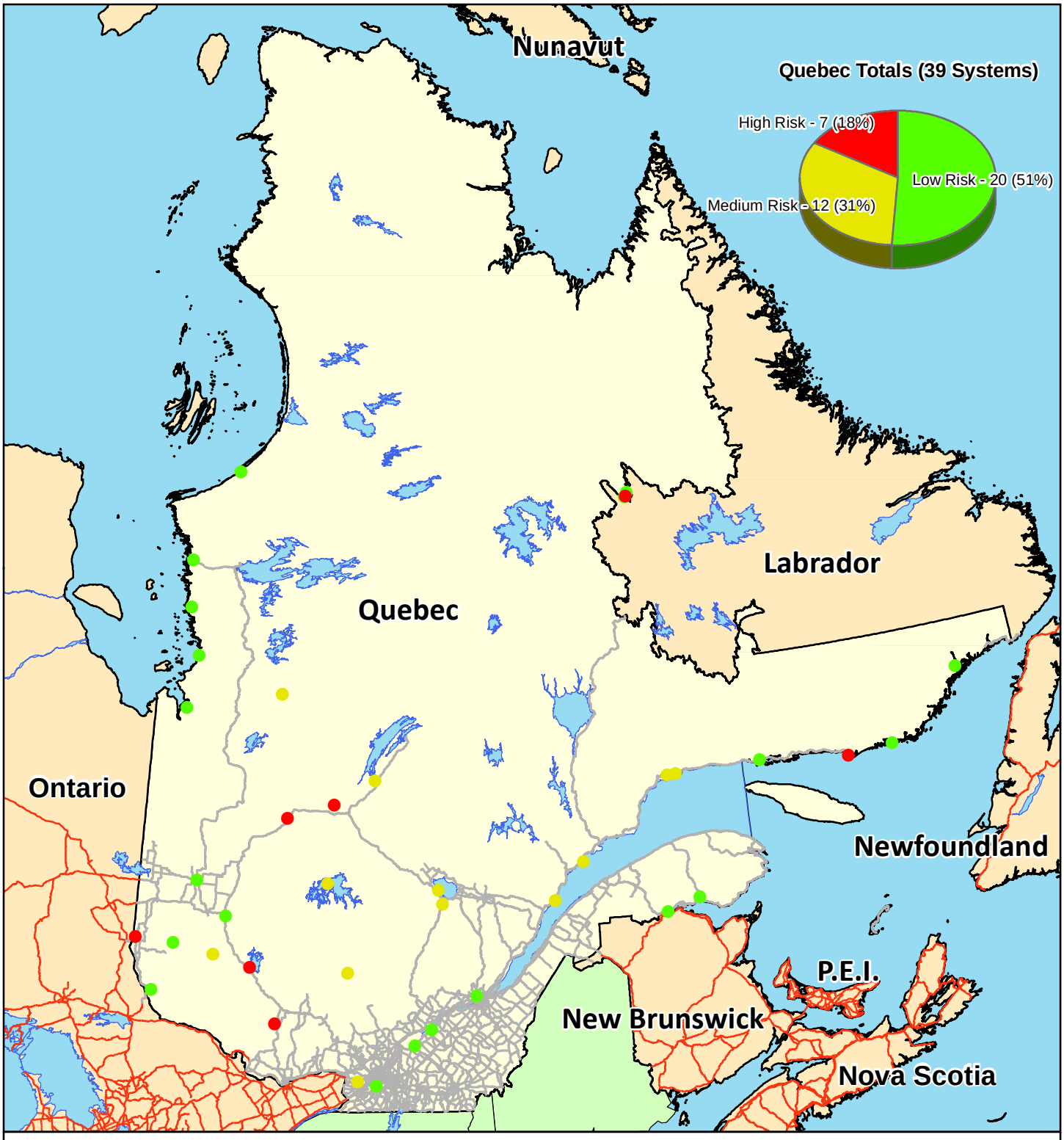
Regional Risk Summary:

Of the 39 water systems inspected:

- 7 are categorized as high overall risk
- 12 are categorized as medium overall risk
- 20 are categorized as low overall risk.

The table in Appendix E.1 summarizes the correlation between the component risk and the overall risk.

Figure 3.4 provides a geographical representation of the final risk for the water systems that were inspected.



NATIONAL ASSESSMENT OF FIRST NATION WATER AND WASTEWATER SYSTEMS

Water System Risk Level

- High
- Medium
- Low
- Quebec Roads
- Major National Roads
- Major Lakes

Figure 3.4 - Quebec Water System Risk

N

0 50 100 150 200 250

Kilometers

NOTES

This map has been compiled with data of varying scale and accuracy.This is not a plan of survey.

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3.3.1 Overall System Risk by Source

The following table summarizes the overall system risk by water source. 26% of groundwater systems, 9% of surface water systems and 13% of Municipal Type Agreement (MTA) systems are high risk. Typically for MTA's, it is assumed that the municipality is operating their system in accordance with provincial legislation and therefore would have a low risk water supply. For the Quebec Region, however, there are a number of MTA water supplies where the treated water did not meet the GCDWQ, which resulted in a higher risk score. 37% of groundwater systems, 63% of MTA's, and 64% of surface water systems, and the only GUDI system is low risk.

Table 3.3 - Summary of Overall Risk Levels by Water Source

Overall Risk Level	Groundwater	GUDI	Surface Water	MTA	TOTAL
High	5	0	1	1	**7**
Medium	7	0	3	2	**12**
Low	7	1	7	5	**20**
Total	**19**	**1**	**11**	**8**	**39**

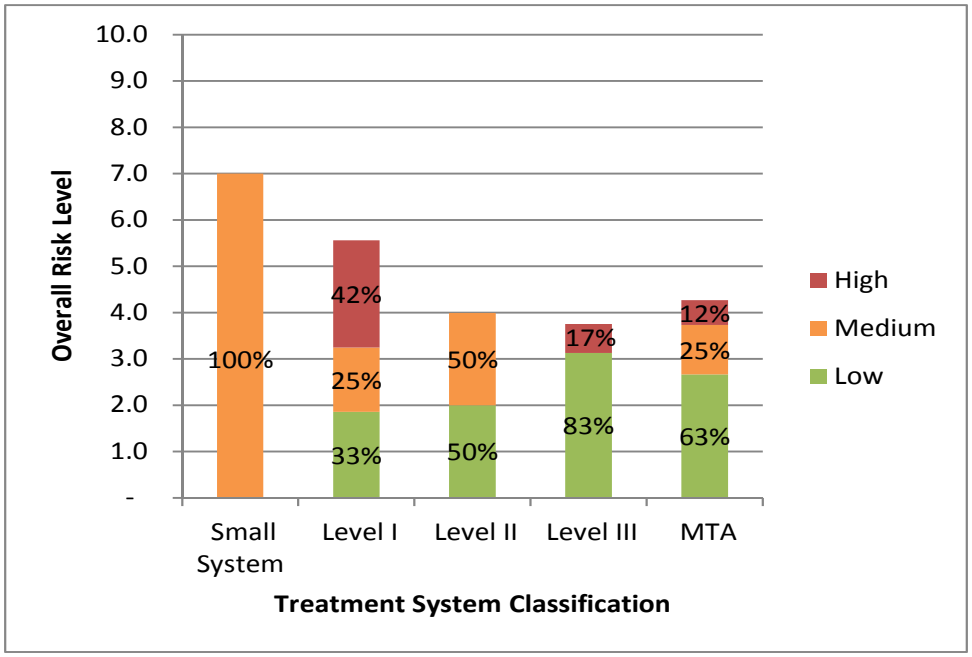
3.3.2 Overall System Risk by Treatment Classification

The following table summarizes the overall system risk by classification level of the treatment system. System classification is based on a number of factors. There is no clear pattern between System Classification Level and Overall System Risk. However, it is noted that over half of the Level I and Level II systems are medium and high overall risk while Level III systems are primarily identified as low risk systems.

Table 3.4 - Summary of Overall Risk Levels by Treatment System Classification

Overall Risk Level	Small System	Level I	Level II	Level III	MTA	Total
High	0	5	0	1	1	**7**
Medium	1	3	6	0	2	**12**
Low	0	4	6	5	5	**20**
Total	**1**	**12**	**12**	**6**	**8**	**39**

Figure 3.5 - Risk Profile Based on Water Treatment System Classification



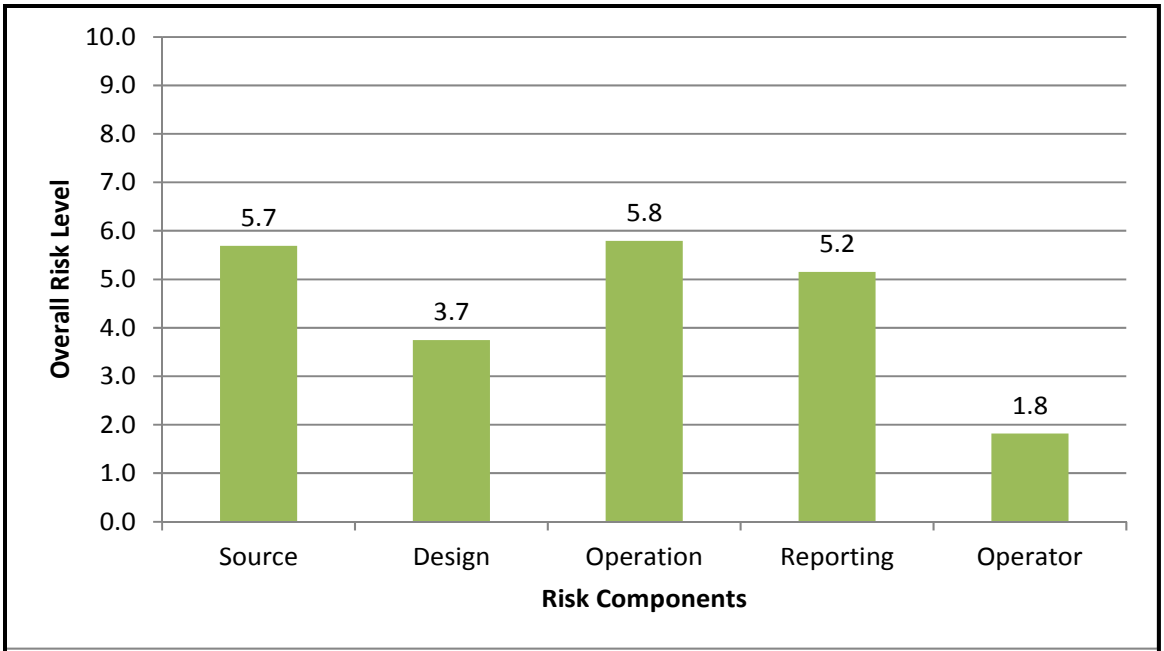
3.3.3 Overall Risk by Number of Connections

For the Quebec Region, approximately 50% of systems serving more than 100 connections are low risk with the remaining systems being fairly evenly split between high and medium risk. For systems serving less than 100 connections, the systems are evenly split between low, medium and high overall risk.

3.3.4 Component Risks: Water

The overall risk is comprised of five component risks: water source, design, operation, reporting and operator. Each of these component risk factors is discussed below.

Figure 3.6 - Water: Risk Profile Based on Risk Components



	Source	Design	Operation	Reporting	Operator
Risk	5.7	3.7	5.8	5.2	1.8
Minimum	1.0	1.0	1.0	1.0	1.0
Maximum	10.0	8.0	9.0	10.0	10.0
Std. Dev.	2.9	2.7	2.5	3.5	2.1

3.3.5 Component Risk - Water: Source

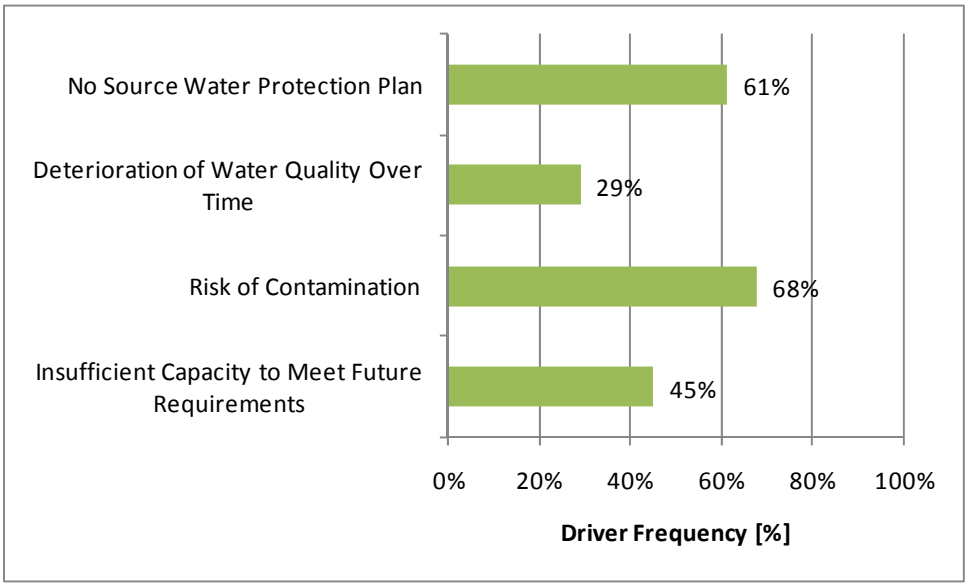
Source Risk has a mean score of 5.7. The mean source risk score by type of source is:

- groundwater at 5.8
- groundwater under the direct influence of surface water (GUDI) at 7.0
- surface water at 8.5
- Municipal Type Agreement (MTA) at 1.5.

Based upon the data collected, systems which rely on GUDI or surface water typically have a higher component risk score than systems that rely on groundwater. The risk formula automatically assigns a higher base risk to these types of systems.

The following figure identifies drivers contributing to source risk scores.

Figure 3.7 - Source Risk Drivers



3.3.6 Component Risk - Water: Design

Design Risk has a mean score of 3.7. The mean design risk score by type of source is:

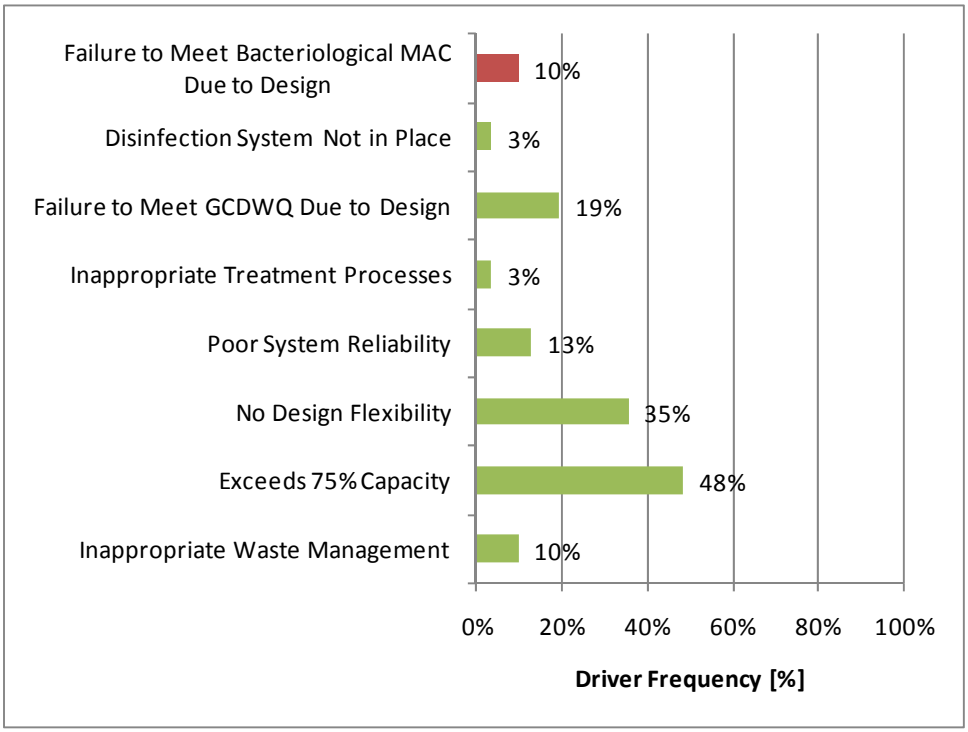
- groundwater at 3.9
- groundwater under the direct influence of surface water (GUDI) at 3.0
- surface water at 3.4
- Municipal Type Agreement (MTA) at 3.9.

The higher design risk associated with groundwater was due to lack of treatment to ensure that the aesthetic and operational guidelines are being met. As part of the multi-barrier approach to water treatment, chlorination is now required for all water systems. A water system with an increased design risk is typically associated with not providing sufficient contact time to ensure that the chlorination process is adequate. A higher risk for surface water sources and MTA's was typically due to exceedances in the treated water or distribution system for disinfection by-products.

The frequency that the following drivers are having a significant contribution to the design risk score for water systems in the Region is presented in the figure below:

- failure to meet bacteriological MAC
- disinfection system not in place or not being used
- failure to meet GCDWQ
- appropriate treatment not in place to meet Protocol requirements
- system reliability
- systems approaching or exceeding design capacity
- systems not having appropriate waste management.

Figure 3.8 - Design Risk Drivers



It should be noted that the drivers in red result in the entire water system being given a high risk score independent of all of the other component risk scores.

3.3.7 Component Risk - Water: Operation

Operation Risk has a mean score of 5.8. The mean operation risk score by type of source is:

- groundwater at 6.6
- groundwater under the direct influence of surface water (GUDI) at 3.0
- surface water at 4.4
- Municipal Type Agreement (MTA) at 6.3.

Areas that increased risk included not maintaining records, not having or not using approved O&M manuals and not scheduling and performing maintenance activities. Increased effort focused on these areas would result in lowering both the component and overall risk scores.

The following drivers are identified as significantly contributing to operation risk scores for water systems in the Region:

- failure to meet bacteriological MAC
- failure to meet GCDWQ (other than bacteriological)
- inadequate maintenance logs being maintained
- lack of general system maintenance

- no emergency response plan in place
- no O&M manual or O&M manual not being used.

Figure 3.9 - Operations Risk Drivers

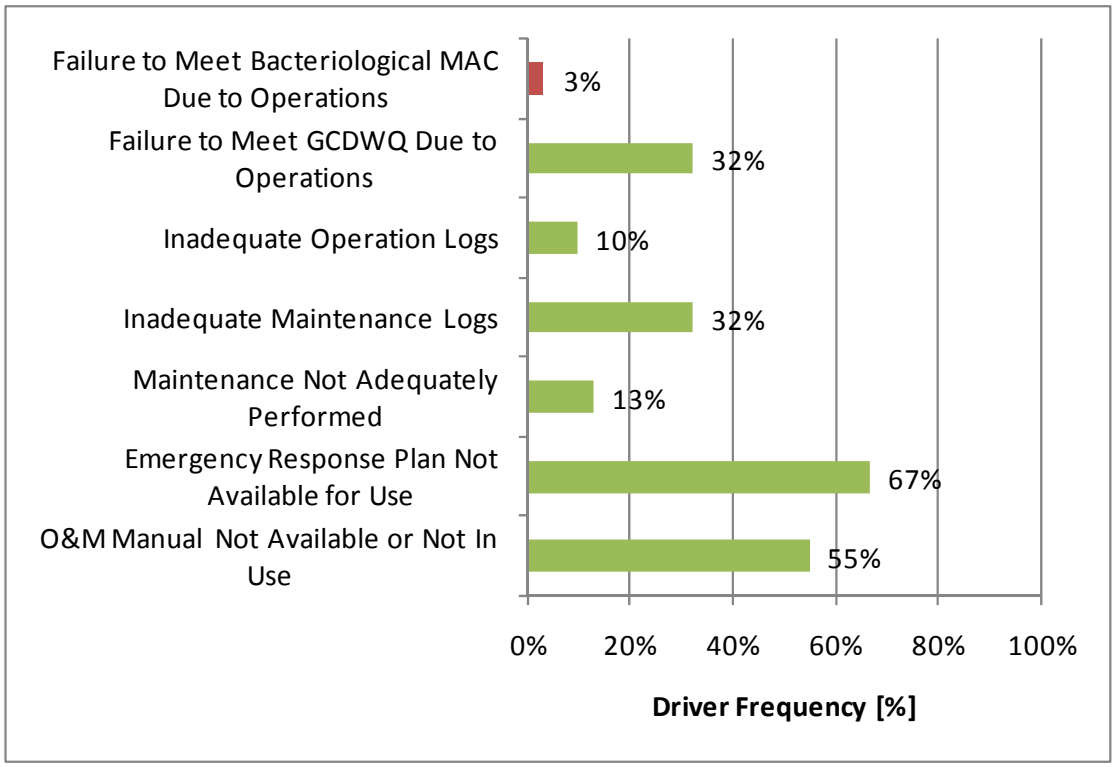
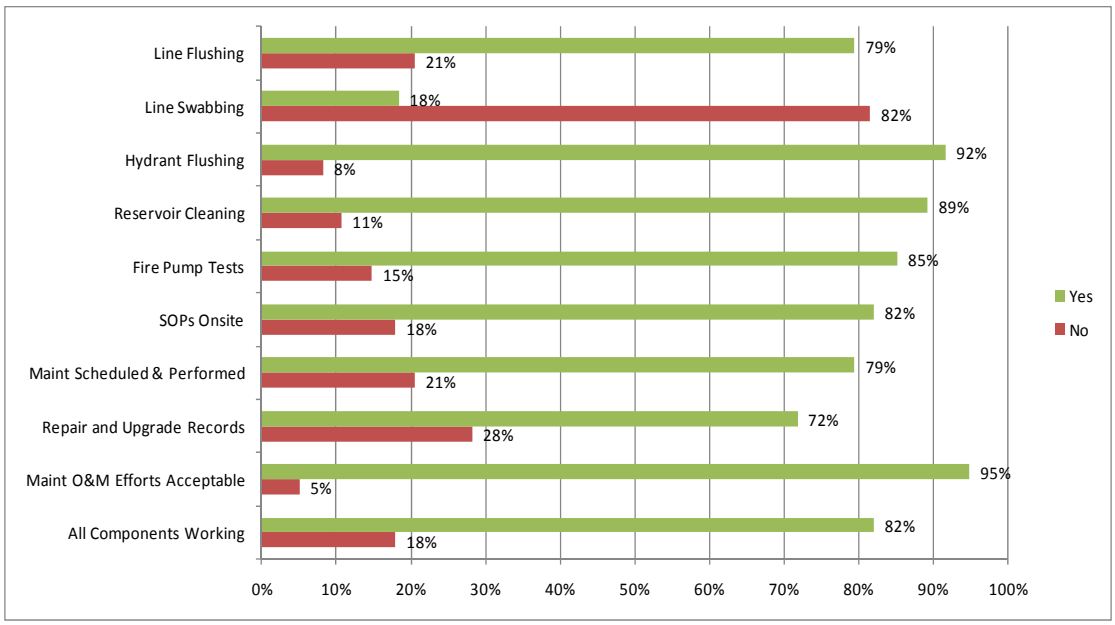


Figure 3.10 - Summary of Findings: Water Systems Operational Practices



For approximately 18% of the systems, one or more major components are identified as not working. While line and hydrant flushing is practiced for the majority of the systems, most do not regularly swab watermains. The majority of the systems have the reservoirs cleaned and fire pumps regularly tested. Only 28% of the systems are not able to produce records of system maintenance and repairs.

3.3.8 Component Risk - Water: Reporting

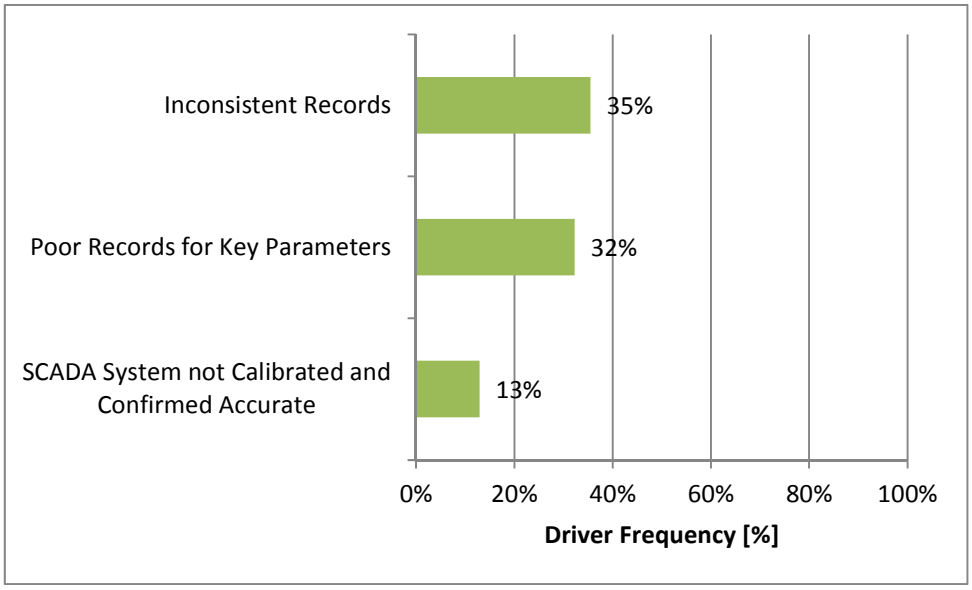
Reporting Risk has a mean score of 5.2. The mean reporting risk score by type of source is:

- groundwater at 5.9
- groundwater under the direct influence of surface water (GUDI) at 3.0
- surface water at 3.0
- Municipal Type Agreement (MTA) at 6.5.

Inconsistent records (35%) and poor record keeping (32%) are the main drivers for reporting risk for all systems. For systems with a SCADA system in place, an additional driver was that the systems are not being calibrated to ensure that the information being recorded was accurate (13%).

An important consideration is that the systems were evaluated based on the requirements for monitoring and reporting as set out in the Protocol. Typically, monitoring and reporting being undertaken by the operators did not meet these requirements. Operator awareness and training could have a significant impact on these risk scores.

Figure 3.11 - Reporting Risk Drivers



3.3.9 Component Risk - Water: Operator

Operator Risk has a mean score of 1.8. Operator Risk has the lowest overall component risk score for all types of systems. In the Quebec Region, all of the treatment and distribution systems have a primary and back-up operator with the exception of one system. The mean operator risk score by type of source is:

- groundwater at 1.9
- groundwater under the direct influence of surface water (GUDI) at 5.0
- surface water at 1.1
- Municipal Type Agreement (MTA) at 2.1.

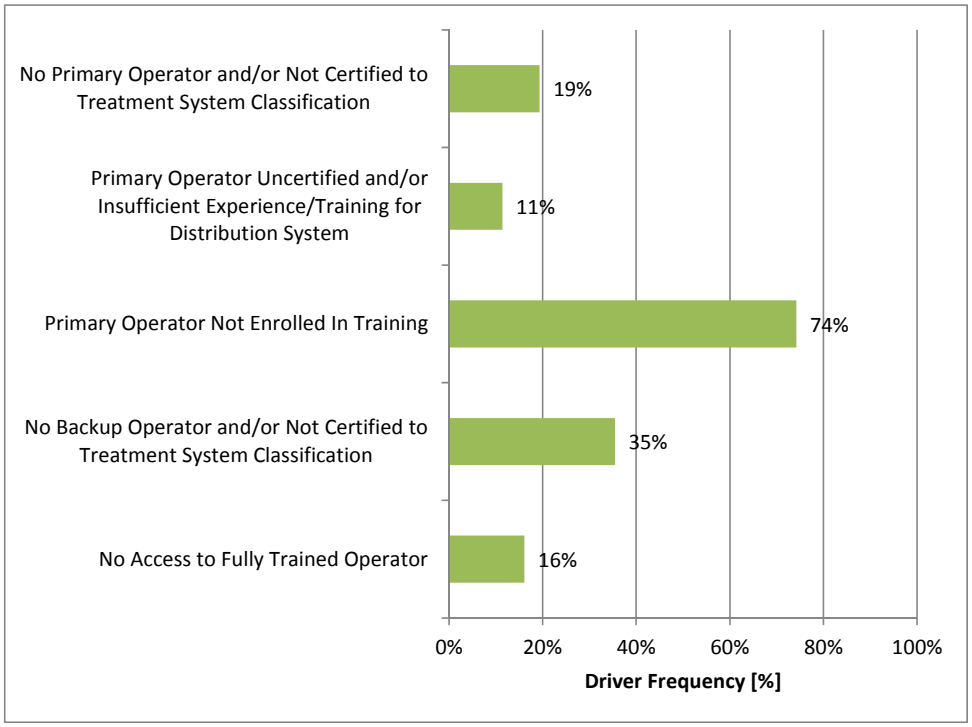
The extent to which existing systems have fully certified primary and backup operators is presented in Table 3.5. Of the 31 systems that require a certified operator for the water treatment system, 19% did not have a fully certified primary operator and 35% did not have a fully certified backup operator. Of the 35 systems that require a certified operator for the distribution system, 14% did not have a fully certified primary operator and 34% did not have a fully certified backup operator.

Table 3.5 - Water: Operator Status for Quebec Region

	Primary Operator		Backup Operator	
	Treatment	Distribution	Treatment	Distribution
No. of Systems Currently Without an Operator	1	1	1	1
No. of Systems with Operator with No Certification	2	3	5	8
No. of Systems with Operator Certified but not to the Required Level of the System	3	1	5	3
No. of Systems with Operator with Adequate Certification	25	30	20	23
No. of Systems Not Requiring Operators with Certification	8	4	8	4
Total No. of Systems	**39**	**39**	**39**	**39**

Those factors which frequently contribute to increased operator risk are identified in Figure 3.12. A lack of certification, lack of training and the lack of primary or backup operator are common drivers that increase operator risk.

Figure 3.12 - Operator Risk Drivers



3.4 Wastewater Risk Evaluation

A risk assessment was completed for each wastewater system. Similar to the water systems, each facility is ranked in risk according to the following categories; Effluent Receiver, Design, Operation, Reporting and Operators. The risk levels of all five categories are then used to determine the overall risk for the system. The overall risk score reflects a weighted average of risk scores under the individual categories.

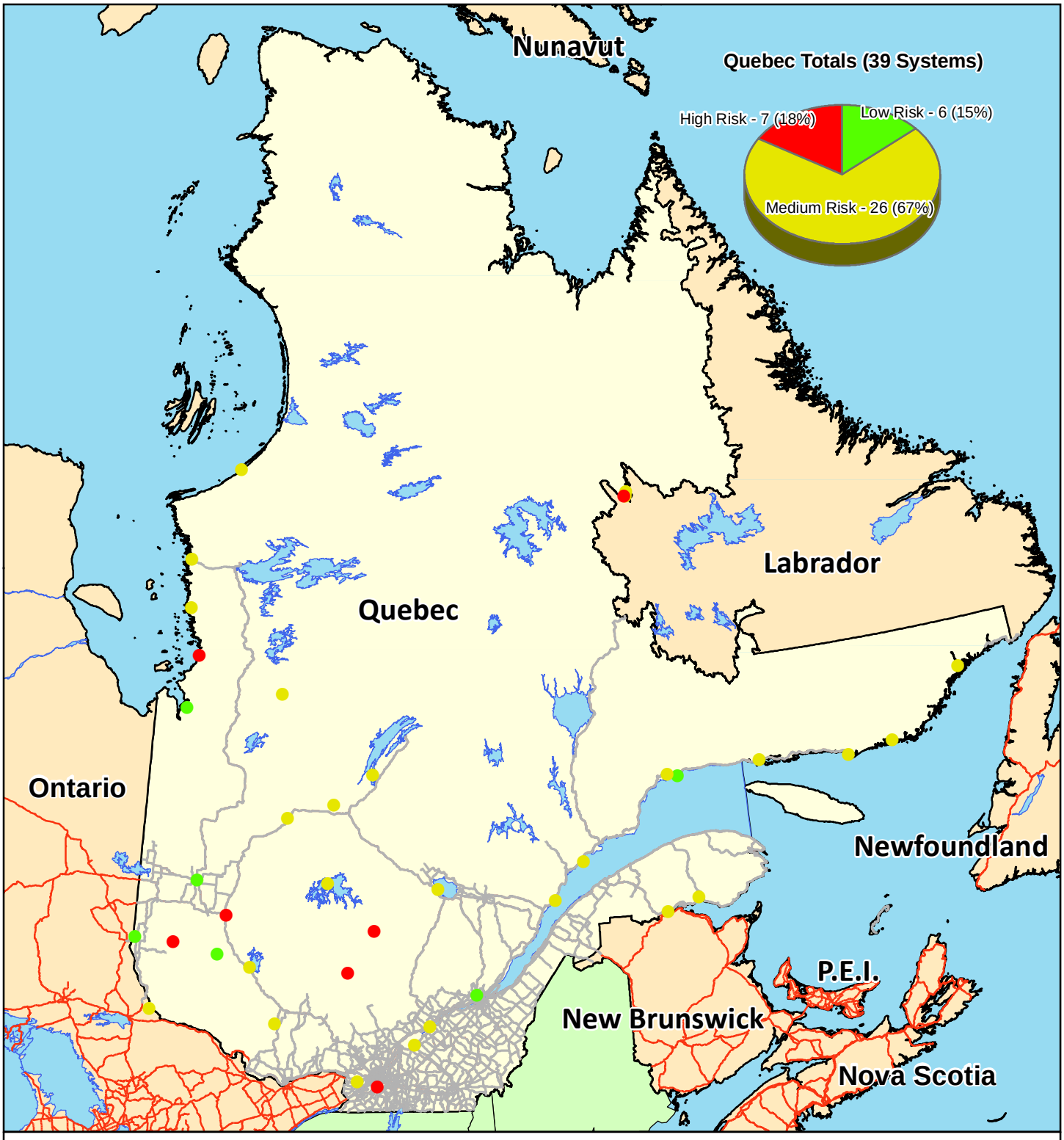
Each of the five risk categories, as well as the overall risk level of the entire system is ranked numerically from 1 to 10. A risk ranking of 1.0 to 4.0 represents low risk, a risk ranking of 4.1 to 7.0 represents a medium risk and a risk of 7.1 to 10.0 represents a high risk.

Of the 39 wastewater systems inspected:

- 7 are categorized as high overall risk
- 26 are categorized as medium overall risk
- 6 systems are categorized as low risk.

A table summarizing the correlation between component risk and overall risk is available in Appendix E.2.

Figure 3.13 provides a geographical representation of the final risk for the wastewater systems that were inspected.



NATIONAL ASSESSMENT OF FIRST NATION WATER AND WASTEWATER SYSTEMS

Wastewater System Risk Level

- High
- Medium
- Low
- Quebec Roads
- Major National Roads
- Major Lakes

Figure 3.13 - Quebec Wastewater System Risk

N

0 50 100 150 200 250

Kilometers

NOTES

This map has been compiled with data of varying scale and accuracy.This is not a plan of survey.

SOURCES

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Geobase® Aboriginal Lands (First Nations) - Accessed from http://geobase.ca.

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Project: FGY16308
Drawn By: B. Goll

Projection: Geographic, Canada LCC

Indian and Northern Affairs Canada | Affaires indiennes et du Nord Canada

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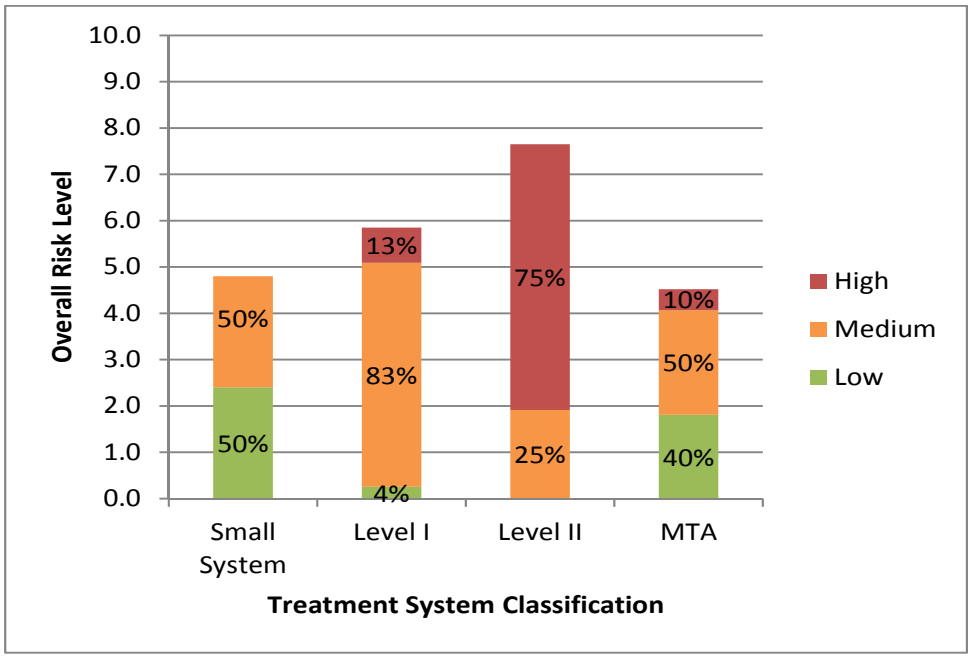
3.4.1 Overall System Risk by Treatment Classification

The following table correlates the overall system risk and the classification level of the treatment system. In the Quebec region, the majority (23) of the systems are Level I. There are 10 Municipal Type Agreement systems, 4 Level II systems, and only 2 Small Systems. For MTA's, it was assumed that the municipality was operating their system in accordance with provincial legislation and therefore resulted in a low risk sewage receiver. Four out of the ten MTA systems are low risk. In general, risk increased with the complexity of the system.

Figure 3.14 - Risk Profile Based on Wastewater Treatment System Classification



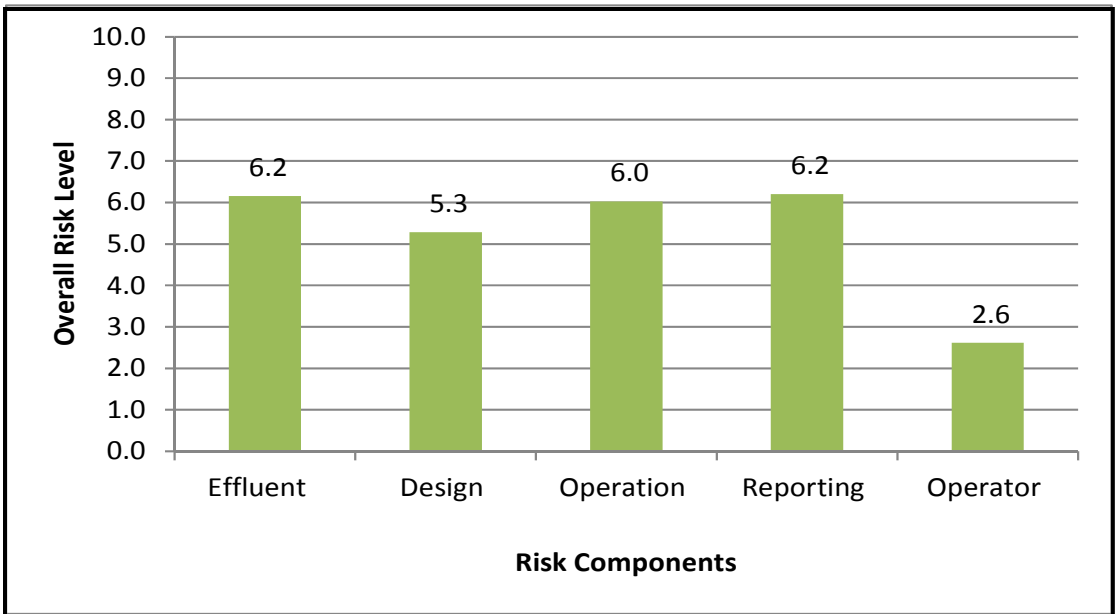
3.4.2 Overall System Risk by Number of Connections

For the Quebec region, there is no clear pattern between the overall system risk and the number of connections.

3.4.3 Component Risks: Wastewater

The overall risk is comprised of five component risks: effluent receiver, design, operation, reporting and operators. Each of these component risk factors is discussed below.

Figure 3.15 - Wastewater: Risk Profile Based on Risk Components



	Effluent	Design	Operation	Reporting	Operator
Risk	6.2	5.3	6.0	6.2	2.6
Minimum	1.0	1.0	1.0	1.0	1.0
Maximum	10.0	9.0	10.0	10.0	10.0
Std. Dev.	3.5	2.8	2.4	3.8	2.9

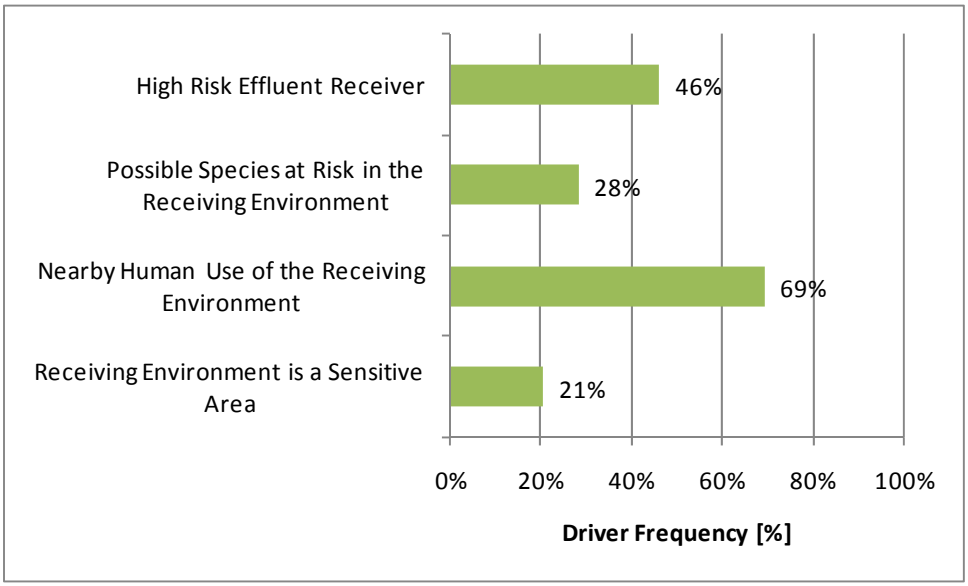
3.4.4 Component Risk - Wastewater: Effluent Receiver

Effluent receiver has a mean risk score of 6.2. There are two key drivers to this risk score. They are the receiving environment and the extent to which the receiver is required to support other human uses such as fishing, recreational use or as a drinking water source.

Effluent Receiver Risk can be mitigated by ensuring that:

- there is no nearby human use of the receiving environment
- this is taken into consideration during the initial evaluation of potential receivers during the planning stages of all projects
- regular monitoring of the effluent quality is undertaken to ensure minimal impact on the receiver during effluent discharge.

Figure 3.16 - Effluent Risk Drivers



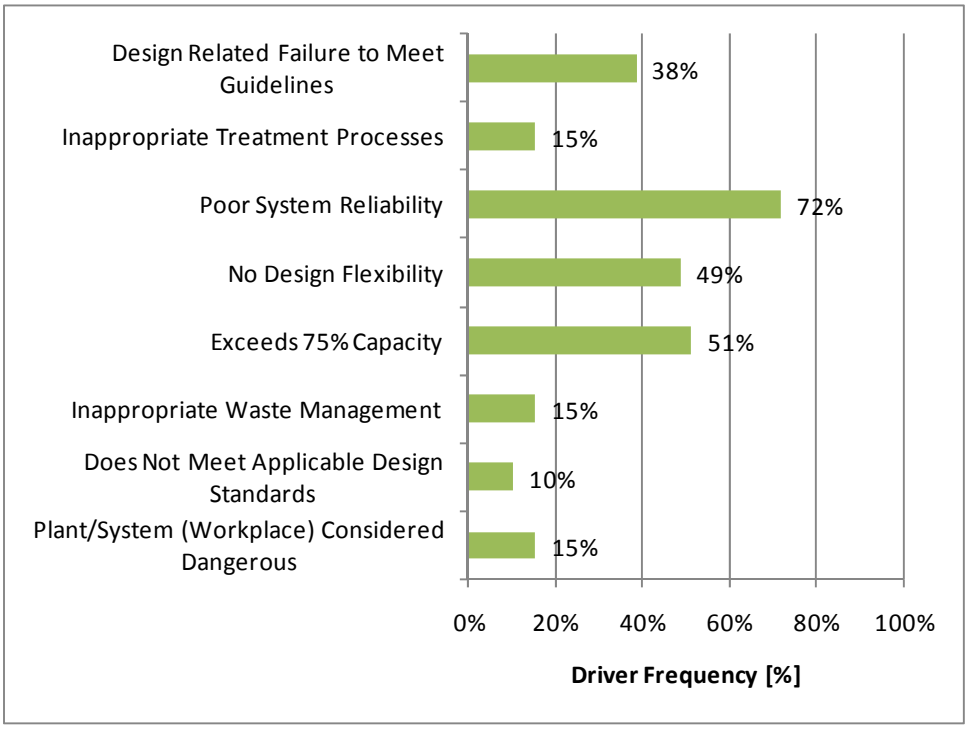
3.4.5 Component Risk - Wastewater: Design

Design Risk has a mean score of 5.3. Design risk has the second lowest mean component score.

The following drivers are identified as significantly contributing to design risk score for wastewater systems in the Region:

- inappropriate treatment process
- system reliability
- system flexibility to meet future growth
- system has exceeded the design capacity
- inappropriate waste management.

Figure 3.17 - Design Risk Drivers



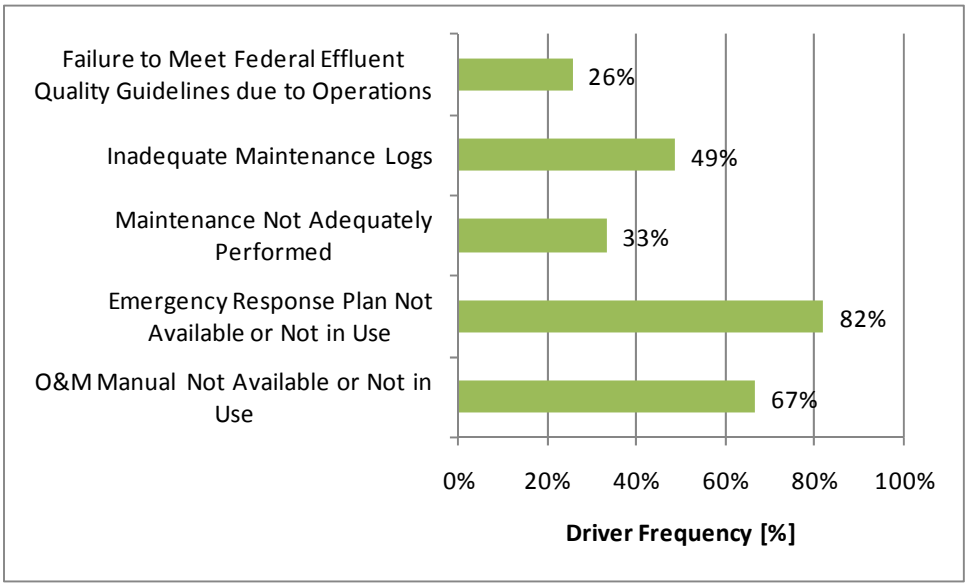
3.4.6 Component Risk - Wastewater: Operation

Operation Risk has a mean score of 6.0. Most of the wastewater systems have a medium or high risk score. This is identified as an area of opportunity for increased risk mitigation efforts.

The following drivers are identified as significantly contributing to operation risk scores for wastewater systems in the region:

- failure to meet Federal Effluent Guidelines
- inadequate maintenance logs
- general maintenance not adequately being performed
- Emergency Response Plans not in place or not being used
- O&M manuals not available or not in use.

Figure 3.18 - Operation Risk Drivers



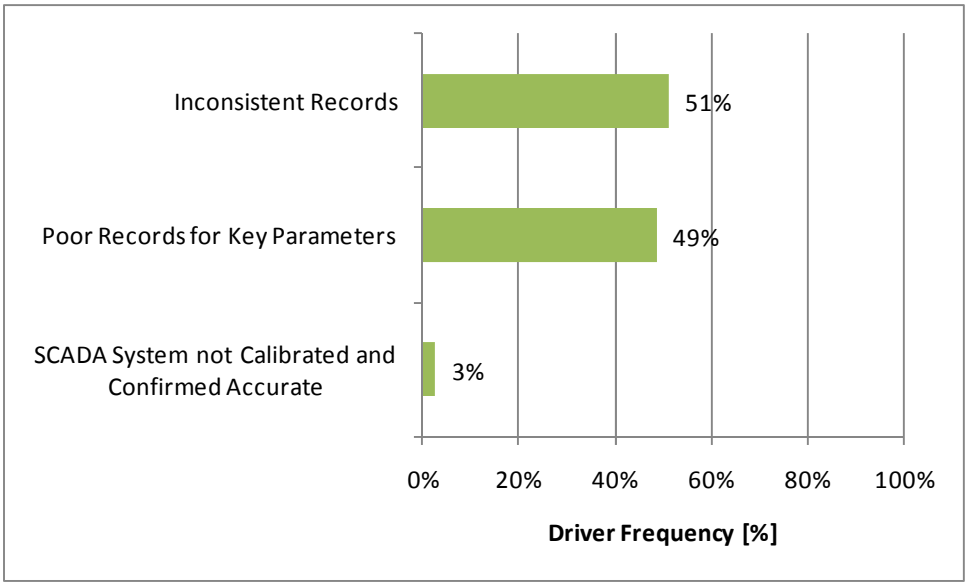
3.4.7 Component Risk - Wastewater: Reporting

Reporting Risk has a mean score 6.2. Reporting risk is associated with the maintenance of records of effluent testing and system monitoring. Poor record keeping is a significant factor in raising the overall risk ranking for many communities in this region. 15 systems have a low risk; 5 systems have a medium risk and 19 systems have a high risk score.

The following drivers are identified as significantly contributing to reporting risk scores for wastewater systems in the Region:

- inconsistent record keeping
- inconsistent records for key parameters.

Figure 3.19 - Reporting Risk Drivers



3.4.8 Component Risk - Wastewater: Operator

Operator Risk has an overall mean score of 2.6. Operator risk is associated with the certification of operators. There are only four systems with high risk due to operators not having adequate certification and/or not having a backup operator available.

However, as shown below there are several systems without an operator and several operators are not certified to the level of the system that they are responsible for. To ensure that the component risk remains low it is important to ensure that all operators are enrolled in training and become certified to the level of their respective treatment systems.

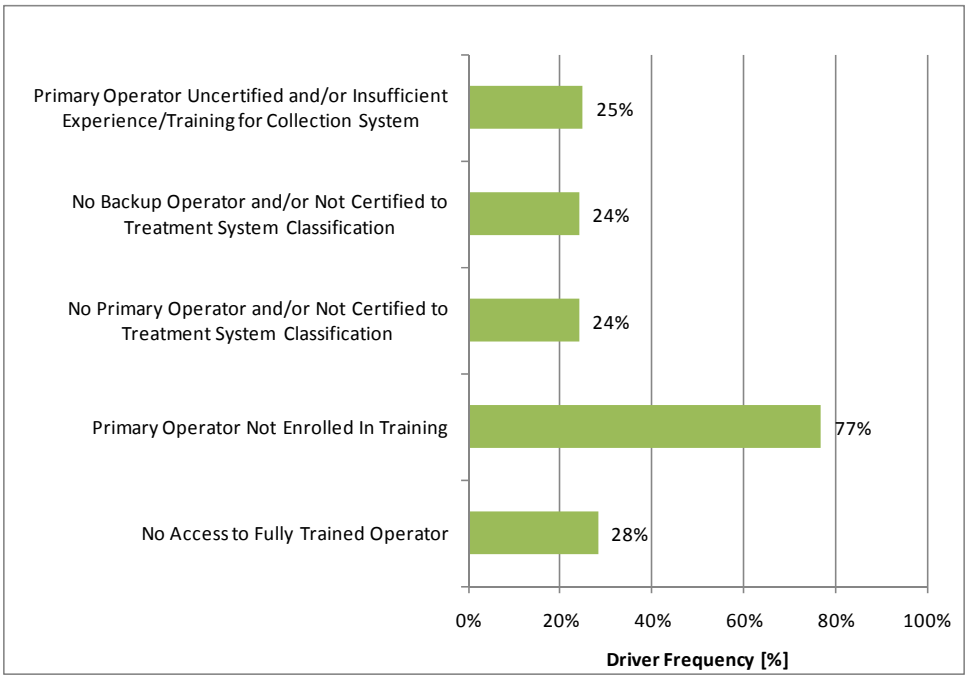
The extent to which existing wastewater systems have fully certified primary and backup operators is presented in Table 3.6. Of the 29 systems which require a certified operator for the wastewater treatment system, 24% did not have a fully certified primary operator and 24% did not have a fully certified backup operator. Of the 36 systems which require a certified operator for the collection system, 31% did not have a fully certified primary operator and 42% did not have a fully certified backup operator.

Table 3.6 - Wastewater: Operator Status for Quebec Region

	Primary Operator		Backup Operator	
	Treatment	Collection	Treatment	Collection
No. of Systems Currently Without an Operator	2	2	2	4
No. of Systems with Operator with No Certification	4	6	5	8
No. of Systems with Operator Certified but not to the Required Level of the System	1	3	0	3
No. of Systems with Operator with Adequate Certification	22	25	22	21
No. of Systems Not Requiring Operators with Certification	10	3	10	3
Total No. of Systems	**39**	**39**	**39**	**39**

Those factors which frequently contribute to increased wastewater operator risk are identified in Figure 3.20. A lack of certification, lack of training and the lack of primary or backup operator are common drivers that increase operator risk.

Figure 3.20 - Operators Risk Drivers



3.5 Plans

Information was collected regarding the availability of various documents including source water protection plans (SWPP), maintenance management plans (MMP), operation and maintenance manuals and emergency response plans (ERP). The following tables provide a summary of the percentages of First Nations that have plans in place.

Table 3.7 - Plans Summary: Water

Source	*Number of Water Systems that have...*		
	Source Water Protection Plan	Maintenance Management Plan	Emergency Response Plan
Groundwater	47%	42%	32%
Groundwater GUDI	100%	100%	0%
MTA	N/A	50%	25%
Surface Water	18%	100%	45%
Overall	**39%**	**62%**	**33%**

Table 3.8 - Plans Summary: Wastewater

Number of Wastewater Systems that have…	
Maintenance Management Plan	Emergency Response Plan
59%	18%

3.5.1 Source Water Protection Plan (SWPP)

Source water protection planning is one component in a multi-barrier approach to providing safe drinking water. Source water protection plans seek to identify threats to the water source, and put in place policies and practices that will prevent contamination of the water source and ensure the water service provider is equipped to take corrective action should a contamination event occur. Source water protection is appropriate for both groundwater and surface water sources.

For the Quebec Region, 39% water systems have SWPP's in place.

3.5.2 Maintenance Management Plans (MMP)

Maintenance Management Plans are intended to improve the effectiveness of maintenance activities and are focused on planning, scheduling and documenting preventative maintenance activities, as well as documenting unscheduled maintenance effort. The plans represent a change from reactive to proactive thinking, and when executed properly they optimize maintenance spending, minimize service disruption and extend asset life.

For the Quebec Region, 42% of groundwater systems; 100% of GUDI systems and 100% of surface water systems have an MMP in place. For wastewater systems, 59% of the systems have an MMP in place. The above does not include the MTA's.

3.5.3 Emergency Response Plans (ERP)

Emergency Response Plans are intended to be a quick reference to assist operators and other stakeholders in managing and responding to emergency situations. ERP's should be in place for both water and wastewater systems. ERP's include key contact information for persons to be notified, and persons that may be of assistance (agencies, contractors, suppliers, etc.) as well as standard communication and response protocols. ERP's will identify recommended corrective actions for "foreseeable" emergencies, as well as methodologies for addressing unforeseen situations. ERP's are essentially the last potential "barrier" in a multi-barrier approach to protecting the drinking water supply or natural environment and provide the last opportunity to mitigate damages.

33% of the water systems and 18% of the wastewater systems had an ERP in place.

4.0 Cost Analysis

4.1 Upgrade to Meet INAC's Protocol: Water

Beginning in 2006 INAC developed a series of Protocol documents for centralised and decentralised water and wastewater systems in First Nations communities. The Protocols contain standards for the design, construction, operation, maintenance, and monitoring of these systems.

One of the objectives of this study was to review the existing water and wastewater infrastructure and identify the potential upgrade costs to meet INAC Protocols, as well as Federal guidelines and Provincial standards. The estimated total construction costs for water system upgrades to meet INAC Protocols is $14.9 million.

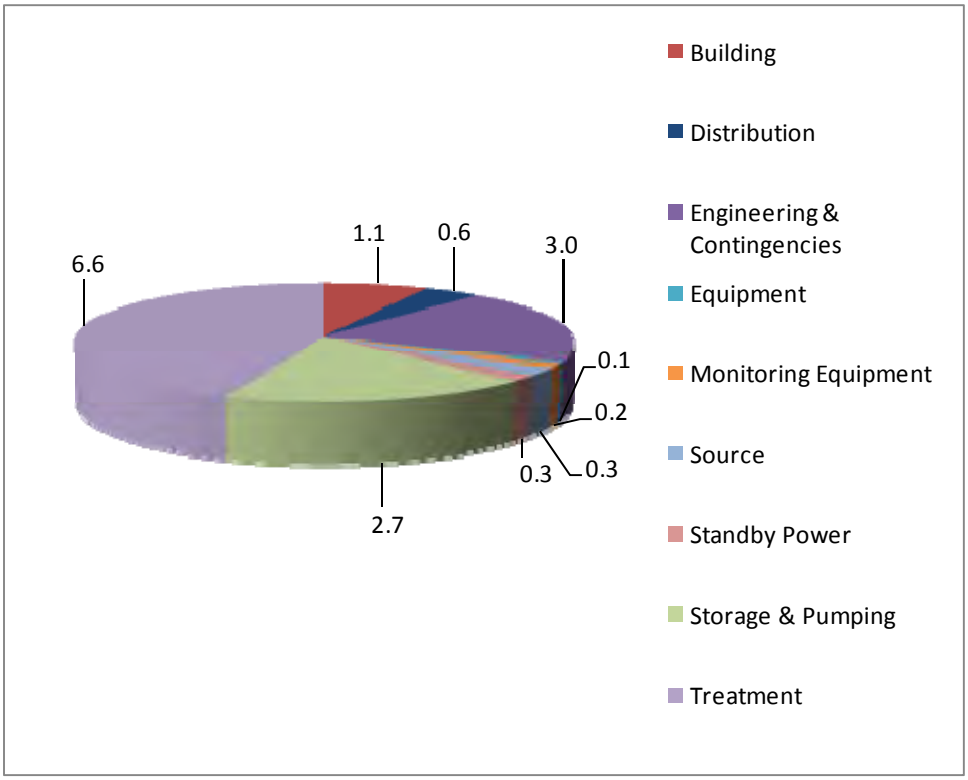
Table 4.1 provides a breakdown of the estimated total capital costs identified. A separate line item is included for engineering and contigency. Figure 4.1 provides a graphical comparison of each of the categories.

Table 4.1 - Estimated Total Construction Costs: Water

Description	Protocol - Estimated Cost	Federal - Estimated Cost	Provincial - Estimated Cost
Building	$1,121,000	$61,000	$395,000
Distribution	$608,500	$560,000	$560,000
Equipment	$87,500	$20,500	$15,000
Monitoring Equipment	$202,000	$136,000	$115,000
Source	$337,500	$107,000	$107,000
Storage & Pumping	$2,736,500	$2,605,500	$2,650,500
Treatment	$6,593,000	$6,556,000	$6,556,000
Standby Power	$255,000	$75,000	$75,000
Engineering & Contingencies	$2,989,600	$2,531,600	$2,625,100
Construction Total Estimate	**$14,930,600**	**$12,652,600**	**$13,098,600**

There are ten water systems that are identified as having potentially GUDI (groundwater under the direct influence of surface water) water supplies. Protocol costs for these systems are estimated assuming that they will prove to be secure groundwater supplies and recommendations for GUDI studies are identified to confirm this. Should the results of the GUDI studies indicate that these supplies are actually to be considered as surface water supplies, additional upgrade requirements would be required to meet the requirements of the INAC Protocol. An additional $1.0 to $2.5 million is estimated to be required for each system that requires upgrading to surface water treatment depending on system capacity and site indices.

Figure 4.1 - Breakdown of the Estimated Construction Costs to Meet INAC's Protocol: Water ($ - M)



Treatment, Distribution and Source are the construction categories with the highest cumulative costs to meet upgrades.

Treatment costs include:

- Providing spare chemical feed equipment.
- Providing spare disinfection equipment.
- Providing additional filter trains.
- Providing secondary containment for treatment chemicals.
- Providing specific treatment equipment (i.e. arsenic, manganese, etc.).
- Providing contact piping.
- Providing surge suppression/uninterruptible power supplies for critical electronic equipment.
- Upgrading the capacity of existing water treatment plant.

Distribution costs include:

- Installing blow offs on dead ends.
- Installing isolation valves.
- Looping distribution systems.
- Installing additional fire hydrants.
- Providing additional water trucks.
- Replacing cisterns.
- Replacing pipeline.

Source costs include:

- Abandoning and decommissioning wells.
- Constructing raw water pipelines.
- Drilling, testing, developing and equipping new wells.
- Providing aeration systems for freeze protection.
- Providing wellhead protection.
- Providing standby power.

Table 4.2 - Estimated Total Non-Construction Costs: Water

Description	Protocol - Estimated Cost	Federal - Estimated Cost	Provincial - Estimated Cost
Training	$80,000	$80,000	$80,000
GUDI Studies	$140,000	$40,000	$40,000
Plans/Documentation	$490,000	$320,000	$235,000
Studies	$65,000	$0	$0
Non-Construction Total Estimate	**$775,000**	**$440,000**	**$355,000**

Additional annual operations and maintenance costs, shown in Table 4.3, include costs that occur annually for items that are not currently being completed to meet protocols, such as calibrating monitoring equipment, additional sampling, cleaning the reservoir, and backup operator's salary.

Table 4.3 - Estimated Additional Annual Operation & Maintenance Costs: Water

Description	Estimated Cost
Sampling	$116,000
Operations	$29,650
Water O&M Total Estimated Cost	**$145,650**

The total estimated cost, inlcuding construction and non-construction costs, for water system upgrades to meet the INAC Protocol is $15.7 million. This excludes costs associated with potentially GUDI systems, as discussed previously.

4.2 Upgrade to Meet INAC's Protocol: Wastewater

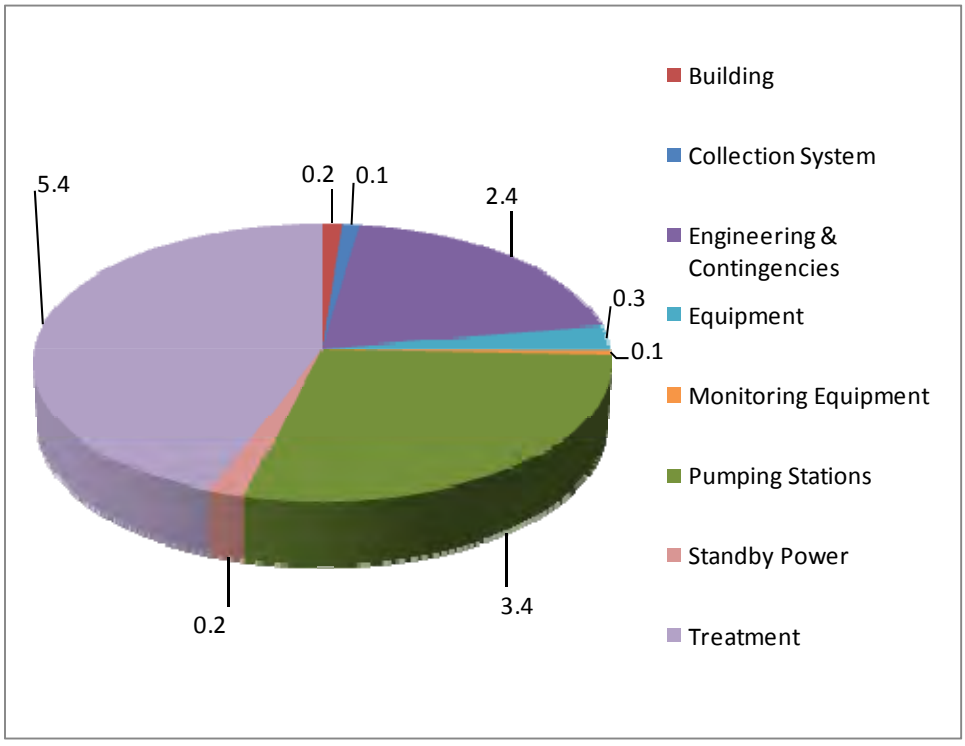
The total construction cost estimate for wastewater system upgrades to meet Protocol is $12.2 million. Specific needs along with the number of systems impacted and the total cost for each is provided below.

Upgrading treatment capacity and pumping stations represents over 72% of the cost associated with upgrades needed to meet Protocol.

Table 4.4 - Estimated Total Construction and Related Costs: Wastewater

Description	Protocol - Estimated Cost	Federal - Estimated Cost	Provincial - Estimated Cost
Building	$154,500	$0	$90,000
Collection System	$135,000	$135,000	$135,000
Equipment	$328,100	$17,000	$0
Monitoring Equipment	$69,500	$27,000	$27,000
Pumping Stations	$3,448,500	$3,413,000	$3,413,000
Treatment	$5,396,000	$5,396,000	$5,396,000
Standby Power	$226,100	$225,000	$225,000
Engineering & Contingencies	$2,447,600	$2,320,500	$2,335,500
Construction Total Estimate	**$12,205,300**	**$11,533,500**	**$11,621,500**

Figure 4.2 - Breakdown of the Estimated Construction Costs to Meet INAC's Protocol: Wastewater ($ - M)



Treatment, Collection System and Standby Power are the categories with the highest cumulative upgrade costs.

Treatment costs include:

- Constructing additional lagoon cells.
- Constructing new mechanical treatment facilities.
- Providing fences for security.
- Providing flow meters.
- Providing new pumping stations.

Collection System costs include:

- Installing cleanouts.
- Providing new sewage trucks.
- Retrofitting sewage pumping stations.

Standby Power costs include:

- Providing standby power for sewage pumping stations.

Table 4.5 - Estimated Total Non-Construction and Related Costs: Wastewater

Description	Protocol - Estimated Cost	Federal - Estimated Cost	Provincial - Estimated Cost
Training	$150,000	$150,000	$150,000
Plans/Documentation	$75,000	$55,000	$25,000
Studies	$100,000	$0	$0
Non-Construction Total Estimate	**$325,000**	**$205,000**	**$175,000**

Additional annual operations and maintenance costs, as shown in Table 4.6, include costs that occur annually, for items that are not currently being completed to meet protocols, such as calibrating monitoring equipment, additional sampling, and backup operator's salary.

Table 4.6 - Estimated Additional Annual Operation & Maintenance Costs: Wastewater

Description	Estimated Cost
Sampling	$154,500
Operations	$44,000
Operator	$100,000
Wastewater O&M Total Estimated Cost	**$298,500**

The total estimated cost, including construction and non-construction costs, for wastewater system upgrades is $12.5 million.

4.3 Upgrade Cost Summary

Table 4.7 provides a summary of the upgrade costs for the Protocol, Federal and Provincial Guidelines.

Table 4.7 - Summary and Comparison of Upgrade Costs

	Total Estimated Cost	
	Water	**Wastewater**
Upgrade to meet Protocol	$15,705,600	$12,530,300
Upgrade to meet Federal Guidelines	$13,092,600	$11,738,500
Upgrade to meet Provincial Guidelines	$13,453,600	$11,796,500

The following tables present a breakdown of the Protocol upgrade costs by risk level.

Table 4.8 - Breakdown of Protocol Estimated Costs by Risk Level: Water

Risk Level	Short Term	Long Term	Total
High	$1,727,912	$49,404	**$1,777,317**
Medium	$989,319	$0	**$989,319**
Low	$12,840,156	$98,808	**$12,938,964**
Total	**$15,557,387**	**$148,213**	**$15,705,600**

Table 4.9 - Breakdown of Protocol Estimated Costs by Risk Level: Wastewater

Risk Level	Short Term	Long Term	Total
High	$6,223,207	$0	**$6,223,207**
Medium	$5,696,901	$19,884	**$5,716,785**
Low	$590,307	$0	**$590,307**
Total	**$12,510,416**	**$19,884**	**$12,530,300**

4.4 Asset Condition and Reporting System (ACRS) Needs

ACRS inspections were completed for water and wastewater related assets. In Quebec region, not all First Nations complete ACRS, and the ACRS inspection was completed only for those with assets entered in the INAC database. The following table summarizes the ACRS needs identified. For the purposes of this assessment, ACRS needs were limited to required repairs of existing facilities, and did not include any upgrade costs, in order to avoid duplication with the Upgrade to Protocol needs identified. The following two tables (Tables 4.10 and 4.11) provide a summary of the O&M repairs required broken down by asset for both water and wastewater, respectively.

Table 4.10 - ACRS Identified Needs: Water

Asset Code	Description	Estimated Cost
A5A	Buildings	$352,825
B1C/B1D	Treatment	$78,100
B1E	Reservoirs	$7,100
B1F	Community Wells	$30,300
B1H	High Lift Pumping	$358,800
	Water ACRS Total Estimated Cost	**$827,125**

Table 4.11 - ACRS Identified Needs: Wastewater

Asset Code	Description	Estimated Cost
A5B	Buildings	$221,225
B2A	Sewers	$61,500
B2H/B2J	Lift Stations & Forcemains	$301,700
B2C/B2D	Treatment	$128,850
B2E/B2I	Lagoons	$35,000
	Wastewater ACRS Total Estimated Cost	**$748,275**

4.5 Community Servicing

An analysis was completed to evaluate future servicing alternatives for a 10 year design period. Alternatives considered include expanding existing systems, developing new systems, establishing local Municipal Type Agreements (if applicable), and use of individual systems. A theoretical operations and maintenance cost has been developed for each alternative along with a 30 year life cycle cost. The cost for upgrades to meet protocol is included in the new servicing cost, if appropriate, i.e. for new servicing alternatives that included continued use of the existing system. A summary of the capital cost along with the estimated total O&M cost for the recommended servicing alternatives are shown below.

The following table summarizes the capital cost and the total estimated operation & maintenance cost of the recommended servicing alternatives.

Table 4.12 - Future Servicing Costs

	Total Estimated Cost		Cost Per Connection	
	Water	Wastewater	Water	Wastewater
Future Servicing Cost	$210,000,000	$170,000,000	$11,100	$9,100
Annual O&M to service future growth	$13,800,000	$8,900,000	$700	$500

The evaluation of future servicing included continuing to service the existing population with the same level of service that was currently in place and evaluating the options for providing service to the future 10 year growth for the community.

Predominantly, it was found that the life cycle costs for extending piped water and wastewater servicing for the future growth was the most cost effective solution. This assumes that future homes would be constructed in a compact subdivision setting adjacent to the existing serviced area. This however will need to be confirmed through detailed studies for each community.

5.0 Regional Summary

The 37 First Nations visited during the completion of this project are serviced by 39 water systems (including 8 Municipal Type Agreement systems) and 39 wastewater systems (including 10 Municipal Type Agreement systems).

The types of systems vary from First Nation to First Nation. In the Quebec Region, 91% of the homes are serviced by communal water, 8% are serviced by individual wells and the remaining homes do not have water servicing.

There are 11 surface water systems in the Quebec Region. There is generally no major concern for systems using surface water, except for one community which has a medium risk due to industry and agriculture activities, and another community which has a potential future risk from a mining operation upstream.

There are 19 groundwater systems and 1 groundwater under the direct influence of surface water (GUDI) system. In areas where a proven groundwater source has been identified, it is recommended that these communities continue to use groundwater to meet the demands for future growth.

There are eight First Nations water systems serviced by MTA's (municipal type agreement). The services provided through MTA in this Region are satisfactory and should be continued since they are usually the more economical servicing solution. In the few instances where there may be quality issues, communities should negotiate with the MTA service provider to improve the service.

Of the 39 wastewater systems, 22 are lagoons and 10 are MTA. There are only 5 mechanical sewage treatment systems in the Quebec Region. The aerated lagoons used in the Region have a good track record. It is an uncomplicated system that is relatively easy to maintain and has a much lower O&M cost than mechanical systems. While the initial capital cost for a lagoon system may be higher, the savings in O&M cost over the life cycle of the system and the reliability of the system will more than make up for the higher initial capital cost.

There are seven water systems and seven wastewater systems in the Quebec region identified as high-risk systems. While there are multiple factors contributing to risk, design and operational concerns are given the most weight, particularly when the concern is related to the protection of public health or the environment. The high risk systems in the region typically require system upgrades or improved operational procedures to meet the guidelines for treated water quality or sewage effluent quality.

Based on the data collected, operator risk was the lowest of the component risks. However, it is important to provide ongoing training for operators to ensure that all systems are operated and maintained by trained/certified operators and that monitoring and record keeping is completed in accordance with the Protocol.

Wastewater sampling prior to effluent discharge appears to be an area where a significant impact on the overall risk could be addressed. Sampling, testing and recording of effluent quality prior to discharge would result in reducing the reporting risk for these systems.

NEEGAN BURNSIDE

Appendix A
Glossary

Appendix A: Glossary of Terms and Acronyms

Aeration (see also lagoon): The process of bringing air into contact with a liquid (typically water), usually by bubbling air through the liquid, spraying the liquid into the air, allowing the liquid to cascade down a waterfall, or by mechanical agitation. Aeration serves to (1) strip dissolved gases from solution, and/or (2) oxygenate the liquid. (Gowen Environmental)

Aesthetic Objective (AO): Aesthetic objectives are set for drinking water quality parameters such as colour or odour, where exceeding the objective may make the water less pleasant, but not unsafe. (INAC *Protocol for Decentralised Water and Wastewater*)

Ammonia (See also: Potable water; Effluent quality requirements): A pungent colorless gaseous alkaline compound of nitrogen and hydrogen (NH_3) that is very soluble in water and can easily be condensed to a liquid by cold and pressure (*Merriam-Webster*). Ammonia is used in several areas of water and wastewater treatment, such as pH control. It is also used in conjunction with chlorine to produce potable water. The existence of ammonia in wastewater is common in industrial sectors as a by-product of cleaning agents. This chemical impacts both human and environmental conditions. Treatment of ammonia can be completed in lagoon systems and mechanical plants.
(R.M. Technologies)

Arsenic: A metallic element that forms a number of compounds. It is found in nature at low levels, mostly in compounds with oxygen, chlorine, and sulphur; these are called inorganic arsenic compounds. Organic arsenic in plants and animals combines with carbon and hydrogen. Inorganic arsenic is a human poison. Organic arsenic is less harmful. High levels of inorganic arsenic in food or water can be fatal.
(Medicinenet.com)

Aquifer (confined): A layer of soil or rock below the land surface that is saturated with water. There are layers of impermeable material both above and below it, and it is under pressure so that when the aquifer is penetrated by a well, the water will rise above the top of the aquifer. (INAC *Protocol for Decentralised Water and Wastewater Systems*)

Aquifer (unconfined): An unconfined aquifer is one whose upper water surface (water table) is at atmospheric pressure, and thus is able to rise and fall. (INAC *Protocol for Decentralised Water and Wastewater Systems*)

As-built/record drawings: Revised set of drawing submitted by a contractor upon completion of a project or a particular job. They reflect all changes made in the specifications and working drawings during the construction process, and show the exact dimensions, geometry, and location of all elements of the work completed under the contract. Also called as-built drawings or just as-builts.

ACRS Inspection (Asset Condition Reporting System Inspection): For centralised water and wastewater systems, an ACRS (asset condition reporting system) inspection of the system is to be performed once every three (3) years by a qualified person (consulting engineer, Tribal Council engineer), who is not from the First Nation involved, to assess the condition of the asset, adequacy of maintenance efforts, and need for additional maintenance work. The ACRS inspection report will be discussed with, and submitted to, the First Nation council and the INAC regional office. Inspections will be conducted in accordance with the ACRS Manual, a copy of which can be obtained from the INAC regional office.

Bacteria (plural) bacterium (singular): Microscopic living organisms usually consisting of a single cell. Bacteria can aid in pollution control by consuming or breaking down organic matter in sewage and/or other water pollutants. Some bacteria may also cause human, animal, and plant health problems. Bacteria are predominantly found in the intestines and feces of humans and animals. The presence of *coliform* bacteria in water indicates the contamination of water by raw or partially treated sewage. (INAC *Protocol for Decentralised Water and Wastewater Systems*)

Baffle (concrete and/or curtain): Vertical/horizontal impermeable barriers in a pond or reservoir. Baffles direct the flow of water into the longest possible path through the reservoir in order to eliminate short-circuiting in the water treatment system. In potable water treatment, short-circuiting can reduce the effectiveness of disinfectants. In effluent treatment, short-circuiting may result in an increase of pollutants at the outlet. Short-circuiting occurs when water flows directly from the inlet to the outlet across a pond or reservoir. (Layfield)

BOD_5 (Biochemical Oxygen Demand): The most widely used parameter of organic pollution applied to both wastewater and surface water is the 5-day BOD (BOD_5). This determination involves the measurement of the dissolved oxygen used by microorganisms in the biochemical oxidation of organic matter. BOD test results are used to: determine the approximate quantity of oxygen that will be required to biologically stabilize the organic matter present; to determine the size of waste treatment facilities; to measure the efficiency of some treatment processes; and to determine compliance with wastewater discharge permits. (Metcalf & Eddy)

Capacity (actual vs. design): Refers to the capacity of the treatment system, with the "design capacity" being the flow rate proposed by the designer or manufacturer. If the system is not operating to design levels, the "actual capacity" could be limited by failing pumps, clogged filters or not meeting the Protocol (i.e. Protocol requires two filter trains such that one could operate while another is being cleaned/repaired and this was previously not explicitly required; therefore, the actual capacity is half of the design capacity).

Chemical feed equipment: All equipment associated with introducing chemicals to the raw water as part of the treatment process including coagulants, coagulant aids, disinfectants, etc.

Chlorine: A disinfectant used in either gas or liquid from gas that is added to water to protect the consumer from bacteria and other micro-organisms. It is widely used because it is inexpensive and easily injected into water. Because of its concentration, a gallon can treat a large amount of water. However, chlorine use does have drawbacks: when chlorine is used as a disinfectant it combines with naturally occurring decaying organic matter to form Trihalomethanes (THMs). (Vital Life Systems)

Chlorination: The application of chlorine to water, sewage or industrial wastes for disinfection (reduction of pathogens) or to oxidize undesirable compounds. (City of Toronto)

Chlorine Residual: The chlorine level in potable water immediately after it has been treated. (Ontario Ministry of the Environment)

Circuit Rider (see also Circuit Rider Training Program): Under the department's Circuit Rider Trainer Program (CRTP) INAC provides funds to engage circuit riders (third party water and wastewater system experts who provide water and wastewater system operators with on-site, mentoring, training, and emergency assistance). The third-party service providers that provide circuit rider services also provide operators with a 24/7 emergency hotline. (INAC *Protocol for Centralised Wastewater Systems in First Nations Communities*)

Circuit Rider Training Program: The main vehicle by which most First Nations operators receive the required training to operate their systems. This program provides qualified experts who rotate through a circuit of communities, providing hands-on training for the operators on their own system. Circuit rider trainers also help the First Nations with minor troubles and issues of operation and maintenance of their systems. (INAC *Plan of Action*)

Cistern: A tank for storing potable water or other liquids, usually placed above the ground. (Bow River Basin Council, cited in Alberta Environment *Glossary*)

Class "D" Cost Estimates: A preliminary estimate, for each community visited, based on available site information, which indicates the approximate magnitude (+/- 40%) of the cost of the actions recommended in the report, and which may be used in developing long-term capital plans and for a preliminary discussion of proposed capital projects.

Collection piping: Sanitary sewer collecting wastewater from individual buildings and homes, for treatment and disposal at a public facility.

Component risk / component risk factors: The overall risk is determined by five component risks: water source/effluent, design, operation, reporting, and operator.

Community Health Representatives (CHRs): Health Canada's local health representatives. They undertake bacteriological and chlorine residual sampling of distributed water within most First Nation communities.

Contact piping: Dedicated watermain to provide chlorine contact time before potable water is distributed to the first user.

Containment liners (for on-site fuel storage): A form of secondary containment used for diesel driven generators or fire pumps.

Continuous discharge to a receiving body: The release of treated wastewater effluent to a lake, river, stream, etc. where the rate of release is continuous (i.e. not batch discharge).

Conventional Wastewater Treatment: Consists of preliminary processes, primary settling to remove heavy solids and floatable materials, secondary biological aeration to metabolize and flocculate colloidal and dissolved organics, and secondary settling to remove additional solids. Tertiary treatment such as disinfection or filtration to further treat the wastewater depending on the level of treatment required for discharge. Waste sludge drawn from these operations is thickened and processed for ultimate disposal, usually either land application or landfilling. Preliminary treatment processes include coarse screening, medium screening, shredding of solids, flow measuring, pumping, grit removal, and pre-aeration. Chlorination of raw wastewater sometimes is used for odor control and to improve settling characteristics of the solids.

Conventional Water Treatment: Consists of a combination of coagulation (adding chemicals called coagulants), flocculation (particles binding together with coagulants) and sedimentation (settling of particles) to remove a large amount of organic compounds and suspended particles, filtration (water passing through porous media) to remove bacteria protozoa and viruses (slow sand filtration) or suspended particles (rapid sand filtration), and disinfection to ensure all the bacteria protozoa and viruses are removed, and provide safe drinking water.

Cross connections: A cross connection is a link between a possible source of pollution and a potable water supply. A pollutant may enter the potable water system when a) the pressure of the pollution source exceeds the pressure of the potable water source or b) when a sudden loss of pressure occurs in the water system and "backflow" occurs. The flow through a water treatment plant should have no instances of treated water coming into contact with raw or wastewater. Backflow preventers should be tested regularly and any actual physical links should be removed.

Decentralized System: A group or groups of communal (as opposed to private) on-site water or wastewater systems. (INAC *Protocol for Decentralised Water and Wastewater Systems*)

Dedicated transmission main: A length of watermain which has no service connections or hydrants; can refer to the length of raw watermain from a raw water source to the water treatment plant or in the distribution system where there are larger distances between homes.

Discharge Frequency: The frequency in which treated wastewater is discharged; could be continuous, seasonal, annual, etc.

Discharge quality data: Data acquired through the completion of a laboratory analysis of treated wastewater effluent prior to obtaining permission to discharge. Relevant parameters for testing include: 5 day Biochemical Oxygen Demand, Suspended Solids, Fecal Coliforms, pH, Phenols, Oils & Greases, Phosphorus and Temperature.

Disinfectant: A disinfectant is a chemical (commonly chlorine, chloramines, or ozone) or physical process (e.g., ultraviolet light) that inactivates or kills microorganisms such as bacteria, viruses, and protozoa. (INAC *Protocol for Decentralised Water and Wastewater Systems*)

Disinfection: A process that has as its objective destroying or inactivating pathogenic micro-organisms in water. (Government of Alberta, *Environmental Protection and Enhancement Act*, cited in Alberta Environment *Glossary*)

Disinfection By-products: Disinfection by-products are chemical, organic and inorganic substances that can form during a reaction of a disinfectant with naturally present organic or anthropogenic matter in the water. (Lenntech)

Distribution Classification > piped / trucked: Refers to the classification of the delivery of potable water leaving the water treatment plant. This can be either piped (via watermain) or trucked (via truck delivery to individual homes/cisterns). The level of classification involves the number of house connections (population served).

Domestic flows: All demands in the water system excluding fire flows.

Drinking Water: Water of sufficiently high quality that can be consumed or used without risk of immediate or long term harm.

Drinking Water Advisory (DWA): Drinking Water Advisories (DWAs) are preventive measures that are regularly issued in municipalities and communities across Canada; they protect public health from waterborne contaminants that can be present in drinking water. A DWA can be issued in any community and may include *boil water advisories, do not consume advisories* and *do not use advisories.* (INAC "Fact Sheet")

Effluent: 1. The liquid waste of municipalities/communities, industries, or agricultural operations. Usually the term refers to a treated liquid released from a wastewater treatment process. (Bow River) 2. The discharge from any *on-site sewage* treatment component. (Alberta Municipal Affairs; cited in Alberta Environment *Glossary*)

Effluent quality data: Any test results or monitoring data that describes the condition of treated wastewater effluent.

Effluent Quality Requirements: All effluents from wastewater systems in Canada must comply with all applicable federal legislation including the *Canadian Environmental Protection Act, 1999* and the *Fisheries Act,* as well as any other applicable legislation, including provincial, depending on the geographical location of the system.
In addition, all discharges from First Nations wastewater systems shall meet the quality requirements found in the *Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments* - EPS 1-EC-76-1 (1976 Guidelines).

For the purposes of determining effluent quality related to ammonia and chlorine, the *Notice Requiring the Preparation and Implementation of Pollution Prevention Plans for Inorganic Chloramines and Chlorinated Wastewater Effluents* and the *Guideline for the Release of Ammonia Dissolved in Water Found in Wastewater Effluents* contain additional and/or updated information to the requirements provided in the 1976 Guidelines.

A copy of the *Guideline for the Release of Ammonia Dissolved in Water Found in Wastewater Effluents* can be found at Environment Canada's website. (INAC *Protocol for Centralised Wastewater Systems in First Nations Communities*)

Effluent Receiver (also referred to as the receiving body; the receiving environment; the receiver) (see also Effluent and Component risks): The environment that receives treated wastewater, including lakes, rivers, wetlands, sub-surfaces, title fields, open marines, and enclosed bays. It may also refer to a community's method for dealing with wastewater (e.g. Municipal Type Agreements or evaporation).

Elevated Storage: A water tower, which is a reservoir or storage tank mounted on a tower-like structure at the summit of an area of high ground in a place where the water pressure would otherwise be inadequate for distribution at a uniform pressure. (Collins)

Emergency Response Plan (ERP): Emergency response plans for water and wastewater systems are intended to be a quick reference to assist operators and other stakeholders in managing and responding to emergency situations. They include key contact information for persons to be notified and for persons who may be of assistance (e.g. agencies, contractors, suppliers, etc.), as well as standard communication and response protocols. Emergency response plans identify recommended action for "foreseeable" emergencies, and provide methodologies for unforeseen situations.

Facultative Lagoon: The most common type of wastewater treatment lagoon used by small communities and individual households. Facultative lagoons rely on both aerobic and anaerobic decomposition of waste, can be adapted for use in most climates and require no machinery to treat wastewater.

Filter: A device used to remove solids from a mixture or to separate materials. Materials are frequently separated from water using filters. (Edwards Aquifier)

Filter train equipment: Includes all components that form part of the water filtration process from where the raw water enters the filter process to where the filtered water leaves the treatment unit. This does not refer to the disinfection equipment.

Filtration: The mechanical process which removes particulate matter by separating water from solid material, usually by passing it through sand. (Edwards Aquifier)

Fire pump tests: A monthly test for the basic operation and functionality of the fire pump.

Grade Level Storage: A treated water storage reservoir that is constructed at grade, typically with earth mounded on top to provide some frost protection.

GPS: Global Positioning System (GPS) - A navigational system involving satellites and computers that can determine the latitude and longitude of a receiver on Earth by computing the time difference for signals from different satellites to reach the receiver.

Groundwater: Groundwater is any water that is obtained from a subsurface water-bearing soil unit (called an aquifer). 1) Water that flows or seeps downward and saturates soil or rock, supplying springs and wells. The upper surface of the saturate zone is called the water table. 2) Water stored underground in rock crevices and in the pores of geologic materials that make up the Earth's crust. (INAC, *Protocol for Decentralised Water and Wastewater Systems*)

Groundwater, confined: Groundwater that is under pressure significantly greater than atmospheric, with its upper limit the bottom of a bed with hydraulic conductivity distinctly lower than that of the material in which the confined water occurs. (INAC, *Protocol for Decentralised Water and Wastewater Systems*)

Groundwater, unconfined: Water in an aquifer that has a water table that is exposed to the atmosphere. (INAC *Protocol for Decentralised Water and Wastewater Systems*)

Groundwater under the direct influence of surface water (GUDI): This term refers to groundwater sources (e.g., wells, springs, infiltration galleries, etc.) where microbial pathogens are able to travel from nearby surface water to the groundwater source. (Government of Nova Scotia)

Guidelines: Guidelines as referred to in this Assessment include all federal and provincial water and wastewater guidelines for domestic potable water and household sanitary waste. These guidelines include the "Guidelines for Canadian Drinking Water Quality" and all its recommended health and aesthetic guidelines for water quality.

Guidelines for Canadian Drinking Water Quality (GCDWQ): Water quality guidelines developed by the Federal-Provincial-Territorial Committee on Drinking Water and have been published by Health Canada since 1968.

Canadian drinking water supplies are generally of excellent quality. However, water in nature is never "pure." It picks up traces of everything it comes into contact with, including minerals, silt, vegetation, fertilizers, and agricultural run-off. While most of these substances are harmless, some may pose a health risk. To address this risk, Health Canada works with the provincial and territorial governments to develop guidelines that set out the maximum acceptable concentrations of these substances in drinking water. These drinking water guidelines are designed to protect the health of the most vulnerable members of society, such as children and the elderly. The guidelines set out the basic parameters that every water system should strive to achieve in order to provide the cleanest, safest and most reliable drinking water possible.

The Guidelines for Canadian Drinking Water Quality deal with microbiological, chemical and radiological contaminants. They also address concerns with physical and aesthetic characteristics of water, such as taste and odour. (Health Canada)

Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments, April 1976: The purpose of these guidelines is to indicate the degree of treatment and effluent quality that will be applicable to all wastewater discharged from existing and proposed Federal installations. Use of these guidelines is intended to promote a consistent wastewater approach towards the cleanup and prevention of water pollution and ensure that the best practicable control technologies used. (Government of Canada)

Highlift Pumping: Refers to pumps installed that provide treated water into the water distribution system at pressure; either directly or via water tower.

Hydrant Flushing (see line flushing and swabbing)

Influent: Water, wastewater, or other liquid flowing into a reservoir, basin or treatment plant. (Gowen)

Lagoon: A shallow pond where sunlight, bacterial action, and oxygen work to purify wastewater. Lagoons are typically used for the storage of wastewaters, sludges, liquid wastes, or spent nuclear fuel. (Edwards Aquifier)

Lagoon, aerated: See Aeration

Lagoon, facultative: See Facultative Lagoon.

L/c/d: Measurement of daily water usage as Litres per capita, per day.

Level of Service Standards (INAC): The Level of Service Standards (LOSS), determined on a national basis, are the levels of service that the Department of Indian Affairs and Northern Development (DIAND) is prepared to financially support to assist First Nations in providing community services comparable to the levels of service that would generally be available in non-native communities of similar size and circumstances.

The Level of Service Standards provide a description of criteria which will be used to establish the level of funding for safe, cost-effective, domestic water supply and wastewater disposal systems for on-reserve housing units and administrative, operative, institutional and recreational buildings. (INAC "Water and Sewage Systems")

Lift Station (also Pumping Station): A point in the sewer system where the wastewater needs to be pumped (lifted) to a higher elevation so that gravity can be used to bring the wastewater to the treatment plant. (Hailey City Hall Public Works)

Line flushing and swabbing (also referred to as watermain swabbing and flushing): Watermain swabbing entails inserting a soft material shaped like a bullet into the watermain through a fire hydrant. The diameter is slightly larger than the watermain and the bullet (swab) is pushed along the watermain by water pressure. As it passes through the watermain, the swab executes a scouring action on the sediment inside the watermain.

During watermain flushing, high velocity water flowing from hydrants is used to remove loose sediment from watermains. (City of Guelph)

L/p/d: Measurement of daily water usage as Litres per person, per day.

MAC (Maximum acceptable concentration): In the Guidelines for Canadian Drinking Water Quality (GCDWQ), Maximum Acceptable Concentrations (MACs) have been established for certain physical, chemical, radiological and microbiological parameters or substances that are known or suspected to cause adverse effects on health. For some parameters, Interim Maximum Acceptable Concentrations (IMACs) are also recommended in the guidelines.

Drinking water that continually has a substance at a greater concentration than the specified MACs will contribute significantly to consumer exposure to the substance and may, in some instances, produce harmful health effects. However, the short-term presence of substances above the MAC levels does not necessarily mean the water constitutes a risk to health. (INAC, *National Assessment Summary Report*)

Maintenance Management Plan (MMP): Maintenance management plans apply to both water and wastewater systems. They are intended to improve the effectiveness of maintenance activities and are focused on planning, scheduling, and documenting preventative maintenance activities and on documenting unscheduled maintenance.

Manganese: Manganese is a mineral that naturally occurs in rocks and soil and is a normal constituent of the human diet. In some places, it exists in well water as a naturally occurring groundwater mineral, but may also be present due to underground pollution sources. Manganese may become noticeable in tap water at concentrations greater than 0.05 milligrams per liter (mg/L) of water by imparting a colour, odour, or taste to the water. However, health effects from manganese are not a concern until concentrations are approximately 10 times higher. (Conneticut Dept. of Health)

Mechanical Plant/ Mechanical Treatment: Refers to any type of wastewater treatment plant including treatments systems consisting of rotating biological contactors (RBC), sequencing batch reactors (SBR), extended aeration (EA), etc. It does not include natural forms of wastewater treatment like lagoons or septic systems.

Metals Scan (Full): A full metal scan refers to what laboratories call Inductively Coupled Plasma Mass Spectrometry (ICP-MS) analysis for the evaluation of trace metals in water samples. This test covers a complete scan of over 20 trace metals in a single analysis.

Municipal Type Agreement (MTA): The situation where First Nations are supplied with treated water from or send their wastewater to a nearby municipality, as outlined in a formal agreement between the two parties. The term is also used in this report to describe a system where the First Nation is supplied with treated water or wastewater treatment services by another First Nation or other independent body such as a corporate entity such as a Casino etc.

Multi-Barrier Approach: Approach used to ensure that drinking water is safe. In the past, the term „multi-barrier' referred only to the barriers involved in the actual treatment of raw water to provide quality drinking water. This approach has now been expanded to include a number of key elements that are an integral part of a drinking water program to ensure delivery of safe, secure supplies of drinking water. Barriers may be physical (eg: filter) or administrative (eg: planning) in nature. (Alberta Environment, *Glossary & Alberta's Drinking Water Program*)

None: Indicates that the treatment and/or distribution/collection system has not been classified.

O & M: Operation and Maintenance.

Operational Plan (OP): An Operational Plan is the primary instrument for communicating the Community's quality management system (QMS) from the public works departments (water and wastewater) to Chief and Council, and from Council to INAC, Health Canada and the community members.

Phosphorus: A non-metallic element of the nitrogen family that occurs widely especially as phosphates (*Merriam-Webster*). Phosphorus occurs naturally in rocks, soil, animal waste, plant material, and even the atmosphere. In addition to these natural sources, phosphorus comes from human activities such as agriculture, discharge of industrial and municipal waste, and surface water runoff from residential and urban areas. Nutrients held in soil can be dissolved in water and carried off by leaching, tile drainage or surface runoff.

Phosphorus does not pose a direct threat to human health; it is an essential component of all cells and is present in bones and teeth. It does, however, pose an indirect threat to both aesthetics and to human health by affecting source waters used for drinking and recreation. For example, excessive nutrients can promote the growth of algal blooms, which can contribute to a wide range of water quality problems by affecting the potability, taste, odour, and colour of the water. (Canadian Council of Ministers of the Environment)

Piped Distribution System: A water distribution system which relies on pipes to convey water through pumping or elevated storage to the end user. Different from trucked distribution in that a trucked distribution system delivers water to end users in batch quantities to individual holding tanks (cisterns).

Potable water: Potable water is water that is destined for human consumption.
For the purposes of the *Protocol for Centralised Drinking Water Systems in First Nations Communities*, water destined for human consumption is water that is consumed directly as drinking water, water that is used in cooking, water that is used to wash food, and water that is used for bathing infants (individuals under 1 year in age). (INAC, *Protocol for Centralised Drinking Water Systems in First Nations Communities*)

PPU: People per unit. Measurement to describe housing density.

Primary Operator: The main operator of a water or wastewater system. The primary operator must be certified to the level of the treatment and distribution/collection system.

Primary Wastewater Treatment: Removal of particulate materials from domestic wastewater, usually done by allowing the solid materials to settle as a result of gravity. Typically, the first major stage of treatment encountered by domestic wastewater as it enters a treatment facility. Primary treatment plants generally remove 25 to 35 percent of the *Biological Oxygen Demand (BOD)* and 45 to 65 percent of the total suspended matter. Also, any process used for the decomposition, stabilization, or disposal of sludges produced by settling. (North American Lake Management Society; cited in Alberta Environment *Glossary*)

Protocol for Safe Drinking Water in First Nations Communities: Standards for design, construction, operation, maintenance, and monitoring of drinking water systems and is intended for use by First Nations staff responsible for water systems. It is also intended for use by Indian and Northern Affairs Canada (INAC) staff, Public Works and Government Services Canada (PWGSC) for INAC staff, and all others involved in providing advice or assistance to First Nations in the design, construction, operation, maintenance, and monitoring of their drinking water systems in their communities, in accordance with established federal or provincial standards, whichever are the most stringent.

Any water system that produces drinking water destined for human consumption, that is funded in whole or in part by INAC, and that serves five or more households or a public facility, must comply with the requirements of this protocol. (INAC *Protocol*)

Quality Assurance/Quality Control (QA/QC): A quality management system that focuses on fulfilling quality requirements and providing confidence that quality requirements will be fulfilled.

Reporting Risk: The Reporting risk level is the risk inherent with the operational method of recording data and providing the required reports. This would include both manual and automatic methods of record keeping. The reporting risk ranking is based on the adequacy of the operational records and the number of reports submitted during the year compared to the total number of records and reports required according to the appropriate legislation, standards, and operation procedures of the system in question.

Reservoir: A man-made lake that collects and stores water for future use. During periods of low river flow, reservoirs can release additional flow if water is available. (Government of Alberta, *Water for Life*, cited in Alberta *Glossary*)

Reservoir Cleaning: This involves the pump-down, clean-out, removal of settled material, disinfection and refill of a water storage reservoir. This activity requires confined space entry equipment and training.

Retrofit: 1. To furnish with new or modified parts or equipment not available or considered necessary at the time of manufacture; 2. To install (new or modified parts or equipment) in something previously manufactured or constructed; 3**.** To adapt to a new purpose or need**:** modify. (*Merriam-Webster*)

Rotating Biological Contactor (RBC): A technology used to treat wastewater classified as mechanical treatment.

Risk (Management Risk Level/Management Risk Score): Risk is defined in INAC's *Management Risk Level Evaluation Guidelines for Water and Wastewater Systems in First Nations Communities* (Revised 2010). These guidelines follow the Multi-Barrier Approach for water management. This approach, developed by the Federal-Provincial-Territorial Committee on Drinking Water and the Canadian Council of Ministers of the Environment (CCME) Water Quality Task Group, is intended to prevent the presence of water-borne contaminants in drinking water by ensuring effective safeguards are in place at each stage of a drinking water system.

Following that approach, INAC assesses five main components of a system to determine an overall system management risk score:
-Source Water (drinking water systems) or Effluent Receiver (wastewater systems)
-System Design
-Operation and Maintenance
-Records and Reporting
-Operator Training and Experience

Each of these components is assigned a risk score, which are then weighed to determine the overall management risk score of a system. The resulting score will then result in the management of the system as being classified as either high risk, medium risk, or low risk.

-High Risk: Major deficiencies in most of the components. Should a problem arise, the system and management as a whole is unlikely to be able to compensate, thus there is a high probability that any problem could result in unsafe water. Issues should be addressed as soon as possible.

-Medium Risk: Minor deficiencies in several components, or major deficiencies in one or two components. Should a problem arise, the system and management can probably compensate for the problem, but the noted deficiencies makes this uncertain, thus there is a medium probability that any problem could result in unsafe water. Issues need to be addressed.

-Low Risk: Minor or no deficiencies with the system or management. Should a problem occur, it is likely that the system and management as a whole will be able to compensate and continue to provide safe water while the issue is being resolved.

It is important to distinguish between INAC's system management risk level and drinking water quality. The actual quality of the water produced by a system is but one part of determining the overall system management risk level.

Unsafe drinking water is noted through the implementation of Drinking Water Advisories (DWA), not by the management risk level of the system. DWA come in multiple forms, the most common being the boil water advisory.

A system with a high-risk ranking under INAC's management evaluation is, because of its multiple deficiencies, likely to be unable to cope with problems that may occur in the system that result in a DWA. This means that DWA are likely to occur more frequently and to have a longer-term duration on a high-risk system. On the other hand, while problems can and do occur in low-risk systems, because of better overall risk management, these systems are more likely to address the problem in the short term, resulting in the rapid removal of problems and DWA.

This means that a high-risk drinking system can still produce perfectly safe and potable water. Deficiencies should be addressed as quickly as possible, however, before any issues arise with the water quality. (INAC, *Management Risk Level Evaluation Guidelines*)

SCADA (Supervisory Control and Data Acquisition) system: Refers to a control and/or computer system that can monitor, record and control infrastructure, or facility-based processes.

Screened reservoir vents: Reservoir vents should be screened to allow air movement and to prevent vermin from entering.

Seasonal discharge: Discharge of wastewater at times of maximum or substantial stream flow. This may vary from location to location.

Secondary containment for treatment chemicals: Secondary containment is required for the storage of all regulated hazardous materials. Secondary containment must be constructed using materials capable of containing a spill or leak for at least as long as the period between monitoring inspections. A means of providing overfill protection for any primary container may be required. This may be an overfill prevention device and/or an attention getting high level alarm. Materials that in combination may cause a fire or explosion, the production of a flammable, toxic, poisonous gas, or the deterioration of a primary or secondary container will be separated in both the primary and secondary treatment containment so as to avoid intermixing.

Secondary Treatment: involving the biological process of reducing suspended, colloidal, and dissolved organic/inorganic matter in effluent from primary treatment systems and which generally removes 80 to 95 percent of the *Biochemical Oxygen Demand (BOD)* and suspended matter. Secondary wastewater treatment may be accomplished by biological or chemical-physical methods. Activated sludge and trickling filters are two of the most common means of secondary treatment. (North American Lake Management Society, cited in Alberta *Glossary*)

Septic tank: A tank used to detain domestic wastes to allow the settling of solids prior to distribution to a leach field for soil absorption. Septic tanks are used when a piped wastewater collection system is not available to carry them to a treatment plant. A settling tank in which settled sludge is in immediate contact with sewage flowing through the tank, and wherein solids are decomposed by anaerobic bacterial action. (INAC *Protocol for Centralised Wastewater*)

Septic system: A combination of underground pipe(s) and holding tank(s) which are used to hold, decompose, and clean wastewater for subsurface disposal. (Bow River, cited in Alberta *Glossary*)

Sequencing Batch Reactor (SBR): A treatment technology used to treat wastewater classified as mechanical treatment.

Sewage treatment plant (STP) (also known as Wastewater Treatment Plant (WWTP) or Water Pollution Control Plant (WPCP)): Facility designed to treat wastewater (sewage) by removing materials that may damage water quality and threaten public health. (Ontario Ministry of Environment)

Sewage treatment systems: Facility or system designed to treat wastewater (sewage) by removing materials that may damage water quality and threaten public health. (Ontario Ministry of Environment)

Shoot-out: A septic system consisting of a septic tank with untreated wastewater effluent being discharged to the surface; this poses a health risk.

Sludge: The accumulated wet or dry solids that are separated from wastewater during treatment. This includes precipitates resulting from the chemical or biological treatment of wastewater. (Government of Alberta, *Activities*, cited in Alberta *Glossary*)

Source Classification: The determination of the water source classification in this assessment includes the options of: surface water, groundwater, GUDI or MTA. Surface water includes water from lakes or rivers; groundwater includes any well water that is not influenced by surface water infiltration; GUDI is any groundwater source under the direct influence of surface water; MTA as a source refers to the community acquiring the treated water from a municipality.

Source risk: The risk inherent in the quality and quantity of the raw source water prior to treatment.

Source Water Protection: 1. The prevention of pollution of the lakes, reservoirs, rivers, streams, and groundwater that serve as sources of drinking water. Wellhead protection would be an example of a source water protection approach that protects groundwater sources, whereas management of land around a lake or reservoir used for drinking water would be an example for surface water supplies. Source water protection programs typically include: delineating source water protection areas; identifying sources of

contamination; implementing measures to manage these changes; and planning for the future. (North American Lake Management Society, cited in Alberta *Glossary*)

2. Action taken to control or minimize the potential for introduction of chemicals or contaminants in source waters, including water used as a source of drinking water (Alberta Environment, *Standards and Guidelines*, cited in Alberta *Glossary*).

SPS: An abbreviation of the term sewage pumping station.

Standard Operating Procedures (SOPs): An SOP is a written document or instruction detailing all steps and activities of a process or procedure. This would include all procedures used in water/wastewater treatment processes that could affect the quality.

Standpipe Storage: An above-grade storage facility where the storage volume is contained within the entirety of the structure. This type of storage is most feasible for use where there is sufficient change in the topography to allow for maximum usable volume in the standpipe.

Storage Type: Refers to whether the community water storage is via grade-level, below-grade or elevated storage (including standpipes and towers). In some cases there is no storage thus the storage type would be considered "direct pump."

Surface water: Surface water is any water that is obtained from sources, such as lakes, rivers, and reservoirs that are open to the atmosphere. (INAC, *Protocol for Centralised Drinking Water*)

System Designer: A system designer is a person, such as a professional engineer, who is qualified to design a water or wastewater systems. (INAC, *Protocol for Centralised Drinking Water*)

System Operator: A system operator is a First Nation employee or third party under contract to a First Nation who is tasked with managing a water or wastewater system. (INAC, *Protocol for Centralised Drinking Water*)

System Manager: A system manager is a First Nation employee or third party under contract to a First Nation who is tasked with managing a water or wastewater system. (INAC, *Protocol for Centralised Drinking Water*)

Tertiary Treatment: Selected biological, physical, and chemical separation processes to remove organic and inorganic substances that resist conventional treatment practices. *Tertiary Treatment* processes may consist of flocculation basins, clarifiers, filters, and chlorine basins or ozone or ultraviolet radiation processes. Tertiary techniques may also involve the application of wastewater to land to allow the growth of plants to remove plant nutrients. Can include advanced nutrient removal processes. (North American Lake Management Society, cited in Alberta *Glossary*)

Trihalomethanes (THMs): Chemical compounds that can be formed when water is disinfected using chlorine or bromine as the chemical disinfection agent. These chemical compounds are formed when organic material present in the raw source water reacts with chlorine or bromine. Therefore, THMs are classified as disinfection by-products (DBPs). The primary source of organic material comes from decaying vegetation found in lakes, rivers and streams and for this reason, THMs are more commonly observed in water systems that use a surface water source. The four chemical compounds that are measured and used to calculate total THMs are: chloroform, bromoform, bromodichloromethane (BDCM) and chlorodibromomethane (CDBM). THMs are a concern in potable water because there is scientific evidence that they may pose a risk in the development of cancer.

Treatment Certification: The treatment level to which an operator is certified for water treatment and distribution and wastewater treatment and collection systems (see Treatment Classification).

Treatment Classification: The size (flow) and complexity of a water or wastewater system is used to determine the Class of a system using a point template. The knowledge and experience it takes to operate a system is closely related to its classification and is reflected in the level of certification of the operator. Systems that are small and relatively simple, are classified as Small Water or Wastewater Systems. Larger or more complex systems are ranked as Class I, II, III, and IV with the highest being Class IV. Systems should be operated under the supervision of an operator certified to at least the same level of the facility.

TSS (Total Suspended Solids): Measure of the amount of non-dissolved solid material present in water or wastewater. Total suspended solids (TSS) can cause: a) interference with light penetration (in UV applications), b) build-up of sediment and c) can carry nutrients and other toxic pollutants that cause algal blooms and potential reduction in aquatic habitat (wastewater).

Underground Storage: A water storage facility (reservoir/clearwell) which is located 100% below-grade. Often located below the water treatment plant.

Waste: Any solid or liquid material, product, or combination of them that is intended to be treated or disposed of or that is intended to be stored and then treated or disposed. This does not include recyclables. (Government of Alberta, Activities Designation Regulation, cited in Alberta *Glossary*)

Waste management plan: A Waste Management Plan identifies and describes types of waste generated during operations and how they are managed and disposed of.

Wastewater (*Industrial Wastewater, Domestic Wastewater)*: A combination of liquid and water-carried pollutants from homes, businesses, industries, or farms; a mixture of water and dissolved or suspended solids. (North American Lake Management Society, cited in Alberta *Glossary*)

Wastewater System: an organized process and associated structures for collecting, treating, and disposing of wastewater. For the purposes of this report, it is a system serving five or more houses. It includes any or all of the following:
1. Sewers and pumping stations that make up a wastewater collection system.
2. Sewers and pumping stations that transport untreated wastewater from a wastewater collection system to a wastewater treatment plant.
3. Wastewater treatment plants.
4. Facilities that provide storage for treated wastewater.
5. Wastewater sludge treatment and disposal facilities.
6. Sewers that transport treated wastewater from a wastewater treatment plant to the place where it is disposed of.
7. Treated wastewater outfall facilities, including the outfall structures to a watercourse or any structures for disposal of treated wastewater to land or to wetlands. (Government of Alberta, *Environmental Protection and Enhancement Act*, cited in Alberta *Glossary*)

Wastewater Treatment: Any of the mechanical, chemical or biological processes used to modify the quality of wastewater (sewage) in order to make it more compatible or acceptable to man and his/her environment. (North American Lake Management System, cited in Alberta *Glossary*)

Wastewater Treatment Plant: Any structure, thing, or process used for the physical, chemical, biological, or radiological treatment of wastewater before it is returned to the environment. The term also includes any structure, thing, or process used for wastewater storage or disposal, or sludge treatment, storage, or disposal. (Government of Alberta, *Activities*, cited in Alberta *Glossary*)

Watermain: A principal pipe in a system of pipes for conveying water, especially one installed underground. (*American Heritage Dictionary*)

Water quality: The term used to describe the chemical, physical, and biological characteristics of water, usually with respect to its suitability for a particular purpose. (INAC, *Protocol for Centralised Drinking Water*)

Water use: The term water use refers to water that is used for a specific purpose, such as for domestic use, irrigation, or industrial processing. Water use pertains to human interaction with and influence on the hydrolic cycle, and includes elements, such as water withdrawal from surface- and ground-water sources, water delivery to homes and businesses, consumptive use of water, water released from wastewater-treatment plans, water returned to the environment, and in-stream uses, such as using water to produce hydroelectric power. (INAC, *Protocol for Centralised Drinking Water*)

Water Well: An opening in the ground, whether drilled or altered from its natural state, that is used for the production of groundwater, obtaining data on groundwater, or recharging an underground formation from which groundwater can be recovered. By definition in the provincial Water Act, a water well also includes any related equipment, buildings, and structures. (Government of Alberta, *Water for Life*, cited in Alberta, *Glossary*)

Wellhead Protection Area: A protected surface and subsurface zone surrounding a well or well field supplying a public water system to keep contaminants from reaching the well water. (Edwards Aquifier)

Wellhead Protection Plan: A wellhead protection plan defines the wellhead protection area, identifies potential sources of contamination, manages the potential contaminant sources including properly decommissioning abandoned wells, identifies emergency and contingency plans (i.e. what to do if the well becomes contaminated or requires additional capacity) and provides overall public awareness.

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Appendix B

Water System Summary

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Appendix B.1
Water System Summary

Regional Roll-Up Summary

Region: QUEBEC
Total No. of First Nations: 38
Participating No. of First Nations: 37
Participation Level: 99%
No. of Community Reports Issued: 39

Water

		Groundwater	GUDI	Surface	MTA	Totals
Total No. of Systems		**19**	**1**	**11**	**8**	**39**
System Age						
	0-5 years (2006 - 2010)	0	0	4	2	**6**
	6-10 years (2001 - 2005)	3	0	2	1	**6**
	10-15 years (1996 - 2000)	2	1	1	1	**5**
	15 -20 years (1991 - 1995)	3	0	0	0	**3**
	> 20 years (≤ 1990)	11	0	4	4	**19**
Treatment						
	None - Direct Use	1	0	0	1	**2**
	Disinfection only	7	0	1	1	**9**
	Conventional Filtration	11	1	10	3	**25**
	MTA	0	0	0	3	**3**
Classification - Treatment						
	Small system	1	0	0	0	**1**
	Level I	11	0	1	0	**12**
	Level II	6	0	6	0	**12**
	Level III	1	1	4	0	**6**
	MTA	0	0	0	8	**8**

				Groundwater	GUDI	Surface	MTA	Totals
Total No. of Systems				**19**	**1**	**11**	**8**	**39**
Classification - Distribution								
	Small system			0	0	0	1	**1**
	Level I			14	1	8	6	**29**
	Level II			2	0	2	0	**4**
	Level III			0	0	1	0	**1**
	MTA			0	0	0	1	**1**
	None			3	0	0	0	**3**
Distribution								
	Piped			19	1	11	8	**39**
Water Quality								
	Fails Health							
		Yes, fails health due to:		3	0	3	2	**8**
			Design	1	0	0	0	**1**
			Operation	0	0	1	0	**1**
			Combination	2	0	1	0	**3**
			Unknown	0	0	1	2	**3**
	Fails Aesthetic							
		Yes, fails aesthetic due to:		2	1	3	0	**6**
			Design	0	0	0	0	**0**
			Operation	1	0	1	0	**2**
			Combination	1	0	0	0	**1**
			Unknown	0	1	2	0	**3**
Primary Operator - Treatment								
	Not certified			1	1	0	0	**2**
	No operator			1	0	0	0	**1**
	Not required			0	0	0	8	**8**
	Certified to Level			15	0	10	0	**25**
	Certified			2	0	1	0	**3**

		Groundwater	GUDI	Surface	MTA	Totals	
Total No. of Systems		**19**	**1**	**11**	**8**	**39**	
Back-up Operator - Treatment							
	Not certified	3	1	1	0	**5**	
	No operator	1	0	0	0	**1**	
	Not required	0	0	0	8	**8**	
	Certified to Level	12	0	8	0	**20**	
	Certified	3	0	2	0	**5**	
Primary Operator - Distribution							
	Not certified	1	1	0	1	**3**	
	No operator	0	0	0	1	**1**	
	Not required	3	0	0	1	**4**	
	Certified to Level	14	0	11	5	**30**	
	Certified	1	0	0	0	**1**	
Back-up Operator - Distribution							
	Not certified	3	1	1	3	**8**	
	No operator	0	0	0	1	**1**	
	Not required	3	0	0	1	**4**	
	Certified to Level	11	0	9	3	**23**	
	Certified	2	0	1	0	**3**	
Risk (mean)						**Mean**	**Mean excluding MTA**
	Final	5.2	3.8	3.8	4.3	**4.6**	**4.6**
	Source	5.8	7.0	8.5	1.5	**5.7**	**6.8**
	Design	3.9	3.0	3.4	3.9	**3.7**	**3.7**
	Operations	6.6	3.0	4.4	6.3	**5.8**	**5.7**
	Reporting	5.9	3.0	3.0	6.5	**5.2**	**4.8**
	Operator	1.9	5.0	1.1	2.1	**1.8**	**1.7**

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Appendix B.2

Wastewater System Summary

Regional Roll-Up Summary

Region: QUEBEC
Total No. of First Nations: 38
Participating No. of First Nations: 37
Participation Level: 99%
No. of Community Reports Issued: 39

Wastewater

		Septic	Aerated Lagoon	Facultative Lagoon	Mechanical	Other	MTA	Totals
Total No. of Systems		**1**	**22**	**0**	**5**	**1**	**10**	**39**
System Age								
	0-5 years (2006 - 2010)	0	0	0	0	0	2	**2**
	6-10 years (2001 - 2005)	0	4	0	1	0	0	**5**
	10-15 years (1996 - 2000)	0	6	0	1	0	3	**10**
	15 -20 years (1991 - 1995)	0	3	0	1	0	1	**5**
	> 20 years (≤ 1990)	1	9	0	2	1	4	**17**
Classification - Treatment								
	Small System	1	0	0	0	1	0	**2**
	MTA	0	0	0	0	0	10	**10**
	Level I	0	19	0	4	0	0	**23**
	Level II	0	3	0	1	0	0	**4**
Classification - Collection								
	Small System	0	0	0	0	0	1	**1**
	Level I	0	19	0	4	0	7	**30**
	Level II	0	2	0	1	0	1	**4**
	Level III	0	1	0	0	0	0	**1**
	MTA	0	0	0	0	0	1	**1**
	None	1	0	0	0	1	0	**2**
Collection								
	Piped	1	22	0	5	1	9	**38**
	Low Pressure	0	0	0	0	0	0	**0**
	Trucked	0	0	0	0	0	0	**0**
	Combined	0	0	0	0	0	1	**1**
Effluent Quality								
	No data	0	5	0	0	0	1	**6**
	Meets	1	6	0	2	1	7	**17**
	Does not meet	0	11	0	3	0	2	**16**

		Septic	Aerated Lagoon	Facultative Lagoon	Mechanical	Other	MTA	Totals
Total No. of Systems		**1**	**22**	**0**	**5**	**1**	**10**	**39**
Primary Operator - Treatment								
	Not certified	0	4	0	0	0	0	**4**
	No operator	0	0	0	1	1	0	**2**
	Not required	0	0	0	0	0	10	**10**
	Certified to Level	1	17	0	4	0	0	**22**
	Certified	0	1	0	0	0	0	**1**
Back-Up Operator - Treatment								
	Not certified	0	4	0	1	0	0	**5**
	No operator	0	0	0	1	1	0	**2**
	Not required	0	0	0	0	0	10	**10**
	Certified to Level	1	18	0	3	0	0	**22**
	Certified	0	0	0	0	0	0	**0**
Primary Operator - Collection								
	Not certified	0	4	0	0	0	2	**6**
	No operator	0	0	0	1	0	1	**2**
	Not required	1	0	0	0	1	1	**3**
	Certified to Level	0	17	0	3	0	5	**25**
	Certified	0	1	0	1	0	1	**3**
Back-Up Operator - Collection								
	Not certified	0	4	0	1	0	3	**8**
	No operator	0	0	0	1	0	3	**4**
	Not required	1	0	0	0	1	1	**3**
	Certified to Level	0	17	0	2	0	2	**21**
	Certified	0	1	0	1	0	1	**3**
Receiver								
	Large river	0	7	0	1	0	0	**8**
	Creek	0	1	0	0	0	0	**1**
	Lake, reservoir	0	6	0	3	0	0	**9**
	River	1	4	0	1	0	0	**6**
	Open marine, enclosed bay	0	3	0	0	0	0	**3**
	Wetland	0	1	0	0	0	0	**1**
	Sub-surface / Ground	0	0	0	0	1	0	**1**
	MTA	0	0	0	0	0	10	**10**

	Septic	Aerated Lagoon	Facultative Lagoon	Mechanical	Other	MTA	Totals	
Total No. of Systems	**1**	**22**	**0**	**5**	**1**	**10**	**39**	
Risk (mean)							**Mean**	**Mean excluding MTA**
Final	3.6	5.8	0.0	7.4	6.0	4.5	**5.6**	**6.0**
Effluent Receiver	8.0	8.0	0.0	8.0	3.0	1.2	**6.2**	**7.9**
Design	2.0	5.8	0.0	7.4	3.0	3.7	**5.3**	**5.8**
Operations	5.0	6.3	0.0	6.6	9.0	5.0	**6.0**	**6.4**
Reporting	1.0	5.4	0.0	8.2	4.0	7.7	**6.2**	**5.7**
Operator	1.0	2.1	0.0	2.6	10.0	3.2	**2.6**	**2.4**

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Appendix C
Site Visit Methodology

Site Visits

Typical Day

Arrive in Community – Lead/Senior Inspector & Technical Support

- Meet with Circuit Rider and/or DIAND representative and First Nation/Tribal Council Representatives to undergo introductions and provide a brief synopsis of the activities to be undertaken for the day. This is based on the assumption that the First Nation has been fully briefed by DIAND on the purpose, process and benefits for the First Nation to cooperate and collaborate with the project.
- Confirm the various components that the First Nation uses to provide water to the entire community (i.e. number and types of distribution systems, source types, private wells, etc.) to help build assessment form for the community.
- Pre-select areas to undertake private system evaluations on community map.
- Confirm any missing background data that may be available allowing the First Nation time during the day to have Public Works Director/Supervisor/Secretary/etc to locate such materials.

Lead/Senior – Inspector

- Meet with Chief/Housing Manager/Band Manager/Finance Manager, to identify:
    - future servicing needs (planned development and population growth)
    - servicing constraints (source availability, soils, groundwater, bedrock, topography, etc.)
    - identify the extent to which non structural solutions or optimization strategies (water conservation, leak reduction, etc) have been previously investigated or implemented
    - confirm current population and housing numbers
    - obtain financial information not previously provided
    - note community concerns related to future servicing.
- Complete a walk through of the water plant from source to storage.
- Prepare a flow schematic (internal use).
- Complete the assessment questionnaire on treatment/storage/operations/operator(s) etc. with Operator/Circuit Rider.
- Take photographs.
- Travel to main sewage pumping station and wastewater treatment facility.
- Complete a walk through of the plant from influent to effluent.
- Prepare a flow schematic (internal use).
- Complete assessment questionnaire.
- Take photographs.
- Complete ACRS update.
- Repeat for additional water or wastewater facilities.
- Review information collected by Technical Support
- Gather all background/operational data gathered by First Nation.
- Complete overall notes.

Technical Support

- Gather any relevant operational data (water and wastewater), if not already provided and arrange with the First Nation to have copied/scanned that day.
- Obtain GPS coordinates of source(s) and treatment.
- Complete the source questions on the assessment questionnaire.
- Undertake sampling of the raw and/or treated water, if necessary.
- Take photographs.
- Complete ACRS update.
- Travel around community with First Nation representative and undertake private system assessments for water and/or septic including GPS coordinates, photographs, assessment forms and sampling.
- Meet back with Lead/Senior Inspector at wastewater location and assist with sampling, if required.

Sampling Requirements

Water Sampling

The terms of reference state, *"The sampling program for public water systems should reflect the requirements of the most stringent regulations applicable in the Province in which the community is located. However, should an adequate sampling program already be in place, then existing data may be used. Bidders should assume sampling and testing will be required for 5% of total wells, septics, and cisterns identified in SW5. Septics and cisterns only require a visual inspection. All bidders are required to carry a $500,000 allowance for this purpose. Any variances should be identified in the Inception Report."*

Health Canada data is anticipated to be available for the majority of the water systems. Where data is not available, sampling will be conducted as part of the inspection.

Minimum existing data required will include:

Community systems
- bacteriological – monthly available for previous year
- general chemistry – annually (treated)
- full Volatile Organic Compound analysis – within 5 years

Private wells
- bacteriological – one sample within past year
- basic chemistry – one sample within past year

For public systems where data is not available, treated water samples will be obtained and submitted to a laboratory for testing that would include; Basic Chemistry, Full Metals Scan, Bacteria and Volatile Organic Compounds.

For public systems that include a piped distribution system and where distributed water quality data is not available, a sample will be taken from the most remote point in the distribution system and sampled for Disinfection By-Products.

For individual wells, samples will be obtained from a representative number of wells (5% of total wells) in the community. The testing will include; Basic Chemistry, Full Metals Scan and Bacteria.

Wastewater Sampling

For systems lacking existing discharge quality data, and that will be discharging at the time of the site visit, representative samples will be obtained and submitted to a laboratory for testing. This would include seasonal discharges at the time of the site visit and from plants with continuous discharge to a receiving body. Sewage treatment systems providing an equivalent to secondary treatment (lagoons, and mechanical facilities) for which effluent quality data does not include the parameters of BOD_5, TSS, and E.Coli, will be sampled in the field, if they are in fact discharging at the time of site visit. Similarly, sewage treatment systems providing an equivalent to tertiary treatment for which effluent quality data does not include BOD_5, TSS, Ammonia, Total Phosphorous and E.Coli, will be sampled in the field, if they are in fact discharging at the time of the site visit.

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Appendix D

First Nation Water Summaries

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Appendix D.1

Individual First Nation Water Summary

Table D.1 - 1: Water System Regional Summary of Water Treatment, Storage and Distribution Systems

First Nation Information		Water System Information									Storage Information		Distribution System Information						
Band #	Band Name	System #	System Name	Water Source	Treatment Class	Const Year	Design Capacity [m3/d]	Actual Capacity [m3/d]	Max Daily Volume [m3/d]	Disinfection	Storage Type	Storage Capacity	Distribution Class	Population Served	Homes Piped	Homes Trucked	Number of Trucks in Service	Pipe Length	Pipe Length / Connection
71	Abénakis de Wôlinak	6493	RÉSERVE DE WÔLINAK NO. 11	MTA	MTA	2006	18300	18300	11741	MTA	Elevated	MTA	Level I	140	78	0	0	3981	51
74	Algonquins of Barriere Lake	6516	RAPID LAKE	Groundwater	Level I	2000		Unknown		Yes	Underground		Level I	0	70	0	0		
79	Atikamekw dOpitciwan	6499	OBEDJIWAN NO. 28	Groundwater	Level II	1988	732	652	504	Yes	Underground	580	Level II	2219	327	0	0	11281.6	34
85	Bande des Innus de Pessamit	6504	BETSIAMITES	Surface Water	Level II	1996	864	864	680	Yes	Underground	820	Level I	2759	800	0	0	16037.81	20
62	Communauté anicinape de Kitcisakik		COMMUNITY WELLS	Groundwater	Level II	2001	92	92	11	Yes	Underground	1.135	NA	312	7	0	0		
55	Conseil de la Première Nation Abitibiwinni	6490	PIKOGAN	MTA	MTA	2009	750	750	485	MTA	None	MTA	MTA	597	147	0	0	3472	23
77	Conseil des Atikamekw de Wemotaci	6497	COMMUNAUTÉ DE WEMOTACI - station de traitement d'eau	Surface Water	Level II	1983	792	648	454	Yes	Underground	800	Level I	1300	250	0	0	7706.8	30
58	Cree Nation of Chisasibi	6509	CHISASIBI - Station de traitement d'eau	Surface Water	Level III	2001	2160	2160	1792	Yes	Underground	2000	Level I	3825	800	0	0		
75	Cree Nation of Mistissini	6508	MISTASSINI	Groundwater	Level I	1965	8200	8200	2775	Yes	Grade level, Underground	1235	Level I	3416	761	0	0		
59	Cree Nation of Nemaska	6507	NEMISCAU	Groundwater	Level I	1978	800	800	236	Yes	Grade level	620	NA	672	211	0	0		
60	Cree Nation of Wemindji	6511	WEMINDJI	Groundwater	Level II	1999	654	654	1057	Yes	Underground	1050	Level I	1301	370	0	0		
65	Eagle Village First Nation - Kipawa	6521	EAGLE VILLAGE FIRST NATION - KIPAWA	Surface Water	Level II	2010	367	367	200	Yes	Elevated	600	Level I	265	107	0	0	2016	18
57	Eastmain	6513	EASTMAIN	Groundwater GUDI	Level III	2000	615	615	486	Yes	Underground	1000	Level I	658	162	0	0		
80	Innu Takuaikan Uashat Mak Mani-Utenam	6501	MALIOTENAM NO. 27A	Groundwater	Level II	1985	1054	1054	711	Yes	Underground	803	Level I	1624	450	0	0	11091.44	24
80	Innu Takuaikan Uashat Mak Mani-Utenam	6500	UASHAT NO. 27	MTA	MTA	2002				MTA	Underground	MTA	Level I	1600	428	0	0	9395.38	21
86	Innue Essipit	6505	COMMUNAUTÉ MONTAGNAISE ESSIPIT	MTA	MTA	0				MTA	None	MTA	Level I	255	110	0	0	5279	47
70	Kahnawake	6492	KAHNAWAKE NO. 14	Surface Water	Level III	1974	5300	5300	5743	Yes	Underground	1385	Level II	6252	1924	0	0	11488.72	5
73	Kitigan Zibi Anishinabeg	6495	KITIGAN ZIBI	MTA	MTA	0	Unknown	Unknown	283	MTA	None	MTA	Small System	348	82	0	0	6695	81
87	La Nation Innu Matimekush-Lac John	6519	RÉSERVE DU LAC JOHN	Surface Water	Level I	1975	75	75	10.1	Yes	Elevated	0.5	Level I	30	12	0	0	426	35
87	La Nation Innu Matimekush-Lac John	6517	RÉSERVE MATIMEKOSH	MTA	MTA	1998			3662	MTA	Underground	MTA	Level I	948	166	0	0	8507	51
78	Les Atikamekw de Manawan	6498	COMMUNAUTÉ ATIKAMEKW DE MANAWAN	Groundwater	Level I	1988	670	670		Yes	Underground	430	Level I	2298	406	0	0	11316	27
82	Les Innus de Ekuanitshit	6518	MINGAN	Groundwater	Level II	2004	545	545	152	Yes	Underground	567	Level II	507	157	0	0	3597.5	22
51	Listuguj Migmaq Government	6488	LISTUGUJ	Groundwater	Level II	1991	2880	2880	1059	Yes	Underground	565	Level I	1940	782	0	0	16114	20
67	Long Point First Nation	6514	WINNEWAY INDIAN SETTLEMENT	Groundwater	Level I	1982	491	491	130	Yes	Underground	675	Level I	380	104	0	0	2656	25
52	Micmacs of Gesgapegiag	9680	GESGAPEGIAG	Groundwater	Level I	1990	567	341	245	Yes	Underground	568	Level I	468	152	0	0	6377	41
69	Mohawks of Kanesatake	6491	KANESATAKE LANDS	Groundwater	Small System	1974	n/a	n/a	n/a	Yes			NA	75	0	0	0		
83	Montagnais de Natashquan	6502	NATASHQUAN NO. 1	Groundwater	Level III	1990	840	428	355	Yes	Grade level	586	Level I	900	206	0	0	9524.5	46
88	Montagnais de Pakua Shipi	6520	ST. AUGUSTIN INDIAN SETTLEMENT	Surface Water	Level II	2004	720	720	112	Yes	Elevated	450	Level I	332	94	0	0	4562	48
84	Montagnais de Unamen Shipu	6503	ROMAINE NO. 2	Surface Water	Level III	2009	720	720	462	Yes	Underground	870	Level I	1200	298	0	0	5913	19
76	Montagnais du Lac St.-Jean	6496	MASHTEUIATSH	Surface Water	Level II	2006	4500	4000	1549	Yes	Underground	2000	Level II	2359	898	0	0	15477.38	17
81	Naskapi Nation of Kawawachikamach	9678	KAWAWACHIKAMACH - Station de traitement d'eau	Surface Water	Level II	1982	870	870		Yes	Underground	517	Level I	849	155	0	0		
63	Nation Anishnabe du Lac Simon	6515	LAC SIMON	Groundwater	Level I	1986	1050	1050	550	Yes	Underground	968	Level I	1718	316	0	0	9262	29
50	Nation Huronne Wendat	6487	VILLAGE DES HURONS WENDAKE NO. 7	MTA	MTA	0	0	0	0	MTA	None	MTA	Level I	1545	640	0	0	13633.3	21
72	Odanak	6494	ODANAK NO. 12	MTA	MTA	1988	3840	3840	2410	MTA	Underground	MTA	Level I	381	214	0	0	7316.5	34
OB1	Ouje Bougoumou	7111	OUJÉ-BOUGOUMOU	Groundwater	Level I	1991	818	818	418	Yes	Underground	360	Level I	813	202	0	0		
95	Première nation de Whapmagoostui	6506	WHAPMAGOOSTUI	Groundwater	Level I	1984	1040	1200	1000	Yes	Grade level	270	Level I	838	236	0	0		
61	The Crees of the Waskaganish First Nation	6510	WASKAGANISH - Station de traitement d'eau	Surface Water	Level III	2009	2400	2400	1200	Yes	Underground	967	Level III	2500	450	0	0		
64	Timiskaming First Nation	6489	TIMISKAMING	Groundwater	Level I	1995	Unknown		861	Yes	Underground	750	Level I	631	226	0	0	6394	28
56	Waswanipi	6512	WASWANIPI	Groundwater	Level I	2003	1417	1417	772	Yes	Grade level, Underground	1135	Level I	1925	409	0	0		

Table D.1 - 2: Regional Summary of Water Quality Information

First Nation Information		Water System Information				Water Quality Information							
Band #	Band Name	System #	System Name	System Status	Water Source	Meets/Does Not Meet GCDWQ	Cause of Failure	Fails Health Guidelines	Fails Aesthetic Guidelines	Fails MAC by Design	Fails MAC by Operation	DWA In Effect	DWA Count
71	Abénakis de Wôlinak	6493	RÉSERVE DE WÔLINAK NO. 11		MTA	Meets Requirements	N/A	No	No	No	No	No	0
74	Algonquins of Barriere Lake	6516	RAPID LAKE		Groundwater	High Freq AND High Mag	Design	Yes	No	No	No	Yes	1
79	Atikamekw dOpitciwan	6499	OBEDJIWAN NO. 28		Groundwater	Meets Requirements	N/A	N/A	N/A	No	No	No	0
85	Bande des Innus de Pessamit	6504	BETSIAMITES		Surface Water	Low Freq, Low Mag	Operation	Yes	Yes	No	No	No	0
62	Communauté anicinape de Kitcisakik		COMMUNITY WELLS		Groundwater	Low Freq, Low Mag	Operation	No	No	No	No	Yes	1
55	Conseil de la Première Nation Abitibiwinni	6490	PIKOGAN		MTA	Meets Requirements	N/A	N/A	N/A	No	No	Yes	1
77	Conseil des Atikamekw de Wemotaci	6497	COMMUNAUTÉ DE WEMOTACI - station de traitement d'eau		Surface Water	Low Freq, Low Mag	Operation	No	No	No	No	No	0
58	Cree Nation of Chisasibi	6509	CHISASIBI - Station de traitement d'eau		Surface Water	Meets Requirements	N/A	N/A	N/A	No	No	No	0
75	Cree Nation of Mistissini	6508	MISTASSINI		Groundwater	Meets Requirements	N/A	N/A	N/A	No	No	Yes	1
59	Cree Nation of Nemaska	6507	NEMISCAU		Groundwater	Meets Requirements	N/A	No	No	No	No	No	0
60	Cree Nation of Wemindji	6511	WEMINDJI		Groundwater	Meets Requirements	N/A	N/A	N/A	No	No	Yes	1
65	Eagle Village First Nation - Kipawa	6521	EAGLE VILLAGE FIRST NATION - KIPAWA		Surface Water	Meets Requirements	N/A	N/A	N/A	No	No	Yes	1
57	Eastmain	6513	EASTMAIN		Groundwater GUDI	Meets Requirements	N/A	No	Yes	No	No	No	0
80	Innu Takuaikan Uashat Mak Mani-Utenam	6501	MALIOTENAM NO. 27A		Groundwater	High Freq, Low Mag	Operation	No	No	No	No	No	0
80	Innu Takuaikan Uashat Mak Mani-Utenam	6500	UASHAT NO. 27		MTA	Low Freq, Low Mag	Unknown	No	No	No	No	Yes	1
86	Innue Essipit	6505	COMMUNAUTÉ MONTAGNAISE ESSIPIT		MTA	High Freq, Low Mag	Unknown	Yes	No	No	No		3
70	Kahnawake	6492	KAHNAWAKE NO. 14		Surface Water	Meets Requirements	N/A	No	No	No	No	No	0
73	Kitigan Zibi Anishinabeg	6495	KITIGAN ZIBI		MTA	Low Freq, Low Mag	Unknown	Yes	No	No	No	Yes	1
87	La Nation Innu Matimekush-Lac John	6519	RÉSERVE DU LAC JOHN		Surface Water	Low Freq, Low Mag	Both	Yes	No	Yes	Yes	No	0
87	La Nation Innu Matimekush-Lac John	6517	RÉSERVE MATIMEKOSH		MTA	Meets Requirements	Unknown	N/A	N/A	N/A	No		8
78	Les Atikamekw de Manawan	6498	COMMUNAUTÉ ATIKAMEKW DE MANAWAN		Groundwater	Low Freq, Low Mag	Both	Yes	No	No	No	No	0
82	Les Innus de Ekuanitshit	6518	MINGAN		Groundwater	Low Freq, Low Mag	Operation	No	Yes	No	No	No	0
51	Listuguj Migmaq Government	6488	LISTUGUJ		Groundwater	Meets Requirements	N/A	N/A	N/A	No	No	No	0
67	Long Point First Nation	6514	WINNEWAY INDIAN SETTLEMENT		Groundwater	Meets Requirements	N/A	N/A	N/A	No	No	No	0
52	Micmacs of Gesgapegiag	9680	GESGAPEGIAG		Groundwater	Meets Requirements	N/A	No	No	No	No	No	0
69	Mohawks of Kanesatake	6491	KANESATAKE LANDS		Groundwater	Meets Requirements	Both	N/A	N/A	No	No	No	0
83	Montagnais de Natashquan	6502	NATASHQUAN NO. 1		Groundwater	Low Freq, Low Mag	Both	Yes	Yes	Yes	No	No	0
88	Montagnais de Pakua Shipi	6520	ST. AUGUSTIN INDIAN SETTLEMENT		Surface Water	Meets Requirements	N/A	Yes	Yes	No	No	No	0
84	Montagnais de Unamen Shipu	6503	ROMAINE NO. 2		Surface Water	Meets Requirements	N/A	No	N/A	No	No	Yes	1
76	Montagnais du Lac St.-Jean	6496	MASHTEUIATSH		Surface Water	Low Freq, Low Mag	Unknown	No	Yes	No	No	No	0
81	Naskapi Nation of Kawawachikamach	9678	KAWAWACHIKAMACH - Station de traitement d'eau		Surface Water	Meets Requirements	N/A	No	No	No	No	No	0
63	Nation Anishnabe du Lac Simon	6515	LAC SIMON		Groundwater	Meets Requirements	N/A	No	No	No	No	No	0
50	Nation Huronne Wendat	6487	VILLAGE DES HURONS WENDAKE NO. 7		MTA	Meets Requirements	N/A	N/A	N/A	No	No	No	0
72	Odanak	6494	ODANAK NO. 12		MTA	Meets Requirements	N/A	N/A	N/A	No	No	Yes	1
OB1	Ouje Bougoumou	7111	OUJÉ-BOUGOUMOU		Groundwater	Meets Requirements	N/A	N/A	N/A	No	No	No	0
95	Première nation de Whapmagoostui	6506	WHAPMAGOOSTUI		Groundwater	Meets Requirements	N/A	No	No	No	No	No	0
61	The Crees of the Waskaganish First Nation	6510	WASKAGANISH - Station de traitement d'eau		Surface Water	Meets Requirements	N/A	N/A	N/A	No	No	No	0
64	Timiskaming First Nation	6489	TIMISKAMING		Groundwater	High Freq, Low Mag	Unknown	No	No	Yes	No	No	0
56	Waswanipi	6512	WASWANIPI		Groundwater	Meets Requirements	N/A	N/A	N/A	No	No		2

Table D.1 - 3: Regional Summary of Water Operator Information

First Nation Information		Water System Information			Operator Information					
Band #	Band Name	System #	System Name	Water Source	Primary Operator Exists	Primary Operator Treatment Class	Primary Operator Distribution Class	Secondary Operator Exists	Secondary Operator Treatment Class	Secondary Operator Distribution Class
71	Abénakis de Wôlinak	6493	RÉSERVE DE WÔLINAK NO. 11	MTA	Yes	No Certification	Level I	Yes	No Certification	No Certification
74	Algonquins of Barriere Lake	6516	RAPID LAKE	Groundwater	Yes	No Certification	No Certification	Yes	Not Required	No Operator
79	Atikamekw dOpitciwan	6499	OBEDJIWAN NO. 28	Groundwater	Yes	Level II	Level II	Yes	Level II	Level II
85	Bande des Innus de Pessamit	6504	BETSIAMITES	Surface Water	Yes	Level II	Level I	Yes	Level II	Level I
62	Communauté anicinape de Kitcisakik		COMMUNITY WELLS	Groundwater	Yes	Level II	Level II	Yes	Level II	Level II
55	Conseil de la Première Nation Abitibiwinni	6490	PIKOGAN	MTA	Yes	Level I	Level I	Yes	Level I	Level I
77	Conseil des Atikamekw de Wemotaci	6497	COMMUNAUTÉ DE WEMOTACI - station de traitement d'eau	Surface Water	Yes	Level II	Level I	Yes	Level II	Level I
58	Cree Nation of Chisasibi	6509	CHISASIBI - Station de traitement d'eau	Surface Water	Yes	Level III	Level I	Yes	Level IV	Level IV
75	Cree Nation of Mistissini	6508	MISTASSINI	Groundwater	Yes	Level I	Level I	Yes	Level I	Level I
59	Cree Nation of Nemaska	6507	NEMISCAU	Groundwater	Yes	Level II	Level II	Yes	Level II	Level II
60	Cree Nation of Wemindji	6511	WEMINDJI	Groundwater	Yes	Level II	Level I	Yes	Level IV	Level IV
65	Eagle Village First Nation - Kipawa	6521	EAGLE VILLAGE FIRST NATION - KIPAWA	Surface Water	Yes	Level I	Level I	Yes	Level I	Level I
57	Eastmain	6513	EASTMAIN	Groundwater GUDI	Yes	No Certification	No Certification	Yes	No Certification	No Certification
80	Innu Takuaikan Uashat Mak Mani-Utenam	6501	MALIOTENAM NO. 27A	Groundwater	Yes	Level II	Level II	Yes	Level II	Level II
80	Innu Takuaikan Uashat Mak Mani-Utenam	6500	UASHAT NO. 27	MTA	No	Not Required		No	Not Required	
86	Innue Essipit	6505	COMMUNAUTÉ MONTAGNAISE ESSIPIT	MTA	Yes	No Certification	Level I	Yes	No Certification	Level I
70	Kahnawake	6492	KAHNAWAKE NO. 14	Surface Water	Yes	Level IV	Level IV	Yes	Level I	Level I
73	Kitigan Zibi Anishinabeg	6495	KITIGAN ZIBI	MTA	Yes	No Certification	No Certification	Yes	No Certification	No Certification
87	La Nation Innu Matimekush-Lac John	6519	RÉSERVE DU LAC JOHN	Surface Water	Yes	Level IV	Level IV	Yes	Level IV	Level IV
87	La Nation Innu Matimekush-Lac John	6517	RÉSERVE MATIMEKOSH	MTA	Yes	Level IV	Level IV	Yes	Level IV	Level IV
78	Les Atikamekw de Manawan	6498	COMMUNAUTÉ ATIKAMEKW DE MANAWAN	Groundwater	Yes	Level I	Level I	Yes	Level I	Level I
82	Les Innus de Ekuanitshit	6518	MINGAN	Groundwater	Yes	Level II	Level II	Yes	Level II	Level II
51	Listuguj Migmaq Government	6488	LISTUGUJ	Groundwater	Yes	Level I	Level I	Yes	Level I	Level I
67	Long Point First Nation	6514	WINNEWAY INDIAN SETTLEMENT	Groundwater	Yes	Level III	Level III	Yes	No Certification	No Certification
52	Micmacs of Gesgapegiag	9680	GESGAPEGIAG	Groundwater	Yes	Level II	Level II	Yes	Level II	Level II
69	Mohawks of Kanesatake	6491	KANESATAKE LANDS	Groundwater	No	No Certification	No Certification	No	No Certification	No Certification
83	Montagnais de Natashquan	6502	NATASHQUAN NO. 1	Groundwater	Yes	Level III	Level I	Yes	Level III	Level I
88	Montagnais de Pakua Shipi	6520	ST. AUGUSTIN INDIAN SETTLEMENT	Surface Water	Yes	Level IV	Level IV	Yes	No Certification	No Certification
84	Montagnais de Unamen Shipu	6503	ROMAINE NO. 2	Surface Water	Yes	Level IV	Level IV	Yes	Level IV	Level IV
76	Montagnais du Lac St.-Jean	6496	MASHTEUIATSH	Surface Water	Yes	Level II	Level II	Yes	Level II	Level II
81	Naskapi Nation of Kawawachikamach	9678	KAWAWACHIKAMACH - Station de traitement d'eau	Surface Water	Yes	Level IV	Level IV	Yes	Level IV	Level IV
63	Nation Anishnabe du Lac Simon	6515	LAC SIMON	Groundwater	Yes	Level II	Level II	Yes	Level I	Level I
50	Nation Huronne Wendat	6487	VILLAGE DES HURONS WENDAKE NO. 7	MTA	Yes	No Certification	Level I	Yes	No Certification	Level I
72	Odanak	6494	ODANAK NO. 12	MTA	Yes	No Certification	Level I	Yes	No Certification	No Certification
OB1	Ouje Bougoumou	7111	OUJÉ-BOUGOUMOU	Groundwater	Yes	Level I	Level I	Yes	No Certification	No Certification
95	Première nation de Whapmagoostui	6506	WHAPMAGOOSTUI	Groundwater	Yes	Level II	Level II	Yes	Level II	Level II
61	The Crees of the Waskaganish First Nation	6510	WASKAGANISH - Station de traitement d'eau	Surface Water	Yes	Level III	Level III	Yes	Level III	Level III
64	Timiskaming First Nation	6489	TIMISKAMING	Groundwater	Yes	Not Required	No Operator	Yes	Not Required	No Operator
56	Waswanipi	6512	WASWANIPI	Groundwater	Yes	Level II	Level I	Yes	No Certification	No Certification

NEEGAN BURNSIDE

Appendix D.2

Individual First Nation Wastewater Summary

Table D.2 - 1: Regional Summary of Wastewater Treatment

First Nation Information				Wastewater System Information										
Band #	Band Name	System #	System Name	Const Year	Receiver Name	Treatment Class	Design Capacity [m3/d]	Max Daily Volume [m3/d]	Wastewater System Type	Wastewater Treatment Level	Wastewater Disinfection Chlorine	Wastewater Disinfection UV	Discharge Frequency	Wastewater Sludge Treatment
71	Abénakis de Wôlinak	7264	RÉSERVE DE WÔLINAK NO. 11	1999	MTA	MTA	4546	4923	MTA	MTA	MTA	MTA	MTA	MTA
74	Algonquins of Barriere Lake	7287	RAPID LAKE	1995	Wetland	Level I	173	134	Aerated lagoon	Secondary	No	No	Continuous	No
79	Atikamekw dOpitciwan	7270	OBEDJIWAN NO. 28	1990	Lake, Reservoir	Level II	398	615	Aerated lagoon	Secondary	No	No	Continuous	No
85	Bande des Innus de Pessamit	7275	BETSIAMITES	1987	Large River	Level I	784		Aerated lagoon	Secondary	No	No	Continuous	Yes
62	Communauté anicinape de Kitcisakik		COMMUNITY SEPTIC	0	River	Small System	17	129	Septic	Primary	No	No	Continuous	No
55	Conseil de la Première Nation Abitibiwinni	7261	PIKOGAN	2010	MTA	MTA	334	247	MTA	MTA	MTA	MTA	MTA	MTA
77	Conseil des Atikamekw de Wemotaci	7268	COMMUNAUTÉ DE WEMOTACI - station d'épuration des eaux d'égout	1998	Large River	Level I	903	866	Aerated lagoon	Secondary	No	No	Continuous	No
58	Cree Nation of Chisasibi	7280	CHISASIBI - Station d'épuration des eaux d'égout	2000	Large River	Level I	2013	942	Aerated lagoon	Secondary	No	No	Continuous	No
75	Cree Nation of Mistissini	7279	MISTASSINI	1980	Lake, Reservoir	Level I	2436	1417	Aerated lagoon	Secondary	No	No	Continuous	No
59	Cree Nation of Nemaska	7278	NEMISCAU	2001	Creek	Level I	630	312.2	Aerated lagoon	Secondary	No	No	Continuous	No
60	Cree Nation of Wemindji	7282	WEMINDJI	2001	Large River	Level I	767	540	Aerated lagoon	Secondary	No	No	Continuous	No
65	Eagle Village First Nation - Kipawa	7292	EAGLE VILLAGE FIRST NATION - KIPAWA	2000	Lake, Reservoir	Level I	125	141	Mechanical	Primary	No	No	Continuous	No
57	Eastmain	7284	EASTMAIN	1994	River	Level I	500	500	RBC	Secondary	No	No	Continuous	Yes
80	Innu Takuaikan Uashat Mak Mani-Utenam	7272	MALIOTENAM NO. 27A	1985	MTA	MTA	2408	1148	MTA	MTA	MTA	MTA	MTA	MTA
80	Innu Takuaikan Uashat Mak Mani-Utenam	7271	UASHAT NO. 27	0	MTA	MTA			MTA	MTA	MTA	MTA	MTA	MTA
86	Innue Essipit	7276	COMMUNAUTÉ MONTAGNAISE ESSIPIT	0	MTA	MTA			MTA	MTA	MTA	MTA	MTA	MTA
70	Kahnawake	7263	KAHNAWAKE NO. 14	2003	Large River	Level II	14800	7065	Mechanical	Tertiary	No	No	Continuous	Yes
73	Kitigan Zibi Anishinabeg	7266	KITIGAN ZIBI	0	MTA	MTA		144	MTA	MTA	MTA	MTA	MTA	MTA
87	La Nation Innu Matimekush-Lac John	7290	RÉSERVE DU LAC JOHN	1975	Lake, Reservoir	Level I	40	6.5	RBC	Secondary	No	No	Continuous	No
87	La Nation Innu Matimekush-Lac John	7288	RÉSERVE MATIMEKOSH	1998	MTA	MTA	1400	988	MTA	MTA	MTA	MTA	MTA	MTA
78	Les Atikamekw de Manawan	7269	COMMUNAUTÉ ATIKAMEKW DE MANAWAN	1988	Lake, Reservoir	Level II	293	452	Aerated lagoon	Secondary	No	No	Continuous	Yes
82	Les Innus de Ekuanitshit	7289	MINGAN	1990	Enclosed Bay, Estuary	Level I	174	156	Aerated lagoon	Secondary	No	No	Continuous	Yes
51	Listuguj Migmaq Government	7257	LISTUGUJ	1997	River	Level I	2012	1978	Aerated lagoon	Secondary	No	No	Other	Yes
67	Long Point First Nation	7285	7285 - WINNEWAY INDIAN SETTLEMENT	1984	Lake, Reservoir	Level I	180	170	RBC	Secondary	No	No	Continuous	No
52	Micmacs of Gesgapegiag	9681	GESGAPEGIAG	1996	Enclosed Bay, Estuary	Level I	248	173	Aerated lagoon	Secondary	No	No	Continuous	No
69	Mohawks of Kanesatake	7262	KANESATAKE LANDS	0	Sub-Surface/Ground	Small System	n/a	n/a	Other	Primary	No	No	Continuous	No
83	Montagnais de Natashquan	7273	NATASHQUAN NO. 1	1986	Open Marine	Level I	210	389	Aerated lagoon	Secondary	No	No	Continuous	Yes
88	Montagnais de Pakua Shipi	7291	ST. AUGUSTIN INDIAN SETTLEMENT	1986	River	Level I	260	74	Aerated lagoon	Secondary	No	No	Continuous	No
84	Montagnais de Unamen Shipu	7274	ROMAINE NO. 2	2000	Large River	Level I	549	442	Aerated lagoon	Secondary	No	No	Other	No
76	Montagnais du Lac St.-Jean	7267	MASHTEUIATSH	1989	Lake, Reservoir	Level I	1375	1789	Aerated lagoon	Secondary	No	No	Continuous	No
81	Naskapi Nation of Kawawachikamach	9679	KAWAWACHIKAMACH - Station d'épuration des eaux d'égout	1997	Lake, Reservoir	Level I	379	374	Aerated lagoon	Secondary	No	No	Continuous	No
63	Nation Anishnabe du Lac Simon	7286	LAC SIMON	2003	Large River	Level II	620	646	Aerated lagoon	Secondary	No	No	Continuous	No
50	Nation Huronne Wendat	7256	VILLAGE DES HURONS WENDAKE NO. 7	2000	MTA	MTA			MTA	MTA	MTA	MTA	MTA	MTA
72	Odanak	7265	ODANAK NO. 12	2003	River	Level I	282	285	Aerated lagoon	Secondary	No	Yes	Continuous	Yes
OB1	Ouje Bougoumou	7651	OUJÉ-BOUGOUMOU - Station de traitement d'eau	1991	Lake, Reservoir	Level I	350	337	Aerated lagoon	Secondary	No	No	Continuous	No
95	Première nation de Whapmagoostui	7277	WHAPMAGOOSTUI	2007	MTA	MTA	1040	860	MTA	MTA	MTA	MTA	MTA	MTA
61	The Crees of the Waskaganish First Nation	7281	WASKAGANISH - Station d'épuration des eaux d'égout	1995	River	Level I	2000	1300	Aerated lagoon	Primary	No	No	Continuous	No
64	Timiskaming First Nation	7258	TIMISKAMING	1995	MTA	MTA		632	MTA	MTA	MTA	MTA	MTA	MTA
56	Waswanipi	7283	WASWANIPI	1989	Large River	Level I	530	799	Aerated lagoon	Secondary	No	No	Continuous	No

Table D.2 - 2: Regional Summary of Wastewater Collection Systems, Effluent Quality and Operators

First Nation Information				Collection System Information										Effluent Quality		Operator Information					
Band #	Band Name	System #	System Name	Collection Type	Collection Class	Pop. Served	Homes Piped	Homes Trucked	No. of Trucks in Service	Pipe Length	Pipe Length / Connection	Low Pressure Sewer	No. of Pumping Stations	Meets Federal Guidelines (1976)	Cause of Failure	Primary Operator Exists	Primary Operator Treatment Class	Primary Operator Collection Class	Secondary Operator Exists	Secondary Operator Treatment Class	Secondary Operator Collection Class
71	Abénakis de Wôlinak	7264	RÉSERVE DE WÔLINAK NO. 11	Piped	Level I	140	77	0	0	6335	82	No	3	MTA	MTA	Yes	Not Required	Not Required	Yes	Not Required	Not Required
74	Algonquins of Barriere Lake	7287	RAPID LAKE	Piped	Level I	584	70	0	0	3055	43	No	1	Unknown	Unknown	Yes	No Certification	No Certification	Yes	No Certification	No Certification
79	Atikamekw dOpitciwan	7270	OBEDJIWAN NO. 28	Piped	Level II	2219	327	0	0	11800.6	36	No	3	High Freq AND High Mag	Design	Yes	Level II	Level II	Yes	Level II	Level II
85	Bande des Innus de Pessamit	7275	BETSIAMITES	Piped, Low Pressure	Level I	2759	800	0	0	12191.1	15	Yes	4	Low Freq, Low Mag	Design	Yes	Level II	Level I	Yes	Level II	Level I
62	Communauté anicinape de Kitcisakik		COMMUNITY SEPTIC	Piped	NA	312	7	0	0			No	0	Meets Requirements	Unknown	Yes	Level II	Level II	Yes	Level II	Level II
55	Conseil de la Première Nation Abitibiwinni	7261	PIKOGAN	Piped, Low Pressure	MTA	597	147	0	0	2882	19	Yes	1	MTA	MTA	Yes	Not Required	Not Required	Yes	Not Required	Not Required
77	Conseil des Atikamekw de Wemotaci	7268	COMMUNAUTÉ DE WEMOTACI - station d'épuration des eaux d'égout	Piped	Level I	1300	250	0	0	10080.4	40	No	2	Low Freq, Low Mag	Unknown	Yes	Level I	Level I	Yes	Level I	Level I
58	Cree Nation of Chisasibi	7280	CHISASIBI - Station d'épuration des eaux d'égout	Piped	Level I	3825	800	0	0			No	7	Unknown	Unknown	Yes	No Certification	No Certification	Yes	Level IV	Level IV
75	Cree Nation of Mistissini	7279	MISTASSINI	Piped	Level I	3416	761	0	0			No	3	Unknown	Unknown	Yes	Level I	Level I	Yes	Level I	Level I
59	Cree Nation of Nemaska	7278	NEMISCAU	Piped, Low Pressure	Level I	726	211	0	0			Yes	3	High Freq, Low Mag	Operation	Yes	Level II	Level II	Yes	Level I	Level I
60	Cree Nation of Wemindji	7282	WEMINDJI	Piped	Level I	1301	370	0	0			No	1	Meets Requirements	Unknown	Yes	Level I	Level I	Yes	No Certification	No Certification
65	Eagle Village First Nation - Kipawa	7292	EAGLE VILLAGE FIRST NATION - KIPAWA	Piped	Level I	265	107	0	0	1920	17	No	1	High Freq, Low Mag	Design	Yes	Level I	Level I	Yes	Level I	Level I
57	Eastmain	7284	EASTMAIN	Piped, Low Pressure	Level I	658	162	0	0			Yes	3	High Freq AND High Mag	Design & Operation	No	No Certification	No Certification	No	No Certification	No Certification
80	Innu Takuaikan Uashat Mak Mani-Utenam	7272	MALIOTENAM NO. 27A	Piped	Level I	1624	450	0	0	10337.1	22	No	2	MTA	MTA	Yes	Not Required	Not Required	No	Not Required	Not Required
80	Innu Takuaikan Uashat Mak Mani-Utenam	7271	UASHAT NO. 27	Piped	Level I	1347	428	0	0	9316.53	21	No	1	MTA	MTA	Yes	Not Required	Not Required	No	Not Required	Not Required
86	Innue Essipit	7276	COMMUNAUTÉ MONTAGNAISE ESSIPIT	Piped, Trucked	Level I	255	108	0	0	4191	38	No	1	MTA	MTA	Yes	Not Required	Not Required	Yes	Not Required	Not Required
70	Kahnawake	7263	KAHNAWAKE NO. 14	Piped	Level II	6252	1924	0	0	18077.1	9	No	8	Meets Requirements	Unknown	Yes	Level II	Level I	Yes	Level II	Level I
73	Kitigan Zibi Anishinabeg	7266	KITIGAN ZIBI	Piped	Small System	348	82	0	0	5830	71	No	3	MTA	MTA	Yes	Not Required	Not Required	Yes	Not Required	Not Required
87	La Nation Innu Matimekush-Lac John	7290	RÉSERVE DU LAC JOHN	Piped	Level I	30	12	0	0	508	42	No	0	Meets Requirements	Unknown	Yes	Level IV	Level IV	Yes	Level IV	Level IV
87	La Nation Innu Matimekush-Lac John	7288	RÉSERVE MATIMEKOSH	Piped	Level I	948	166	0	0	7957.29	47	No	5	MTA	MTA	Yes	Not Required	Not Required	Yes	Not Required	Not Required
78	Les Atikamekw de Manawan	7269	COMMUNAUTÉ ATIKAMEKW DE MANAWAN	Piped	Level I	2298	406	0	0	8653	21	No	1	High Freq AND High Mag	Design & Operation	Yes	Level II	Level I	Yes	Level II	Level I
82	Les Innus de Ekuanitshit	7289	MINGAN	Piped	Level I	507	157	0	0	4840.5	30	No	1	High Freq OR High Mag	Unknown	Yes	Level I	Level I	Yes	Level I	Level I
51	Listuguj Migmaq Government	7257	LISTUGUJ	Piped	Level I	3564	1162	0	0	15671.5	13	No	7	Meets Requirements	Unknown	Yes	Level I	Level I	Yes	Level I	Level I
67	Long Point First Nation	7285	7285 - WINNEWAY INDIAN SETTLEMENT	Piped, Low Pressure	Level I	380	104	0	0	2653	25	Yes	1	High Freq AND High Mag	Design	Yes	Level III	Level III	Yes	No Certification	No Certification
52	Micmacs of Gesgapegiag	9681	GESGAPEGIAG	Piped	Level I	468	152	0	0	5667	37	No	1	Meets Requirements	Unknown	Yes	Level II	Level II	Yes	Level II	Level II
69	Mohawks of Kanesatake	7262	KANESATAKE LANDS	Piped	NA	75	0	0	0			No	0	Meets Requirements	Design & Operation	No	No Certification	No Certification	No	No Certification	No Certification
83	Montagnais de Natashquan	7273	NATASHQUAN NO. 1	Piped	Level I	900	206	0	0	5023	24	No	1	High Freq AND High Mag	Design & Operation	Yes	Level I	Level I	Yes	Level I	Level I
88	Montagnais de Pakua Shipi	7291	ST. AUGUSTIN INDIAN SETTLEMENT	Piped	Level I	332	94	0	0	2606.5	27	No	1	Low Freq, Low Mag	Design	Yes	Level IV	Level IV	Yes	Level IV	Level IV
84	Montagnais de Unamen Shipu	7274	ROMAINE NO. 2	Piped	Level I	1200	298	0	0	9698	32	No	1	Low Freq, Low Mag	Design & Operation	Yes	Level II	Level I	Yes	Level II	Level I
76	Montagnais du Lac St.-Jean	7267	MASHTEUIATSH	Piped	Level I	2359	898	0	0	15244.4	16	No	4	Meets Requirements	Unknown	Yes	Level I	Level I	Yes	Level I	Level I
81	Naskapi Nation of Kawawachikamach	9679	KAWAWACHIKAMACH - Station d'épuration des eaux d'égout	Piped	Level I	849	155	0	0			No	2	Low Freq, Low Mag	Design	Yes	Level IV	Level IV	Yes	Level IV	Level IV
63	Nation Anishnabe du Lac Simon	7286	LAC SIMON	Piped, Low Pressure	Level II	1718	316	0	0	6957	22	Yes	3	Meets Requirements	Unknown	Yes	Level I	Level I	Yes	Level II	Level II
50	Nation Huronne Wendat	7256	VILLAGE DES HURONS WENDAKE NO. 7	Piped	Level I	1545	640	0	0	12313.6	19	No	1	MTA	MTA	Yes	Not Required	Not Required	Yes	Not Required	Not Required
72	Odanak	7265	ODANAK NO. 12	Piped	Level I	480	214	0	0	6437.9	30	No	2	High Freq AND High Mag	Design & Operation	Yes	Level I	Level I	Yes	Level I	Level I
OB1	Ouje Bougoumou	7651	OUJÉ-BOUGOUMOU - Station de traitement d'eau	Piped	Level I	813	199	0	0			No	1	Unknown	Unknown	Yes	No Certification	No Certification	Yes	No Certification	No Certification
95	Première nation de Whapmagoostui	7277	WHAPMAGOOSTUI	Piped, Low Pressure	Level II	1426	236	0	0			Yes	1	MTA	MTA	No	Not Required	Not Required	No	Not Required	Not Required
61	The Crees of the Waskaganish First Nation	7281	WASKAGANISH - Station d'épuration des eaux d'égout	Piped, Low Pressure	Level III	2500	450	0				Yes	3	Meets Requirements	Unknown	Yes	Level IV	Level IV	Yes	Level II	Level II
64	Timiskaming First Nation	7258	TIMISKAMING	Piped	Level I	631	226	0	0	3279.3	14	No	1	MTA	MTA	Yes	Not Required	Not Required	Yes	Not Required	Not Required
56	Waswanipi	7283	WASWANIPI	Piped, Low Pressure	Level I	1925	409	0	0			Yes	2	Unknown	Unknown	Yes	No Certification	No Certification	Yes	No Certification	No Certification
							13581	**0**													

NEEGAN BURNSIDE

Appendix E
Risk Summary

NEEGAN BURNSIDE

Appendix E.1

Individual First Nation Water Risk Summary

Table E.1: Individual First Nation Water Risk Summary

Legend: High Risk | Medium Risk | Low Risk

Band #	Band Name	System #	System Name	Water Source	Treatment Class	Source Risk	Design Risk	Operations Risk	Report Risk	Operator Risk	Final Risk Score
74	Algonquins of Barriere Lake	6516	RAPID LAKE	Groundwater	Level I	5.0	8.0	6.0	10.0	7.0	7.1
79	Atikamekw dOpitciwan	6499	OBEDJIWAN NO. 28	Groundwater	Level II	10.0	5.0	6.0	5.0	1.0	5.0
62	Communauté anicinape de Kitcisakik		COMMUNITY WELLS	Groundwater	Level II	5.0	4.0	8.0	6.0	1.0	4.9
75	Cree Nation of Mistissini	6508	MISTASSINI	Groundwater	Level I	3.0	1.0	8.0	10.0	1.0	4.2
59	Cree Nation of Nemaska	6507	NEMISCAU	Groundwater	Level I	5.0	2.0	6.0	10.0	1.0	4.1
60	Cree Nation of Wemindji	6511	WEMINDJI	Groundwater	Level II	7.0	3.0	3.0	3.0	4.0	3.6
80	Innu Takuaikan Uashat Mak Mani-Utenam	6501	MALIOTENAM NO. 27A	Groundwater	Level II	7.0	4.0	8.0	1.0	1.0	4.6
78	Les Atikamekw de Manawan	6498	COMMUNAUTÉ ATIKAMEKW DE MANAWAN	Groundwater	Level I	6.0	8.0	8.0	2.0	1.0	5.8
82	Les Innus de Ekuanitshit	6518	MINGAN	Groundwater	Level II	5.0	1.0	8.0	2.0	1.0	3.6
51	Listuguj Migmaq Government	6488	LISTUGUJ	Groundwater	Level II	4.0	1.0	6.0	1.0	1.0	2.8
67	Long Point First Nation	6514	WINNEWAY INDIAN SETTLEMENT	Groundwater	Level I	2.0	3.0	3.0	5.0	1.0	2.7
52	Micmacs of Gesgapegiag	9680	GESGAPEGIAG	Groundwater	Level I	7.0	2.0	5.0	7.0	1.0	3.7
69	Mohawks of Kanesatake	6491	KANESATAKE LANDS	Groundwater	Small System	10.0	1.0	9.0	10.0	10.0	7.0
83	Montagnais de Natashquan	6502	NATASHQUAN NO. 1	Groundwater	Level III	7.0	8.0	8.0	6.0	1.0	8.0
63	Nation Anishnabe du Lac Simon	6515	LAC SIMON	Groundwater	Level I	5.0	2.0	4.0	8.0	1.0	3.3
OB1	Ouje Bougoumou	7111	OUJÉ-BOUGOUMOU	Groundwater	Level I	4.0	8.0	8.0	10.0	1.0	8.0
95	Première nation de Whapmagoostui	6506	WHAPMAGOOSTUI	Groundwater	Level I	4.0	4.0	5.0	5.0	1.0	3.8
64	Timiskaming First Nation	6489	TIMISKAMING	Groundwater	Level I	8.0	8.0	8.0	3.0	1.0	8.0
56	Waswanipi	6512	WASWANIPI	Groundwater	Level I	6.0	2.0	8.0	9.0	1.0	8.0
57	Eastmain	6513	EASTMAIN	Groundwater GUDI	Level III	7.0	3.0	3.0	3.0	5.0	3.8
71	Abénakis de Wôlinak	6493	RÉSERVE DE WÔLINAK NO. 11	MTA	MTA	1.0	1.0	5.0	10.0	1.0	3.1
55	Conseil de la Première Nation Abitibiwinni	6490	PIKOGAN	MTA	MTA	1.0	1.0	8.0	10.0	1.0	4.0
80	Innu Takuaikan Uashat Mak Mani-Utenam	6500	UASHAT NO. 27	MTA	MTA	1.0	8.0	8.0	1.0	1.0	5.2
86	Innue Essipit	6505	COMMUNAUTÉ MONTAGNAISE ESSIPIT	MTA	MTA	1.0	8.0	8.0	4.0	3.0	5.9
73	Kitigan Zibi Anishinabeg	6495	KITIGAN ZIBI	MTA	MTA	1.0	8.0	8.0	10.0	8.0	7.5
87	La Nation Innu Matimekush-Lac John	6517	RÉSERVE MATIMEKOSH	MTA	MTA	2.0	2.0	1.0	1.0	1.0	1.4
50	Nation Huronne Wendat	6487	VILLAGE DES HURONS WENDAKE NO. 7	MTA	MTA	1.0	1.0	7.0	8.0	1.0	3.5
72	Odanak	6494	ODANAK NO. 12	MTA	MTA	4.0	2.0	5.0	8.0	1.0	3.5
85	Bande des Innus de Pessamit	6504	BETSIAMITES	Surface Water	Level II	9.0	5.0	8.0	3.0	1.0	5.3
77	Conseil des Atikamekw de Wemotaci	6497	COMMUNAUTÉ DE WEMOTACI - station de traitement d'eau	Surface Water	Level II	10.0	3.0	8.0	4.0	1.0	4.9
58	Cree Nation of Chisasibi	6509	CHISASIBI - Station de traitement d'eau	Surface Water	Level III	9.0	3.0	3.0	4.0	1.0	3.3
65	Eagle Village First Nation - Kipawa	6521	EAGLE VILLAGE FIRST NATION - KIPAWA	Surface Water	Level II	7.0	2.0	1.0	10.0	2.0	3.0
70	Kahnawake	6492	KAHNAWAKE NO. 14	Surface Water	Level III	9.0	2.0	3.0	1.0	1.0	2.7
87	La Nation Innu Matimekush-Lac John	6519	RÉSERVE DU LAC JOHN	Surface Water	Level I	8.0	8.0	8.0	6.0	1.0	8.0
88	Montagnais de Pakua Shipi	6520	ST. AUGUSTIN INDIAN SETTLEMENT	Surface Water	Level II	9.0	2.0	2.0	1.0	1.0	2.4
84	Montagnais de Unamen Shipu	6503	ROMAINE NO. 2	Surface Water	Level III	9.0	2.0	2.0	1.0	1.0	2.4
76	Montagnais du Lac St.-Jean	6496	MASHTEUIATSH	Surface Water	Level II	9.0	8.0	8.0	1.0	1.0	6.0
81	Naskapi Nation of Kawawachikamach	9678	KAWAWACHIKAMACH - Station de traitement d'eau	Surface Water	Level II	6.0	1.0	2.0	1.0	1.0	1.8
61	The Crees of the Waskaganish First Nation	6510	WASKAGANISH - Station de traitement d'eau	Surface Water	Level III	8.0	1.0	3.0	1.0	1.0	2.3

NEEGAN BURNSIDE

Appendix E.2

Individual First Nation Wastewater Risk Summary

Table E.2: Individual First Nation Wastewater Risk Summary

Legend: High Risk | Medium Risk | Low Risk

Band #	Band Name	System #	System Name	Receiver Type	Treatment Class	Effluent Risk	Design Risk	Operations Risk	Report Risk	Operator Risk	Final Risk Score
59	Cree Nation of Nemaska	7278	NEMISCAU	Creek	Level I	8.0	2.0	8.0	1.0	1.0	4.4
82	Les Innus de Ekuanitshit	7289	MINGAN	Enclosed bay	Level I	10.0	8.0	8.0	2.0	1.0	6.4
52	Micmacs of Gesgapegiag	9681	GESGAPEGIAG	Enclosed bay	Level I	10.0	3.0	7.0	8.0	1.0	5.5
79	Atikamekw dOpitciwan	7270	OBEDJIWAN NO. 28	Lake, reservoir	Level II	10.0	8.0	7.0	7.0	1.0	6.6
75	Cree Nation of Mistissini	7279	MISTASSINI	Lake, reservoir	Level I	10.0	2.0	7.0	10.0	1.0	5.4
65	Eagle Village First Nation - Kipawa	7292	EAGLE VILLAGE FIRST NATION - KIPAWA	Lake, reservoir	Level I	10.0	8.0	5.0	10.0	1.0	6.4
87	La Nation Innu Matimekush-Lac John	7290	RÉSERVE DU LAC JOHN	Lake, reservoir	Level I	10.0	4.0	7.0	10.0	1.0	5.9
78	Les Atikamekw de Manawan	7269	COMMUNAUTÉ ATIKAMEKW DE MANAWAN	Lake, reservoir	Level II	10.0	8.0	10.0	5.0	4.0	8.0
67	Long Point First Nation	7285	7285 - WINNEWAY INDIAN SETTLEMENT	Lake, reservoir	Level I	8.0	9.0	9.0	10.0	1.0	8.0
76	Montagnais du Lac St.-Jean	7267	MASHTEUIATSH	Lake, reservoir	Level I	10.0	5.0	6.0	1.0	1.0	5.0
81	Naskapi Nation of Kawawachikamach	9679	KAWAWACHIKAMACH - Station d'épuration des eaux d'égout	Lake, reservoir	Level I	8.0	8.0	2.0	1.0	1.0	4.4
OB1	Ouje Bougoumou	7651	OUJÉ-BOUGOUMOU - Station de traitement d'eau	Lake, reservoir	Level I	10.0	6.0	5.0	10.0	6.0	6.9
85	Bande des Innus de Pessamit	7275	BETSIAMITES	Large river	Level I	10.0	8.0	5.0	7.0	1.0	6.1
77	Conseil des Atikamekw de Wemotaci	7268	COMMUNAUTÉ DE WEMOTACI - station d'épuration des eaux d'égout	Large river	Level I	8.0	8.0	8.0	5.0	1.0	8.0
58	Cree Nation of Chisasibi	7280	CHISASIBI - Station d'épuration des eaux d'égout	Large river	Level I	4.0	3.0	4.0	10.0	4.0	4.3
60	Cree Nation of Wemindji	7282	WEMINDJI	Large river	Level I	5.0	3.0	5.0	10.0	1.0	4.2
70	Kahnawake	7263	KAHNAWAKE NO. 14	Large river	Level II	5.0	8.0	2.0	1.0	1.0	8.0
84	Montagnais de Unamen Shipu	7274	ROMAINE NO. 2	Large river	Level I	8.0	8.0	8.0	9.0	1.0	6.7
63	Nation Anishnabe du Lac Simon	7286	LAC SIMON	Large river	Level II	4.0	8.0	4.0	1.0	1.0	8.0
56	Waswanipi	7283	WASWANIPI	Large river	Level I	6.0	4.0	4.0	9.0	8.0	5.7
71	Abénakis de Wôlinak	7264	RÉSERVE DE WÔLINAK NO. 11	MTA	MTA	1.0	4.0	6.0	10.0	1.0	5.7
55	Conseil de la Première Nation Abitibiwinni	7261	PIKOGAN	MTA	MTA	2.0	1.0	3.0	10.0	1.0	2.6
80	Innu Takuaikan Uashat Mak Mani-Utenam	7272	MALIOTENAM NO. 27A	MTA	MTA	1.0	2.0	5.0	4.0	2.0	2.7
80	Innu Takuaikan Uashat Mak Mani-Utenam	7271	UASHAT NO. 27	MTA	MTA	1.0	8.0	8.0	8.0	1.0	5.2
86	Innue Essipit	7276	COMMUNAUTÉ MONTAGNAISE ESSIPIT	MTA	MTA	2.0	8.0	8.0	4.0	6.0	6.0
73	Kitigan Zibi Anishinabeg	7266	KITIGAN ZIBI	MTA	MTA	1.0	1.0	5.0	10.0	8.0	4.3
87	La Nation Innu Matimekush-Lac John	7288	RÉSERVE MATIMEKOSH	MTA	MTA	1.0	8.0	1.0	1.0	1.0	8.0
50	Nation Huronne Wendat	7256	VILLAGE DES HURONS WENDAKE NO. 7	MTA	MTA	1.0	2.0	6.0	10.0	1.0	3.4
95	Première nation de Whapmagoostui	7277	WHAPMAGOOSTUI	MTA	MTA	1.0	1.0	3.0	10.0	10.0	4.2
64	Timiskaming First Nation	7258	TIMISKAMING	MTA	MTA	1.0	2.0	5.0	10.0	1.0	3.1
83	Montagnais de Natashquan	7273	NATASHQUAN NO. 1	Open marine	Level I	7.0	8.0	10.0	6.0	1.0	6.7
62	Communauté anicinape de Kitcisakik	0	COMMUNITY SEPTIC	River	Small System	8.0	2.0	5.0	1.0	1.0	3.6
57	Eastmain	7284	EASTMAIN	River	Level I	7.0	8.0	10.0	10.0	9.0	8.7
51	Listuguj Migmaq Government	7257	LISTUGUJ	River	Level I	10.0	4.0	8.0	1.0	1.0	5.3
88	Montagnais de Pakua Shipi	7291	ST. AUGUSTIN INDIAN SETTLEMENT	River	Level I	6.0	8.0	3.0	1.0	1.0	4.2
72	Odanak	7265	ODANAK NO. 12	River	Level I	10.0	8.0	9.0	4.0	1.0	6.8
61	The Crees of the Waskaganish First Nation	7281	WASKAGANISH - Station d'épuration des eaux d'égout	River	Level I	8.0	4.0	3.0	1.0	1.0	3.6
69	Mohawks of Kanesatake	7262	KANESATAKE LANDS	Sub-surface / Ground	Small System	3.0	3.0	9.0	4.0	10.0	6.0
74	Algonquins of Barriere Lake	7287	RAPID LAKE	Wetland	Level I	5.0	3.0	7.0	10.0	7.0	5.9

NEEGAN BURNSIDE

Appendix F

Future Servicing Protocol Costs

REGION: QUEBEC
January 2011

Table F: Protocol and Servicing Costs *(Water & Wastewater Combined)*

Band #	Band Name	Community Name	Population	Current Homes	Forecast Population	Forecast Homes	Zone Markup	Upgrade To Protocol	Per Lot Upgrades to Protocol (Current Homes)	Recommended Servicing	Per Lot Reccomended Servicing (Forecast Homes)	Recommended O&M	Per Lot O&M (Forecast Homes)
71	Abénakis de Wôlinak	Wôlinak 11	140	78	150	88	1.069	$ 99,600	$ 1,300	$ 2,410,000	$ 27,400	$ 270,000	$ 3,100
74	Algonquins of Barriere Lake	Rapid Lake	584	70	729	106	1.239	$ 267,000	$ 3,800	$ 6,520,000	$ 61,500	$ 400,000	$ 3,800
79	Atikamekw dOpitciwan	Obedjiwan	2219	327	2641	432	1.480	$ 690,000	$ 2,100	$ 19,720,000	$ 45,600	$ 710,000	$ 1,600
85	Bande des Innus de Pessamit	Betsiamites	2759	800	2927	856	1.080	$ 400,000	$ 500	$ 6,750,000	$ 7,900	$ 730,000	$ 900
62	Communauté anicinape de Kitcisakik	Grand Lac Victoria Indian Settlement	312	113	566	240	1.239	$ 311,000	$ 2,800	$ 14,800,000	$ 61,700	$ 290,000	$ 1,200
55	Conseil de la Première Nation Abitibiwinni	Pikogan	597	147	825	204	1.134	$ 416,000	$ 2,800	$ 4,210,000	$ 20,600	$ 300,000	$ 1,500
77	Conseil des Atikamekw de Wemotaci	Communauté De Wemotaci	1300	250	1679	344	1.180	$ 324,000	$ 1,300	$ 11,900,000	$ 34,600	$ 510,000	$ 1,500
58	Cree Nation of Chisasibi	Chisasibi	3825	800	4810	1046	1.596	$ 420,000	$ 500	$ 18,960,000	$ 18,100	$ 790,000	$ 800
75	Cree Nation of Mistissini	Mistassini	3416	761	4498	1031	1.281	$ 128,100	$ 200	$ 8,350,000	$ 8,100	$ 570,000	$ 600
59	Cree Nation of Nemaska	Nemiscau	726	211	956	287	1.596	$ 399,500	$ 1,900	$ 9,370,000	$ 32,600	$ 370,000	$ 1,300
60	Cree Nation of Wemindji	Wemindji	1301	370	1426	411	1.596	$ 475,000	$ 1,300	$ 12,010,000	$ 29,200	$ 500,000	$ 1,200
65	Eagle Village First Nation - Kipawa	Eagle Village First Nation - Kipawa	265	107	420	184	1.239	$ 20,000	$ 200	$ 6,460,000	$ 35,100	$ 430,000	$ 2,300
57	Eastmain	Eastmain	658	162	866	214	1.596	$ 510,000	$ 3,100	$ 18,980,000	$ 88,700	$ 370,000	$ 1,700
80	Innu Takuaikan Uashat Mak Mani-Utenam	Maliotenam	1624	450	1710	478	1.221	$ 236,500	$ 500	$ 5,230,000	$ 10,900	$ 470,000	$ 1,000
80	Innu Takuaikan Uashat Mak Mani-Utenam	Uashat	1600	428	1756	480	1.221	$ 115,000	$ 300	$ 1,520,000	$ 3,200	$ 155,000	$ 300
86	Innue Essipit	Innue Essipit	255	110	400	182	1.080	$ 125,000	$ 1,100	$ 990,000	$ 5,400	$ 230,000	$ 1,300
70	Kahnawake	Kahnawake 14	7506	2290	8649	2671	1.069	$ -	$ -	$ 5,420,000	$ 2,000	$ 4,020,000	$ 1,500
73	Kitigan Zibi Anishinabeg	Kitigan Zibi	1549	389	2074	564	1.102	$ 387,000	$ 1,000	$ 16,230,000	$ 28,800	$ 940,000	$ 1,700
87	La Nation Innu Matimekush-Lac John	Lac John	30	12	30	12	2.562	$ 691,500	$ 57,600	$ 700,000	$ 58,300	$ 250,000	$ 20,800
87	La Nation Innu Matimekush-Lac John	Matimekosh 3	777	166	923	202	2.562	$ -	$ -	$ 4,950,000	$ 24,500	$ 500,000	$ 2,500
78	Les Atikamekw de Manawan	COMMUNAUTÉ ATIKAMEKW DE MANAWAN	2298	406	2981	576	1.168	$ 3,177,000	$ 7,800	$ 11,530,000	$ 20,000	$ 310,000	$ 500
82	Les Innus de Ekuanitshit	MINGAN	507	158	548	171	1.330	$ 173,100	$ 1,100	$ 2,520,000	$ 14,700	$ 410,000	$ 2,400
51	Listuguj Migmaq Government	Listuguj	1940	782	2665	1144	1.080	$ 615,500	$ 800	$ 4,680,000	$ 4,100	$ 740,000	$ 600
67	Long Point First Nation	Winneway Indian Settlement	380	104	513	148	1.239	$ 508,000	$ 4,900	$ 7,950,000	$ 53,700	$ 390,000	$ 2,600
52	Micmacs of Gesgapegiag	Gesgapegiag	468	178	597	242	1.080	$ 137,000	$ 800	$ 2,790,000	$ 11,500	$ 430,000	$ 1,800
69	Mohawks of Kanesatake	Kanesatake Lands	1628	447	2078	597	1.069	$ -	$ -	$ 35,720,000	$ 59,800	$ 580,000	$ 1,000
83	Montagnais de Natashquan	Natashquan	900	206	1130	263	1.657	$ 487,000	$ 2,400	$ 12,340,000	$ 46,900	$ 640,000	$ 2,400
88	Montagnais de Pakua Shipi	St. Augustin Indian Settlement	332	94	425	125	2.562	$ 240,000	$ 2,600	$ 4,230,000	$ 33,800	$ 440,000	$ 3,500
84	Montagnais de Unamen Shipu	Romaine 2	1200	298	1370	340	2.376	$ 1,130,000	$ 3,800	$ 14,250,000	$ 41,900	$ 520,000	$ 1,500
76	Montagnais du Lac St.-Jean	Mashteuiatsh	2359	973	2891	1239	1.080	$ 31,500	$ -	$ 17,520,000	$ 14,100	$ 1,050,000	$ 800
81	Naskapi Nation of Kawawachikamach	Kawawachikamach	849	155	1233	251	2.888	$ 124,000	$ 800	$ 13,540,000	$ 53,900	$ 570,000	$ 2,300
63	Nation Anishnabe du Lac Simon	Lac Simon	1718	316	2248	448	1.134	$ 3,264,600	$ 10,300	$ 13,780,000	$ 30,800	$ 660,000	$ 1,500
50	Nation Huronne Wendat	Village Des Hurons Wendake 7	1545	640	2041	888	1.080	$ 179,000	$ 300	$ 1,610,000	$ 1,800	$ 430,000	$ 500
72	Odanak	Odanak 12	381	214	605	438	1.069	$ 200,000	$ 900	$ 2,600,000	$ 5,900	$ 260,000	$ 600
OB1	Ouje Bougoumou	Ouje Bougoumou	813	202	1048	260	1.000	$ 1,056,000	$ 5,200	$ 11,270,000	$ 43,300	$ 330,000	$ 1,300
95	Première nation de Whapmagoostui	Whapmagoostui	850	236	1070	309	2.782	$ 10,050,000	$ 42,600	$ 13,440,000	$ 43,500	$ 400,000	$ 1,300
61	The Crees of the Waskaganish First Nation	Waskaganish	2500	450	3029	582	2.100	$ 259,000	$ 600	$ 7,320,000	$ 12,600	$ 840,000	$ 1,400
64	Timiskaming First Nation	Timiskaming	631	226	848	334	1.134	$ 290,000	$ 1,300	$ 4,160,000	$ 12,500	$ 360,000	$ 1,100
56	Waswanipi	Waswanipi	1925	409	2470	545	1.239	$ 299,000	$ 700	$ 20,090,000	$ 36,900	$ 530,000	$ 1,000