Mackenzie Valley Land and Water Board
7th Floor - 4910 50th Avenue
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

APPLICATION FOR A NEW WATER LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE.

Application/Licence No: (amendment or renewal only)	MV2006L3-0002

1. **Name and Mailing Address of Applicant**	2. **Address of Head Office in Canada if Incorporate**
Susan Christie, SAO, Hamlet of Fort Providence Fort Providence NT, X0E 0L0	
Telephone: (867) 699-3441	Telephone:
Fax: (867) 699-3360	Fax:

3. Location of Undertaking (describe and attach a map, indicating watercourses and location of any proposed waste deposits).

Latitude 61 21' 29" Longitude 117 39' 37"

4. Description of Undertaking (describe and attach plans)

withdraw water for consumption, and disposal of municipal sewage and waste

5. Type of Undertaking.

1.	Industrial		5.	Agriculture	
2.	Mining and Milling		6.	Conservation	
3.	Municipal	X	7.	Recreation	
4.	Power		8.	Miscellaneous	

6. Water Use

To obtain water	X	Flood control	
To cross a watercourse		To divert water	
To modify the bed or bank of a watercourse		To alter the flow of, or store water	

Other (describe): Municipal Wastewater and lagoon and landfill operation

7. Quantity of water involved (litres per second, litres per day or cubic meters per year), including both quantity to be used and quantity to be returned to source.

60,000 cubic meters annually

8. Waste deposited (quantity, quality, treatment and disposal)

A Waste Management Plan for the proposed activities is to be developed in accordance with the Board's *Guidelines for Developing a Waste Management Plan* (accessible at www.mvlwb.com) and submitted as an attachment to the application form. A template for this Plan is provided in the Guidelines. Applications for a municipal licence do not need to include a Waste Management Plan as this information is required under the Operation and Maintenance Plan.

In addition, applicants are referred to the Board's *Water and Effluent Quality Management Policy* (accessible at www.mvlwb.com) to understand the Board's approach to managing the deposit of waste into the receiving environment through enforceable terms and conditions set in water licences.

municipality has an Operation and Maintenance Plan in place that was most recently updated in December, 2015.

9. Other persons or properties affected by this Undertaking (give name, mailing address and location). Attach a list if necessary.

a list of parties contacted and sample letter are attached.

10. Predicted environmental impacts of Undertaking and proposed mitigation.

As part of the response to this section, a spill contingency plan for the proposed activities is to be developed in accordance with INAC's *Guidelines for Spill Contingency Planning, April 2007* (accessible at http://www.ainc-inac.gc.ca/ai/scr/nt/pdf/SCP-EUD-eng.pdf). This plan is to be submitted as an attachment to the application form.

None - this is a municipal undertaking, and spill contingency planning is covered in the municipality's O&M Plan

11. Contractors and sub-contractors (names, addresses and functions). Attach a list if necessary.

Digaa Enterprises, Fort Providence - sewage collection and disposal
Cheridon Enterprises, Fort Providence - assists with solid waste site operations.

12. Studies undertaken to date. Attach a list if necessary.

list attached

13. Proposed time schedule.

Start date: July, 2016 Completion date: July, 2026

Name (print): Susan Christie Signature:

Title (print): Senior Administrative Officer Date: April 5/16

Please make all cheques payable to "Receiver General of Canada"

FOR OFFICE USE ONLY

Application Fee Amount: $_____ **Receipt No:** _____

Water Use Deposit Amount: $_____ **Receipt No:** _____

Fort Providence, NWT
Water Licence Renewal
List of Studies Undertaken
As of March, 2016

Water Supply:

- Water Intake Options Assessment (Arktis, 2015)
- Design Concept Brief – Water Supply Improvements (Dillon, 2002) *02-0627*
- Review of Community Water Management and Water System Infrastructure (PW&S, 2002)
- Geotechnical Review of Proposed Water Supply Improvements (AMEC, 2002)
- Water Intake Improvement Study, Stage 2 (Reid Crowther, 2000)
- Investigation Report, Fort Providence (MM Dillon, 1993) *92-4292*
- Water Treatment Plant (Dillon, 1992) *92-3608*
- Emergency Raw Water Supply Measures (DPW, 2000)
- Water Level Frequencies (Hydroconsult EN3 Services Ltd., 2000)
- Water Intake Structure (EBA, 2000)
- Borehole Information, Dory Point South Ferry Crossing (EBA, 1999)
- Borehole Information, Proposed Water Treatment Plant (Hardy BBT Limited, 1991)
- Borehole Information, Proposed Hamlet Office (Hardy BBT Limited, 1987)

Sewage Lagoon

- Sewage Lagoon Expansion (Dillon, 1999) *99-6731*
- Lagoon Ramp Access (Dillon 2005) *05-5040*

Solid Waste Facility

- Solid Waste Expansion Study, (Dillon, 2012)

Municipal Questionnaire to Accompany Water License Applications to the Mackenzie Valley Land and Water Board

Mackenzie Valley Land and Water Board
7th Floor - 4910 50th Avenue
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Regulating the use of land and waters and the deposit of waste, and enabling residents to participate in the management of resources to provide optimum benefit to the residents of the settlement areas and of the Mackenzie Valley and to all Canadians.

October 2003

The purpose of this questionnaire is to solicit supplemental information from an applicant to support his/her application for a water licence (or renewal). It is anticipated that the completion of this questionnaire will reduce delays arising from the Board having to solicit additional information after an application has already been submitted.

This information will also be useful during the pre-screening of your application, which must be undertaken prior to development and approval of a water licence to determine if the project needs to be referred to the Environmental Impact Review Board.

The applicant should complete the questionnaire to the best of his/her ability, recognizing that some questions may not be relevant to the project under consideration. For questions that do not relate to his/her operation, the applicant is requested to indicate “N/A” (Not Applicable).

If any questions arise while completing the questionnaire, the applicant may wish to contact the Mackenzie Valley Land and Water Board at (867) 669-0506.

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PLEASE PRINT OR TYPE YOUR RESPONSES
NOTE If space is insufficient for any of the responses on this questionnaire, use the back of the sheet or an attachment.

SECTION 1 – GENERAL
Date: April 5, 2016 (current WL expires July, 2016)

1.1 Applicant

Hamlet of Fort Providence
Box 290
Fort Providence, NT X0E 0L0

TELEPHONE: (867) 699-3441
FAX: (867) 699-3360

Attention: Susan Christie, Senior Administrative Officer

1.2 Community Status Hamlet

1.3 Population: 734 (2011 census)

population is projected to remain stable for the next 5 years

1.4 Indicate the status of the municipality's license on the date of application.

Renewal of Water License # MV2006L3-0002

1.5 Has any baseline data been collected for the main water bodies in the area?

Not by the municipality/Hamlet

1.6 If "Yes", please attach all data gathered on the physical, biological and chemical characteristics at each sampling location. Attach a summary of program details indicating sampling locations, description of waste at each location, sampling frequency, and parameters analyzed. Include an outline of Quality Assurance/Quality Control methods being applied to sampling, preservation and analysis within the program.

1.7 Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project (e.g., wildlife, soils, air quality) in addition to water related information requested in this questionnaire?

Not by the municipality/Hamlet

1.8 If "Yes", please attach copies of reports or cite titles, authors and dates.

n/a

1.9 If no, are such studies being planned?

Not by the municipality/Hamlet

1.10 If "Yes", briefly describe the proposals.

n/a

1.11 Attach detailed maps which show the relative locations of the:

- raw water intake,
- water treatment facilities,

• fuel & chemical storage,
• sewage treatment facilities,
• wastewater treatment area and discharge outlets,
• solid waste disposal areas and drainage patterns,
• hazardous waste disposal area,
• transportation access routes,
• existing waterbodies/courses and any changes to these water bodies/courses which have or may occur as a result of water use of waste disposal facilities, locations of environmental monitoring sites.

Figure 1 taken from the 2015 O&M Plan is attached.

1.12 Attach detailed scale plan drawing(s) of the proposed (or present) sewage treatment system. The drawing(s) must be stamped by an engineer registered in NWT and include the following:

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

No stamped engineered drawings exist – Figure 2 taken from the 2015 O&M Plan is attached.

1.13 Attach detailed scale plan drawings of the proposed (or present) solid waste disposal area. The drawings must include the following:

(a) precise details of all retaining structures (dimensions, materials of construction, etc.);
(b) details of the drainage basin, and existing and proposed drainage modifications;
(c) details regarding direction and route followed by wastewater flow from the area;
(d) indications of the distance to nearby major watercourses, and fish bearing waters;
(e) all sources of seepage presently encountered in the vicinity of these areas;
(f) the volume of each seepage flow (m^3/day); and
(g) the direction of each flow.

No engineered drawings exist - Figure 3 taken from the 2015 O&M Plan is attached.

1.14 Attach the present or proposed contingency plan which will be used for each portion of the waste control system in the event it fails to operate properly.

Information can be found in Section 6.3 of the Hamlet's O&M Plan – attached.

1.15 Attach the present or proposed spill contingency plan which will be employed in case a spill of hazardous materials occurs. Describe courses of action, mitigative methods and equipment available for use.

Information can be found in Section 6.3 of the Hamlet's O&M Plan – attached.

NOTE: Individual detailed large scale drawings of all facilities (dam, decant system, ditch, dike, water treatment plant, etc) constructed or proposed must be attached. Specific details with regard to the methods of construction, materials used, etc. are required.

SECTION 2 -- WATER SUPPLY

1. 2.1 Volume of water use

All water is trucked
Estimated volumes for 2016 to 2026 are shown in the table below, allowing for a 1% annual growth rate.

Calendar Year	Total Population	Daily Rate (m^3/d)	Annual Rate (m^3/yr)	Cumulative Water Volume (m^3)
2011	734	92	33,489	33,489
2012	741	93	33,824	67,312
2013	749	94	34,162	101,474
2014	756	95	34,503	135,978
2015	764	95	34,849	170,826
2016	771	96	35,197	206,023
2017	779	97	35,549	241,572
2018	787	98	35,904	277,477
2019	795	99	36,264	313,740
2020	803	100	36,626	350,366
2021	811	101	36,992	387,359
2022	819	102	37,362	424,721
2023	827	103	37,736	462,457
2024	835	104	38,113	500,570
2025	844	105	38,494	539,065
2026	852	107	38,879	577,944

2.2 Type of source

River

2.3 Name of raw water source and alternative, if any.

Mackenzie River - no alternative.

2.4 Usual break-up & freeze-up months.

break-up: May
freeze-up: November

2.5 Please provide short descriptions for the Freshwater intake facility, Operating capacity of the pumps used, Intake screen size.

- Raw water supply to the WTP is comprised of three gravity intakes to a wet well. The wet well has two submersible pumps controlled by the level gauges in the clear wells. The pumps feed the WTP
- In 2004 the wet well intake system was replaced with a new incline shaft intake, with a riser and includes 2 below-grade inclined shaft water intake lines. One line is used to supply water to the treatment plant, and the other is used for fire flow. The incline shaft system has 2 intake pumps, one for each intake line. The duty pump is a Goulds 55GS15, with a 2.24 kW motor. (The motor was replaced in 2005.) It is a 1-stage pump that provides 190 L/min at 27 m of head, at the pump's peak efficiency of 59%. The fire pump is a Goulds 275H102, with a 7.46 kW motor. It is a 2 stage pump and gives 910 L/min at 34 m of head and 69% efficiency. This pump is back-up to the duty pump.

- The Hamlet has experienced some operational problems with the new intake installed in 2004. For this reason, the Hamlet has periodically switched back and forth between the old wet well system and the new intake process pump system.
- The flow rate in the intake line is regulated by the Water Boy Influent Control Valve. The intake pump is turned on by the start of the Water Boy process plant, which is regulated by the level switches in the clear wells. The intake pumps and the Water Boy are turned off by the level switch in the clear wells.
- Intake screen openings meet DFO requirements.

2.6 Type of water storage facility:

Underground concrete reservoirs (clear wells)

2.7 What is the capacity of the water storage facility?

The dimensions of the reservoir are 3.55 m x 11 m x 2.25 m in height, with a total volume of 170 m^3. This includes 35 m^3 for peak balancing, 80 m^3 for emergency and 52 m^3 for fire reserve.

2.8 What is the rate of withdrawal from the source?
Estimated daily withdrawals based on population projections to 2026 are shown in the table below

Calendar Year	Total Population Projection	Daily Rate (m^3/d)
2016	771	96
2017	779	97
2018	787	98
2019	795	99
2020	803	100
2021	811	101
2022	819	102
2023	827	103
2024	835	104
2025	844	105
2026	852	107

2.9 Is water drawn from the source?

continuously

2.10 If it is drawn intermittently, during what month(s) is it drawn? n/a

2.11 For what time period is it drawn (days/weeks/months)? n/a

2.12 What is the rate of flow of source (if river) or size (if lake)?

The average mean flow of the Mackenzie River is 8 480 m^3/s (National HYDAT database, data up to 1999). The Mackenzie River Basin recharges naturally due to precipitation. Seasonal trends are characterized by the water level dropping during the summer, and recharging a significant amount during the spring thaw.

2.13 At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn.

The Mackenzie River is dynamic and water usage by the Hamlet accounts for only 0.00001% of the total annual flow of $2.67 \times 10^{11} m^3$/year.

2.14 General condition of:

Intake: Satisfactory

Storage facility: Satisfactory

Distribution system: Satisfactory

2.15 Are there any changes planned in the water supply system?

Yes.

2.16 If "Yes", please attach a copy of the plan, or describe changes.

A study to determine options for improving the intake was completed by Arktis Engineering Consultants in 2015. A copy of the report is available on the MVLWB on-line public registry. The optimal solution will be determined in future.

SECTION 3 -- WATER TREATMENT

3.1 Indicate the quality of the raw water prior to treatment & distribution.

Good

Describe
Certificates of analysis for raw water from May, 2015 and July 2015 are attached.

3.2 Indicate the capacity of the treatment facility.

see 2.5 above.

3.3 Type of water treatment facility

Primary treatment is provided by a Neptune Microfloc Waterboy 82 (Water Boy) packaged plant. This is a coagulation and multi-media filtration package plant. Upstream of the plant are chemical injectors for alum and polymers. On the supply line to the plant is also an on-line filter and flash mixer.

Design documents for the WTP are attached.

3.4 Describe in detail the method of water treatment (i.e. backwash, flocculation, sedimentation, chemicals used), and provide the results of the most recent bacteriological and chemical analysis. Attach a diagram if possible.

The Water Boy consists of four unit processes: a rapid mix chamber, a flocculation chamber, a sedimentation chamber and a filtration chamber. It was installed in 1994, and modified in 1998 to enhance treatment efficiency. It was designed to treat the raw water for colour and turbidity. The treated water is chlorinated after filtration, prior to storage.

Various water quality testing equipment are available to the operators for various physical and chemical parameters. These are summarized in the following table:

Table 1: Testing Equipment Available to Operators

Test Equipment	Physical/Chemical Parameters
Hach DR 2000	Colour, iron, manganese, aluminum, free and total residual chlorine
Lamotte 2008	Turbidity
Hach one meter	pH
Phipps & Bird	Jar test

The treatment system was optimized by Public Works and Services (GNWT) in 1998. The following describes each component:

- Pretreatment: An inline micron filter was installed in 1998, upstream of the treatment plant prior to addition of chemicals to remove suspended matter. This prevents the plugging up of the flow sensor, the static mixer and the flash mix chamber.

- Flash mix: A 75 mm Komax 29044 in-line static mixer was installed in 1999 to replace the original mixer and the flash mixer of the Water Boy. This promotes fast and thorough chemical mixing with raw water for initial destabilization of charged particles. Alum is the primary coagulant. The chemical injection pump is a Prominent model CONb 0308NP1 000D000, 8.4 L/hr and dates from 1997 approximately.

- Coagulation and flocculation: This process uses a paddle type stirrer mounted vertically in the chamber to provide a low energy low mix to promote particle to particle contact to obtain larger, stronger flow particles. The trade name of the coagulant aid used to condition the floc particles is Preastol, an organic type of polyeletrolyte.

  The polyeletrolyte has 2 tanks; one for mixing chemicals and the other for storing the chemical solution after mixing.

  The chemical injection pump for the polyeletrolyte is a Prominent model CONb 0308NP1 000D000, 8.4 L/hr. The mixer for the polyeletrolyte is a top mount, Dayton, model 5K279C, ¼ hp.

- Sedimentation: This consists of settling tubes arranging at a 7 – 1/2º to the horizontal mounted in a chamber to facilitate solids separation and removal. This process follows flocculation for the removal of floc particles

- Filtration: The multi-media filter bed consists of 450 mm of anthracite (MS4), 225 mm of intermediate sand (MS18), 75 mm of high density sand (MS21) and 300 mm of supporting gravel for removal of any carryover floc particles from the sedimentation process. It is the final polishing process prior to storage.

  The effluent pump is a Goulds 3642, 1hp with Franklin electric Motor model 1303032116. It removes filtered water and delivers to the storage reservoir.

- Backwash: The backwash operation is controlled by a headloss gauge and can be automatic or manual. During automatic mode, when the headloss gauge reaches a predetermined set point, the plant will initiate an automatic backwash sequence. It is a

reversal of the normal filtration process whereby treated water is pumped through the collecting pipes in the filter chamber and up to expand the filter bed.

The backwash pump is a Goulds 3653, 7.5 hp centrifugal pump.

During the backwash operation, which occurs once a day, waste water is removed from the Water Boy via a 200 mm scheduled 40 galvanized steel pipe to a waste sump located inside the water plant. The waste water level in the sump is regulated by a high level float and a low level float. The high level float activates a submersible pump that pumps the waste water via a buried 200 mm insulated and heat traced HDPE pipe to a discharge outfall on the river bank. The low level float stops the pump when the level is down below the float.

The backwash water is disposed of in the river. It has a chlorine concentration of 0.02 ppm or less. The volume of backwash is approximately 5000L (5 m^3)/day.

- Disinfection: Liquid chlorine is injected into the treated water after the filter prior to storage to prevent bacteria re-growth in the reservoir.

An additional chlorine injection system is provided at the Truckfill system to maintain the free available chlorine level when water is pumped to the water truck. The operation of the chlorinator is controlled by a flow switch located on the Truckfill piping. Currently the system is not in use except when the free residual level drops below 0.2 ppm in the reservoir (which is infrequent).

The injection pump for the treated water prior to storage is a Prominent model CONb 1601NE1 000D000, 1L/hr pump. The Truckfill chlorinator is a Wallace & Ternan model 45-010 with a capacity of 1 gph.

3.5 Have there been any problems or health and environmental concerns with the water treatment facilities?

Yes.

3.6 If "Yes", please describe

There was a fuel spill in the WTP in December 7th, 2009. The spill was reported to the Department of Energy and Natural Resources, Environment Division. The spill report number is 2009531. The spill was reported to consist of 20 L of heating fuel. A hairline crack in the concrete floor allowed a small amount of fuel to leak into the water reservoir. The WTP was shut down, and the reservoirs cleaned before resuming operations.

3.7 Are there any changes planned in the water treatment facilities?

No

3.8 If "Yes", please attach a copy of the plan or indicate changes

n/a

SECTION 4 -- SEWAGE DISPOSAL

4.1 Indicate the level of treatment the sewage will be receiving:

primary

4.2 Pre-treatment (if applicable): n/a

4.3 Lagoons (if applicable): facultative

4.4 Indicate the capacity of the sewage treatment facility.

69,059 m^3 (See also 4.14 below)

4.5 Indicate the retention time of the sewage while in the treatment facility.

120 days (May to September)

4.6 Indicate the estimated rate of discharge of wastewater.

120,000 L/sec

4.7 Indicate the location of the discharge point.

A map showing the location of the discharge point can be found in Appendix B of the Hamlet's O&M Plan - attached.

4.8 Will the discharge be: seasonal

4.9 If the discharge is seasonal, during what month(s) is it done?

Typically September

4.10 What is the duration of the discharge (days/weeks/months)?

20 to 25 days

4.11 Comment on the general condition of the:

(a) Sewage collection system: good

(b) Discharge control system: good

(c) Dams, diversion dykes, berms: good

4.12 Have there been any problems or health and environmental concerns with the sewage disposal facilities?

Yes

4.13 If "Yes", please describe

The discharge ramp at Cell 1 was replaced in 2012, and concrete deteriorated within one year. The defective product will be replaced under the terms of the contract.

4.14 The average depth of the wastewater lagoon is:

The first 2 cells (1 and 2) are small and used for settling solids from the sewage as a primary treatment. Each of these cells is approximately 1.63 m deep with approximate average surface area of 900 m^2 each. Cell 3 is also 1.63 m deep with surface area of approximately 5,300 m^2. Cell 4 is approximately 2.75 m deep with a larger surface area of 12,500 m^2.
In 2000, a 5^{th} cell was constructed to create more storage capacity. It is approximately 2.75 m deep with a surface area of 8,404 m^2. All of these cells (1 through 5) are connected via corrugated metal pipe culverts, creating an S-shaped pathway through the lagoons.

4.15 What is the design freeboard? 1m.

4.16 Is there any harvesting of fish or shellfish in the waters where waste is discharged?

No

4.17 If yes, please indicate species harvested, and estimate amounts. n/a

4.18 Will the municipality be using a honey bag pit?

No

4.19 If yes, describe its: n/a

4.20 Are there any sources of commercial or industrial liquid waste being discharged or deposited to the municipal system which may affect the quality of the effluent or leachate produced?

No

4.21 If "Yes", please describe. n/a

4.22 Have any spills occurred in the past five years?

No sewage spills have occurred.

4.23 If "Yes", please describe. n/a

4.24 Have there been any operating problems with the lagoon?

No

4.25 If "Yes", describe. n/a

4.26 Are any changes planned in the sewage disposal facilities?

No

4.27 If "Yes", please describe and if possible, attach a copy of the plan. n/a

SECTION 5 --SOLID WASTE DISPOSAL

5.1 Indicate the capacity of the disposal area. m^3

5.2 The average depth of the solid waste disposal site is

Unknown

5.3 Are there any sources of commercial or industrial solid waste being deposited in the municipal system which may affect the quality of the effluent or leachate produced?

No

5.4 If "Yes", please describe. n/a

5.5 Briefly describe how the solid waste will be picked up & delivered to the disposal area.

Garbage is collected twice a week (Mondays and Thursdays) from the community, by Hamlet personnel.

5.6 Is the solid waste site fenced?

Yes

5.7 Will the municipality be using a dead animal pit?

No

5.8 If "Yes", describe its: n/a

5.9 Will the municipality be using a bulky metal waste disposal area?

Yes

5.10 If "Yes", briefly describe its location and operation plan:

Figure 3 taken from Appendix B of the O&M Plan shows the location – see attached.
Bulky wastes are periodically buried or removed

5.11 Will the municipality be using a hazardous waste disposal area?

Yes

5.12 If "Yes", describe its:

Figure 3 taken from Appendix B of the O&M Plan shows the location – see attached.
A description of how it is managed can be found in Section 4.2.5 of the O&M Plan – see attached.

5.13 Are there any hazardous commercial wastes entering the solid waste disposal system?

No

5.14 If "Yes", describe and note amounts and special handling/disposal methods for these

wastes. n/a

5.15 If any natural watercourse may gain access to the proposed solid waste disposal area, what methods will be used to decrease the amount of runoff water entering these areas? Indicate the volume of water which may enter these areas from the source(s) in question and attach all pertinent details of proposed diversions.

No natural watercourse will gain access.

5.16 Please describe the nature of any diversions of watercourses: n/a

5.17 Have there been any problems or health and environmental concerns with the solid waste disposal facilities?

No

5.18 If "Yes", please describe. n/a

5.19 Are any changes planned in the solid waste disposal system?

A future expansion will be required.

5.20 If "Yes", please describe and, if possible, attach a copy of the plan.

A preliminary review of future expansion requirements has been completed.
The report (Dillon, 2012) was submitted to the MVLWB and is available on the on-line public registry.

SECTION 6 -- ABANDONMENT AND RESTORATION PROGRAM

6.1 List and describe the locations of abandoned or restored water treatment facilities.

n/a

6.2 List and describe the locations of abandoned or restored sewage treatment facilities.

n/a

6.3 List and describe the locations of abandoned or restored solid waste disposal facilities.

n/a

6.4 Do you have an abandonment and restoration plan?

No

6.5 If "Yes", please attach a copy of the plan. n/a

SECTION 7 -- WATER QUALITY MONITORING PROGRAM

7.1 Briefly describe the methodology that is presently used to sample the raw water supply.

Samples are collected and sent to Taiga Labs for analysis.
Lab results are summarized and included in annual reports submitted to the MVLWB in accordance with WL conditions.

7.2 Briefly describe any monitoring that is done on wastewater effluent and leachate.

The Hamlet includes lab results and analysis for wastewater effluent in annual reports submitted to the MVLWB in accordance with WL conditions.

As per the conditions set out in the Hamlet's water licence, the effluent discharged from the lagoon system must be monitored following discharge. Samples are taken on the first day and monthly thereafter during the period of the lagoon discharge at the point of compliance, Station 1412-2 - the discharge point of the last lagoon, prior to the effluent being released to the natural environment. The samples undergo the same analysis which will contain the following set of tests:

- 5-Day Biological Oxygen Demand, BOD5
- Total Suspended Solids, TSS
- pH
- Fecal Coliforms, FC
- Ammonia as Nitrogen, NH3-N

7.3 Recognized laboratory performing analysis of samples.

Name: Taiga Environmental Laboratory

Contact name: n/a

Postal address: 4601-52nd Ave. Box 1320, Yellowknife NT, X1A 2L9

Telephone number (867) 765-6645

Facsimile number (867) 873-2652

7.4 Are any changes planned in the water quality monitoring program?

No

7.5 If "Yes", describe n/a

SECTION 8 -- PRESCREENING

8.1 Has this project ever undergone an initial environmental review, including previous owners?

No

8.2 If "Yes", by whom/when n/a

8.3 Has approval been obtained or sought from the Department of Fisheries and Oceans for using any fish bearing waterbodies for containment or disposal of waste?

No

8.4 Are there any environmental studies ongoing or planned?

No

8.5 If "Yes", list:

SECTION 9 -- LIST OF ATTACHMENTS

Item	Descriptions	Related Question
1.	Figures 1-3 taken from Appendix B Fort Providence O&M Plan Sewage and Solid Waste Facilities, Updated December, 2015 (also available on the MVLWB on-line Registry).	1.11, 1.12, 1.13, 5.10, and 5.12
2.	Certificates of Analysis – Raw Water May and July 2015	3.1
2.	WTP Design Drawings	3.3
4.	Section 4.25 taken from taken from O&M Plan Sewage and Solid Waste Facilities, Updated December, 2015	5.12
5.	Section 6.2 and 6.3: Fort Providence taken from O&M Plan Sewage and Solid Waste Facilities, Updated December, 2015	1.14, 1.15

Prepared by: Ann Peters, Dillon Consulting Limited

Title: Project Manager

Completion Date: April 5, 2016

FORT PROVIDENCE

Water and Waste Facility Locations

FIGURE 1

FLOW DIRECTION

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY GNWT

MAP CREATED BY: PMH
MAP CHECKED BY: ALP
MAP PROJECTION: NAD 1983 UTM Zone 11N

SCALE 1:14,000

0 125 250 500 Meters

N W E S

FILE LOCATION: \\DILLON.CA\DILLON_DFS\YELLOWKNIFE\YELLOWKNIFE CAD\GIS\152261 FORT PROVIDENCE WL RENEWAL\MXD

PROJECT: 152261 STATUS: DRAFT DATE: 2015-11-05

CELL # 3 → CELL # 4
↑ ↓
CELL # 2 → CELL # 5 → WETLAND AREA → MACKENZIE RIVER
↑
CELL # 1

FLOW SCHEMATIC

300mm CMP DISCHARGE CULVERT

300mm CMP DISCHARGE CULVERT

300mm CMP CULVERT

CELL # 5 (18,958 m³ VOLUME)

CELL # 3 (8,790 m³ VOLUME)

DITCH

CELL # 2 (1,251 m³ VOLUME)

CELL # 4 (27,370 m³ VOLUME)

CELL # 1 (1,209 m³ VOLUME) (SETTLING CELL)

300mm CMP CULVERT

SOLID WASTE DISPOSAL SITE

300mm CMP CULVERT

GRAVEL ACCESS ROAD

Image retrieved 2015-11-05
from the Department of Municipal and Community Affairs

FORT PROVIDENCE

Sewage Treatment Lagoon System
FIGURE 2

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY GNWT

MAP CREATED BY: PMH
MAP CHECKED BY: ALP
MAP PROJECTION: NAD 1983 UTM Zone 11N

SCALE 1:1500

0 12.5 25 50 Meters

N W E S

FILE LOCATION: \\DILLON.CA\DILLON_DFS\YELLOWKNIFE\YELLOWKNIFE CAD\GIS\152261 FORT PROVIDENCE WL RENEWAL\MXD

PROJECT: 152261 STATUS: DRAFT DATE: 2015-11-05

FORT PROVIDENCE

Domestic Solid Waste Site

FIGURE 3

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY GNWT

MAP CREATED BY: PMH
MAP CHECKED BY: ALP
MAP PROJECTION: NAD 1983 UTM Zone 11N

SCALE 1:1000

0 5 10 20 Meters

N W E S

FILE LOCATION: \\DILLON.CA\DILLON_DFS\YELLOWKNIFE\YELLOWKNIFE CAD\GIS\152261 FORT PROVIDENCE WL RENEWAL\MXD

PROJECT: 152261 STATUS: DRAFT DATE: 2015-11-05

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-765-6645 Fax: (867)-873-2652

Taiga Batch No.: 150274

- CERTIFICATE OF ANALYSIS -

Client Sample ID:

Taiga Sample ID: 002

Client Project:
Sample Type: Raw Water
Received Date: 21-May-15
Sampling Date: 20-May-15
Sampling Time: 9:30
Location: Ft. Providence
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Organics						
Bromodichloromethane	< 0.005	0.005	mg/L	26-May-15	EPA8260B	
Bromoform	< 0.005	0.005	mg/L	26-May-15	EPA8260B	
Chloroform	< 0.005	0.005	mg/L	26-May-15	EPA8260B	
Dibromochloromethane	< 0.005	0.005	mg/L	26-May-15	EPA8260B	
Trihalomethanes, Total	< 0.005	0.005	mg/L	26-May-15	EPA8260B	

ReportDate: Thursday, June 04, 2015
Print Date: ***Thursday, June 04, 2015***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-765-6645 Fax: (867)-873-2652

Taiga Batch No.: 150536

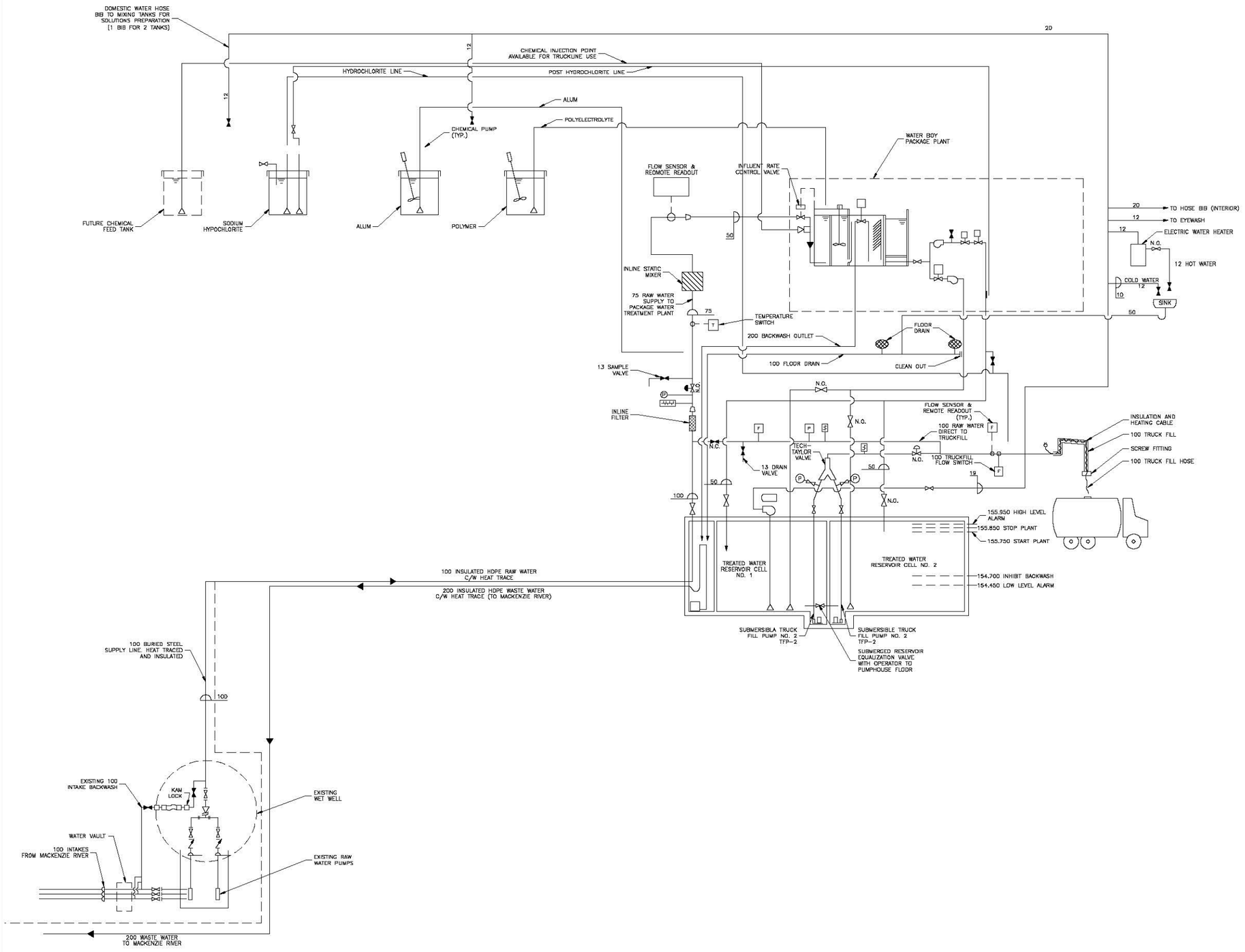
- CERTIFICATE OF ANALYSIS -

Client Sample ID: Raw Water **Taiga Sample ID:** 002

Client Project:
Sample Type: Water
Received Date: 15-Jul-15
Sampling Date: 15-Jul-15
Sampling Time:
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	< 0.005	0.005	mg/L	21-Jul-15	SM4500-NH3:G	
Biochemical Oxygen Demand	< 2	2	mg/L	15-Jul-15	SM5210:B	
Chemical Oxygen Demand	10	5	mg/L	16-Jul-15	SM5220:D	
Nitrogen, Dissolved	0.31	0.06	mg/L	22-Jul-15	ISO/TR 11905:1997(E)	
Nitrogen, Total	0.24	0.06	mg/L	22-Jul-15	ISO/TR 11905:1997(E)	
Phosphorous, Total	0.015	0.002	mg/L	22-Jul-15	SM4500-P:D	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	74.0	0.4	mg/L	16-Jul-15	SM2320:B	
Chlorine, Total	0.02	0.01	mg/L	15-Jul-15	SM4500-Cl:G	
Colour, Apparent	91	5	CU	15-Jul-15	SM2120:B	
Colour, True	6	5	TCU	15-Jul-15	SM2120:B	
Conductivity, Specific (@25C)	215	0.4	µS/cm	16-Jul-15	SM2510:B	
pH	8.32		pH units	16-Jul-15	SM4500-H:B	
Solids, Total Dissolved	132	10	mg/L	16-Jul-15	SM2540:C	
Solids, Total Suspended	13	3	mg/L	16-Jul-15	SM2540:D	
Turbidity	11.6	0.05	NTU	15-Jul-15	SM2130:B	

ReportDate: Thursday, July 30, 2015
Print Date: ***Thursday, July 30, 2015***



LEGEND

- DIFFUSER
- VALVE (GLOBE) – NORMALLY OPEN
- VALVE (GLOBE) – NORMALLY CLOSED
- SOLENOID VALVE
- FOOT VALVE
- CHECK VALVE
- VALVE (BUTTERFLY)
- MOTORIZED VALVE (NORMALLY OPEN)
- MOTORIZED VALVE (NORMALLY CLOSED)
- N.O. NORMALLY OPEN
- N.C. NORMALLY CLOSED
- FUSIBLE LINK VALVE
- PRESSURE GAUGE C/W STEP COCK
- FLOW SENSOR
- TEMPERATURE GUAGE
- UNION
- WHISTLE
- PUMP
- KAMLOCK
- 100 PIPE SIZE
- REDUCER

CHANGE	DATE	DESCRIPTION	CHECK

REVISIONS

DESIGN	DRAWN	CHECKED	DATE
	TPW		FEB. 2016

Northwest Territories Public Works

PROJECT

FORT PROVIDENCE
WATER LICENSE
APPLICATION

TITLE

EXISTING
WTP SCHEMATIC

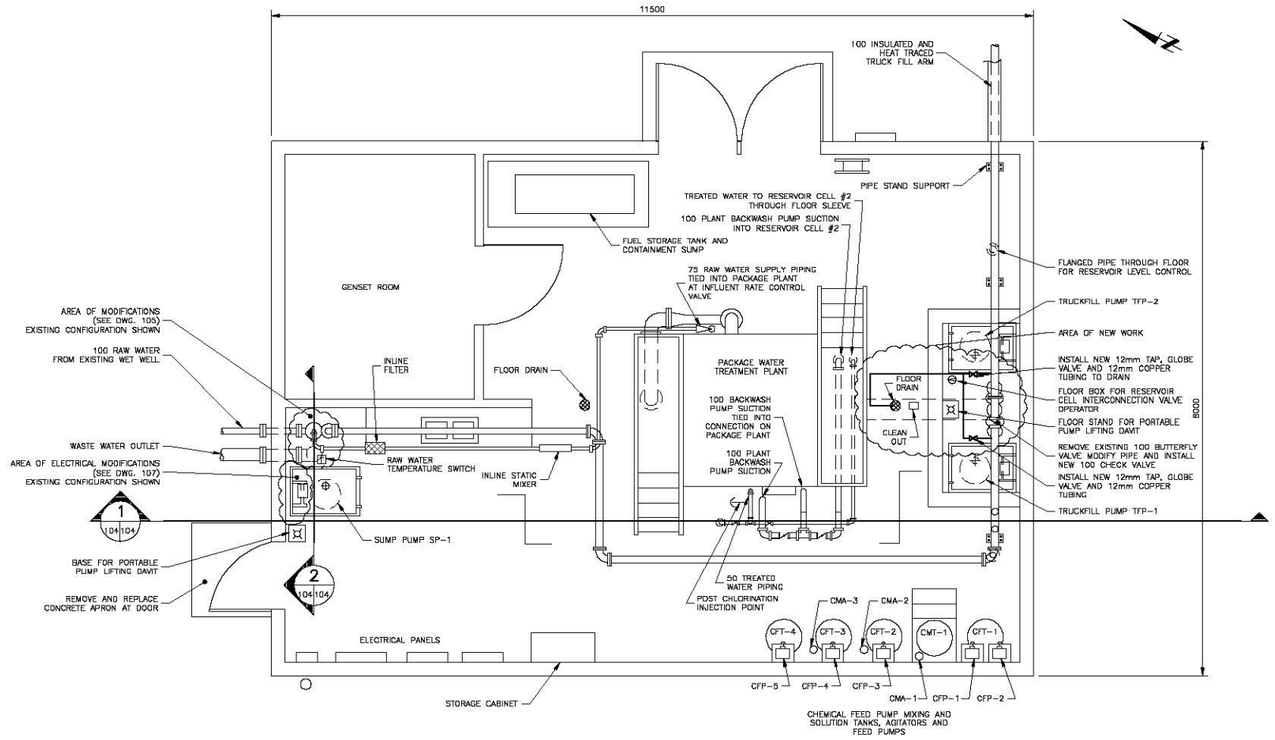
DILLON CONSULTING

SCALE
NOT TO SCALE

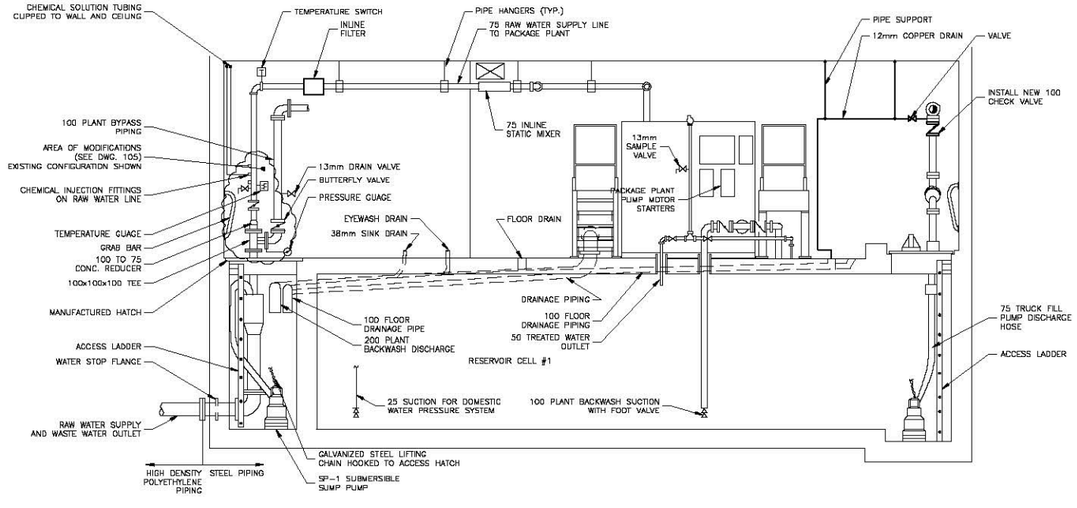
D.P.W. PROJECT NUMBER
15-2261-1000

DRAWING NUMBER
FIGURE 6

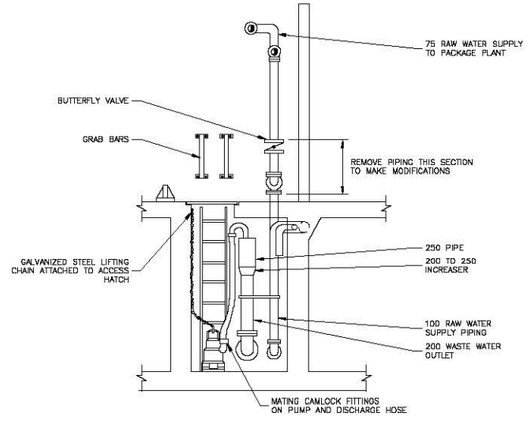
EDIT DATE: 2/1/2016 ACAD FILE: 411pw e:\projects\fet\working directory\active\411pw\d0128882\15226l-d0-fig6-7.dwg-103 ex schematic



FLOOR PLAN



BUILDING SECTION 1
SCALE 1:40 104/104



WASTE SUMP SECTION 2
SCALE 1:40 104/104

NOT TO SCALE
REDUCED FROM RECORD DRAWING

CHANGE	DATE	DESCRIPTION	CHECK

REVISIONS

DESIGN	DRAWN	CHECKED	DATE
	TPW		FEB. 2016

Northwest Territories Public Works

PROJECT
FORT PROVIDENCE
WATER LICENSE
APPLICATION

TITLE
EXISTING MECHANICAL
FLOOR PLAN
AND SECTIONS

DILLON CONSULTING

SCALE 1:40
D.P.W. PROJECT NUMBER 15-2261-1000
DRAWING NUMBER FIGURE 7

EDIT DATE: 2/1/2018 ACAD FILE: 41.dwg c:\projects\active\working directory\active\41.dwg\d0128882\152261-d0-fig6-7.dwg-104 ex mechanical

4.2.5 Hazardous Waste

The MVLWB exempted the Hamlet from the requirement for a separate Hazardous Waste Management Plan however, this section of the O&M Plan provides information about how hazardous waste identified in 4.1.1.2 and 4.1.1.3 should be managed, stored, and disposed of.

In order to ensure the safe and proper management and disposal of hazardous waste:

- Hazardous wastes will be stored in the clearly marked designated areas identified in 4.1.1
- Signs clearly indicating the location of the hazardous wastes will be maintained;
- An inventory of all hazardous waste materials stored at the solid waste facility site will be maintained and updated annually; and
- A qualified contractor will be engaged to remove and dispose of Hazardous Waste annually, or when quantities warrant.

Guidelines developed by the Department of Environment and Natural Resources of the GNWT are included in Appendix G that provide hazardous waste management plan principles, objectives, and requirements, and a sample sheet of a hazardous materials inventory that can be used for annual reporting.

4.2.6 Discharge of Leachate

When water is present at the bottom of the domestic and construction waste pits, the Hamlet employees have been taking samples and then pumping it out and discharging it onto adjacent land, to the satisfaction of the Inspector as required by the current Water Licence. For the domestic waste pit, the discharge is west of the site and for the construction waste pit it is to the north.

Because the discharge of accumulated water from a solid waste site may contain harmful contaminants the following is recommended for future operations:

- measures should be taken to minimize water infiltration to the solid waste cells/trenches;
- prior to pumping and discharge onto adjacent lands, analysis results should be submitted and approved by the Inspector.

Samples should be analyzed for:

- Field parameters (pH, temperature and conductivity);
- Total metals;
- Hydrocarbons (F1 to F4 and BTEX);
- Total ammonia, nitrate and nitrite (separately);
- Total phosphorus; and
- Major ions.

In the event that the Inspector is not satisfied with the analysis results a qualified Professional Engineer should be engaged to determine appropriate treatment and/or disposal options.

6 EMERGENCY RESPONSE

The Hamlet must be able to respond efficiently and effectively to all possible emergencies that may be encountered in the operation of the Hamlet's facilities. These include, but are not limited to fuel, chemical and wastewater spills as well as fires. Due to the nature of the Hamlet's facilities, burning or spillage of unknown or hazardous materials may occur. Only personnel who are properly trained to deal with these situations should respond to such emergencies.

Personnel must familiarize themselves with the emergency preparedness plans before an accident or emergency occurs. Copies of these plans must be kept in all sewage and solid waste disposal vehicles as well as in all common work areas. The following sections list contact numbers and outline procedures to follow in the event of an emergency.

6.1 Emergency Contact Numbers

The following is a list of contact numbers in the case of an emergency:

Fire Department:	(867) 699-2222
RCMP Detachment:	(867) 699-1111
24 Hour Spill Response Line:	(867) 920-8130
Department of Environment and Natural Resources (ENR), Bear Nuisance Line:	(867) 695-7433

6.2 Fire

A contingency plan should be developed by the Hamlet Fire Department to describe the response and action protocols to be implemented in the case of a fire. Special precautions should be used in the case of waste burning as it can produce harmful, poisonous gases. If an uncontrolled fire occurs, the following procedures should be followed:

- Immediately evacuate area and go to community's designated meeting place.
- Keep all personnel up-wind from the source.
- Notify the Community Fire Department at (867) 699-2222.

6.3 Spill Contingency Plan

A spill contingency plan identifies the measures to take when a spill of any sewage or hazardous material has occurred. The measures to be taken follow for:

- Initial Response
- Containment Procedures
- Spot Spills
- Spills in Proximity to a Waterbody

6.3.1 Initial Response

If a spill occurs, the first person at the scene will:

1. Perform an initial assessment to identify immediate danger.
2. Identify the material spilled and verify the nature of the hazard by corresponding to the Material Safety Data Sheets (MSDS) so to apply appropriate safety procedures.
3. If possible and safe to do so, cut off and/or stop the source of the spill.
4. Control danger to the human life without further assistance, if possible. If, for instance, the spill creates a fire, explosion or other hazard, remove all potential ignition sources.
5. Obtain immediately assistance from qualified personnel and start to contain and/or clean up the spill.
6. Contact the Municipal Works Foreman to notify them of the spill as they will contact relevant regulators and community residents of the occurrence.
7. Mark off the spill site to warn the public of the incident and to prevent access.

Once the Municipal Works Foreman has been contacted and has arrived on site, he/she will immediately ensure that:

1. Necessary arrangements for first aid and removal of injured personnel have been made. Where possible, necessary action will be taken to secure the site to protect human safety.
2. If not already done and is safe to do so, take the appropriate action to stop the flow or release of material/substance as well as to contain or prevent the spread of the spilled material if at all possible.
3. Contact the 24 Hour Spill Line at (867) 920-8130 to report spill and obtain additional assistance.
4. Contact the Hamlet's Senior Administrative Officer.
5. If required, notify the Fire Department and RCMP Detachment.

6.3.2 Containment Procedures

Response personnel will immediately start to contain the spill to ensure that the spill does not spread and contaminate other areas and/or environment. The following actions might also be taken if relevant to the spill situation:

1. If the source of the spill is coming from a leaking fuel truck, then pump fuel into a suitable container or another tank until the tank is dry.
2. Culverts that have been potentially affected by the spill should be blocked off to minimize travel of the substance.
3. Dig a basin or construct a berm to stop and contain the pathway and flow of the spill.
4. Apply absorbent materials to contain and recover small volumes of spilled substance.

5. Spilled substance and/or material are to be collected and transported to an approved waste disposal facility in the appropriate matter.

6.3.3 Spot Spills

Spot spills are those that involve a small volume of substance in a controlled material over a small, contained surface area. For spot spills involving hazardous materials, the following steps may be taken by personnel:

- Immediately take action to clean up spill by implementing proper or suitable handling and containment procedures for the material spilled.
- Report spill to the Municipal Works Foreman and Hamlet's Senior Administrative Officer.
- Determine suitable methods for removal of contaminated soils and restoring site of the spill, consult appropriate environmental and government agencies for assistance.
- Flag and record locations and information of spot spills for future reference and monitoring.
- In the case of a spot sewage spill, place lime over the sewage, collect and transport the material to the solid waste facility for proper disposal.

6.3.4 Spills in Proximity to a Waterbody

If a spill occurs in close proximity to a waterbody, take necessary actions to prevent the spill entering the nearby waterbody. Similar containment procedures discussed above in Section 7.3.2 can be used to assist with the likelihood of spills located near water bodies.

6.4 Bear Safety

Bears are known to frequent solid waste sites and precautions should be taken. Bear safety information can be found in Appendix E.