From:	Amy Isaikina
To:	Erica Janes
Cc:	Blachford Lake Lodge Info
Subject:	Re: Arctic Kingdom - Information Request
Date:	Saturday, September 14, 2024 8:23:56 PM
Attachments:	AU and NZ Sanicubic Booklet (1) (1).pdf Blachford Lake Water Source.pdf Blachford SNP 1 Water Intake Layout.pdf Cabin Water Flow.pdf Comment-17-GNWT-ECC-BLL-Reclaim-7 (AKBL Edited).xlsm Information Request Responses.pdf MV2017J0029 MV2017L3-0005 - Blachford Lake Lodge - Issuance Letter with Permit and Conditions - Oct25-17.pdf Site Water, Grey Water, Black Water and Bulk Flow.pdf Water Layout in the main lodge..pdf
Importance:	High

Hi Erica,

Please find attached our response and supporting documents for the Information Request. I have not compiled these, as the Sanicube manual and previous authorization documents are quite lengthy.

Any further questions or information please let me know.

Thanks
Amy

AMY ISAIKINA
Project Manager | **BLACHFORD LODGE BY ARCTIC KINGDOM**

t: 1 (867) 675-1181 x128
e: amy.isaikina@arctickingdom.com
Box 1568, Yellowknife, NT, Canada X1A 2P2
arctickingdom.com | blachfordlakelodge.com

Blachford Lodge is located on Chief Drygeese territory, the traditional land of Yellowknives Dene First Nation Akaitcho, Treaty 8 territory.

From: Erica Janes <ejanes@mvlwb.com>
Sent: Monday, September 9, 2024 12:06 PM
To: Distribution List <mvrb+D6E5DF1C-46D4-EB11-A7AD-0050F22DCB89@simensma.onmicrosoft.com>; Amy Isaikina <amy.isaikina@arctickingdom.com>
Subject: Arctic Kingdom - Information Request

Hello Amy,

Please see the letter from Board staff to Arctic Kingdom Wilderness Lodge Holdings, detailing Information Requests related to the ongoing renewal proceedings for Blachford Lake Lodge.

Please contact me with any questions.

Regards,
Erica

Erica Janes (she/her)
Regulatory Specialist
Mackenzie Valley Land and Water Board
7th Floor, 4922 48th St, PO Box 2130 | Yellowknife, NT | X1A 2P6
ph 867.766.7466 | fax 867.873.6610
ejanes@mvlwb.com | www.mvlwb.com

Information Request Responses.

Water and Compost Overview	Overview of the current water and human waste handling at Blachford: 1. Water intake (SNP 1) is an automatic submersible water pump, with pressure tank and self draining line located 20 meters off short east of the lodge. The pump is suspended 4' off the bottom of the lake ensuring prime water intake. 2. Water is pumped up the shore and hill and enters through the wall of the basement on the east side of the lodge. 3. Water passes through a water meter for SNP data. 4. Water passes through a Rain fresh 10 micron filter. 5. Water is treated with an automatic chloring injector. 6. Water is collected and stored in 2 conjoined 1000 Litre water tanks located into the basement of the lodge. 7. All lodge, cabin and camp water comes from these tanks. 8. On average the camp is using <2000 L per day. We now separate into Lodge VS Cabin usages and systems: Lodge: 9. The clivus multrum compositing systems are still in place and in use. 10. 3 flush toilets have been added to the 3 of the upstairs lodge room as ensuites. These are 6 l flush toilets that are used in combination with the clivus composting toilet system. 11. Black water and bulk from the toilets is plumbed and put through a Sanicube 2 macerator. 12. Black water and bulk is then pumped into the black holding tanks in the basement of the lodge (the existing system). 13. Black water is pumped out to the existing lodge sump. 14. Human waste is settled and removed from the tanks as per the existing composting toilet systems and handling procedures. 15. Human waste is removed from the tanks on an annual basis and placed into composting beds at the site. Cabin: 16. Water, depending on the outdoor temperatures is either: 17. Soft water line delivered to the cabins. 18. Trucked via atv and holding tank in freezing temperatures. 19. Cabins are outfitted with 500 Litre holding tanks, for water that has been processed, and or from the lodge being metered, filtered and chlorinated to standards. 20. 5 flush toilets have been added to the existing cabin ensuites. 21. Toilets are flushed into Black Settling tanks. 22. Black water is pumped out of the holding tanks and trucked to the existing lodge sump site, as per the existing system. 23. Human waste is settled and removed from the tanks as per the existing composting toilet systems and handling procedures. 24. Human waste is removed from the tanks on an annual basis and placed into composting beds at the site.

1.	Infrastructure Upgrades	Whether flush toilets are currently in operation at Blachford Lake Lodge; if so, when operation began, if not, when it is planned to begin;	8 Flush toilets were installed and trailed over the summer at the lodge. They became operations as of August 13th, 2024
		A labelled schematic or flow diagram that clearly shows how Sewage and Greywater are conveyed and treated on site, and includes all of the sources (i.e. composting or flush toilets, sinks, showers, holding tanks, solid/liquid separators, macerators, sump(s), etc.);	Please find a labeled schematic of the water and sewage flow on the site.
		The distances from the Sewage and/or Greywater sump(s) to camp buildings and operations and to Blachford Lake or any other open water bodies;	The Sump is located 60 meters northwest of the main lodge. In the summer, we extend the pump out pipe another 20 meters to use the further side of the sump. The sump is located 45 meters from the lake.
		The distances from the Sewage solids composting location to camp buildings and operations and to Blachford Lake or any other open water bodies;	The old composting stations are being moved closer to the sump, and all future human waste bulk will be composted 50 meters from the buildings, operations and bodies of water.
		Manufacturers information on Sanicube2 and the mechanism of sewage treatment;	The manual for the Sanicube 2 will be submitted with the Information Request documents.
		Whether the current Surveillance Network Program is appropriately designed to ensure that the sump(s) are not impacting the Receiving Environment; and	As the existing sump has and can handle the discharge volumes in the past. The SNP is appropriately designed for our set up. Water and Land inspecting officers are pleased with the sump and the water testing of SNP 2 for environmental impact.
		The appropriateness and effectiveness of the Sanicube2 and sump for	Should all facilities fed into the Sanicube2 be functional at the same time, it would be 10

		treating the volume of Sewage proposed.	gallons per minute of flow. This is less than 25% of the units' capabilities and capacity. The macerating of the flow assists it with the transport through the lodge plumbing at an easier and faster rate, this is designed to function better at colder temperatures that we experience through the winter. The sump at Blachford has been licenced and in use at Blachford since 1999, when the main lodge was constructed. It has been inspected by staff on a weekly basis, by inspectors on average of twice a year, and has always been an environmentally stable, safe, end effective way of treating and disposing of Black Water. The Black bulk is composted at the site, and the same is at the sump, the composting beds have always been an approved method of disposal.
2.	Water Source Capacity	AK to confirm the dimensions, surface area and capacity of Blachford Lake.	Please see the attached Google Earth layout of Blachford Lake, showing the following spec: 17,140,285 meters squared surface area. By the boards formula on the application form of multiplying the SA*0.1 that would equal 1,714,028.5 Meters cubed. The lake is 16km long east to west. 4km at the widest part on the west from the lodge to the opposite short. 0.5km on average through the narrows from the east over towards the west. There is an average of 25" on the surface over the winter and an average of 60' in depth of the lake. Please note that we are well below the daily usage trigger of 100m3 daily that requires

			further assessment of this on the application form. Our annual usages on average have been 80meters cubed annually and are anticipated to be between 80 and 150 meters cubed annually going forward.
3.	RECLAIM Estimate	Comment ID GNWT-ECC-ERA 17 recommended that "the Board set the total security for the project at $39,104, with the total land liability at $28,911, and the total water liability at $10,193." Although AK provided an answer, more detailed rationale, including specific comments on the GNWT-ECC RECLAIM estimate (provided in detail as an attachment to the review comments), and potentially including a RECLAIM estimate developed by AK, are recommended. Information Request: Provide detailed rationale for maintaining the security amount set in 2017, including specific comments on the GNWT-ECC-ERA RECLAIM estimate provided, and potentially a RECLAIM estimate generated by AK.	Blachford Lodge has consulted with Bill Payne of the GNWT, overviewing the RECLAIM calculation excel. There are several factors we wish to mention here: 1) Adjustments to the calculations. On review of the calculations, we are suggesting a reduction of $11,844.00, based on the physical factors and conditions at the site. Please see the BLL-Reclaim excel with the notes, and proposed changes to support the notes. 2) The total proposed security amounts should be reduced by the past security payments that have already been paid. 3) The existing systems at Blachford have been upgraded, meaning that the systems functions etc. have remained the same, just the plumbing and guest experiences upgraded. The additional amounts of water usage from the flush toilets are minimal and we are still well below our use capacity. Blachford still believes that there should be little to no security charged as the site and practices have remained the same from the

			previous licencing approvals. 4) In the past the MVLWB has opted not to charge land security for Blachford. It is inequitable that for more than 40 years we have operated in the same capacity with no land security, which now has been propositioned in full. 5) Should the board decide that lands liability and increased water liability be applicable to the licence and permit application, there are some recommendations. The total funds due exceeds what was planned for and considered reasonable by the proponent. The board should consider approval of the licences with an installment plan for due security. As the licences renew on average of every 5 years, a sustainable approach would be to spread the total of the land security due over the next three permit renewals / applications. This way a smaller amount is paid this application, and we as the proponent are not catching up on 40 years of security, due at once, that was never opted to be charged previously.
Additional Documentation	Please find included with this submission the following documents:	- Sanicube 2 Manual - 2017 issuance letter to support past security fee amounts. - Reviewed and commented BLL-Reclaim Excel - Blachford Lake Water Source Lay Out - Water and Sewage Schematic. - Water Intake Schematic - Water Flow to Storage Layout	

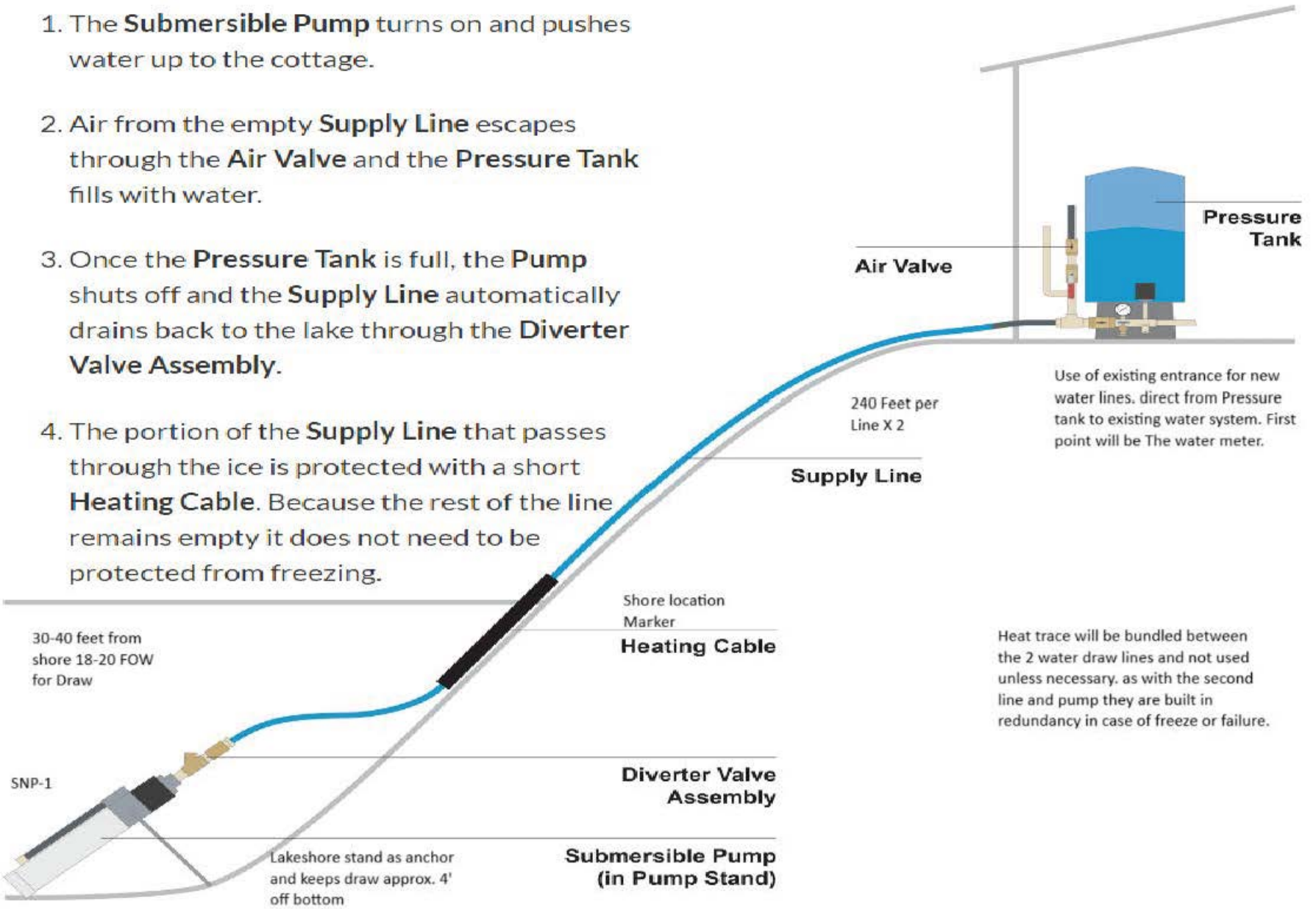
How Does the Self-Draining System Work?

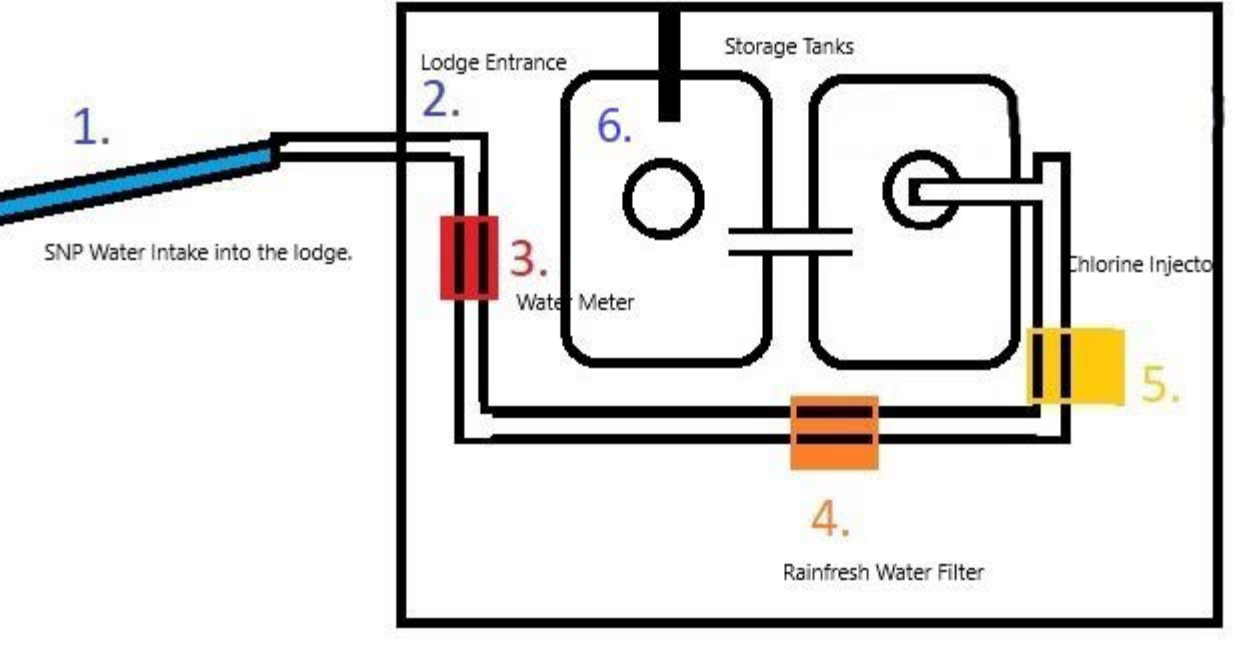
1. The **Submersible Pump** turns on and pushes water up to the cottage.

2. Air from the empty **Supply Line** escapes through the **Air Valve** and the **Pressure Tank** fills with water.

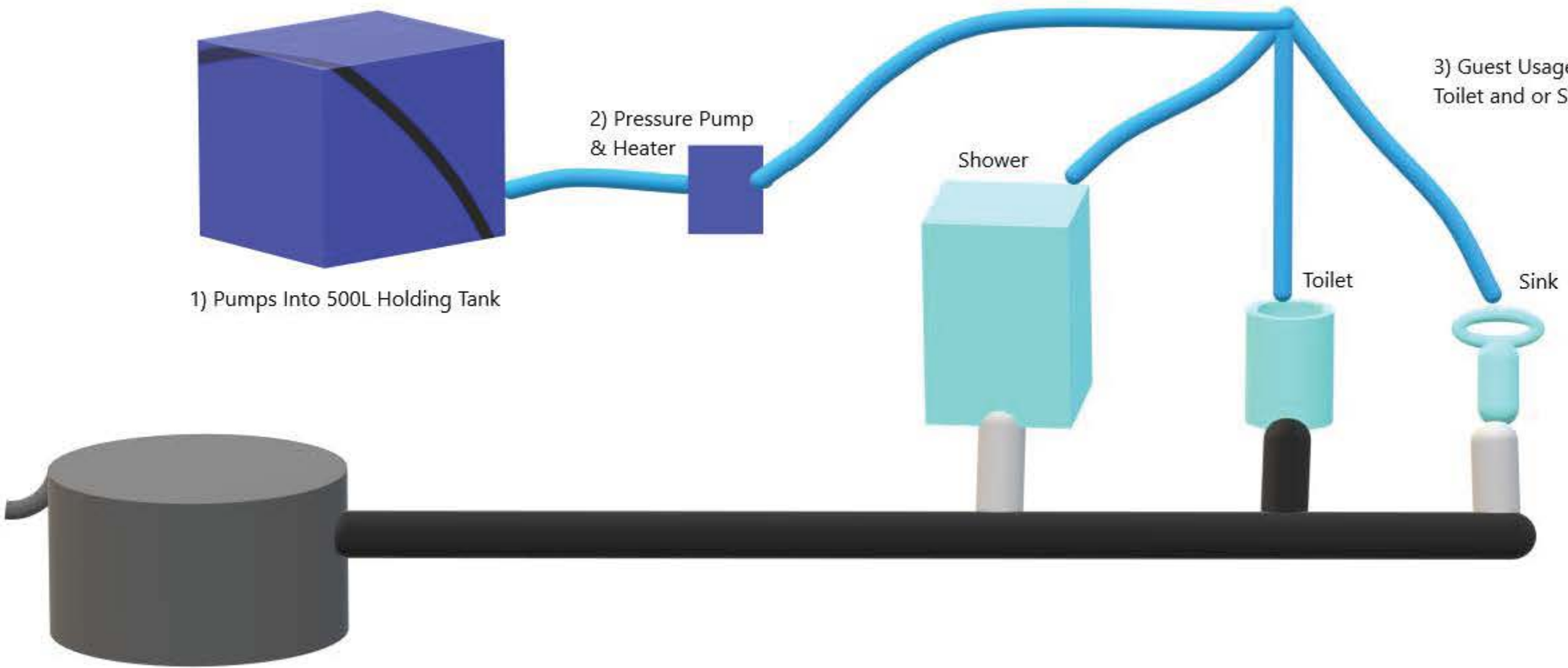
3. Once the **Pressure Tank** is full, the **Pump** shuts off and the **Supply Line** automatically drains back to the lake through the **Diverter Valve Assembly**.

4. The portion of the **Supply Line** that passes through the ice is protected with a short **Heating Cable**. Because the rest of the line remains empty it does not need to be protected from freezing.

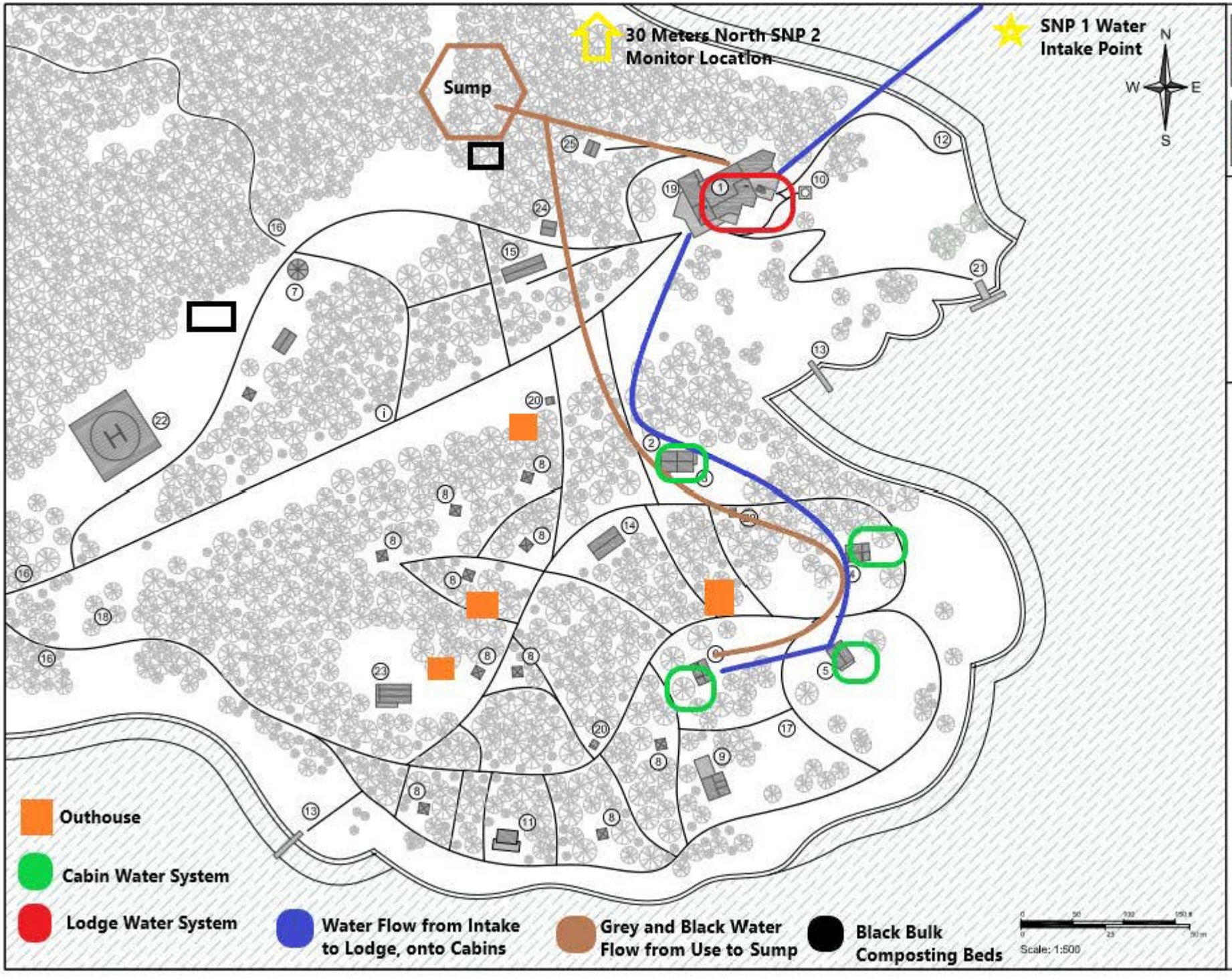



Storage Tanks
Lodge Entrance
2.
1.
6.
SNP Water Intake into the lodge.
3.
Water Meter
Chlorine Injecto
5.
4.
Rainfresh Water Filter

Cabin Water Flow



4) 450L Settling Tank. Grey and Black are plumbed to the settling tank. Black water is removed and deposited into the existing lodge sump system. Black Bulk is removed annually, and composted as per the existing lodge practices and systems.



Blachford Lake Lodge & Wilderness Resort

ARCTIC KINGDOM

Blachford Lake Lodge

Proposed grounds layout & amenities

Legend

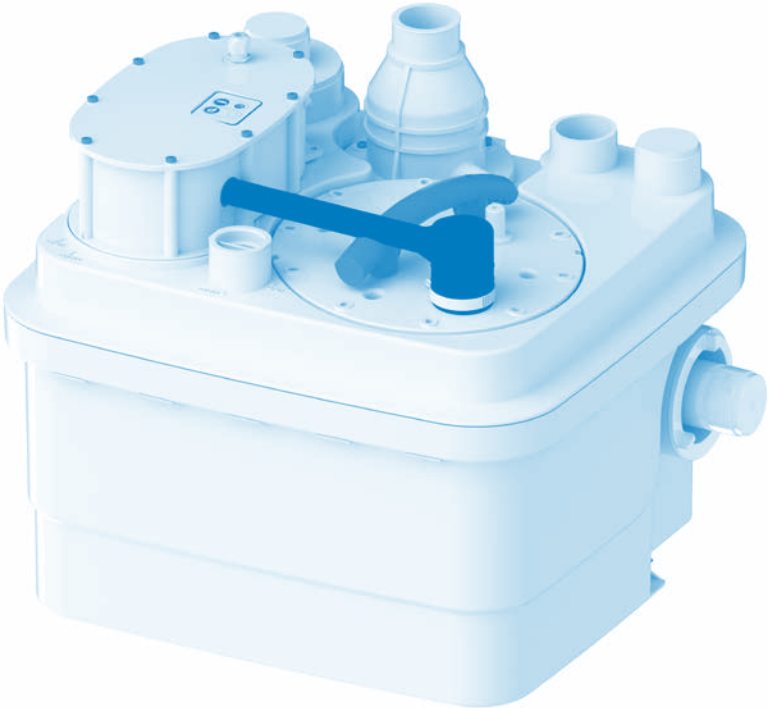
1. Blachford Lake Lodge
2. Ravens Roost Cabin
3. Eagles Nest Cabin
4. Point Cabin
5. Beaver Cabin
6. Old Trappers Cabin
7. TIpI Private Camp Site
8. Tent Shelter
9. Kids Area
10. Hot Tub
11. Sauna
12. Wellness Area
13. Small Boats
14. Summer Equipment (ATVs, Fatbikes, etc.)
15. Winter Equipment (Snowmobiles, snowshoes, skis, etc.)
16. Hiking Trails
17. Fire Pit
18. Picnic Area
19. Trading Post (Store)
20. Washrooms
21. Main Dock
22. Helicopter Pad
23. Staff Quarters
24. Maintenance Shed/Utility Systems
25. Generator
i. Information

CUBICNM
03.17

SFA

SANICUBIC®

SANICUBIC® 1
SANICUBIC® 1 WP
SANICUBIC® 2 Classic
SANICUBIC® 2 Pro
SANICUBIC® 2 XL



Notice de service / montage • Operating / installation manual • Bedienungs- / Installationsanleitung • Manuale per l'uso e l'installazione • Gebruikers- / installatiehandleiding • Руководство по эксплуатации и установке • 操作/安装指南

CONTENTS

SFA – 41 Bis Avenue Bosquet – 75007 PARIS 03.2017

GLOSSARY

Ventilation pipe
Ventilation duct limiting pressure variations inside the blackwater pumping station. The pumping station must be ventilated above the roof.

ND (Nominal Diameter)
Parameter used to characterise parts that are suitable for each other, for example: pipes, connections, sleeves.

Wastewater
Spent or used water that is not clean because it has been discharged from homes, commercial establishments, farms, and industries.

EN 12050-1
Current European standard for pumping stations for effluents containing faecal material intended for discharge below the back-flow level in buildings and on land.

Noise level
Expected sound emissions, expressed in sound pressure level LpA in dB(A).

Back-flow level
The highest level that can reach the wastewater flowing back into a discharge system.

Separator
Equipment which prevents, by gravity, the penetration of harmful substances into the discharge system by separating them from wastewater, for example: grease trap.

Pumping station for blackwater
Facilities for the automatic collection and pumping of wastewater and blackwater above the back-flow level.

Dual station
Pumping station for blackwater equipped with a second pump of the same power that starts automatically when needed.

Inlet piping
Line through which wastewater from sanitary fixtures is routed to the pumping station.

Discharge piping
Piping for raising wastewater above the back-flow level routing it to the sewer.

Useful
Volume to be discharged between the start level and the stop level.

Clearance
The clearance is the space that needs to be provided to allow comfortable fitting and installation of the product.

1 SAFETY

ATTENTION

This device may be used by children who are at least 8 years old, by people with reduced physical, sensory or mental capacities or those without knowledge or experience, if they are properly supervised and if the instructions relating to using the device completely safely have been given to them and the associated risks have been understood. Children must not play with the device. Cleaning and maintenance undertaken by the user must not be carried out by unsupervised children.

1.1 Identification of warnings

Symbol	Meaning
DANGER	**DANGER** This term defines a high risk of danger, which can lead to death or serious injury, if not avoided.
WARNING	**WARNING** This term defines a hazard which could cause a risk to the machine and its operation, if it is not taken into account
	**Dangerous area** This symbol, in combination with a keyword, characterises hazards that could lead to death or injury.
	**Dangerous voltage** This symbol, in combination with a keyword, characterises dangers associated with the voltage and provides information on voltage protection.
WARNING 	**Property damage** This symbol, in combination with the keyword **WARNING**, characterises dangers to the machine and its proper operation.

1.2 General points

This operating and installation manual contains important instructions to follow for the fitting, operation and maintenance of the SANICUBIC® pumping station. Following these instructions guarantees safe operation and prevents injury and property damage.

Please follow the safety instructions in every section.

Before fitting and commissioning the pumping station, the qualified installer/user concerned must read and understand all these instructions.

1.3 Intended use

Only use the pumping station in the fields of application described in this documentation.

- The pumping station must only be operated in technically perfect conditions.
- Do not use a partially assembled pumping station.
- The pumping station must only pump the fluids described in this documentation.
- The pumping station must never operate without pumped fluid.
- Contact us for operating modes not described in this documentation.
- Never exceed the usage limits defined in the documentation.
- The safe use of the pumping station is only guaranteed if used as intended (=> section 5.2, page 7).

1.4 Qualification and training of staff

Commissioning and maintenance of this device must be performed by a qualified professional. Please refer to installation standard EN 12056-4.

1.5 Safety instructions for maintenance, inspection and installation

- Any alteration or modification of the pumping station will void the warranty.
- Only use original parts or parts recognised by the manufacturer. The use of other parts may void the manufacturer's liability for any resulting damage.
- The operator must ensure that all maintenance, inspection and installation work is carried out by qualified, authorised staff having previously studied this operating and installation manual.
- Before working on the pumping station, switch it off and unplug the pumping station's power plug.
- You must follow the procedure for shutting down the pumping station described in this operating manual.
- Pumping stations discharging fluids that may be harmful to health must be decontaminated. Before restarting the pumping station, follow the commissioning instructions. (⇨ section 5.1, page 7)
- Keep unauthorised people (children, for example) away from the pumping station.
- Never exceed the usage limits defined in the documentation.
- Follow all the safety precautions and instructions in this operating and installation manual.

This operating manual must always be available on site so it can be accessed by qualified staff and the operator.

1.6 Risks and consequences of non-compliance with the operating manual

Failure to comply with this operating and installation manual will result in the loss of warranty rights and rights to damages.

2 TRANSPORT / TEMPORARY STORAGE / RETURNS / DISPOSAL

2.1 Receiving inspection

- When receiving goods, check the condition of the pumping station's packaging.
- In case of damage, note the exact damage and immediately notify the dealer in writing.

2.2 Transport

DANGER

Dropping the pumping station

Risk of injury if the pumping station is dropped!

▷ Keep the pumping station horizontal when moving it.

▷ Observe the indicated weight.

▷ Never suspend the pumping station by the power cord.

▷ Use suitable means of transport.

✓ The pumping station has been inspected to make sure there is no damage due to transport.

Choose suitable means of transport according to the weight table

Table 1: Weight of the pumping station

Model	Gross Weight (including packaging and accessories) [kg]
SANICUBIC® 1	19.8
SANICUBIC® 1 WP	26.7
SANICUBIC® 2 Classic	35.5
SANIICUBIC® 2 Pro	33.0
SANICUBIC® 2 XL	101.0
SANICUBIC® 2 XL Three-phase	102.0

2.3 Temporary storage / Packaging

In the case of commissioning after an extended storage period, take the following precautions to ensure storage of the pumping station:

WARNING

Wet, dirty or damaged openings and junction points. Leaks or damage to the pumping station!

▷ Clear the pumping station's blocked openings at the time of installation.

2.4 Returns

- Properly drain the pumping station.
- Rinse and decontaminate the pumping station, especially if it has transported harmful, explosive, hot or otherwise dangerous liquids.

2.5 Disposal

The device must not be disposed of as household waste and must be disposed of at a recycling point for electrical equipment. The device's materials and components are reusable. The disposal of electrical and electronic waste, recycling and recovery of any form of used appliances contribute to the preservation of our environment.

3 DESCRIPTION

3.1 General description

This device is a compact pumping station. SANICUBIC® 1 and SANICUBIC® 1 WP are pumping stations specially developed for individual use (detached house or small commercial premises). SANICUBIC® 2 Classic and SANICUBIC® 2 Pro are pumping stations specially developed for individual, commercial and small community use (small buildings, shops, public places). SANICUBIC® 2 XL is a pumping station specially designed for community use (professional buildings, restaurants, industries, schools, hotels or shopping centres). These devices comply with the EN 12050-1 standard (pumping station for waste water containing faeces) as well as the European directives on construction products, electrical safety and electromagnetic compatibility. DoP available on our website in the product file («Diagrams and technical data sheet» tab).

3.2 Scope of supply

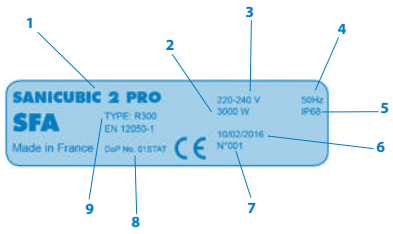
Depending on the model, the following components are provided:

- Sump tank with 1 or 2 pumps and 3 level sensors, depending on the model
- Remote control box (except SANICUBIC® 1)
- Wired or HF alarm unit, depending on the model
- Check valves
- Mounting kit (screws, pegs)
- Connecting sleeves for inlet, discharge and ventilation piping
- Clamps for the connecting sleeves
- Vent turbine

3.3 Rating plate

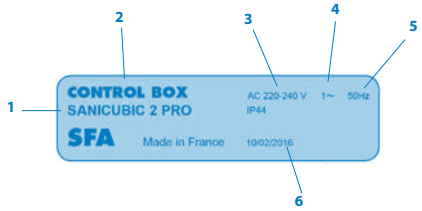
Examples:

Pumping station



1	Name of the pumping station
2	Power consumption of the motors
3	Power supply
4	Frequency
5	Protection index
6	Date of production
7	Identification number
8	Declaration of performance reference (DoP)
9	Type of certification

Control box



1	Name of the pumping station
2	Name of the control box
3	Power supply
4	Phase type
5	Frequency
6	Protection index
7	Date of production

3.4 Design and operating mode

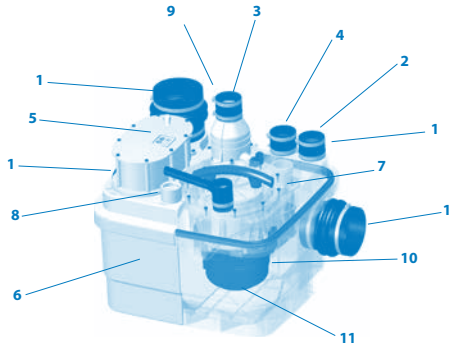


Table 2: SANICUBIC® 2 Pro illustration

1	Inlet	Ø ext.40/50/100/110 mm
2	Inlet	Ø ext. 40/50 mm
3	Waste pipe	Ø ext. 50 mm
4	Ventilation opening	Ø ext. 50 mm
5	Level sensor (dip tube)	
6	Tank	
7	Access panel	
8	Control opening	
9	Built-in check valve	
10	Engine-pump assembly	
11	Shredding system	

The pumping station is equipped with several horizontal and vertical inlet openings for 40/50/100/110 mm outside diameter piping (1) and 40/50 mm outside diameter piping (2). The engine-pump assembly (10) carries the pumped fluid in the vertical discharge piping with an outside diameter of 50 mm (3) and outside diameter of 110 mm for the SANICUBIC® 2 XL. The ventilation duct (4) allows the tank to always remain at atmospheric pressure.

Operating mode:

Effluents enter the pumping station through the horizontal and vertical inlet openings (1) (2). They accumulate in a gas-tight, smell-proof and watertight plastic tank (6). Controlled by a level sensor (5) and a control box, effluents are shredded by the shredding system (11) or carried away by a vortex impeller for the SANICUBIC® 2 XL and automatically pumped, when they reach a certain level in the tank, by one or two pumps, depending on the model, (10) above the back-flow level to flow into the discharge line.

- SANICUBIC® 1/SANICUBIC 1® WP contains one pump equipped with a high-performance shredding system.
- SANICUBIC® 2 Classic/SANICUBIC® 2 Pro contains two independent pumps. Each of these pumps is equipped with a high-performance shredding system. Both pumps operate each in turn, alternately. In case of abnormal operation, both engines run simultaneously (or if one pump fails, the other takes over).
- SANICUBIC® 2 XL contains two independent pumps, each with a clearance of 50 mm. Both pumps operate each in turn, alternately. In case of abnormal operation, both engines run simultaneously (or if one vortex pump fails, the other takes over).

Level sensor / Dip tube:

• 2 Long dip tubes

During normal operation, as soon as the effluents reach the long tube's actuation level in the tank, the pumping system switches on.

• Short dip tube

During abnormal operation, if the effluents reach the highest level in the tank (short tube), an audible and visual alarm system is activated and the pumping system switches on (if it is not faulty).

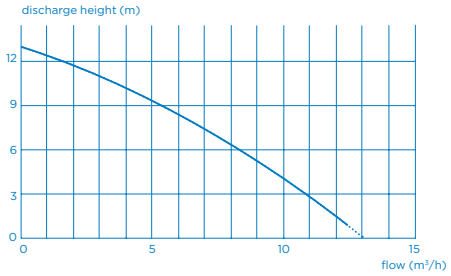
3.5 Technical data

Pumping station for blackwater (submersible for the SANICUBIC® 1 WP, SANICUBIC® 2 Classic, SANICUBIC® 2 Pro, SANICUBIC® 2 XL versions).

SANICUBIC® 1 / SANICUBIC® 1 WP

Type of current	Single-phase
Voltage	220-240V
Frequency	50/60 Hz
Motor - Pump	Oil bath cooled Thermal overload protection Class F insulation
Type of pump	Shredding by blade-plate
Motor power consumption (for one motor)	1,500 W
Maximum absorbed current	6 A
Cable station – control box	4 m - H07RN-F-4 G 1.5
Control box cable – socket	2.5 m - H05VV-F-3 G 1,5
Protection Station: SANICUBIC® 1: SANICUBIC® 1 WP:	IP67 IP68
Control box:	IPX4
Max. recommended height	11 m
Max. flow	12 m³/hour
Max. temperature of incoming wastewater	70°C (Max. 5 min.)
Tank volume	32 L
Usefull volume	10 L
Height of low inlets (from the ground)	140 mm
Gross Weight [KG] SANICUBIC® 1: (including packaging and accessories) SANICUBIC® 1 WP:	19.8 26.7
Waste pipe	Ø ext. 50 mm
Inlet	Ø ext. 40, 50, 100, 110 mm
Ventilation	Ø ext. 50 mm

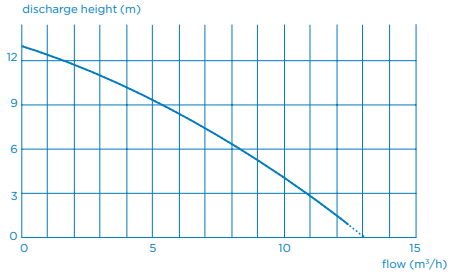
SANICUBIC® 1 flow curve; SANICUBIC® 1 WP



SANICUBIC® 2 Classic / SANICUBIC® 2 Pro

Type of current	Single-phase
Voltage	220-240V
Frequency	50/60 Hz
Motor - Pump	Oil bath cooled Thermal overload protection Class F insulation
Type of pump	Shredding by blade-plate
Motor power consumption (for one motor)	1,500 W
Maximum absorbed current	13 A
Cable station – control box	4 m - H07RN-F-4 G 1.5
Control box cable – socket	2.5 m - H05VV-F-3 G 1,5
Protection Station: Control box:	IP68 IPX4
Max. recommended height	11 m
Max. flow	12 m³/hour
Max. temperature of incoming wastewater	70°C (Max. 5 min.)
Tank volume	45 L
Usefull volume	17.5 L
Height of low inlets (from the ground)	140 mm
Gross Weight [KG] SANICUBIC® 2 Classic: (including packaging and accessories) SANICUBIC® 2 Pro:	35.5 33.0
Waste pipe	Ø ext. 50 mm
Inlet	Ø ext. 40, 50, 100, 110 mm
Ventilation	Ø ext. 50 mm

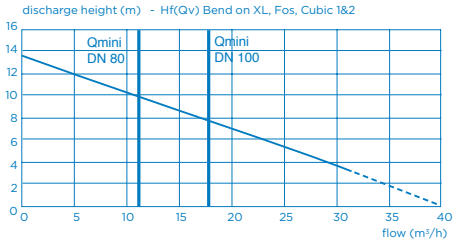
SANICUBIC® 2 Classic flow curve; SANICUBIC® 2 Pro



SANICUBIC® 2 XL

Type of current	Single-phase
Voltage	220-240V
Frequency	50/60 Hz
Motor - Pump	Oil bath cooled Thermal overload protection Class F insulation
Type of pump	Vortex Impeller (clearance: 50 mm)
Motor power consumption (for one motor)	2,000 W
Maximum absorbed current	16 A
Cable station – control box	4 m - H07RN-F-4 G 1.5
Control box cable – socket	2.5 m - H05VV-F-3 G 1,5
Protection Station : Control box:	IP68 IPX4
Max. recommended height	10 m (DN80) 7 m (DN100)
Max. flow	40 m³/hour
Max. temperature of incoming wastewater	70°C (Max. 5 min.)
Tank volume	120 L
Usefull volume	26 L
Gross Weight [KG] (including packaging and accessories)	101.0
Waste pipe	ND 100 (Ø ext. 110 mm) or ND80 (Ø ext. 90 mm)
Inlet	Ø ext. 40, 50, 100, 110 mm
Ventilation	Ø ext. 50 mm

SANICUBIC® 2 XL Single-phase discharge bend



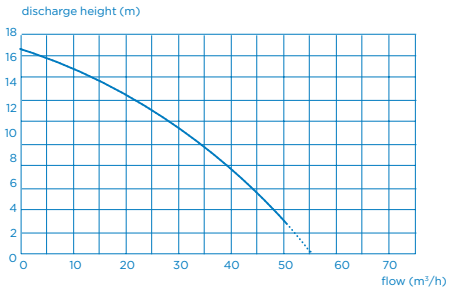
Self-cleaning speed limit: 0.7 m/s

SANICUBIC® 2 XL Three-phase

Type of current	Three-phase
Voltage	230-400V
Frequency	50/60 Hz
Motor - Pump	Oil bath cooled Thermal overload protection Class F insulation
Type of pump	Vortex Impeller (clearance: 50 mm)
Motor power consumption (for one motor)	3,500 W
Maximum absorbed current	12 A
Cable station – control box	4 m - H07RN-F-4 G 1.5
Control box cable – socket	2.5 m - H05VV-F-5 G 2.5

Protection	Station: Control box:	IP68 IPX4
Max. recommended height		14.5 m (DN80) 13 m (DN100)
Max. flow		55 m^3/h
Max. temperature of incoming wastewater		70°C (Max. 5 min.)
Tank volume		120 L
Usefull volume		26 L
Height of low inlets (from the ground)		102.0
Waste pipe		DN 100 (Ø ext. 110 mm) or DN80 (Ø ext. 90 mm)
Inlet		Ø ext. 40, 50, 100, 110 mm
Ventilation		Ø ext. 75 mm

SANICUBIC® 2 XL Single-phase discharge bend



3.6 Control box

DANGER

Submersion of the control device
Risk of death by electric shock
▷ Only use the control device in rooms safe from floods

SANICUBIC® remote control box

- Pump control and monitoring cabinet integrated into a compact plastic housing
- For 1 or 2 pumps
- Option of forced mode

3.6.1 Electrical characteristics

Table 3: Electrical characteristics of the control box

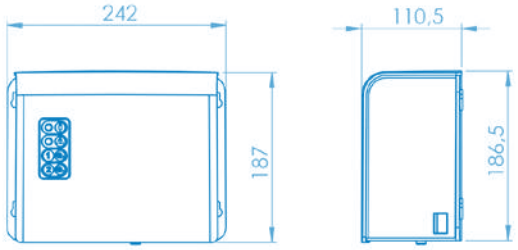
Parameter	Value	
Nominal power supply	1 ~ 220-240 V AC	
Network frequency	50/60 Hz	
Protection index	IPX4	
Nominal current per engine		
	SANICUBIC® 1; SANICUBIC® 1 WP; SANICUBIC® 2 Classic; SANICUBIC® 2 Pro	6 A
	SANICUBIC® 2 XL Single-phase	8 A
	SANICUBIC® 2 XL Three-phase	6 A

3.6.2 Technical characteristics of the detection device

Analog level sensor:
- Input voltage 0 - 5 V

Process outputs:
- One potential-free signalling output (250 V, 16 A) NO Contact
- One signalling output for the wired alarm unit that comes with the device (except SANICUBIC® 2 Pro): 5V, 50mA

3.6.3 Dimensions of the remote control box



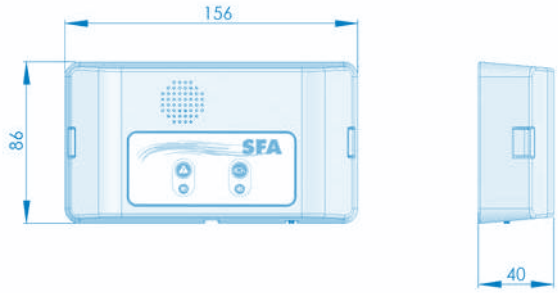
3.7 Alarm unit

3.7.1 Technical characteristics of the alarm device

SANICUBIC® alarm unit:
SANICUBIC® 1; SANICUBIC® 1 WP; SANICUBIC® 2 Classic; SANICUBIC® 2 XL:
Wired alarm unit
5m cable
Audio and visual information
Protection index: IP20

SANICUBIC® 2 Pro:
HF alarm unit 868 MHz (radio)
Unobstructed range: 100 m
Audio and visual information
Protection index: IP20

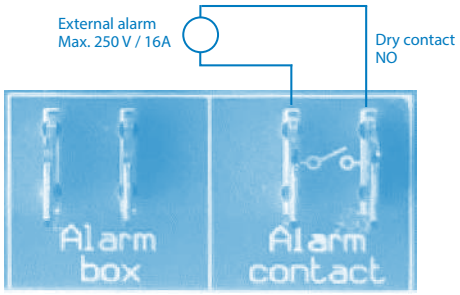
3.7.2 Dimensions of the remote alarm unit



3.7.3 Option of connection to an external alarm

Option of externalising the alarm signal (depending on the model). Dry contact (no voltage) NO (normally open) operated by a max. 250V/16A relay.

The terminals can be connected to a powered system.
This contact closes as soon as the station is in alarm mode (except in the case of area alarm) and remains closed as long as the alarm sounds.



3.8 Sump tank

The sump tank is designed for pressure-free operation. Wastewater is collected there at atmospheric pressure before being discharged to the sewer. The ventilation duct allows the tank to always remain at atmospheric pressure

3.9 Pumped fluids

DANGER

Pumping unauthorised fluids
Dangerous for people and the environment!
▷ Only discharge authorised pumped fluids in the public sewerage network

Authorised pumped fluids:

The following liquids are allowed in discharge systems:

Water contaminated by domestic use, human excrement.

Unauthorised pumped fluids:

The following liquids and substances are banned:

- Solid materials, fibres, tar, sand, cement, ash, coarse paper, hand towels, wipes, cardboard, rubble, rubbish, slaughterhouse waste, oils, greases, etc.
- Wastewater containing harmful substances (for example, untreated greasy waste from restaurants). Pumping these liquids and substances requires the fitting of a compliant grease trap.
- Rain water.

3.10 Noise level

The noise level depends on the fitting conditions and operating point. This sound pressure level Lp is less than 70 dB (A).

4 INSTALLATION / FITTING

4.1 Installing the pumping station

- The characteristics shown on the rating plate have been compared with those on the order and installation (supply voltage, frequency).
- The installation room must be protected against frost.
- The installation room is adequately lit.
- The work has been prepared in accordance with the dimensions shown in the example installation and standard EN 12056-4.
- The plant room where the SANICUBIC® will be installed must be large enough to allow a 600 mm clearance around and above the device to facilitate maintenance.
- The alarm signal is always visible to the user (if necessary, use an external alarm contact switch).
- Stop valves (not provided) must be fitted on the effluent inlet as well as on the discharge line, as close as possible to the pumping station.
- The discharge line must be designed to prevent any back-flow of sewage. By fitting a non-return loop, located above the back-flow level, back-flow is avoided.

Comment: In the absence of local information to the contrary, the maximum back flow level corresponds to street level - roadway, pavements etc. Extend this line after the non-return loop through a larger diameter pipe.

- Provide a sump to drain the room.
- The installation of an auxiliary pump for possible drainage of the plant room (for floods) is recommended.
- The pumping station must be ventilated above the roof.
- The pumped fluid is appropriate and authorised by this documentation. (section 3.9, page 5)
- In case of discharge of greasy effluents, the use of a degreasing tank is essential.

Wastewater other than those mentioned above, for example, of artisanal or industrial origin, must not be discharged into the pipes without prior treatment.

4.2 Electrical connection

DANGER

Electrical connection work performed by an unqualified individual. Risk of death by electric shock!

▷ The electrical connection must be performed by a qualified and licensed electrician.

▷ The electrical installation must meet the current standards in the country

WARNING

Wrong supply voltage. Damage to the pumping station!

▷ The supply voltage must not differ by more than 6% of the rated voltage specified on the rating plate.

The power supply must be class 1. The device must be connected to an earthed junction box. The electrical power supply must be protected with a high sensitivity circuit breaker set to 10 Mini Amps for SANICUBIC 1/ SANICUBIC 1 WP and 20 Mini Amps for SANICUBIC 2 Classic/SANICUBIC 2 Pro/SANICUBIC 2XL single-phase and 25 Amps for SANICUBIC 2XL three-phase. This connection must be used exclusively for the SANICUBIC® power supply. If the cord of this device is damaged, it must be replaced by the manufacturer or its after-sales service in order to avoid any danger to users.

4.3 Fitting the pumping station

Fit the pumping station on the bare ground and level it with a bubble level.

To avoid any risk of the pumping station floating, attach it to the ground using the mounting kit provided.

NOTE

Pumping stations should not be installed near bedrooms and living rooms (noise from the pumping station). (⇨ section 3.10, page 5)

Fitting the pumping station on anti-vibration mounts ensures sufficient insulation against structure-borne sound with respect to the pumping station.

Do not fit the pumping station in direct contact with the walls to avoid transmission of the pumping station's vibrations.

4.4 Pipe connections

4.4.1 Inlet pipes

DANGER

▷ The pumping station must not be used as a control point for piping.

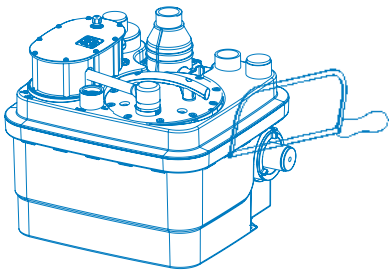
▷ Prop up the pipes upstream from the pumping station. Make connections without constraints.

▷ Use suitable means to compensate for thermal expansion of the piping.

NOTE

It is recommended that you mount check valves and stop valves on the inlet pipes. These must be mounted so that they do not hinder disassembly of the pumping station.

✓ The piping is supported.
1. Choose the connection openings to use.
2. Cut the tip of the corresponding boss with a saw



NOTE

All piping connections must prevent the propagation of noise and be flexible.

4.4.2 Discharge piping

WARNING

Improper fitting of the discharge pipe. Leaks and flooding of the installation room!

▷ Run the discharge line above the back-flow level before connecting to the sewer.

▷ The pumping station must not be used as a control point for piping.

▷Do not connect other drain pipes to the discharge pipe.

▷Fit isolation valves to inlets and discharge pipework.

NOTE

To prevent the risk of back-flow of water from the sewer, install the discharge pipe in a «loop» so that its base, at the highest point, is located above the back-flow level.

Fit a shutoff valve behind the check valve.

The check valves are equipped with a lever for emptying the discharge pipe into the tank.

4.4.3 Ventilation pipe

WARNING

Insufficient ventilation. Risk that the pumping station will not work!

▷ Ventilation must remain free

▷ Do not block the vent outlet

▷ Do not install an air intake valve (diaphragm valve).

According to the recommendations of EN 12050-1, it must be equipped with a vent above the roof. The pumping station must always be ventilated so that the tank is always at atmospheric pressure. The ventilation must be completely free and air must flow in both directions (no diaphragm valve fitted).

The vent pipe must not be connected to the vent pipe on the inlet side of a grease trap.

Connect the ND 50 or ND 70 vent pipe (depending on the model) vertically to the vent opening with the flexible couplings. The connection must be smell-proof.

4.5 Cellar drying
Automatic drying:

For automatic drainage of the installation room (in case a sump is installed, for example), especially in case of risk of water infiltration or flooding, a submersible pump for contaminated water must be fitted.

Figure 1: Example of installation with submersible pump:

WARNING

Discharge line for drying the cellar connected to the discharge line of the pumping station.

Flooding of installation room!

➢ Run the discharge line of the cellar drainer above the back-flow level before connecting it to the sewer.

➢ Never connect the discharge line of the cellar drainer to the discharge line of the pumping station.

➢ Fit a check valve at the base of the discharge line

➢ Select the pump depending on installation conditions: (manometric delivery head H [m] = Static head + head loss).

5 COMMISSIONING / DECOMMISSIONING

5.1 Commissioning

5.1.1 Prerequisites for commissioning

Before commissioning the pumping station, make sure that the electrical connection for the pumping station and all protective devices has been correctly performed.

5.2 Application limit

DANGER

▷Pressure and temperature limits exceeded. Leakage of hot or toxic fluid!

▷Observe the operating specifications in the documentation.

▷Avoid running the pump with the valve closed.

▷Dry running, without pumped fluid, must be avoided.

When in use, observe the following parameters and values:

Parameter	Value
Max. allowed temperature of the fluid	40 °C up to 70 °C when pumped 5 minutes max.
Max. room temperature	50 °C
Operating mode	Intermittent service SANICUBIC® 1 / 1 WP: S3 30 % Intermittent service SANICUBIC® 2 Classic / Pro / SANICUBIC® 2 XL Single-phase: S3 50% SANICUBIC® 2 XL Three-phase: S3 30 %

5.3 Starting frequency

To prevent engine overheating and excessive stress on the engine, seals and bearings, limit the number of starts to 60 per hour.

5.4 Commissioning with the control box

DANGER

▷ The control box cover is not properly closed. Risk of death!

▷ Properly close the control box cover.

▷ Then reconnect the power plug.

Operations required for commissioning

1. Perform a functional and sealing test of the pumping station: Once the hydraulic and electrical connections are made, check the connections for leaks by running water successively through each inlet used. Ensure the device is operating properly and there are no leaks by performing a water test and observing several start cycles.
2. Check the various points on the checklist (⇨ section 7.6, page 10)
3. Warning: Do not run the motor in forced mode (by pressing the key on the keypad) before putting the pump in water. Dry running damages the grinding system.

5.5 Decommissioning

1. Close the valves on the inlet and discharge pipes.
2. Drain the tank by pressing the forced mode button on the pump.
3. Switch off the electrical power supply and record the installation.

DANGER

▷ The current is not cut. Risk of death!

▷ Unplug the plug or disconnect the electrical conductors and take the steps required to avoid inadvertent operation.

4. Inspect the hydraulic parts and shredding blades (depending on the model). Clean them if necessary.
5. Clean the tank.

DANGER

▷ Pumped fluids and secondary consumable materials that are harmful to health. Dangerous for people and the environment!

▷ Pumping stations used to discharge fluids that may be harmful to health must be decontaminated.

If necessary, wear a mask and protective clothing.

▷ Observe current legal provisions for the discharge of fluids harmful to health.

6 OPERATION

6.1 SANICUBIC® Control box

NOTE

This paragraph describes the operation of a control box for two pumps. The control box is operated in a similar manner for one pump.

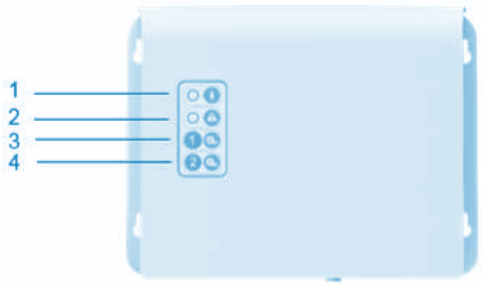


Table 4: SANICUBIC® remote control box

1	Yellow mains supply LED
2	Red alarm LED
3	Forced mode Engine 1
4	Forced mode Engine 2

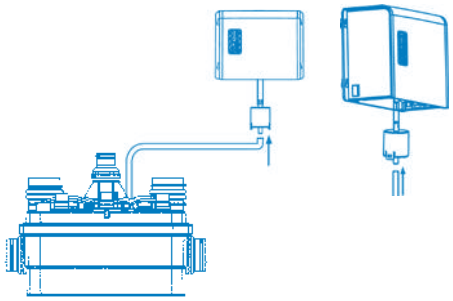
LED lamps

The LED lamps provide information on the operating state of the control box:

NOTE: On the SANICUBIC® 1, the control box is integrated on the top of the station's tank.

The detection system must be vented. Connect the vent turbine to the station's control box.

Figure 2: Ventilation of the SANICUBIC® control box



6.1.1. Operation of the SANICUBIC® 1 control keypad (IP67)

1/ General alarms:

Level alarm:

If the water level inside the device is abnormally high, the alarm LED lights up red + engine starts up. Furthermore, if this LED **flashes** red, it indicates a detection problem for the normal water level (Long dip tube).

Time alarm:

If the motor runs continuously for more than 1 minute, the red alarm LED lights up.

2/ Alarm reset: The button on the keypad will only allow you to turn off the red LED (it will turn green) if the problem that triggered the alarm has been resolved. It also allows you to stop the ringing of the remote alarm control.

Mains alarm:

- If the LED is off, there is no power supply.
- When the device is powered on again, the LED flashes green, indicating that the mains voltage has temporarily disappeared.

6.1.2 Operation of the SANICUBIC® 2 Classic /SANICUBIC® 2 Pro / SANICUBIC® 2 XL remote control box

OPERATION OF THE ALARM

1/ General alarms:

Level alarm:

If the water level inside the device is abnormally high: the siren is triggered + the red alarm LED lights up + both motors start-up. If this LED flashes red, it indicates a detection problem for the normal water level (Long dip tube).

Time alarm:

If one of the two motors runs for more than 1 minute: the siren is triggered + the red alarm LED lights up + the other engine starts-up.

Mains alarm:

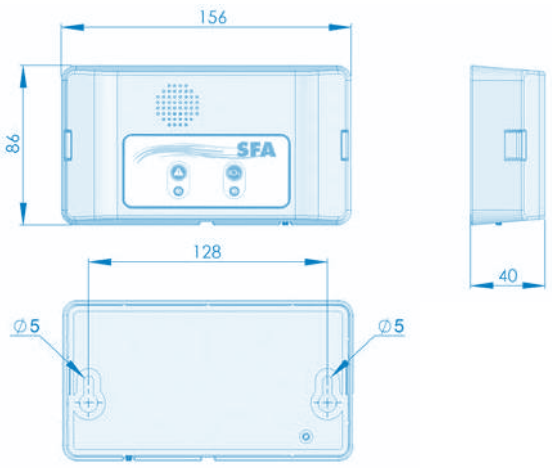
In case of power failure (or when unplugging the device): the siren is triggered + the red alarm LED lights up + the yellow mains LED blinks.

2/ General alarm reset:

If the problem that triggered one of the alarms above disappears, the siren stops, but the red alarm LED remains lit as a reminder of the fact that the system encountered a problem. Either of the two keypad keys will stop the siren in all cases, but it will only turn off the red LED if the problem that triggered the alarm has been resolved. Alarms from the remote box will also remain active until the problem has been solved. This prevents the system from being «abandoned» by default.

6.2 SANICUBIC® alarm unit

To wall mount the unit, use the following figure as a guide:



6.2.1 Operation of the SANICUBIC® 1 / SANICUBIC® 1 WP SANICUBIC® 2 Classic /SANICUBIC® 2 XL wired alarm unit

The SANICUBIC® alarm unit does not require a separate power supply. The power is supplied through the SANICUBIC®. In case of power failure, the alarm unit's battery takes over.

Connection of the alarm unit to the device:

Connect the alarm cable directly to the unit.

1/ The red general alarm LED reproduces the operation of the red LED on the base card. The alarm unit sounds in the event of an alarm as long as the fault is present. To stop the alarm, press the reset (*) button on the device's keypad or the button under the alarm unit.

2/ The yellow «mains» LED indicates the power status of the alarm unit

-Steady light = live SANICUBIC® connected to the mains supply

-Flashing = power failure on the SANICUBIC®

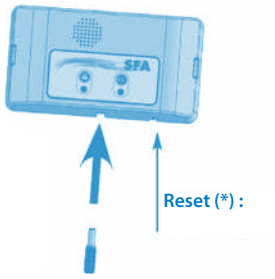


Table 5: SANICUBIC® 1 / SANICUBIC® 1 WP / SANICUBIC® 2 Classic / SANICUBIC® 2 XL alarm unit

1	Red general alarm LED
2	Yellow mains alarm LED (power supply indicator)

6.2.2 Operation of the SANICUBIC® 2 PRO HF alarm unit

DANGER

▷ Unit powered by an electrical socket. Risk of death!

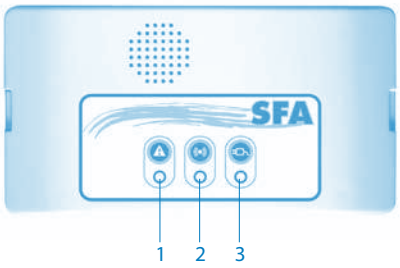
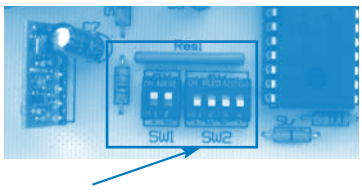


Table 6: SANICUBIC® 2 Pro alarm unit

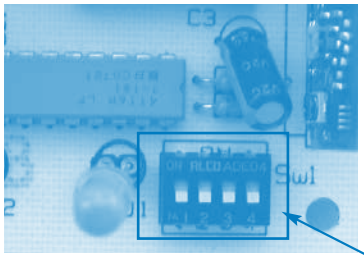
1	Red general alarm LED
2	Yellow alarm transmission LED
3	Green mains alarm LED

The alarm unit is in HF -868 MHz connection with the SANICUBIC® 2 Pro. It receives various alarm information from it. If other devices operating in HF are disrupted by the system (or vice versa), a commutation of the HF -868 MHz coding, which connects the base card and the remote alarm unit, has been anticipated. In case of interference with other nearby HF devices or other SANICUBIC® 2 Pro devices, unplug the device and the remote module, switch one or more of the four switches on the device's card (SW2) and do likewise on the remote control unit.

Control box card



Alarm unit card



Warning: the code must be the same for both cards.
The alarm unit has 3 LEDs and 1 buzzer.
1/ The red «general alarm» LED reproduces the operation of the red LED on the base card.
2/ The yellow «HF reception» LED reproduces the operation of the base card's yellow mains LED:
- steady = transmission OK, live base card
- flashing = transmission OK, but mains fault on the base card (which then operates on battery)
- off = no HF reception (make sure the code is the same as the one on the base card) or loss of HF signal (too far away) discharge, discharged battery or failure of the base card.

3/ The green «mains» LED indicates the power status of the remote alarm unit:
- steady = live unit
- flashing = mains fault on the unit (which then operates on battery)
- off = failure of the unit or the unit's battery is discharged

4/ The buzzer sounds continuously during an alarm. It stops buzzing if the alarms disappear or if you press the general alarm reset button.

6.3 Messages and faults

Table 7: Messages and faults:

Alarm on the device SANICUBIC® 1 and SANICUBIC® 1 WP:
Green LED: station live

Alarm on the device SANICUBIC® 2 Classic and SANICUBIC® 2 Pro and SANICUBIC® 2 XL: Yellow LED: station live

ANOMALY DETECTED	CAUSES PROBLEMS	SOLUTIONS
Flashing red alarm LED	• Water level detection system faulty	• Consult SFA after-sales service
Steady red alarm LED	• Clogged vent pipe • Clogged drain line • Blocked or out of order pump • Discharge too high or excessive inflow	• Check that air flows freely in both directions in the vent pipe • Go over the installation again • Consult SFA after-sales service
LED off	• Mains failure • Faulty electronic board	• Check the electrical system • Consult SFA after-sales service

7 MAINTENANCE

7.1 General information / Safety instructions

DANGER

Work performed on the pumping station by unqualified staff. Risk of injury!
▷ Repairs and maintenance must be performed by specially trained staff
▷ Observe the safety and basic instructions.

DANGER

Pumped fluids and secondary consumable materials that are harmful to health. Dangerous for people and the environment!
▷ Pumping stations used to discharge fluids that may be harmful to health must be decontaminated.
If necessary, wear a mask and protective clothing.
▷ Observe current legal provisions for the discharge of fluids harmful to health.

7.2 Maintenance and inspection operations

DANGER

Work on the pumping station without adequate preparation.
Risk of injury!
▷ Properly stop the pumping station and secure it against inadvertent operation.
▷ Close the inlet and discharge valves.
▷ Drain the pumping station.
▷ Close any auxiliary connections.
▷ Allow the pumping station to cool to room temperature.

In accordance with EN 12056-4, pumping stations must be maintained and repaired to ensure the proper disposal of wastewater and to detect and eliminate malfunctions at an early stage.
The proper functioning of pumping stations must be checked by the user once a month by observing at least two operating cycles.
The inside of the tank should be checked from time to time and deposits, especially around the level sensor, should be removed, if necessary

In accordance with EN 12056-4, maintenance of the pumping station must be performed by qualified staff. The following intervals should not be exceeded:
• 3 months for pumping stations for industrial use
• 6 months for pumping stations for small communities
• 1 year for domestic pumping stations

7.3 Maintenance contract

As with any technical, high-performance equipment, SANICUBIC® pumping stations must be maintained to ensure a sustainable level of performance. We recommend you take out a maintenance contract with a qualified company to carry out regular inspection and maintenance work. For more information, please contact us.

7.4 Emergency service with a single pump

NOTE

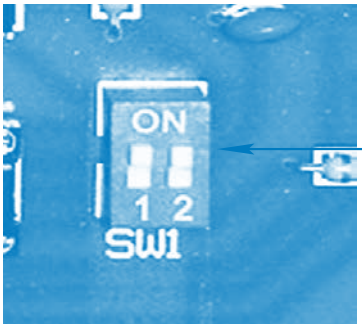
If emergency service must be ensured during maintenance and inspection work, perform the following steps.

1. Close the valves on the inlet and discharge sides.
Warning: The incoming feed for inlets must be minimised while performing maintenance
2. Turn off the power supply.

7.5 Checking the hydraulics of each motor

• Make sure its blade and plate are not blocked or damaged (excluding SANICUBIC® 2 XL)
• Make sure the turbine rotates freely
• Make sure the hydraulic parts are clean. Clean them if necessary.

In case an motor is not working properly, it is possible to "disable" the use of this motor by switching the corresponding "switch" on the main card to indicate the absence of the corresponding motor. The card will only work with the valid motor - SW1: switch 1 and 2 for motor 1 (left) and 2 (right).



NOTE: If both switches are lowered (off position), abnormal situation, the card will be in alarm mode when power is restored

7.5.1 General information

Inspect the tank, check for possible deposits, the presence of grease and foreign bodies. Thoroughly clean the tank and remove foreign bodies.

7.5.2 Disassembling the motor

1. Unscrew the motor hatch from the tank cover (10 screws).
2. Use the handle to gently lift the motor. If the defective motor is to be returned to the manufacturer, the pumping station can provide a minimum service with one single motor.
3. Unscrew the screws of the faulty motor from the hatch.
4. Put the hatch back in position.

7.5.3 Disassembling and inspection of the compression chambers and level sensors:

1. Unscrew (1 screw), unlock and lift the pressure switch from the cover.
2. Check that the funnels are not obstructed (grease, faecal matter etc.). Clogged compression chambers indicate that the device has not been properly maintained. It is recommended to clean the device at least every 6 months.
3. If necessary unclog the compression chambers.

7.5.4 Reassembly of the level sensors

Warning: Do not grease the level sensors' O-rings before reassembly.

1. Fully insert the level sensor in the compression chamber.
2. Screw the level sensor onto the cover.

7.5.5 Reassembly

During reassembly, observe the following points:
To reassemble the pump, observe the rules applicable to engineering goods.
Do not over-tighten the screws on plastic parts (risk of breaking the plastic) and clamps.
Clean all disassembled parts and check their wear.
Replace damaged or worn parts with original spare parts.
Ensure that the sealing surfaces are clean and the O-rings are properly installed.

7.5.6 Tightening torque

The tightening torque for screws and clamps is 2 ± 0.1 N.m

7.6 Checklist for commissioning / inspection ① and maintenance ②

Operations	Required for	
Read the operating manual.	①	②
Check the power supply. Compare the values with those of the rating plate.	①	②
Check the connection of the power supply to the earth.	①	②
heck the connection of the power supply to a 30 mA GFCI breaker.	①	②
Check the proper operation of the motors by pressing the forced mode buttons. If abnormal, make sure the pump is not clogged, check the resistance values of the engine coils. Where SANICUBIC 2 XL three-phase version is used, check the motor rotation direction by dismantling the motor.	① 2XL three-phase version	②
Check the sump tank. Clean the tank in case of deposits. In case of significant grease deposits in the tank from greasy wastewater from artisanal or industrial businesses, inform the customer that they must install a grease trap upstream from the pumping station.	①	②
Check the level sensors. Dismantle the pressure switches and make sure that the dip tubes are not clogged. Clean them if necessary.	①	②
Check the control mechanism. Dismantle the level sensor. Check if it is blocked or encrusted. Clean them, if necessary.	①	②
Perform a functional test over several cycles.	①	②
Check the correct installation and state of wear of the flexible couplings.	①	②
Check the proper operation and effectiveness of the alarm device.		②
Check the proper operation and seal of the stop valves and check valves.	①	②
If applicable, identify the necessary spare parts.	①	②
Advise and/or train operating staff.	①	②

NOTE

Before working inside the pump during the warranty period, you must consult the manufacturer. Our after-sales service is available to you. Failure to comply leads to the loss of rights to damages.

DANGER

Inappropriate work aiming to eliminate malfunctions. Risk of injury!
▷ For all work intended to eliminate malfunctions, follow this operating manual's instructions and / or the manufacturer's documentation for the relevant accessories.

NOTE

After every flood, the pumping station should be inspected.

NOTE

After an incident, subject the pumping station to functional test and visual inspection.

For any problem not described in the table below, contact SFA after-sales service.

Problems encountered:

A The pump does not flow
B Insufficient flow
C Excessive current / power consumption
D Insufficient manometric delivery head
E Irregular and noisy operation of the pump
F Frequent faults reported by the pumping station
G Overflow of the pumping station
H Untimely start

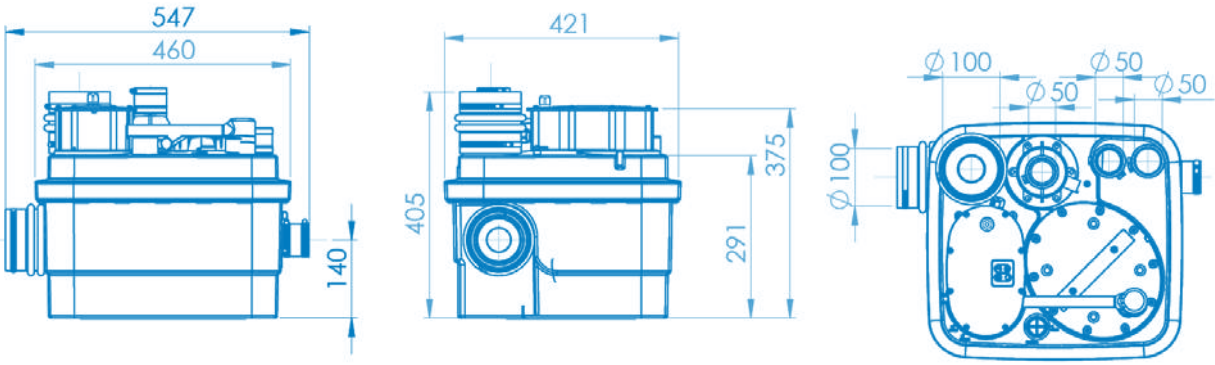
Before working on pressurised components, reduce the pressure inside the pump! Disconnect the pump from the electrical power supply.

8. Incidents: causes and solutions

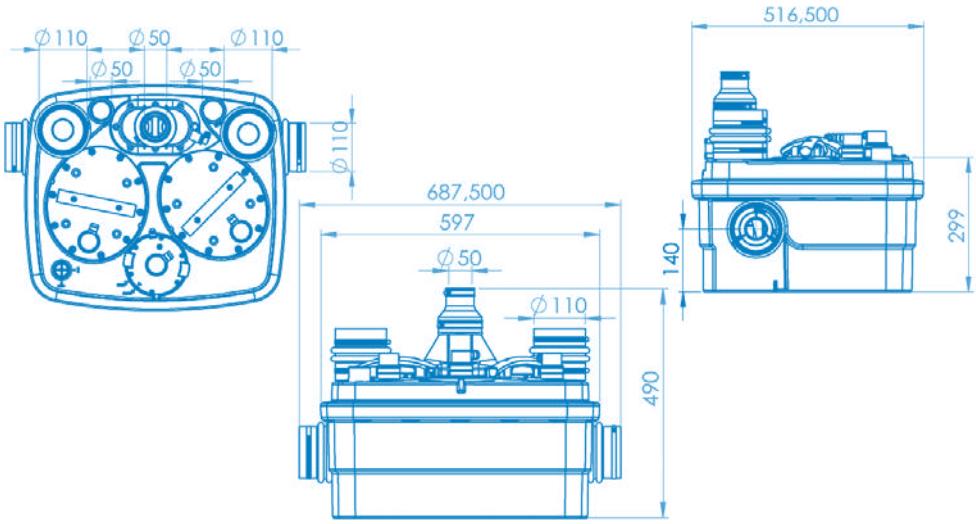
A	B	C	D	E	F	G	H	Possible cause	Solutions
-	✘	-	-	-	✘	-	-	Pump flows against excessive pressure.	The size of the pumping station is insufficient for these operating conditions.
-	✘	-	-	-	✘	-	-	The discharge valve is not fully open.	Open the valve to the maximum.
✘	-	-	-	-	✘	-	-	The pumping station is not ventilated.	Check the pumping station's vent pipes
-	✘	-	✘	✘	✘	-	-	Inlet pipes or wheel clogged.	Remove deposits in the pump and/ or piping.
-	-	✘	-	✘	✘	-	-	Presence of deposits / fibres in the wheel. The rotor does not turn freely.	Check if the wheel turns freely without blocking. If necessary, clean the pump.
✘	-	-	-	-	✘	✘	-	The engine is off.	Check the electrical installation (and fuses).
✘	-	-	-	-	-	-	-	Trigger of the thermal protection due to excessive temperature.	The engine automatically restarts after cooling.
-	✘	-	-	-	✘	-	-	Deposits in the sump tank.	Clean the sump tank. In case of grease deposits, make sure there is a grease trap.
-	-	-	-	-	✘	-	✘	The check valve is leaky.	Clean the check valve.
-	-	-	-	✘	-	-	-	Vibrations in the installation.	Check the flexible pipe connections.
✘	-	-	-	✘	✘	✘	-	Faulty, clogged, pulled out or impro-perly inserted level sensor.	Check the level sensor. Clean or replace it, if necessary.
	-	-	-	✘	-	-	-	Faulty capacitor	Replace the capacitor
-	✘	-	✘	-	-	-	-	In the case of three-stage installation: 2 phases may be inverted. To check, visually look at the motor rotation direction by dismantling the motor.	With the connection, inverse 2 power cable phases (5 wires).

APPENDICES

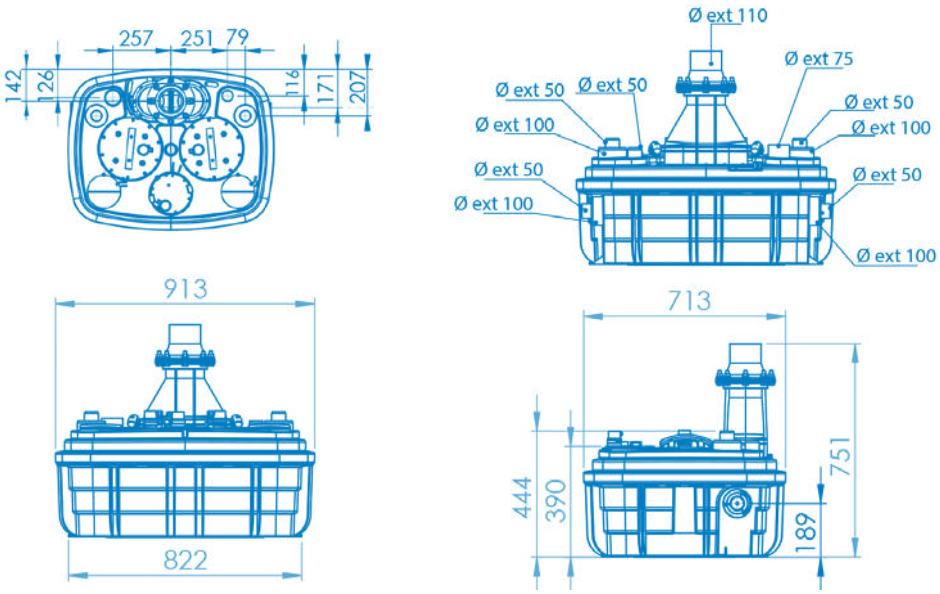
SANICUBIC 1 - SANICUBIC 1 WP sizing diagram

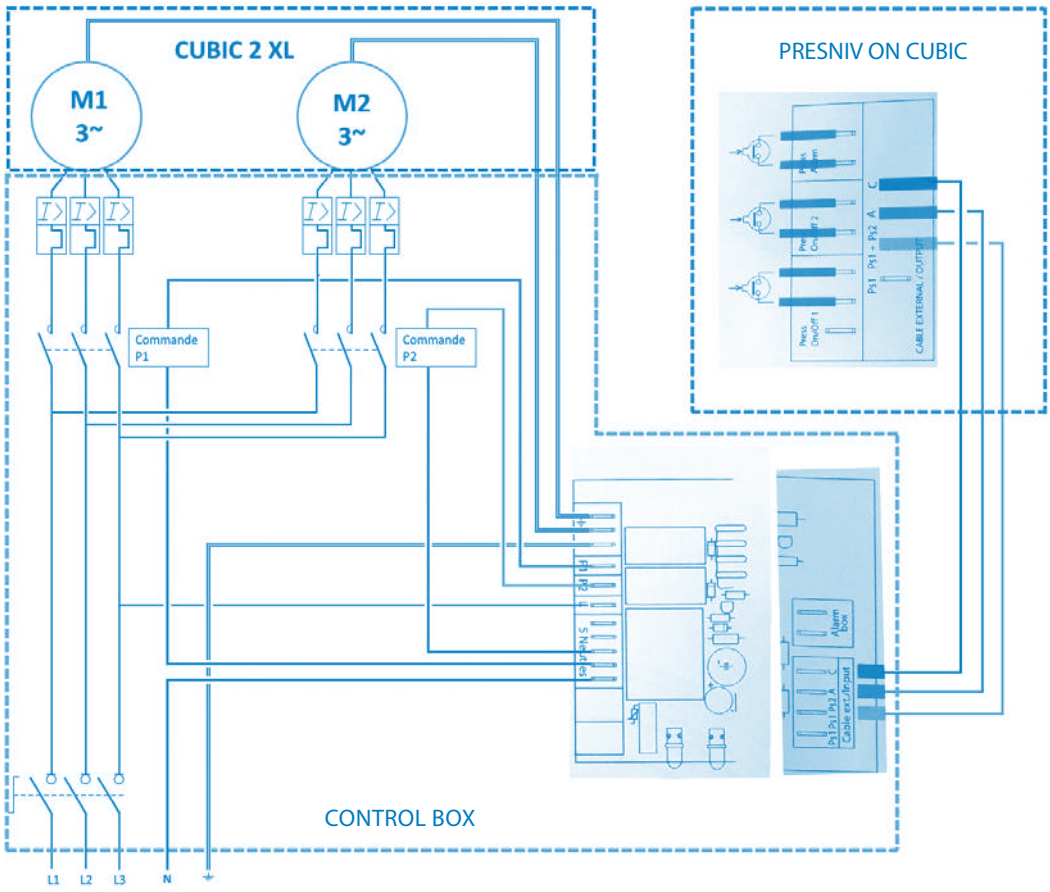


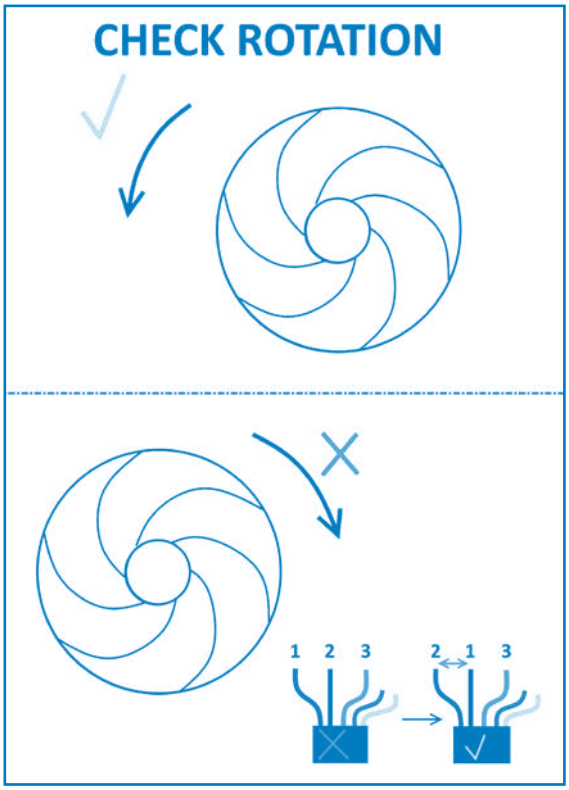
SANICUBIC® 2 Classic – SANICUBIC® 2 Pro sizing diagram



Dimensional drawing SANICUBIC® 2 XL







- 1 : brown
- 2 : black
- 3 : grey

FRANCE
SOCIÉTÉ FRANÇAISE D'ASSAINISSEMENT
41Bis, Avenue Bosquet - 75007 Paris
Tél. + 33 1 44 82 39 00
Fax + 33 1 44 82 39 01

UNITED KINGDOM
SANIFLO Ltd.,
Howard House, The Runway
South Ruislip Middx.,
HA4 6SE
Tel. +44 208 842 0033
Fax +44 208 842 1671

IRELAND
SANIRISH Ltd
IDA Industrial Estate
Edenderry - County Offaly
Tel. + 353 46 9733 102
Fax + 353 46 97 33 093

AUSTRALIA
Saniflo (Australasia) Pty Ltd
Unit 9-10, 25 Gibbes Street
Chatswood
NSW 2067
Tel. +61 298 826 200
Fax +61 298 826 950

DEUTSCHLAND
SFA SANIBROY GmbH
Waldstr. 23 Geb. B5 - 63128 Dietzenbach
Tel. (060 74) 30928-0
Fax (060 74) 30928-90

ITALIA
SFA ITALIA spa
Via del Benessere, 9
27010 Siziano (PV)
Tel. 03 82 61 81
Fax 03 82 61 8200

KOREA
www.sfa.biz
sales@saniflo-korea.kr

ESPAÑA
SFA SI
C/ Vinyalets,1 - P.I. Can Vinyalets
08130 Santa Perpètua de Mogoda
Barcelona
Tel. +34 93 544 60 76
Fax +34 93 462 18 96

PORTUGAL
SFA, Lda.
Sintra Business Park, ed. 01-1ºP2710-089
SINTRA
Tel. +35 21 911 27 85
Fax. +35 21 957 70 00

SUISSE SCHWEIZ SVIZZERA
SFA SANIBROY AG
Vorstadt 4
3380 Wangen a.A
Tel: +41 (0)32 631 04 74
Fax: +41 (0)32 631 04 75

BENELUX
SFA BENELUX B.V.
Voltaweg 4
6101 XK Echt (NL)
Tel. +31 475 487100
Fax +31 475 486515

SVERIGE
SANIFLO AB
BOX 797
S-191 27 Sollentuna
Tel. +08-404 15 30
info@saniflo.se

POLSKA
SFA POLAND Sp. z O.O.
ul. Białołęcka 168
03-253 Warszawa
Tel. (+4822) 732 00 32
Fax (+4822) 751 35 16

РОССИЯ
SFA РОССИЯ
101000 Москва - Колпачный переулок 9а
Тел. (495) 258 29 51
факс (495) 258 29 51

ČESKÁ REPUBLIKA
SFA-SANIBROY, spol. s r.o
Sokolovská 445/212, 180 00 Praha 8
Tel : +420 266 712 855
Fax : +420 266 712 856

ROMANIA
SFA SANIFLO S.R.L.
145B Foisorului Street District 3
31177 BUCURESTI
Tel. +40 256 245 092
Fax +40 256 245 029

TÜRKIYE
SFA SANIHYDRO LTD ŞTİ
Mecidiye Cad No:36-B Sevencan Apt.
34394 MECIDIYEKOY - ISTANBUL
Tel : +90 212 275 30 88
Fax : +90 212 275 90 58

CHINA
SFA 中国
上海市静安区石门二路333弄3号振安广场恒安大厦27C室 （200041）
Tel. +86(0)21 6218 8969
Fax +86(0)21 6218 8970

BRAZIL
SFA Brasil Equipamentos Sanitários
Rua Maria Figueiredo 595,
CEP : 04002-003 São Paulo, SP
Tel : (11) 3052-2292
sanitrit@sanitrit.com.br
www.sanitrit.com.br

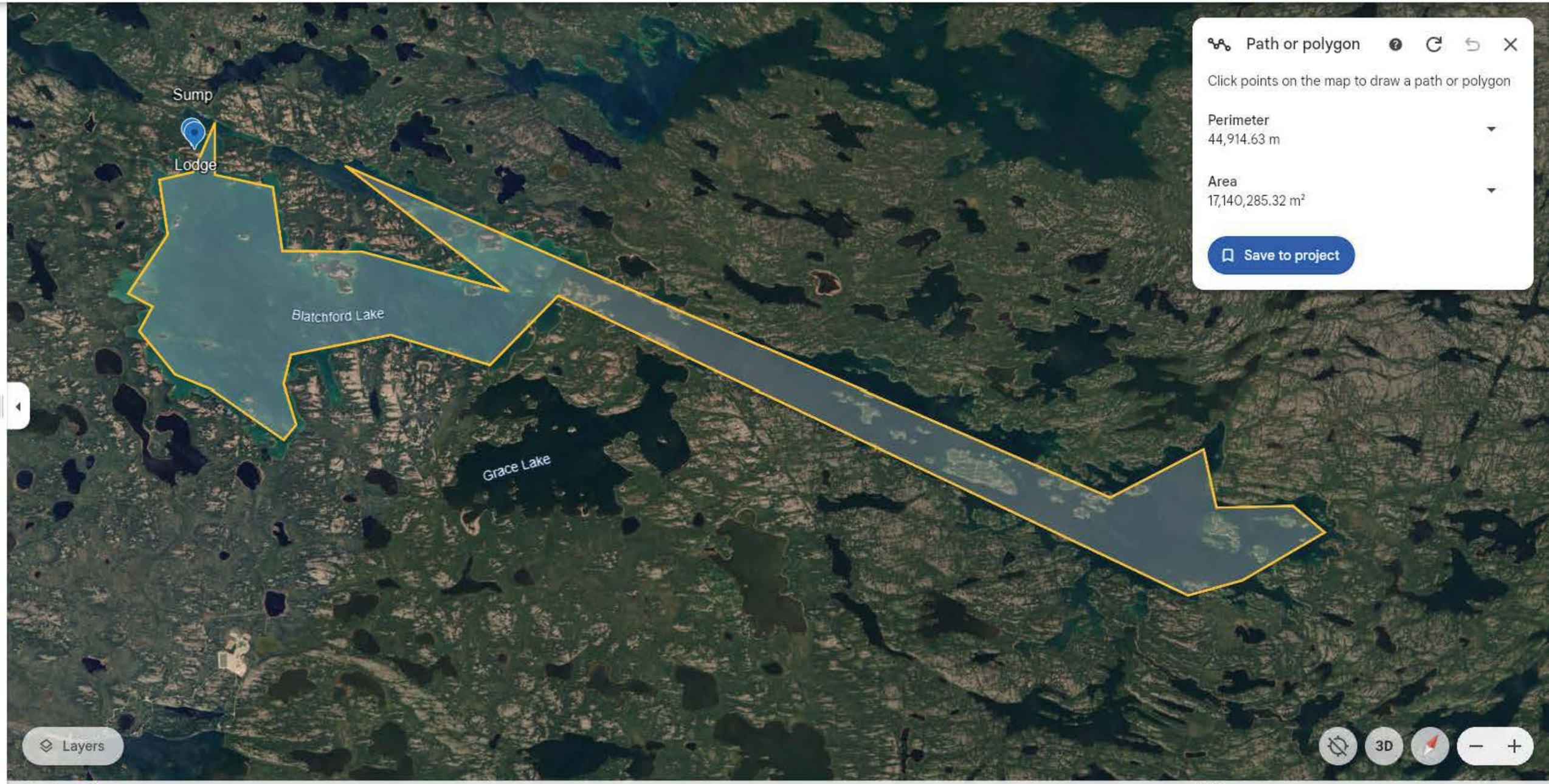
SOUTH AFRICA
Saniflo Africa (PTY) Ltd
Unit A6 , Spearhead Business Park
Cnr. Freedom Way & Montague Drive
Montague Gardens, 7441
Tél : +27 (0) 21 286 00 28
info@saniflo.co.za
www.saniflo.co.za

NEW ZEALAND
Saniflo New Zealand Ltd
PO Box 383 Royal Oak,
Auckland 1345
Tel : 09 390 4615
Fax : +61 2 9882 6950

SERVICE HELPLINES

	TEL	FAX
France	01 44 82 25 55	03 44 94 46 19
United Kingdom	08457 650011 (Call from a land line)	020 8842 1671
Ireland	1850 23 24 25 (LOW CALL)	+ 353 46 97 33 093
Australia	+1300 554 779	+61.2.9882.6950
Deutschland	0800 82 27 82 0	(060 74) 30928-90
Italia	0382 6181	+39 0382 618200
España	+34 93 544 60 76	+34 93 462 18 96
Portugal	+35 21 911 27 85	+35 21 957 70 00
Suisse Schweiz Svizzera	+41 (0)32 631 04 74	+41 (0)32 631 04 75
Benelux	+31 475 487100	+31 475 486515
Sverige	+08-404 15 30	
Norge	+08-404 15 30	
Polska	(+4822) 732 00 33	(+4822) 751 35 16
Россия	(495) 258 29 51	(495) 258 29 51
Česká Republika	+420 266 712 855	+420 266 712 856
România	+40 256 245 092	+40 256 245 029
Türkiye	+90 212 275 30 88	+90 212 275 90 58
Brazil	(11) 3052-2292	
中国	+86(0)21 6218 8969	+86(0)21 6218 8970
South Africa	+27 (0) 21 286 00 28	

Service information : www.sfa.biz


Sump
Lodge
Blatchford Lake
Grace Lake
Path or polygon
Click points on the map to draw a path or polygon
Perimeter
44,914.63 m
Area
17,140,285.32 m²
Save to project
Layers
3D
Google
100%
Data attribution
6/14/2017-newer
2,000 m
Camera: 18 km
62°12'07"N 112°29'43"W 234 m

Mackenzie Valley Land and Water Board
7th Floor - 4922 48th Street
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

October 25, 2017

File: MV2017J0029
MV2017L3-0005

Mr. Mike Freeland, Owner
Blachford Lake Lodge
P.O. Box 1568
YELLOWKNIFE, NT X1A 2P2

Email: mike@blachfordlakelodge.com

Dear Mr. Freeland:

Issuance of Type A Land Use Permit and Type B Water Licence
Domestic Use, Outfitting Camp – Blachford Lake, NT

Attached is Type A Land Use Permit (Permit) MV2017J0029 granted by the Mackenzie Valley Land and Water Board (MVLWB or the Board) in accordance with the *Mackenzie Valley Resource Management Act* (MVRMA). This Permit has been approved for a period of 5 (five) years commencing October 25, 2017 and expiring October 24, 2022.

Also attached is Type B Water Licence (Licence) MV2017L3-0005 granted by the Board in accordance with the MVRMA and *Waters Act*. This Licence has been approved for a period of 7 (seven) years commencing October 25, 2017 and expiring October 24, 2024. A copy of the *General Procedures for the Administration of Licences in the Northwest Territories*. The MVLWB requests that you review these and address any questions to the Board's office.

Please read all conditions carefully. For the purpose of submitting plans in accordance with these authorizations, the date of this letter, October 25, 2017, is the date of commencement.

Security

In accordance with Part C, item 1 of the Licence, a security deposit in the amount of **$8,220.00** shall be posted with the Minister and copied to the Board **prior to January 23, 2018**, pursuant to section 35 of the *Waters Act*. Submit payment of the security, made out to the **Government of the Northwest Territories**, in the amount of $8,220.00, to: Government of the Northwest Territories, Box 1320, Yellowknife, NT, X1A 2L9, Attention: Director, Water Resources. Please provide a copy of the receipt of security to the MVLWB office prior to January 23, 2018.

…/2

Management Plans

The Board hereby approves the **Engagement Plan** as submitted with the Applications, and required by Part B, item 11 of the Licence and condition 52 of the Permit.

The Board hereby requires that Blachford Lake Lodge resubmit the Waste Management Plan and Spill Contingency Plan in accordance with comments made during this review, as summarized in Table 1. These Plans will be considered to be approved upon written confirmation of conformity from Board staff.

Table 1: Plans requiring resubmission

Condition Number	Title of Plan	Date Due	Revision Requirements
Part G, item 2 Condition 23	**Waste Management Plan**	**November 30, 2017**	• Include a detailed and accurate reflection of current waste management practices, in particular regarding the blackwater system; • Ensure terminology used matches the definitions used in the Water Licence; and • Include the Covered Sump monitoring forms. •
Part H, item 1 Condition 40	**Spill Contingency Plan**		• Include ensuring that staff will undergo annual Spill Response Training. • Include reference to the Blachford main office maintaining records of staff training. •

Copies of the Permit and Licence have been filed on the Public Registry at the MVLWB office. Please be advised that this letter, with attached procedures, all inspection reports, and related correspondence, are part of the Public Registry which is intended to keep all interested parties informed of the manner in which the Permit and Licence requirements are being met. All Public Registry material will be considered if an amendment to the Permit or Licence is requested.

Should you wish to discontinue your land-use operation at any time prior to the date of completion set out in the Permit, a written notice of discontinuance is required as per section 37 of the MVLUR, in addition to the submission of a final plan.

…3/

Blachford Lake Lodge shall adhere to the commitments made in their responses to reviewer comments dated October 11, 2017. The full cooperation of Blachford Lake Lodge is anticipated and appreciated. If you have any questions or concerns, please contact Erica Janes at (867) 766-7466 or email ejanes@mvlwb.com.

Yours sincerely,

Mavis Cli-Michaud
MVLWB, Chair

Copied to: Distribution List
Nahum Lee, Water Resources Officer, GNWT-ENR
Clint Ambrose, GNWT-Lands Inspector

Attached: Land Use Permit MV2017J0029
Water Licence MV2017L3-0005
Reasons for Decision
Review Summary and Attachments
General Procedures for the Administration of Licences in the Northwest Territories

Land Use Permit

Permit Class	Permit No	Amendment No
A	MV2017J0029	-

Subject to the Mackenzie Valley Land Use Regulations and the terms and conditions in this Permit, authority is hereby granted to:

Blachford Lake Lodge

Permittee

to proceed with the land use operation described in the Application of:

Signature Mr. Mike Freeland	October 25, 2017
Type of Land Use Operation Domestic Use – Outfitting Camp	
Location Blachford Lake, NT	

This Permit may be assigned, extended, discontinued, suspended, or cancelled pursuant to the Mackenzie Valley Land Use Regulations.

Dated at Yellowknife this 25 day of October , 2017

Signature Chair

Mavis Cli-Michaud

Signature Witness

Tyree Mullaney

Commencement Date
October 25, 2017

Expiry Date
October 24, 2022

ATTENTION

It is a condition of this Permit that the Permittee comply with the provisions of the *Mackenzie Valley Resource Management Act* and Regulations and the terms and conditions set out herein. A failure to comply may result in suspension or cancellation of this Permit.

Conditions Annexed to and Forming Part of Land Use Permit # MV2017J0029

Part A: Scope of Permit

1. This Permit entitles the Permittee to conduct the following land-use activities associated with the operation of a tourist fishing lodge and educational and cultural camp facility on Blachford Lake, NT:
   a) Use of a campsite/lodge exceeding 400 person-days;
   b) Use and storage of vehicles and equipment; and
   c) Storage of fuel;

2. This Permit is issued subject to the conditions contained herein with respect to the use of land for the activities and area identified in Part A, item 1 of this Permit.

3. Compliance with the term and conditions of this Permit does not excuse the Permittee from its obligation to comply with the requirements of any applicable Federal, Territorial, or Municipal laws.

Part B: Definitions (defined terms are capitalized throughout the Permit)

Act - the *Mackenzie Valley Resource Management Act*.

Board - the Mackenzie Valley Land and Water Board established under Part 4 of the Act, or the Mackenzie Valley Land and Water Board established under Part 3 of the Act, as the case may be.

Covered Sump - a man-made pit or natural depression in the earth's surface used for the purpose of depositing Sewage as described in the application.

Engagement Plan - a document, developed in accordance with the Board's *Engagement and Consultation Policy* and the *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*, that clearly describes how, when, and which engagement activities will occur with an affected party during the life of the project.

Fuel Storage Container - a container for the storage of petroleum or allied petroleum products with a capacity of less than 230 litres.

Fuel Storage Tank - a closed container for the storage of petroleum or allied petroleum products with a capacity of more than 230 litres.

Greywater - all liquid wastes from showers, baths, sinks, kitchens, and domestic washing facilities but not including toilet wastes.

Habitat - the area or type of site where a species or an individual of a species of wildlife naturally occurs or on which it depends, directly or indirectly, to carry out its life processes.

Inspector - an Inspector designated by the Minister under the *Act.*

Minister - the Minister of Indian Affairs and Northern Development Canada or the Minister of the Government of the Northwest Territories – Department of Lands, as the case may be.

Ordinary High Water Mark - the usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands, or marine environments, it refers to those parts of the Watercourse bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs, this refers to normal high operating levels (full supply level).

Permittee - the holder of this permit.

Secondary Containment - containment that prevents liquids that leak from Fuel Storage Tanks or containers from reaching outside the containment area and includes double-walled Tanks, piping, liners, and impermeable barriers.

Sewage - all toilet wastes and Greywater.

Spill Contingency Plan - a document, developed in accordance with Aboriginal Affairs and Northern Development Canada's *Guidelines for Spill Contingency Planning* (April 2007*,* that describes the set of procedures to be implemented to minimize the effects of a spill.

Toxic Material - any substance that enters or may enter the environment in a quantity or concentration or under conditions such that it:

a) Has or may have an immediate or long-term harmful effect on the environment or its biological diversity;
b) Constitutes or may constitute a danger to the environment on which life depends; or
c) Constitutes or may constitute a danger in Canada to human life or health.

Waste - any garbage, debris, chemical, or Toxic Material to be used, stored, disposed of, or handled on land, and also as defined in section 51 of the Act**.**

Waste Management Plan - a document, developed in accordance with the Board's *Guidelines for Developing a Waste Management Plan,* that describes the methods of Waste management from Waste generation to final disposal.

Watercourse - a natural body of flowing or standing water or an area occupied by water during part of the year, and includes streams, springs, swamps and gulches but does not include groundwater.

Part C: Conditions Applying to All Activities (headings correspond to subsection 26(1) of the Mackenzie Valley Land Use Regulations)

26(1)(*a*) Location and Area

1. The Permittee shall use an existing campsite, as described in the complete application. **EXISTING CAMP**

2. The Permittee shall not conduct this land-use operation on any lands not designated in the complete application. **LOCATION OF ACTIVITIES**

26(1)(*b*) Time

3. At least 48 hours prior to the commencement of the land-use operation, the Permittee's Field Supervisor shall contact an Inspector at (867) 767-9188. **CONTACT INSPECTOR**

4. At least 48 hours prior to commencement of this land-use operation, the Permittee shall provide the following information, in writing, to the Board and an Inspector: **IDENTIFY AGENT**
   (a) the name(s) of the person(s) in charge of the field operation;
   (b) alternates; and
   (c) all methods for contacting the above person(s).

5. At least ten days prior to the completion of the land-use operation, the Permittee shall advise an Inspector of: **REPORTS BEFORE REMOVAL**
   a) the plan for removal or storage of equipment and materials; and
   b) when final cleanup and reclamation of the land used will be completed.

26(1)(*c*) Type and Size of Equipment

6. The Permittee shall not use any equipment except of a similar type, size, and number to that listed in the complete application. **ONLY APPROVED EQUIPMENT**

7. The Permittee shall maintain fire-fighting equipment at the site in accordance with the *Government of the Northwest Territories' Forest Fire Prevention and Suppression Guidelines for Industrial Activities*. **FIRE-FIGHTING EQUIPMENT**

26(1)(*d*) Methods and Techniques

8. The Permittee shall not erect camps or store material, other than that required for immediate use, on the ice surface of a Watercourse. **STORAGE ON ICE**

26(1)(*e*) Type, Location, Capacity, and Operation of All Facilities

9. The Permittee shall ensure that the land use area is kept clean at all times. **CLEAN WORK AREA**

10. The Permittee shall not locate any sump within 100 metres of the Ordinary High Water Mark of any Watercourse, unless otherwise authorized in writing by an Inspector. **SUMPS FROM WATER**

26(1)(*f*) Control or Prevention of Ponding of Water, Flooding, Erosion, Slides, and Subsidence of Land

11. The land-use operation shall not cause obstruction to any natural drainage. **NATURAL DRAINAGE**

12. The Permittee shall minimize erosion by installing erosion control structures as the land-use operation progresses. **PROGRESSIVE EROSION CONTROL**

13. The Permittee shall not conduct off-road vehicle travel in areas without snow-covered surfaces. **OFF-ROAD VEHICLE TRAVEL**

14. The Permittee shall suspend overland travel of equipment or vehicles at the first sign of rutting. **SUSPEND OVERLAND TRAVEL**

15. The Permittee shall not move any equipment or vehicles unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting or gouging. **VEHICLE MOVEMENT FREEZE-UP**

16. The Permittee shall not remove vegetation or operate heavy equipment within 100 metres of the Ordinary High Water Mark of any Watercourse. **WATERCOURSE BUFFER**

26(1)(*g*) Use, Storage, Handling, and Ultimate Disposal of Any Chemical or Toxic Material

17. At least seven days prior to the use of any chemicals that were not identified in the accepted application, the MSDS sheets must be provided to an Inspector and the Board. **CHEMICALS**

18. Prior to the expiry date of this Permit or the end of the land-use operation whichever comes first, the Permittee shall backfill and restore all sumps, unless otherwise authorized in writing by an Inspector. **BACKFILL SUMPS**

19. The Permittee shall maintain a record of all spills. For all reportable spills, in accordance with the GNWT *Spill Contingency Planning and Reporting Regulations,* the Permittee shall: **REPORT SPILLS**

    a) immediately report each spill to the 24-hour Spill Report Line (867) 920-8130;
    b) report each spill to an Inspector within 24 hours; and
    c) submit, to the Board and an Inspector, a detailed report on each spill within 30 days.

20. The Permittee shall dispose of all Toxic Material as described in the approved Waste Management Plan. **WASTE CHEMICAL DISPOSAL**

21. The Permittee shall dispose of all combustible Waste petroleum products by removal to an approved disposal facility. **WASTE PETROLEUM DISPOSAL**

26(1)(*h*) Wildlife and Fish Habitat

22. The Permittee shall take all reasonable measures to prevent damage to wildlife and fish Habitat during this land-use operation. **HABITAT DAMAGE**

26(1)(*i*) Storage, Handling, and Disposal of Refuse or Sewage

23. The Permittee shall adhere to the **Waste Management Plan**, once approved, and shall annually review the plan and make any necessary revisions to reflect changes in operations, technology, chemicals, or fuels, or as directed by the Board. Revisions to the plan shall be submitted to the Board for approval. **WASTE MANAGEMENT**

24. The Permittee shall keep all garbage and debris in a secure container until disposal. **GARAGE CONTAINER**

25. The Permittee shall dispose of all garbage, Waste, and debris as described in the approved Waste Management Plan, unless otherwise authorized in writing by an Inspector. **REMOVE GARBAGE**

26. The Permittee shall dispose of all Sewage and Greywater into a Covered Sump at least 100 metres from the Ordinary High Water Mark of any Watercourse. **SEWAGE DISPOSAL – COVERED SUMP**

27. The Permittee shall dispose of all Sewage as described in the approved Waste Management Plan. **SEWAGE DISPOSAL – PLAN**

26(1)(*j*) Protection of Historical, Archaeological, and Burial Sites

28. The Permittee shall not operate any vehicle or equipment within 150 metres of a known or suspected historical or archaeological site or burial ground. **ARCHAEOLOGICAL BUFFER**

29. The Permittee shall not knowingly remove, disturb, or displace any archaeological specimen or site. **SITE DISTURBANCE**

30. The Permittee shall, where a suspected archaeological or historical site, or burial ground is discovered: **SITE DISCOVERY AND NOTIFICATION**

    a) immediately suspend operations on the site; and
    b) notify the Board at (867) 873-0506 or an Inspector at (867) 767-9188, and the Prince of Wales Northern Heritage Centre at 767-9347 ext. 71250 or ext. 71251.

26(1)(*k*) Objects and Places of Recreational, Scenic, and Ecological Value

Left blank intentionally

26(1)(*l*) Security Deposit

31. All costs to remediate the area under this Permit are the responsibility of the Permittee. **RESPONSIBILITY FOR REMEDIATION COSTS**

26(1)(*m*) Fuel Storage

32. The Permittee shall: **CHECK FOR LEAKS**

    a) examine all Fuel Storage Containers and Tanks for leaks a minimum once per week ; and
    b) repair all leaks immediately.

33. The Permittee shall not place any Fuel Storage Containers or Tanks within 100 metres of the Ordinary High Water Mark of any Watercourse, unless otherwise authorized in writing by an Inspector. **FUEL NEAR WATER**

34. The Permittee shall ensure that all fuel caches have adequate Secondary Containment. **FUEL CACHE SECONDARY CONTAINMENT**

35. The Permittee shall set up all refueling points with Secondary Containment. **SECONDARY CONTAINMENT – REFUELING**

36. The Permittee shall mark all Fuel Storage Containers and Tanks with the Permittee's name. **MARK CONTAINERS AND TANKS**

37. The Permittee shall have a maximum of 16,000 litres of fuel stored on the land use site at any time, unless otherwise authorized in writing by the Board. **MAXIMUM FUEL ON SITE**

38. Within ten days of the establishment of any fuel cache, the Permittee shall report the location and quantity of the cache in writing to the Board and an Inspector. **REPORT FUEL LOCATION**

39. The Permittee shall seal all outlets of Fuel Storage Containers and store the containers on their sides with the outlets located at 3 and 9 o'clock, except for containers currently in use. **SEAL OUTLET**

40. The Permittee shall adhere to the **Spill Contingency Plan**, once approved, and shall annually review the plan and make any necessary revisions to reflect changes in operations, technology, chemicals, or fuels, or as directed by the Board. Revisions to the plan shall be submitted to the Board for approval. **SPILL CONTINGENCY PLAN**

41. Prior to commencement of the land-use operation the Permittee shall ensure that spill-response equipment is in place to respond to any potential spills. **SPILL RESPONSE**

42. The Permittee shall clean up all leaks, spills, and contaminated material. **CLEAN UP SPILLS**

26(1)(*n*) Methods and Techniques for Debris and Brush Disposal

43. The Permittee shall progressively dispose of all brush and trees and shall complete all brush disposal; all disposal shall be completed prior to the expiry date of this permit. **BRUSH DISPOSAL/TIME**

44. The Permittee shall not clear areas larger than identified in the complete application. **MINIMIZE AREA CLEARED**

26(1)(*o*) Restoration of the Lands

45. Prior to the expiry date of this Permit, the Permittee shall complete all cleanup and restoration of the lands used. **FINAL CLEANUP AND RESTORATION**

46. Prior to the expiry date of this Permit, the Permittee shall prepare the site in such a manner as to facilitate natural revegetation. **NATURAL VEGETATION**

47. The Permittee shall carry out progressive reclamation of disturbed areas as soon as it is practical to do so. **PROGRESSIVE RECLAMATION**

48. The Permittee shall restore any trails impacted by the land-use operation by removing fallen trees and any other obstructions from the trails. **TRAILS RESTORATION**

26(1)(*p*) Display of Permits and Permit Numbers

49. The Permittee shall display a copy of this Permit on the site established to carry out this land-use operation. **DISPLAY PERMIT**

50. The Permittee shall ensure that all persons working under the authority of the Land Use Permit are aware of and adhere to the conditions in the Land Use Permit. **NOTIFICATION TO ALL EMPLOYEES/ CONTRACTORS**

26(1)(*q*) Biological and Physical Protection of the Land

51. If any plan is not approved by the Board, the Permittee shall revise the plan according to the Board's direction and re-submit it to the Board for approval. **RESUBMIT PLAN**

52. The Permittee shall adhere to the **Engagement Plan**, once approved, and shall annually review the plan and make any necessary revisions to reflect changes in operations or as directed by the Board. Revisions to the plan shall be submitted to the Board for approval. **ENGAGEMENT PLAN**

53. All revised plans submitted to the Board shall include a brief summary of the changes made to the plan. **SUMMARY OF CHANGES**

Mackenzie Valley Land and Water Board
Water Licence

Pursuant to the *Mackenzie Valley Resource Management Act* the *Waters Act*, and the Waters Regulations, the Mackenzie Valley Land and Water Board, hereinafter referred to as the Board, hereby grants to:

Blachford Lake Lodge
(Licensee)

of P.O. Box 1568, Yellowknife NT, X1A 2P2
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert, or otherwise use water subject to the restrictions and conditions contained in the *Waters Act* and Regulations made thereunder and subject to and in accordance with the conditions specified in this Licence.

Licence Number:	MV2017L3-0005
Licence Type:	B
Water Management Area:	1
Location:	62°09'55" N, 112°40'59" W
Purpose:	To use water and dispose of waste and associated uses
Description:	Domestic Use – Outfitting Camp
Quantity of Water **not to be exceeded**:	19,000 cubic metres (m^3) per year
Effective date of licence:	October 25, 2017
Expiry date of licence:	October 24, 2024

This Licence issued and recorded at Yellowknife includes and is subject to the annexed conditions.

Mackenzie Valley Land and Water Board

Chair **Witness**

DRAFT Type B Water Licence #MV2017L3-0005
Blachford Lake Lodge
Domestic Use – Outfitting Camp

Table of Contents

Part A: Scope and Definitions

1. Scope

a) This Licence entitles the Licensee to use Water and dispose of Waste for the purpose of operating a tourist fishing lodge and educational and cultural camp facility located on Blachford Lake, Northwest Territories.

b) This Licence is issued subject to the conditions contained herein with respect to the taking of Water and the depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposit of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Commissioner in Executive Council under the Act, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations.

c) Compliance with the term and conditions of this Licence does not relieve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial or Municipal legislation.

d) The Licensee shall take every reasonable precaution to protect the environment.

e) In conducting its activities under this Licence, the Licensee shall make best efforts to consider and incorporate any scientific and Traditional Knowledge that is made available to the Licensee.

2. Definitions

Act - the *Waters Act*, S.N.W.T. 2014, c.18.

Analyst - an Analyst designated by the Minister by subsection 65(1) of the Act.

Board - the Mackenzie Valley Land and Water Board established by subsection 99(1) of the *Mackenzie Valley Resource Management Act*.

Closure and Reclamation Plan - a document, developed in accordance with the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's November 2013 Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories which describes the proposed plans to close and reclaim the undertaking.

Construction - any activities undertaken to construct or build any components of, or associated with, the undertaking.

Covered Sump - a man-made pit or natural depression in the earth's surface used for the purpose of depositing Sewage as described in the application.

Discharge - the direct or indirect release of any Water or Waste to the Receiving Environment.

Engagement Plan - a document, developed in accordance with the Board's June 2013 *Engagement and Consultation Policy* and the *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits* describes proposed engagement activities during the life of the undertaking.

Groundwater - all Water below the ground surface.

Greywater - all liquid Wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include Toilet Wastes.

Inspector - an Inspector designated by the Minister under subsection 65(1) of the Act.

Licensee – Blachford Lake Lodge.

Minister - a duly appointed member of the Executive Council who is responsible for the *Waters Act* or the department responsible for administering that Act.

Modification - a change, other than an expansion, that does not alter the purpose or function of a structure.

Receiving Environment - the aquatic environment that receives any Water or Waste released from the undertaking.

Reclamation - activities which facilitate the return of areas affected by the undertaking to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment, human activities, and the surrounding environment.

Regulations - Regulations promulgated pursuant to section 63 of the Act.

Sewage - all Toilet Wastes and Greywater.

Sewage Disposal Facilities - the area and associated infrastructure designated to contain Sewage as identified as the composting toilet, deep pit outhouses, Wastewater holding tanks, and the Covered Sump in the application.

Spill Contingency Plan - a document, developed in accordance with Indian and Northern Affairs Canada's April 2007 *Guidelines for Spill Contingency Planning*, that describes the set of procedures to be implemented to minimize the effects of a spill.

Surveillance Network Program (SNP) - the monitoring requirements detailed in Annex A of this Licence.

Traditional Knowledge - the cumulative collective body of knowledge, experience and values built up by a group of people through generations of living in close contact with nature. It builds upon the historic experiences of a people, and adapts to social, economic, environmental, spiritual and political change.

Toilet Wastes - all human excreta and associated products, not including Greywater;

Unauthorized Discharge - a Discharge or spill of any Water or Waste not authorized under this Licence.

Waste – any Waste as defined in section 1 of the Act.

Wastewater - any Water that is generated by activities or originates on site and contains Waste and includes, but is not limited to, runoff, Seepage, or Minewater.

Waste Management Plan - a document, developed in accordance with the Board's March 2011 *Guidelines for the Development of a Waste Management Plan* which describes the methods of Waste management from Waste generation to final disposal.

Water - any Water as defined in section 1 of the Act.

Water Supply Facilities - the area and associated intake and distribution infrastructure designed to supply Water as identified as an above-ground pipe/hose, pump and Water storage tank in the application.

Water Use - a use of Water as defined in section 1 of the Act.

Part B: General Conditions

1. The Licensee shall ensure a copy of this Licence is maintained on site at all times.

2. All references to policies, guidelines, codes of practice, statutes, Regulations or other authorities shall be read as a reference to the most recent versions.

3. All information submitted to the Board, as required by this Licence, shall:
    a) Be in accordance with the Mackenzie Valley Land and Water Board's March 2012, *Document Submission Standards;* and
    b) Include a section within each submission which identifies where the pertinent requirements of the Licence are addressed.

4. The Licensee shall operate in accordance with approved plans referred to in this Licence, including such revisions as may be made pursuant to the conditions of this Licence and as approved by the Board. If any plan is not approved by the Board, the Licensee shall revise the plan as directed and resubmit it to the Board for approval.

5. All revisions to plans shall include a brief summary of the changes made, be in a format consistent with the Mackenzie Valley Land and Water Board's *Standard Outline for Management Plans*, and be submitted to the Board for approval at least 60 days prior to any proposed changes to the requirements in the approved plans.

6. The Licensee shall comply with the **Schedules** which are annexed to and forms part of this Licence, and any changes to the Schedules as may be made from time to time by the Board.

7. The Licensee shall comply the **Surveillance Network Program**, which is annexed to and forms part of this Licence, and any changes to the Surveillance Network Program as may be made from time to time by the Board.

8. The Schedules, Surveillance Network Program, and any compliance dates specified in this Licence may be changed at the discretion of the Board. If any date for a submission falls on a weekend or holiday, the submission shall be submitted on the following business day.

9. Meters, devices, or other such methods used for measuring the volumes of Water used and Waste Discharged shall be installed, operated, and maintained by the Licensee to the satisfaction of an Inspector.

10. Within 60 days following issuance of this Licence, the Licensee shall post signs to identify the Surveillance Network Program stations. All signs shall be located and maintained to the satisfaction of an Inspector.

11. The Licensee shall act in accordance with the **Engagement Plan** once approved by the Board. The Licensee shall annually review the approved Plan and make any necessary revisions to reflect changes in operations, or as directed by the Board. The revised Plan shall include a brief summary of the changes made, and shall be submitted to the Board, for approval, at least 60 days prior to any proposed changes to the requirements in the approved Plan.

12. Beginning March 1, 2018, and no later than every March 1 thereafter, the Licensee shall submit to the Board, an **Annual Water Licence Report**. The report shall be in accordance with Schedule 1.

Part C: Conditions Applying to Security Deposits

1. By January 23, 2018 the Licensee shall post and maintain a security deposit of $8,220.00, pursuant to section 35 of the Act and section 11 of the Waters Regulations.

Part D: Conditions Applying to Water Use

1. The Licensee shall obtain all Water from Blachford Lake using the **Water Supply Facilities**, or unless otherwise approved by the Board.

2. The annual quantity of fresh Water withdrawn shall not exceed 19,000 m^3.

3. The Licensee shall comply with the most recent version of the *Department of Fisheries and Oceans Protocol for Water Withdrawal in the Northwest Territories*.

4. The Licensee shall maintain on-site, to the satisfaction of an Inspector, a detailed log of the total daily volumes of Water withdrawn from Blachford Lake. The log(s) will be provided to the Water Licence Inspector or the Board upon request.

Part E: Conditions Applying to Construction

1. The Licensee shall ensure that all structures intended to contain, withhold, divert, or retain Water or Wastes are designed, constructed, and maintained to prevent escape of Waste to the Receiving Environment.

Part F: Conditions Applying to Modifications

1. The Licensee may, without written approval from the Board, carry out Modifications to the Water Supply Facilities, Sewage Disposal Facilities and the Sump provided the following requirements are met:
   a) The Licensee has notified the Board and an Inspector in writing of such proposed Modifications at least 60 days prior to beginning the Modifications;
   b) The Modifications do not place the Licensee in contravention of either the Licence or the Act;
   c) The Board has not, during the 60 days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than 60 days;
   d) An Inspector has authorized the proposed Modifications and provided a letter of notification to the Board; and,
   e) The Board has not rejected the proposed Modifications.

2. Modifications for which all of the conditions referred to in Part F, item 1 have not been met, may be carried out only with written approval from the Board.

Part G: Conditions Applying to Water and Waste Management

1. The Licensee shall manage Water and Waste with the objectives of minimizing impacts on the quantity and quality of Water in the Receiving Environment through the use of appropriate mitigation measures, monitoring, and follow-up actions.

2. The Licensee shall act in accordance with the **Waste Management Plan**, once approved by the Board. The Licensee shall annually review the approved Plan and make any necessary revisions to reflect changes in operations, or as directed by the Board. The revised Plan shall include a brief summary of the changes made, and shall be submitted to the Board, for approval, at least 60 days prior to any proposed changes to the requirements in the approved Plan.

3. The Licensee shall maintain the **Sewage Disposal Facilities** to the satisfaction of an Inspector.

Part H: Conditions Applying to Spill Contingency Planning

1. The Licensee shall act in accordance with the **Spill Contingency Plan** once approved by the Board. The Licensee shall annually review the approved Plan and make any necessary revisions to reflect changes in operations, or as directed by the Board. The revised Plan shall include a brief summary of the changes made, and shall be submitted to the Board, for approval, at least 60 days prior to any proposed changes to the requirements in the approved Plan.

2. If, during the period of this Licence, a spill or an Unauthorized Discharge occurs or is foreseeable, the Licensee shall:
   a) Implement the Spill Contingency Plan referred to in Part H, item 1;
   b) Report the incident immediately via the 24-Hour Spill Reporting Line (867) 920-8130 in accordance with the instructions contained in the Spill Report Form NWT 1752/0593;
   c) Report each spill and Unauthorized Discharge to the Board and an Inspector within 24 hours; and,
   d) Submit a detailed report on each spill and Unauthorized Discharge, including descriptions of root causes, response actions and any changes to procedures to prevent similar occurrences in the future, to the Board within 30 days.

3. All spills and Unauthorized Discharges of Water or Waste shall be reclaimed to the satisfaction of an Inspector.

Part I: Conditions Applying to Closure and Reclamation

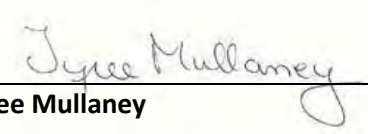
1. The Licensee shall submit a **Closure and Reclamation Plan** to the Board, for approval, 12 months prior to the end of operations. The Plan shall include, but not be limited to, the following information:

   a) Water Supply Facilities, including Water treatment;
   b) Sewage Disposal Facilities:
      i) Contamination remediation;
      ii) Leachate prevention; and
      iii) Types and sources of cover materials;
   c) Petroleum and chemical storage areas;
   d) Sites affected by spills or Unauthorized Discharges;
   e) Methods to restore watercourse banks;
   f) Potential locations for Groundwater contamination;
   g) Any facilities or areas which may have been affected by the development such that pollution problems exist;
   h) A phased approach for completing the activities and implementation schedule; and
   i) Maps delineating all disturbed areas, borrow material locations, and site facilities.

2. The Licensee shall carry out progressive Reclamation of areas as soon as is reasonably practicable.

Signed on behalf of the Mackenzie Valley Land and Water Board

Mavis Cli-Michaud, Chair



Tyree Mullaney

Schedule 1
Part B: General Conditions

1) The **Annual Water Licence Report** referred to in Part B, item 12, shall include, but not be limited to, the following information:

   a) A summary of engagement activities conducted in accordance with the approved Engagement Plan, referred to in Part B of this Licence, undertaken during the previous calendar year and shall include a brief description of activities planned for the forthcoming year;
   b) A summary of Construction activities conducted in accordance with Part E of this Licence, undertaken during the previous year calendar year;
   c) A summary of Modifications and/or major maintenance work carried out on the Water Supply Facilities and Sewage Disposal Facilities, including all associated structures;
   d) A summary of activities conducted in accordance with the approved Waste Management Plan, required in Part G of this Licence, undertaken during the previous calendar year;
   e) The monthly and annual quantities in cubic metres of each and all Waste discharged;
   f) Tabular summaries of all data generated under the Surveillance Network Program, including:
      i) A map of the SNP locations;
      ii) Rationale for SNP stations where samples were not collected; and
      iii) Geographic coordinates (degrees, minutes, seconds) for each established SNP station;
   g) A summary of activities conducted in accordance with the approved Spill Contingency Plan, required in Part H of this Licence, undertaken during the previous calendar year, including:
      i) A list and description for all Unauthorized Discharges that occurred during the previous calendar year, including the date, NWT spill number, volume, location, summary of the circumstances and follow-up actions taken, and status (i.e. open or closed), in accordance with the reporting requirements in Part H of this Licence; and
      ii) An outline of any spill training and communications exercises carried out during the previous calendar year.
   h) A summary of activities conducted in accordance with the Closure and Reclamation Plan, required in Part I of this Licence, completed during the year, a summary of updates or changes made, and an outline of any work anticipated for the next year;
   i) A summary of actions taken to address concerns, non-conformances, or deficiencies in any reports filed by an Inspector; and
   j) Any other details on Water use or Waste disposal requested by the Board by November 1st of the year being reported.

Annex A: Surveillance Network Program
Annexed to Water Licence MV2017L3-0002
Blachford Lake Lodge
Domestic Use – Outfitting Camp

Part A: Reporting Requirements

1. The effective date of this Surveillance Network Program (SNP) is October 25, 2017.

2. The Licensee shall submit to the Board, SNP results as per Part B, item 12 of this Licence (Annual Water Licence Report).

3. The Licensee shall also provide SNP data at other times, if requested by an Inspector or the Board.

Part B: Sampling and Analysis Requirements

1. All sampling, sample preservation, and analyses shall be conducted in accordance with methods prescribed in the current edition of American Public Health Association's (APHA) *Standard Methods for the Examination of Water and Wastewater* at the time of analysis, or by other such methods approved by an Analyst.

2. All analyses shall be performed in a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA) for the specific analyses to be performed or as approved by an Analyst.

Part C: Site Descriptions and Monitoring Requirements

1. The location of sampling sites is subject to approval by, and satisfaction of, an Inspector.

2. More frequent sample collection may be required at the request of an Inspector.

3. The sampling station locations and monitoring requirements are as follows:

SNP station BLL-1

Description	The monthly and annual quantities of Water pumped in for domestic purposes.
Location	Water intake at Blachford Lake
Sampling Frequency	Monthly, during intake
Sampling Parameters	Volume of Water in m^3
Rationale	To monitor the monthly and annual quantity of Water withdrawn for use.
Status	Active.

SNP station BLL-2

Description	The Receiving Environment, downstream of the Covered Sump during the open Water season.
Location	The shore of Blachford Lake, east of Blachford Lake Lodge, at the closest point directly downstream of the Covered Sump.
Sampling Frequency	At the beginning and end of open Water season, (i.e. one week following freshet, and before freeze-up).
Sampling Parameters	$CBOD_5$, Total Suspended Solids, Nutrients[a], and Faecal Coliforms
Rationale	To monitor the quality of Water in the Receiving Environment downstream of the Covered Sump.
Status	Active.

Footnotes:
[a.] Total Ammonia (NH_3, + NH_4^+), Total Nitrate + Nitrite (NO_3 + NO_2), Total Phosphorus (TP), Orthophosphate (OP), and Total Organic Carbon (TOC).

Signed the 25th day of October 2017 on behalf of the Mackenzie Valley Land and Water Board

Mavis Cli-Michaud, Chair

Tyree Mullaney

Annex B: Table of Items Requiring Submission

Supplemental information to be submitted by Licensee as required through Water Licence conditions.

Part	Item	Date
Part B	Annual Water Licence Report	- Beginning March 1, 2018 and no later than every March 1 thereafter
Part B	Engagement Plan	- Annual Review
Part G	Waste Management Plan	- Annual Review
Part H	Spill Contingency Plan	- Annual Review
Part I	Closure and Reclamation Plan	- 12 months prior to the end of operations
Annex A	Surveillance Network Program reports	- With Annual Water Licence Report (Part B)

Annex C: Revisions to Water Licence 2017L3-0005

List of changes that have been made to the Water Licence since issuance:

Date	Location of Change	What has changed

Mackenzie Valley Land and Water Board
7th Floor - 4922 48th Street
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

Reasons for Decision

Issued pursuant to paragraph 40(2)(*c*) of the Mackenzie Valley Land Use Regulations (MVLUR) and sections 72.25 and 121 of the *Mackenzie Valley Resource Management Act* (MVRMA)

Type A Land Use Permit and Type B Water Licence Applications	
Preliminary Screener	MVLWB
Reference/File Number	MV2017J0029 and MV2017L3-0005
Applicant	Blachford Lake Lodge
Project	Blachford Lake Lodge – Blachford Lake, NT
Date of Decision	October 25, 2017

These Reasons for Decision set out the Mackenzie Valley Land and Water Board's (the Board or MVLWB) decision on Applications made by Blachford Lake Lodge (Blachford, or Lodge) to the Board on July 28, 2017 for Type A Land Use Permit MV2017J0029 (Permit) along with a corresponding Type B Water Licence MV2017L3-0005 (Licence).

1.0 Background

Submission Description

On July 28, 2017, Blachford Lake Lodge submitted Applications to continue operation of their tourist and camp facilities on Blachford Lake, NT, approximately 90 km south east of Yellowknife.

Description of Operation

Blachford Lake Lodge operates year-round as a commercial fishing lodge and educational and cultural camp for the purposes of aurora viewing, wilderness education, family retreats, and conferences. The Lodge was established in 1981 and consists of a main building and outbuildings (23 in total). On average, there are 25 people on site; 12 personnel stationed in camp for 10 months of the year and 4 personnel stationed for the remaining two months.

Water is sourced and pumped from Blachford Lake, with slightly different methods depending on the season. The main equipment used on site includes snowmobiles, ATVs, and small motorized equipment such as chainsaws, snow blowers, outboard boat motors, ice augers, brush cutters, pumps, and generators.

Blachford brings diesel, gas, and jet B fuel to site for storage in 205L barrels; propane is brought to site and stored in 100L cylinders. The Lodge has four fuel storage areas, one hazardous material storage area, and four fuel pumping sites. Blachford uses solar panels and a wind turbine to supplement power generation, and note in the Waste Management Plan that they have reduced fuel usage by more than half since 2013. Blachford notes that they have initiated a fish management program which involves the use of barbless hooks and fish gloves, and a catch and release protocol.

Blachford's activities include monitoring and management systems to ensure minimal impact to the land and water. Blachford employs waste minimization strategies, and breaks down all inorganic wastes for shipment to Yellowknife for proper disposal, including garbage, recycling, hazardous waste, and fuels and oils. Brush, trees, organic overburden and wood stove ash are all processed through composting systems; human waste is managed through an industrial size composting toilet and outhouses, with liquid effluent pumped into the Lodge's greywater system. This system comprises settling tanks that drain into a Covered Sump/natural depression away from buildings and Blachford Lake, and was developed with the Lands Inspector.

There are currently no activities proposed which require reclamation. Blachford notes it would be possible to remove all structures and materials off site if final reclamation is required.

A Waste Management Plan, Spill Contingency Plan, and Engagement Plan were included with the Applications. Blachford committed to annual reviews of the Waste Management Plan and Spill Contingency Plan each November, in their Applications.

Blachford holds several permits and licenses related to Lodge operation, including a valid Free Timber Cutting Permit and Tourism Licence with the Government of the Northwest Territories (GNWT).

2.0 Public Review

On July 28, 2017, the Applications were received by the Board and distributed for review shortly thereafter. By September 28, 2017, comments and recommendations on the Applications and draft Permit and Licence conditions were received from four reviewers:

- Environment and Climate Change Canada (ECCC);
- GNWT - Department of Environment and Natural Resources (GNWT-ENR);
- GNWT - Department of Lands (GNWT-Lands); and
- GNWT - Department of Lands (Lands Inspector).

Blachford responded by October 12, 2017.

3.0 Decision

The Board is satisfied that:

- the project has been screened pursuant to the MVRMA;
- any potential adverse environmental effects are insignificant or mitigatable with known technology; and,
- there is no likelihood that the proposed development might be a cause of public concern.

After reviewing the submissions of the Applicant, the written comments and submissions from parties received by the Board, the Staff Report prepared for the Board, and having due regard to the facts and circumstances, the merits of the submissions made to it, and to the purpose, scope, and intent of the MVRMA and *Waters Act* and Regulations made thereunder, the Board has determined that Land Use Permit MV2017J0029 and Water Licence MV2017L3-0005 be issued subject to the scope, definitions, conditions, and terms contained therein. The Board's determinations and reasons for this decision are set out below.

4.0 General Principles

In conducting the review process for these Applications, the Board has ensured that all applicable legal and procedural requirements have been satisfied, including:

- The Board is satisfied that appropriate consultation has been conducted and that advice has been sought and considered, in accordance with sections 63 and 64 of the MVRMA and section 43 of the *Waters Act*. The Board is satisfied that a reasonable period of notice was given to Communities and First Nations so that they could provide comments to the Board.
- The use of water and/or deposit of waste proposed by the Applicant is of a nature contemplated by the MVRMA.
- The use of land proposed by the Applicant is of a nature contemplated by the MVRMA.
- It is the opinion of the Board that the conditions attached to Permit MV2017J0029 and Licence MV2017L3-0005, pursuant to the MVRMA, will prevent or mitigate any potential environmental impacts which might result from the project, from water use and/or deposit of waste. Specific conditions and how they relate to issues raised during the regulatory proceeding are discussed below.

The scope, definitions, conditions, and terms set forth in the Licence and Permit have been developed in order to address the Board's statutory responsibilities and the concerns that arose during the regulatory proceeding.

5.0 Determinations

5.1 Requirements of Section 26 of the Waters Act

5.1.1. *Existing Licensees*

After reviewing the submissions filed on the Public Registry, the Board is satisfied that, with respect to paragraph 26(5)(a) of the *Waters Act*, the granting of this Licence will not adversely affect, in a significant way, any existing Licensee, provided that compliance with the conditions of the Licence are adhered to. There are no applicants with precedence.

5.1.2. *Existing Water Users*

Paragraph 26(5)(b) of the *Waters Act* prohibits issuance of a Licence unless the Board is satisfied that appropriate compensation has been or will be paid by the Applicant to people who were, at the time when the Applicant filed its application with the Board, members of the classes of water users, depositors, owners, occupiers, or holders listed under paragraph 26(5)(b), who would be adversely affected by the use of waters, or deposit of waste proposed by the Applicant.

The Board received no claims for compensation either during the prescribed period or afterwards. Provided that compliance with the Licence conditions is achieved, the Board does not believe that any water users or persons listed in paragraph 26(5)(b) of the *Waters Act* will be adversely affected by the deposit of Waste proposed by the Applicant.

5.1.3. *Water Quality Standards*

With regards to subparagraph 26(5)(c)(i) of the *Waters Act*, the Board is satisfied that compliance with the Licence conditions will ensure that waste will be collected and disposed of in a manner which will maintain water quality consistent with applicable standards and the Board's *Water and Effluent Quality Management Policy*.

5.1.4. *Effluent Standards*

Consistent with subparagraph 26(5)(c)(ii) of the *Waters Act*, the Board is satisfied that the effluent standards are consistent with the Board's *Water and Effluent Quality Management Policy* and are protective of the receiving waters and environment. In addition, the approved Waste Management Plan will ensure that waste will be collected and disposed of in a manner which will protective of the receiving waters and environment.

5.1.5. *Financial Responsibility of the Applicant*

The Board must satisfy itself of the financial responsibility of the Applicant under paragraph 26(5)(d) of the Waters Act before it can issue the Licence. The Board notes that the applicant has been running this operation in good standing for a number of years, and has included the requirement for a security deposit in the amount of $8,220.00 under the Water Licence to ensure sufficient resources are in place to reclaim the site.

5.2 Water Licence MV2017L3-0005 Terms and Conditions

The scope of the Licence ensures the Applicant is entitled to conduct activities which have been applied for and screened by the Board. In setting out the scope of the Licence, the Board endeavoured to provide enough detail to describe the authorized activities, and allow for project flexibility.

The Board has notified the Applicant, through a statement included in the scope, that compliance with the term and conditions of this Licence does not absolve Blachford from responsibility for compliance with the requirements of any other legislation.

The Board included a list of defined terms used in the Permit in order to ensure a common understanding of conditions and to avoid future differences in interpretation. The definitions and conditions in the Licence are based on recent Licences of similar scope and scale including recently issued outfitting camp authorizations, and reflect upon information in the Application and recommendations or concerns raised by reviewers. The Board presents the following information and rationale to support Licence MV2017L3-0005:

Definitions:

- "Sewage Disposal Facilities" was revised to include "wastewater holding tanks" based on a reviewer comment.
- "Covered Sump" was added to the definition section to more accurately describe and identify the natural depression that is used for sewage disposal, as described in the Application.

Part B of the Licence applies to matters regarding compliance and conformity with the MVRMA and *Waters Act*, and is consistent with standard conditions found in previous Licences issued by the Board. This section addresses conformity and compliance with plans, submission timelines, revisions, and format of the Surveillance Network Program (SNP) and the Schedules which are annexed to and form part of the Licence. This section also addresses signage, measuring devices, public engagement requirements, and annual water licence reporting.

Part B, item 11 refers to an Engagement Plan. This Plan describes how Blachford will engage with stakeholders about their licenced activities. The Plan is to be annually reviewed to ensure that any changes are submitted for a public review, and Board approval.

Part B, item 12 and Schedule 1 outline the requirements for the Annual Water Licence Report. The purpose of the Annual Water Licence Report is to provide the Board and reviewers with a summary of activities that have occurred on-site during the previous year, and are not meant to be onerous. These summaries include engagement activities, summary of works/maintenance completed onsite, summaries of all monitoring data, and anticipated activities for the following year. The Board has included a requirement for a map of the SNP station locations as they have not yet been selected and agreed upon with an Inspector.

Part C of the Licence applies to security. The Board has decided to apply security of $8,220.00 under the Water Licence, to be protective of the receiving environment, and in accordance with GNWT-ENR's recommended water liability, as calculated using the RECLAIM model version 7.0. The timing of the security payment is set at 90 days following issuance of the Licence, bringing the deadline for posting security to January 23, 2018.

Part D of the Licence applies to water use and reflects the amounts applied for in the Application.

Part E of the Licence contains a condition related to construction activities at the site. This condition ensures that all structures intended to contain, withhold, divert, or retain Water or Wastes are designed, constructed, and maintained to prevent escape of Waste to the Receiving Environment. This condition is standard and consistent with recently issued Licences. The purpose of Part E is to streamline the process for authorizing modifications and ensure that any proposed changes to structures that might be outside the scope of the Licence are brought to the Board's attention.

Part F of the Licence contains conditions applying to modification of structures and facilities associated with the operation. These conditions are in place to ensure changes to the project are within the scope of the applications and with the notification and approval, as appropriate, of the Inspector and/or the Board. All conditions in Part F are standard conditions and consistent with recently issued Licences.

Part G describes the overall objectives of the Licence as they apply to the management of waste and water for the Project. Part G, item 2 specifies the requirement to act in accordance with the approved Waste Management Plan. Part G, item 3 requires the Sewage Disposal Facilities to be maintained to the satisfaction of an Inspector.

Part H of the Licence contains conditions applying to spills, unauthorized discharges, and emergency response actions for the Project, and specifies the requirement to act in accordance with the approved Spill Contingency Plan. The purpose of this part is to ensure that the Licensee is fully prepared to respond to spills and unauthorized discharges. This will ensure that any spills or unauthorized discharges are effectively reported, controlled, and cleaned up, with the goal of preventing or limiting damage to the receiving environment. All conditions in Part H are standard conditions consistent with recently issued Licences.

Part I of the Licence requires the submission of a Closure and Reclamation Plan to address the aspects of site reclamation, if the facility is closed and reclaimed. The Board acknowledges that Blachford is currently operational and holds a long-term lease with the GNWT.

Annex A of the Licence contains conditions applying to the Surveillance Network Program (SNP). SNP locations monitor the volume of water used and Blachford Lake downstream of the Covered Sump, as follows:

SNP Station	Description
BLL-1	Water intake at Blachford Lake to measure monthly and annual quantities of water pumped for domestic use.
BLL-2	The shore of Blachford Lake, east of Blachford Lake Lodge, at the closest point directly downstream of the Covered Sump, to monitor the quality of Water in the Receiving Environment downstream of the Covered Sump.

Term

A term of thirty years was specifically identified by the Blachford in its Application, to align with their Lease expiry date. As per Section 26(2) of the *Waters Act*, Type B Water Licences may be issued for a term not exceeding 25 years. The Board decided to approve a term of 7 years for Water Licence MV2017L3-0005, to correspond with the 5-year (plus possible 2-year extension) term of Permit MV2017J0029, and to ensure operational consistency and ease.

5.3 Land Use Permit MV2017J0029 Terms and Conditions

The scope of the Permit ensures the Applicant is entitled to conduct activities which have been applied for and screened by the Board. In setting out the scope of the Permit, the Board endeavoured to provide enough detail to describe the authorized activities, and allow for project flexibility.

The Board has notified the Applicant, through a statement included in the scope, that compliance with the term and conditions of this Permit does not absolve Blachford from responsibility for compliance with the requirements of any other legislation.

The Board included a list of defined terms used in the Permit in order to ensure a common understanding of conditions and to avoid future differences in interpretation. The definitions and conditions in the Permit are from the MVLWB's Standard Land Use Permit Conditions Template (Standard Template), and reflect upon information in the Application and recommendations or concerns raised by reviewers. The Board presents the following information and rationale to support Permit MV2017J0029:

The following paragraphs discuss any conditions that were brought forward during the review process.

Definitions: "Covered Sump" is added to the definition section to more accurately describe and identify the natural depression that is used for sewage disposal, as described in the Application.

26(1)(b) Time: Conditions in this section are found in the MVLWB's Standard Template. The Board accepted the GNWT-Inspector recommendation to add condition "Identify Agent", as it is a standard condition.

26(1)(g) Use, Storage, Handling, and Ultimate Disposal of Any Chemical or Toxic Material: Conditions in this section are found in the MVLWB's Standard Template. The Board accepted the GNWT-Inspector recommendation to add condition "Chemicals"; this allows the Board and Inspector to review the chemicals on site and take action if there are concerns with environmental impacts.

26(1)(l) Security Deposit: The Board considered the past performance of Blachford in respect of their GNWT Land Lease confidential Inspection Report, and the low probability and/or significance of environmental damage, given Blachford's proactive efforts to protect the environment surrounding their operation and implement sustainable operational practices. As such the Board has decided to not apply security under the Land Use Permit.

26(1)(i) Storage, Handling, and Disposal of Refuse or Sewage: Conditions in this section are found in the MVLWB's Standard Template. The Board accepted the GNWT-Inspector recommendation to add condition "Garbage Container", to require the Permittee to contain all garbage and prevent wildlife from getting into garbage.

26(1)(m) Fuel Storage: Conditions in this section are found in the MVLWB's Standard Template. The Board accepted the GNWT-Inspector recommendation to remove condition "Drip Trays" and rationale that it is not practical or necessary for the type and scale of this operation.

26(1)(n) Methods and Techniques for Debris and Brush Disposal: Conditions in this section are found in the MVLWB's Standard Template. The Board accepted the GNWT-Inspector recommendation to add condition "Brush Disposal/Time" as it requires progressive disposal of brush and trees so the site is well groomed; this may assist with fire prevention.

5.4 Management Plans

The Board has approved the Engagement Plan because it meets the applicable guidelines and sufficiently reflects the scope of the proposed activities.

The Waste Management Plan should be revised and re-submitted by November 30, 2017 to reflect updates as agreed to during the public review, and to include information about annual Spill Response Training for staff, and to require that records of staff training are maintained. The revised Plan will be considered to be approved upon written confirmation of conformity from Board staff.

The Spill Contingency Plan should be revised and re-submitted by November 30, 2017 to reflect updates as agreed to during the public review, and to include the following:

- Include ensuring that staff will undergo annual Spill Response Training; and
- Include reference to the Blachford main office maintaining records of staff training.

The Waste Management Plan should be revised and re-submitted by November 30, 2017 to reflect updates as agreed to during the public review, and to include the following:

- Include a detailed and accurate reflection of current waste management practices, in particular regarding the blackwater system;
- Ensure terminology used matches the definitions used in the Water Licence; and
- Include the Covered Sump monitoring forms.

The revised Plans will be considered to be approved upon written confirmation of conformity from Board staff.

6.0 Conclusion

Land Use Permit MV2017J0029 and Water Licence MV2017L3-0005 contain provisions that the Board feels necessary to ensure and monitor compliance with the MVRMA and the *Waters Act* and the Regulations made thereunder and to provide appropriate safeguards in respect of the Applicant's use of the land and waters and/or deposit of waste affected by the Licence.

SIGNATURE

Mackenzie Valley Land and Water Board

Mavis Cli-Michaud, Chair

October 25, 2017

Date

Review Comment Table

Board:	MVLWB
Review Item:	Blachford Lake Lodge - New Land Use Permit and Water Licence Applications (MV2017J0029 and MV2017L3-0005)
File(s):	MV2017J0029 MV2017L3-0005
Proponent:	Blachford Lake Lodge
Document(s):	MV2017J0029 - Blachford Lake Lodge - New LUP Application - Jul28-17.pdf (4.6 MB) MV2017L3-0005 - Blachford Lake Lodge - New WL Application - Jul28-17.pdf (856.6 KB) MV2017J0029 MV2017L3-0005 - Blachford Lake Lodge - New Application - Engagement Plan - Jul28-17.pdf (557.2 KB) MV2017J0029 MV2017L3-0005 - Blachford Lake Lodge - New Application - Waste Management Plan - Jul28-17.pdf (818.5 KB) MV2017J0029 MV2017L3-0005 - Blachford Lake Lodge - New Application - Spill Contingency Plan - Jul28-17.pdf (875.5 KB) MV2017J0029 MV2017L3-0005 - Blachford Lake Lodge - draft LUP conditions - Sep7-17 (215 KB) MV2017J0029 MV2017L3-0005 - Blachford Lake Lodge - draft WL conditions - Sep7-17 (203 KB)
Item For Review Distributed On:	Aug 4 at 15:14 Distribution List Sep 7 at 14:08 Distribution List
Reviewer Comments Due By:	Sep 28, 2017
Item Description:	**September 7, 2017 Update: Draft Land Use Permit MV2017J0029 and Draft Water Licence MV2017L3-0005 have been added to this review, and the review has been reopened. Reviewers are now invited to comment on the draft Permit and Licence. The new review comment deadline is September 28, 2017, and the new proponent response deadline is October 12, 2017.** _____ August 21, 2017 Update: A separate review for both the draft Land Use Permit and draft Water Licence will be opened in the near future. Blachford Lake Lodge has submitted applications for a Type A Land Use Permit and a Type B Water Licence to the MVLWB. The purpose of the applications is for continued operation of their tourist fishing lodge and educational and cultural camp facilities on Blachford Lake, NT. Reviewers are invited to submit questions, comments and recommendations using the Online Review System (ORS) by **August 24, 2017**. Please provide comments and recommendations on the following: • Land Use Permit Application; • Water Licence Application;

	• Engagement Plan; • Waste Management Plan; and • Spill Contingency Plan Please note that draft Land Use Permit and Water Licence conditions will be posted for review at a later date. Under the Preliminary Screening Requirement Regulations of the Mackenzie Valley Resource Management Act (MVRMA), the Board must conduct a preliminary screening for an application for a proposed development that requires a land use permit, unless it is exempt from Part 5 of the MVRMA. Reviewers are encouraged to provide comments and recommendations to assist with the completion of the preliminary screening. All documents that have been uploaded to this review are also available on our public registry. If you have any questions or comments about the ORS or this review, please contact Board staff identified below.
General Reviewer Information:	In addition to the email distribution list, the following organizations received review materials by fax: • Fort Resolution Métis Council - Trudy King (867)394-3322; • Hay River Metis Council - Trevor Beck, President (867)874-4472; and • NWT Metis Nation - Tim Heron, NWTMN IMA Coordinator (867)872-3586.
Contact Information:	Erica Janes 867-766-7466 Heather Scott 867-766-7463 Jen Potten 867-766-7468

Blachford Lake Lodge (Proponent)				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	General File	**Comment** (doc) Revised Spill Contingency Plan. **Recommendation**	N/A	Noted.
2	General File	**Comment** (doc) LUP and WL Security Response **Recommendation**	N/A	Noted.
Environment and Climate Change Canada: Gabriel Bernard-Lacaille				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	General	**Comment** ECCC has reviewed in accordance with its mandate and doesn't have any comments at this time. **Recommendation** Not applicable.	-	Noted.
GNWT - ENR: Central Email GNWT				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
10	General File	**Comment** (doc) ENR Letter with Comments and Recommendations - **Recommendation**	-	Noted.
16	General File	**Comment** (doc) ENR Letter with Comments and Recommendation - Comments of Draft Water Licence **Recommendation**	-	Noted.
17	General File	**Comment** (doc) Attachment to September 28 2017 Letter to the Board: - Reclaim 7.0 **Recommendation**	-	Noted.
2	Topic 1: Water Intake	**Comment** It is indicated that collection of water is done via two systems pending on the season. In the summer, water is taken from the lake through a submersible pump located 10 m from shore and is connected to a 40 m above ground pipeline that runs to the storage tanks. The map provided does not outline where the water pump is within the lake. Additionally, it	**Oct 11:** Response: In the winter season, classified not by dates, but by when the open water is no longer accessible due to ice conditons, the water collections is done by a similar procedure. A 7" diameter hole is drilled through the ice in the exact same location as the summer submersible pump (please refer to updated map) with an ice auger. A portable	Adequate response. Please include a map with the first SNP Report submission.

		is not explained how this procedure changes during the winter. **Recommendation** 1) ENR recommends Taiga Sports Ltd. (c/o Blachford Lake Lodge) indicate on the map the location of water intake within the lake.	water pump is then used, with a filtered draw intake pipe through the hole, and out take connected to the 40 m above ground pipeline. By disconnecting and draining the entire pump and lines after each use we are able to continue use of all lines through out the season without them freezing solid.	
3	None	**Comment** None **Recommendation** 2) ENR recommends Taiga Sports Ltd. (c/o Blachford Lake Lodge) explain how the water collection procedure changes during the winter.	**Oct 11:** Response: In the winter season, classified not by dates, but by when the open water is no longer accessible due to ice conditons, the water collections is done by a similar procedure. A 7" diameter hole is drilled through the ice in the exact same location as the summer submersible pump (please refer to updated map) with an ice auger. A portable water pump is then used, with a filtered draw intake pipe through the hole, and out take connected to the 40 m above ground pipeline. By disconnecting and draining the entire pump and lines after each use we are able to continue use of all lines through out the season without them freezing solid.	Noted.
4	Topic 2: Greywater	**Comment** It is indicated in the Water Licence Application that liquid effluent collected from the composting toilet is pumped out of the composter daily and filtered into the lodge's grey water system. Toilet wastes are referred to as blackwater and or sewage. So by definition, the receiving water system or sump should no longer be considered or referred to as a greywater system. **Recommendation** 1) ENR recommends the Board include in the Water Licence, effluent quality criteria (EQC) and Surveillance Network Program (SNP) stations to monitor the sump quality prior to discharge. It is recommended that the SNP stations be located at the	**Oct 11:** Response: Correct there is grey water and black water pumped out together to the sump. Ultimately classifying it all as black water. The lodge operations and manuals refer to this system as the "grey water system" with all instructions and labeling using this term in reference to both. Our apologies for any confustion here. Blachford Lake Lodge has a unique environemntal toileting system called the clivus multrum, which turns all of the human bulk into compostable soil. From this composter, is where the blackwater is pumped out into the into the "grey water system" taking it out to the covered sump. The Blachford sump is unlike most others in that it	Board staff note that Blachford states there is never flow from the sump, so establishing an SNP location here would not be possible. The draft WL proposes an SNP location (BLL-2) on the shore of Blachford Lake, east of the Lodge at the closest point directly downstream of the sump, to be monitored at the beginning and end of open water season for $CBOD_5$, Total Suspended Solids, Nutrients and Faecal Coliforms, to monitor the

		discharge point where the waste leaves the sump. The Board should also consider adding some SNP sites in the surrounding environment such as the water bodies already being monitored by Taiga Sports Ltd. (c/o Blachford Lake Lodge) as indicated in the Waste Management Plan.	is covered, is 31 meters or more from the highest water point, has no bulk waste pumped into it, has no active dischage, and never is under a condition which could cause overflow. Managers onsite actively and diligently monitor the plumbing systems, the sump, and surrounding flora and fauna. Additionally Blachford performs annual water sample tests, for which all hostorically have been clean. Moreover, there are no active locations for SNP stations to be installed, with no effluent ever leaving the sump. We feel that SNP stations are not a viable monitoring system for the lodge, and that our current criteria for monitoring is satisfactory.	quality of Water in the Receiving Environment, downstream of the sump. Blachford should revise the Waste Management Plan to accurately reflect current practices and to correctly refer to blackwater, instead of greywater.
5	Topic 3: Waste Water Operation and Maintenance Plan	**Comment** Along with the Water Licence and Land Use Permit Application, Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) has completed and submitted a Waste Management Plan and a Spill Contingency Plan. Currently at site greywater, along with blackwater, is pumped to a sump. The application makes reference to a covered sump, but the sump itself is not explained in sufficient detail. ENR believes an Operation and Maintenance Plan for the covered sump should be developed. The plan should include information on the frequency of pumping water from holding tanks, the volume of water that reports to the sump, the capacity of the sump and, the freeboard limit of the sump. ENR notes that the sump was designed and created with the owner, lands officer, engineers and contractors with a record of surrounding flora and fauna to monitor environmental changes. **Recommendation** 1) ENR recommends Taiga	**Oct 11:** Response: Indeed Blachford Lake Lodge has a uniquie sump that was designed and created by the owner, lands officer, engineers and contractors, for the most environmentally viable system available. With the use of clivus multrum composting toilets, all of the bulk of the human waste stays in the composter until it is graded soil. The effluent blackwater is then pumped into the lodge's "greywater" system consisting of one 1000 liter tank and one 700 liter tank, which are then pumped down a line out of the lodge when at 80% capacity. Thus 1200 liters at a time is pumped into the covered sump. The sump itself is located 400 meters from the lodge and more then 31 meters from the high water mark on Blachford Lake. The frequency of blackwater effluent and greywater pumped is conditional to what percentage of capacity the lodge is holding. So the bulkless effluent is pumped into the sump, which then filters naturally into the vegetation. The sump does	Adequate response. Board staff agree that an Operations and Maintenance Plan is beyond the scope and scale of the operation and have not included this as a draft condition. However, the Board could request that Blachford submit their existing monitoring and sampling records with their Annual Water Licence Reports. This explanation, along with the forms for monitoring should be added to the revised Waste Management Plan. This revision should also clarify what “bulkless effluent” is.

		Sports Ltd. (c/o Blachford Lake Lodge) develop and submit an Operation and Maintenance Plan for the lodge water and the operation of the sump. The plan should include historical information such as the inventory of surrounding flora and fauna and the plan should be for board approval.	not have any activeflow, no active discharge, and is never at risk of any overflow. The managers onsite diligently monitor all systems especially being conscious of when the lodge has a heavier capacipy. The entire system itself is quite simple, and small scale compared to that of the average sump and or Operations and Maintenance plans for the NWT. With this information there should not be a need to develop and operations and maintenance plan as we are not dealing with any bulk, and effluent discharge, and overflow, etc.	
6	Topic 4: Sump Operation and Treatment	**Comment** The application explains that wood chips and saw dust were added to the sump as a cover during construction and are added annually for decomposition. In addition, bacteria are added to encourage smell reduction and environmental stability. ENR is curious why wood chips and saw dust are added to the sump. Additional information about this practice should be provided and include if it is done once the sump is empty (as erosion control) or if they are added when the sump is full? ENR is curious as to how wood chips and saw dust would enhance decomposition rather than act as an absorption medium. ENR notes that UV light is a good treatment mechanism for blackwater and greywater and that wood chips would actually prevent sun light from penetrating the sump during the summer months. **Recommendation** 1) ENR recommends Taiga Sports Ltd. (c/o Blachford Lake Lodge) provide additional rational for placing wood chips and saw dust in the sump.	**Oct 11:** Response: The wood chips and or sawdust are not added annually, but as felt required for odur retention. With stronger winds that may sometimes come from the north, the grey water and black water smell does blow up into our main guest area. Most of the time this is not an isue, but in the heat of some summers we add mostly woodchips to trap the smell down slightly. We do recognize that UV aids in the treatment and decomposition, but we choose this method to try and balance between mainaining a fresh smelling resort and an environmentally responsible sump.	Adequate response.

7	None	**Comment** None **Recommendation** 2) ENR recommends Taiga Sports Ltd. (c/o Blachford Lake Lodge) consider alternative treatment techniques for greywater and blackwater such as solar powered aeration and UV penetration to promote biological activity and improve water quality within the sump.	**Oct 11:** Response: Blachford Lake Lodge will consider alternative treatment techniques in our upcoming annual review, planning, and strategy meeting.	Noted.
8	Topic 5: Training Records	**Comment** In the Spill Contingency Plan, it is indicated that currently, Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) does not keep records of training because as indicated, all individuals have to go through the process and training. ENR notes that spill training is an ongoing requirement just like fire prevention and drills. During an emergency, responders must be familiar with techniques and steps to ensure proper and efficient response to a spill event. Spill response training should occur once a year regardless of previous training or experience in spill response. Further, records should be kept that include participant names and training dates. ENR notes that the company is liable if a situation occurs and individuals on site did not receive training or do not properly respond to the spill. **Recommendation** 1) ENR recommends that spill training exercises occur once annually. The operator may decide to do this once an individual arrives or collectively during periods of low occupancy.	**Oct 11:** Response: Blachford Lake Lodge will ensure that staff onsite will have current certified Spill Response training, in addition to all individuals having to go through our emergency, fire, spill and training.	Adequate response. Blachford should update the Spill Contingency Plan to reflect the commitment to provide training annually.
9	None	**Comment** None **Recommendation** 2) ENR recommends Taiga Sport Fishing Ltd. (c/o Blachford Lake Lodge) keep a training record which includes names and dates for all personnel.	**Oct 11:** Response: Blachford Lake Lodge's main office in Yellowknife has a record of which staff are trained and certified in all areas. We will continue to maintain this with all new and changing training requirements.	Noted. Blachford should update the Spill Contingency Plan to reflect that the main

				Yellowknife office maintains records of staff training.
10	Topic 1: Definition of Sewage Disposal Facilities	**Comment** In the Draft Water Licence, Sewage Disposal Facilities is defined as the area and associated infrastructure designated to contain Sewage as identified as the composting toilet, deep pit outhouses, and the covered sump in the application. ENR notes that it is indicated in the Water Licence Application that liquid effluent collected from the composting toilet is pumped out of the composter daily and filtered into the lodge's grey water system. The holding tanks that contain the wastewater prior to discharge into the sump should therefore also be included in the definition of Sewage Disposal Facilities. **Recommendation** 1) ENR recommends the Board amend the definition of Sewage Disposal Facilities to include the wastewater holding tanks.	**Oct 11:** Response: Blachford Lake Lodge is in agreeance that the board amend the definition of Sewage Disposal Facilities to include wastewater holding tanks.	Noted. Board staff have updated the definition of Sewage Disposal Facilities to include wastewater holding tanks.
11	Topic 2: Effluent Quality Criteria	**Comment** The draft Water Licence currently requires two Surveillance Network Program (SNP) stations; one at the water intake in Blachford Lake and a second at the shore of Blachford Lake, east of Blachford Lake Lodge, at the closest point directly downstream of the sump. ENR remains of the opinion that since liquid effluent collected from the composting toilet is pumped out of the composter daily and filtered into the lodge's grey water system which is then discharged into the sump, this effluent is now considered sewage. **Recommendation** 1) ENR recommends the Board set an SNP station and effluent quality criteria (EQC) to monitor the sump quality prior to discharge. It is recommended that the	**Oct 11:** Response: The effluent that is added to the holding tanks is filtered, diluted and contains no bulk. Blachford Lake Lodge is not of the opinion that this is considered bulk sewage. The holding tanks are pumped to a covered sump that has no active flow. There will never be any active flow from the sump. We note that our sump is extremely small and is absorbed back into the ground. There is no pooling or flowing of discharge. Since there is no waste water leaving the sump it is impossible and not practical to install any SNP stations. Blachford Lake Lodge does not see any reason to install SNP stations as there is no effluent quality to monitor.	Adequate response. See Comment ID ENR 4 above, and 14 below.

		SNP station be located at the discharge point where the waste leaves the sump.		
12	Topic 3: Closure and Reclamation Plan	**Comment** In the draft Water Licence Part I: Conditions Applying to Closure and Reclamation, clause 1. b) Sewage Disposal Facilities only considers contamination and remediation and leachate prevention. In Water Licences associated with similar developments such as Great Slave Lake Lodge, types and sources of cover materials are also considered for closure and reclamation. **Recommendation** 1) ENR recommends the Board include the types and sources of cover materials in clause 1, Part I of the Water Licence.	**Oct 11:** Response: Blachford Lake Lodge is in agreeance that the board should detail types and sources of cover material, should they wish it to create any specific regulation on covernings.	Noted. Board staff have included types and sources of cover material as a requirement in the Closure and Reclamation Plan.
13	Topic 4: SNP Station BLL-2	**Comment** The Board has requested comment on the location, parameters and frequency of the SNP Station BLL-2. ENR agrees with the proposed location at the shore of Blachford Lake, east of Blachford Lake Lodge, at the closest point directly downstream of the sump and the proposed parameters being CBOD5, Total Suspended Solids, Nutrients and Faecal Coliforms. ENR notes that Blachford Lake Lodge is operational approximately 10 months of the year and it is assumed that during the winter months, the sump is in a frozen state. ENR therefore agrees with the proposed sampling frequency being set at the beginning and end of the open water season. Should it be known or become known that seepage enters Blachford Lake during the months before freshet or after freeze-up, the monitoring frequency should be increased to capture this time period. **Recommendation** 1) ENR recommends the Board set the SNP Station BLL-2 at the	**Oct 11:** Response: The effluent that is added to the holding tanks is filtered, diluted and contains no bulk. Blachford Lake Lodge is not of the opinion that this is considered bulk sewage. The holding tanks are pumped to a covered sump that has no active flow. There will never be any active flow from the sump. We note that our sump is extremely small and is absorbed back into the ground. There is no pooling or flowing of discharge. Since there is no waste water leaving the sump it is impossible and not practical to install any SNP stations. Blachford Lake Lodge does not see any reason to install SNP stations as there is no effluent quality to monitor. Should the any authority be concerned of water quality, Blachford LAke Lodge does and is more then happy to continue performing water sampling when the lake has thawed and in the late fall. We feel that this is satisfactory for monitoring the quality of the water around the lodge and sump areas.	Refer to GNWT-ENR 4

		proposed location and sample for the proposed parameters set in the Draft Water Licence.		
14	None	**Comment** None **Recommendation** 2) ENR recommends the Board set the SNP Station BLL-2 sampling frequency at the beginning and end of the open water season, unless it is known or becomes known that seepage from the sump occurs outside of this timeframe.	**Oct 11:** Response: Blachford Lake Lodge sees no reason to install SNP stations as there is no seepage from the sump, nor will there ever be.	This SNP station has been added to the draft Licence. Blatchford has previously agreed to the inclusion of this station (see Oct12-17 email from Blachford). Refer also to Comment ID GNWT-ENR 4.
15	Topic 5: Security	**Comment** The Board has requested comment on the appropriate security amount for this undertaking. ENR has estimated a total security amount for land and water liability using the RECLAIM model version 7.0. ENR's calculation for the water liability amounted to a total of $31,536. Of this amount, $23,315 should be held under a Land instrument and $8,220 under the Water Licence. **Recommendation** 1) ENR recommends that the total security for this undertaking held under the Water Licence should be $8,220.	**Oct 11:** Response: Blachford Lake Lodge is understanding that the board is not required to request security be posted but might potentially do so pending the situation and information provided. We believe that the MVLWB was created to guide and process exploration, mining camps and large invasive operations of that nature. This application for Blachford must be one of the first "tourism operations" to come before the board. The size and scope of our lodge operation, including and potential harm to the surrounding environment, cannot be compared or applied to the same criteria as most of the exploration and mining activities. Generally speaking it is the business of mines to locate minerals of various natures, to construct infrastructure and facilities for extraction, mine the material, and then to leave the site upon completion. Please see attached appendix for further information.	Noted.

GNWT - Lands: Charlene Coe				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	comments re: LUP MV2017J0029	**Comment** (doc) formal letter **Recommendation** Permit be granted	--	Noted.
GNWT - Lands: Clint Ambrose				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	Land Use Permit - Inspector Recommended Operating Conditions	**Comment** (doc) The land use permit application and associated plans have been reviewed. **Recommendation** Attached are the Inspector's recommended operating conditions for the land use operations proposed by Blachford Lake Lodge.	**Oct 11:** Response: Blachford Lake Lodge agrees with and shall here by operate under these conditions.	Board staff note that the Inspector provided recommended conditions before Board staff had posted a draft Permit on the ORS. Inspector recommendations have been considered in the draft Permit.
2	Spill Contingency Plan	**Comment** The plan has been reviewed and a couple of edits are required since AANDC/INAC would not be the lead agency if a spill were to occur. **Recommendation** Please update the plan with contact information for the GNWT - Department of Lands Inspector; Phone: (867) 767-9188 or Cell: (867) 446-0769.	**Oct 11:** Response: Blachford Lake Lodge will update the application as required.	Board staff note that Blachford has submitted a revision of the Spill Contingency Plan to reflect the contact information.

August 22, 2017

Erica Janes
Executive Director, Mackenzie Valley Land and Water Board (MVLWB)
7th Floor, 4910-50th Ave
YELLOWKNIFE, NT X1A 2P6

Dear Ms. Janes:

LUPA:	**MV2017J0029 – Blachford Lake Lodge**
Type of Operation:	**Camp**
Location:	**Blachford Lake**

The Government of the Northwest Territories (GNWT) reviewed Land Use Permit Application MV2017J0029 and recommends that the permit be granted.

Our Inspector will provide his comments and recommendations for your consideration, via the LWB Online Review System by August 24, 2017.

Comments received from Territorial Lands Administration advised that the site is leased to Taiga Sports Fishing Ltd., whereby Blachford lake Lodge is their business name, so therefore no concerns.

Comments received from the Mining Recorder's Office indicate no concerns.

Thank you for the opportunity to comment on this application. Should you have any questions or concerns regarding our comments, please contact our Inspector, Clint Ambrose, at (867) 767-9188.

Sincerely,

Scott Stewart
Regional Superintendent
North Slave Region

c. North Slave Region (Yellowknife), Department of Lands, GNWT

cc

Blachford Lake Lodge & Wilderness Resort
P.O. Box 1568, Yellowknife, NT Canada X1A 2P2 | info@blachfordlakelodge.com | (867)873-3303

Reviewer: GNWT – ENR: Topic 5: Security

Response: Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) is understanding that the board is not required to request security be posted but might potentially do so pending the situation and information provided. We believe that the MVLWB was created to guide and process exploration, mining camps and large invasive operations of that nature. This application for Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) must be one of the first "tourism operations" to come before the board. The size and scope of our lodge operation, including and potential harm to the surrounding environment, cannot be compared or applied to the same criteria as most of the exploration and mining activities. We would like to note that we don't apply to even a quarter of the criteria on the security template.

Generally speaking, it is the business of mines to locate minerals of various natures, to construct infrastructure and facilities for extraction, mine the material, and then to leave the site upon completion.

The nature of a tourism establishment, such as Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge), is to construct facilities that exist in harmony with the environment, that provide comfortable and safe services to both educational groups and tourists. We have invested, and continue to improve our site with the intent of long term operation. Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) is a family business which will be passed onto our children, and grandchildren, and for generations beyond to ensure, enjoy, and educate the preservation of environment forever!

The lodge is built with sustainable practices that allow safe handling of all systems and that coexist with the surrounding land, water, and air. This is what we market and the kind of business that we are in! In 1998 during the designing and architecture of our main building all of our systems were sourced and installed with the goal of having and running an environmentally friendly wilderness application. One site example is our Clivus Multrum composting toileting system that uses no water. Choices like the Clivus are built for sustainable use, not to mention that they run at approximately 5 times the cost of a regular flush toilet system, nearing $40,000. We prefer to think of our security as the investments that we have made to ensure that nothing goes wrong before you even start.

One of the overall goals at Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) is to be the "model of sustainability and alternative energy" to the NWT, remote communities, other camps and lodges etc. In this we exemplar our initiatives such as the Clivus Multrum, solar and wind power, battery banking, bulk vermicomposting, organic food production, safe and environmentally friendly equipment, etc. just to name a few. Over many years Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) has been supporting educational client groups including the Dechinta Bush University, FOXY/SMASH northern youth programs, both of which engage local, first nations, elders, youth, and more in practicing sustainability and alternative energy initiatives.

Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) would like to refer the board to our two recent Lands Inspection Reports, as included proof of our dedication to maintaining our lease holding for good standing with the land.

Blachford Lake Lodge & Wilderness Resort
P.O. Box 1568, Yellowknife, NT Canada X1A 2P2 | info@blachfordlakelodge.com | (867)873-3303

We feel that Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) should not be applicable to a security amount as infrastructure and assets onsite in excess of the amount proposed and provisions in the lease and Territorial Lands Act that would allow the landlord to 'cease' assets if there was a bankruptcy or environmental hard that required immediate attention.

Understanding that we are a new entity of its kind in the application process the only reference we have to a similar operation would be Mackay Lake Lodge (permit MV2013J0006) for which there was no security placed in this permit. Indeed they were not applying for a water license at the time, however, their nature is similar and are applying for one to meet the needs of our growing future.

Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) is choosing to apply for a water license under future consideration, but also two-fold with our occasional numbers on site increasing, and with the our use and access to fuel storage on site. We rarely are under circumstances where we could exceed the load capacity. Additionally, we are in the process of demoing and trialing a wood pellet boiler with arctic energy alliance which will dramatically reduce the amount of fuels consumed and stored on site. Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) is working towards a goal of a zero-fossil fuel usage.

Please do visit our website www.blachfordlakelodge.com for general information, photos and details about our facility. We also are linked to Trip Advisor and Facebook which we advise that you look into all to achieve a better understanding of Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge).

In consideration of the information above and attached, we request the board not require a security deposit from Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge). We request that the board approve our application for the Land Use Permit and the Water License at this time.

Sincerely,

Mike Freeland
Owner, Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge)

Spill Contingency Plan

1 – Site and Systems Description

Company – Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge)

Contact Information – Po Box 1568 Yellowknife, NT, X1a 2P2.

Tell – 867-873-3303

Contact – Mike Freeland, Owner, Mike@blachfordlakelodge.com

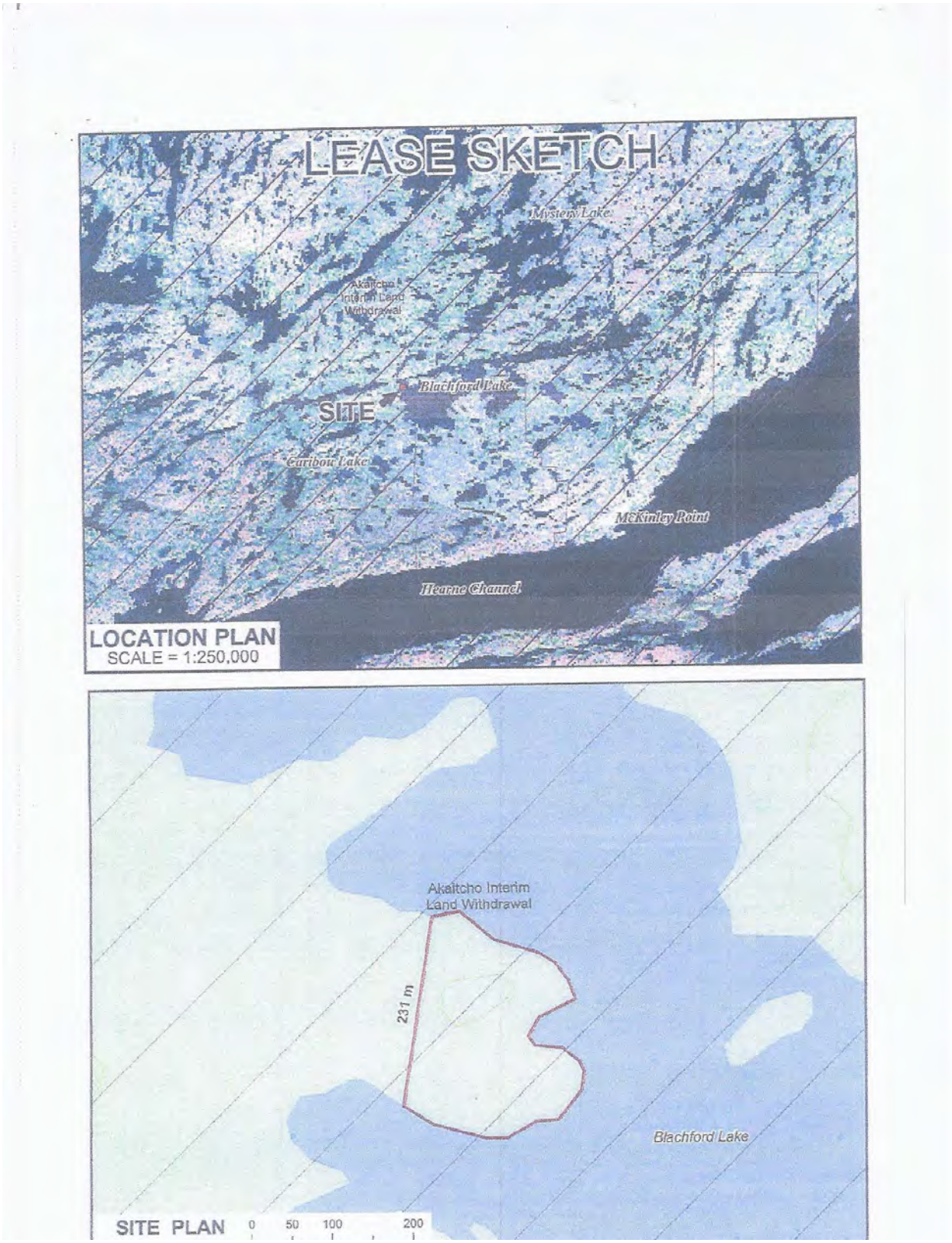
Site Location – Latitude – 62* 09’ 55” N, Longitude – 112* 40’ 59” W, Map Sheet Number – 85 I-2

Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) has prepared this spill contingency plan for operating our commercial fishing lodge, on our land lease agreement in the Mackenzie Valley. This plan demonstrates that BLL has appropriate regulations, plans, guidelines, equipment, and training in place to safely prevent and handle any spills that may occur onsite.

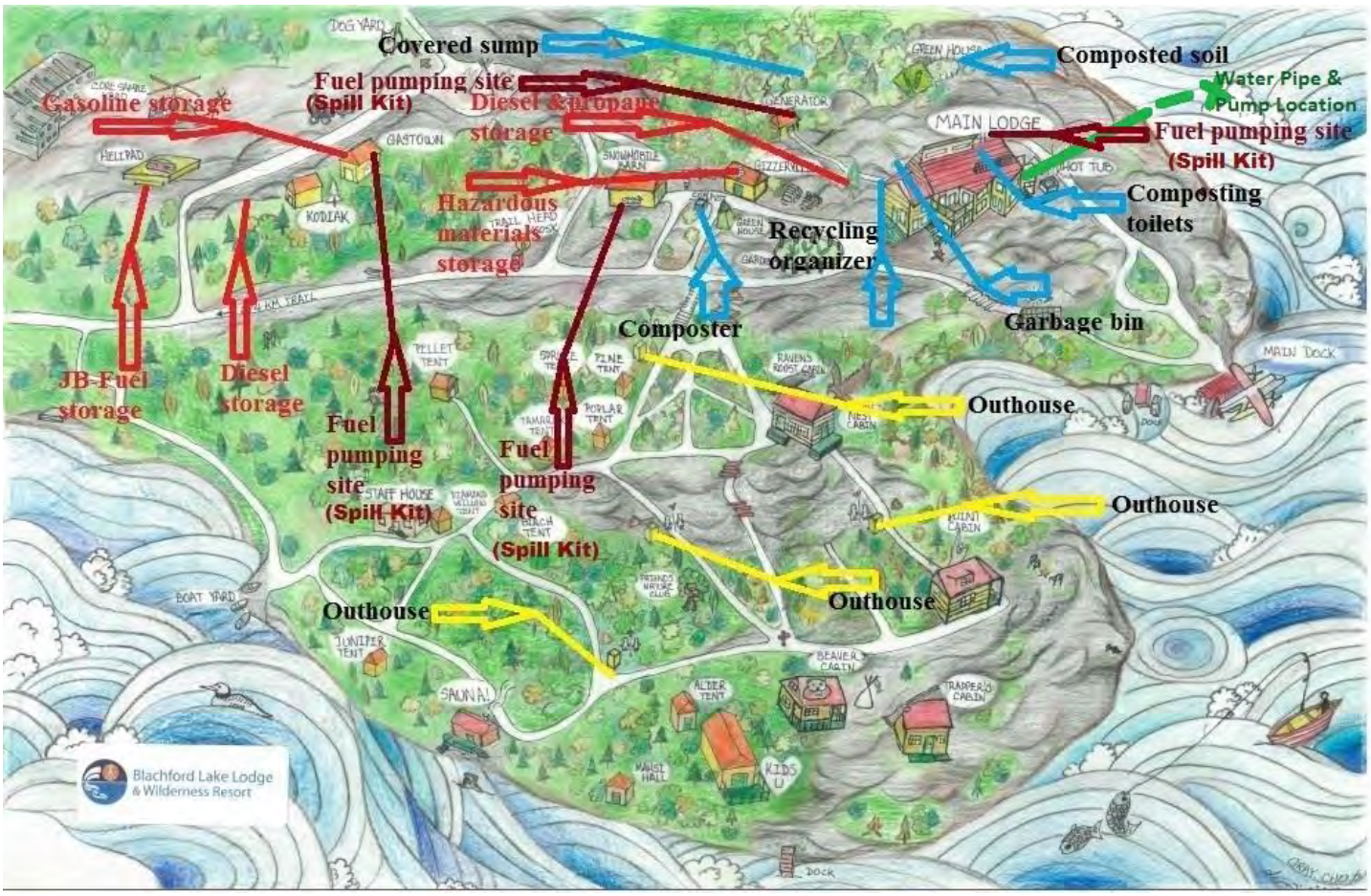
Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) is a main lodge with supporting 22 camp buildings, which includes four main sites for storing fuels and hazardous materials, and four fuel pumping sites. As we are the only community / establishment in the area we are responsible for the care and maintenance of the land issued under our lease, with designated staff onsite being allocated responsibility for and emergencies or spills that may happen.

The following are the requested two maps:

1) The lease sketch showing boundary lines, and the location of the facility.



2) Our site map outlining the locations for fuel storage, hazardous materials storage, and fuel pumping.



2 – Spill Contingency Plan

2.1 – SCP Introduction

The effective date of this spill contingency plan for Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) is November 21st, 2016.

From this date forward the SCP will be reviewed annually, factoring in any stills that have occurred during the year, and amended as needed. This plan has a review date of November first of each forthcoming year. This plan applies to all operations within our legal land lease and complies with the guidelines and regulations that we are under.

2.2 – SCP Revision

As this is the first current year of the Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) SCP, we have no revisions to record from previous years. For future reference these reviews and revisions will be recorded in a format such as the following, and saved in records both onsite and at our office in Yellowknife.

Date of Revision (yyyy/mm/dd)	Title, Section Number, or Page Number of Revised Sections	Summary of Changes

2.3 – SCP Purpose

The purpose of this plan is to outline response actions for potential spills of any size, including a worst case scenario, for Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge). The plan identifies key response personnel and their roles and responsibilities in the event of a spill, as well as the equipment and other resources available to respond to a spill. It details spill response procedures that will minimize potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to a spill.

It is the policy of Blachford Lake Lodge:

• To comply with existing regulations

• To provide such protection of the environment as it is technically feasible and economically practical

• To cooperate with other groups on the protection of the environment

• To keep employees, government officials, and the general public informed

2.4 – Contact Information and Responsibilities

An immediately reportable spill is defined as a release of a substance that is likely to be an imminent environmental or human health hazard or meets or exceeds the volumes shown in the attached table. These spills must be reported to the NWT 24-hour Spill Report Line at (867) 920-8130.

Additional Relevant Contact Include:

NWT 24-Hour Spill Line: 867-920-8130

GNWT Department of Lands Inspector: 867-767-9188; 867-446-0769

NWT RCMP 24-Hour Line: 867-669-1111

NWT/ENR Fire Line: 877-698-3473

NWT Medevac/MedResponse Line: 867-669-4109

Onsite BLL Manager : Sarah Van Stiphout / Amy Isaikina; 1-780-665-3494

Yellowknife Systems Support: Stuart Oldham; 403-818-1897; 867-873-3837

Yellowknife Lodge Owner: Mike Freeland; 867-446-1902; 867-873-3316

Yellowknife Additional Support: John Stephenson; 867-446-4521

Yellowknife Media/Additional Copies of the SCP; Katherine Johnson; 867-873-3303

In the event of a Spill, or any emergency, the onsite Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) Manager would be responsible for all action taken, designation, plan deployment, supervision, summary, follow up and revision. It would

be at the direction and the communication of the onsite manager to direct the staff through the SCP, to contact the needed off site assistance, and any other additional support from YK.

2.5 – Off Site Resources

Off-site resources for assistance in the event of a spill are listed below. Assistance from outside the community may not be able to reach the site until at least the next business day.

- NWT 24-Hour spill line ..... (867) 920-8130
- GNWT Environmental Protection Division ..... (867) 873-7654
- GNWT Department of Lands Inspector ..... (867) 767-9188
- Environment Canada (Emergency) Yellowknife ..... (867) 669-4725
- GNWT Environmental Health Officer ..... (867) 669-8979
- RCMP (Yellowknife) ..... (867) 669-1111
- Stanton Territorial Health Authority ..... (867) 669-4111
- Dehcho Health & Social Services Authority ..... (867) 695-3815
- Medivac (Yellowknife) ..... (867) 669-4115
- Great Slave Helicopters (Yellowknife) ..... (867) 873-2081
- Trinity Helicopters (Yellowknife)..... (867) 669-7031
- Air Tindi (Yellowknife) ..... (867) 669-8218

2.6 – Emergency Phone and Radio Locations

Blachford Lake Lodge Phone Locations: Right wall in the main lodge office and window sill in the pantry.

*Blachford's Emergency Contact and Phone Numbers charts are located on the walls beside each phone.

Blachford Lake Lodge Emergency Sat Phone Location: On the shelf behind the door in the main office.

Blachford Lake Lodge Onsite Radios and Bases Location: On the window sill in the pantry.

Please Note that the lodge manager and one other designated individual onsite will always have a radio on them and are receiving.

Please Note that the lodge manager may be away from the lodge phones in an emergency, but there will be a designated person to man the phones in their absence.

2.7 – Distribution and Storage of Spill Contingency Plan

Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) keeps copies of its SCP in several locations on and off site including our main lodge office, each onsite pumping and storage location, recorded on our backed up hard drive, and at our Yellowknife office.

During the process of Blachford Lake Lodge's application for a LUP and water license, their specific SCP will only be released to:

1) Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) YK and Lodge Offices: Po Box 1568, Yellowknife, NT, X1A 2P2, 867-873-3303, info@blachfordlakelodge.com, www.blachfordlakelodge.com
2) Mackenzie Valley Land and Water Board: 7th Floor, 4922-48th St. | PO Box 2130 | Yellowknife, NT | Canada | X1A 2P6, ph 867.766.7469 | fax 867.873.6610, www.mvlwb.com
3) The North Slave Regional Office for the Department Of Lands with the Government of the Northwest Territories; #16 Yellowknife Airport, Yellowknife, NT X1A 3T2, Tel: 867.767.9188
Email: Clint_Ambrose@gov.nt.ca, Web: www.lands.gov.nt.ca

2.8 – Community Environmental Policy

Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) is committed to operating in an environmentally sensitive manner, and complying with requirements of the Mackenzie Valley Lands and Water Board.

In correspondence with our lands lease, under the section 'Environmental' it is stated and we comply that:

- The lessee shall at all times keep the land in a condition satisfactory to the minister.
- The leesee shall not unduly interfere with the natural drainage pattern of the land, except with the permission of the minister.
- The leesee shall not do anything which will cause erosion of the banks of any body of water or adjacent to the land, and shall provide necessary controls to prevent such erosion.

Please also refer to all of the sections under the lands lease definitions for our required outlook and care of the land, community, and environment associated with our operation.

On a separate entity, Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) strives to exist as environmentally and sustainably as possible. Cited from our website (www.blachfordlakelodge.com) we note our initiatives and goals pertaining to the community and environment:

GENERATING POWER

- We have 4 sets of solar panes that generate the bulk of our power necessary
- We have 1 wind turbine that charges our batteries during the nighttime when we would otherwise not be producing power
- We operate daily on power collected from our solar panes, wind turbine and 5 sets of batteries; all with diesel generator back up
- We run the generator for only a few hours daily in the summertime, and less than half the day in the winter time - we are the most energy efficient lodge in the north
- Since 2013 we have cut our fuel usage by more than half

CONSERVING OUR FRESHWATER

- We purify our drinking water
- We try to use phosphate free products, to prevent growth of algae in our waterways
- We maintain a garden and greenhouses that produce fresh vegetables for our guests
- We offer fair trade organic coffee

LAUNDRY AND DISHWASHING

- We use cold water wash for laundry to cut our carbon emissions
- We use fabric softener created without phosphates, perfumes, dyes or enzymes
- We use oxygenated bleach, formulated without chlorine
- In summer, we hang our sheets and clothes outside to dry and we encourage our guests to hang their towels outside as well
- Our pre-washing dish detergent is biodegradable and phosphate free
- We use vinegar as a biodegradable cleaning product for windows and mirrors

RECYCLING

- We use 80% recycled plastic garbage bags
- We use 100% recycled paper, and products whitened without bleach. This includes table napkins, coffee filters, paper towels, facial tissue and bathroom tissue
- We compost leftover fruits, vegetables, eggshells, and coffee grounds and use it in our greenhouse and vegetable garden
- Grey water is processed through two settling tanks and a leaching pit well away from the lake
- Our composting toilet system handles waste without any water, and this compost is used for natural flower and shrub gardens
- We recycle paper, and newspaper is reused as fire starter for lodge woodstoves.
- We use refillable dispensers for shampoo, conditioner and body wash, hand soap and pre-wash dish detergent
- We provide recycling bins in all cabins and lodge rooms, and we ship recyclable and non recyclable cans, bottles, boxes and cardboard to Yellowknife where they are recycled or sent to landfill.

SAVING ENERGY

- We encourage our guests to conserve energy and water by turning off the tap when washing, brushing their teeth and shaving
- We encourage short showers
- We use high-efficiency appliances, and low wattage fluorescent lights
- We turn off lights and electrical equipment when not in use
- A hybrid power system, combines a large battery bank, solar panels and efficient diesel generator to provide electricity
- Motorboats are fitted with efficient, low emission 4-stroke motors

SAVING FISH STOCKS

- Blachford Lake Lodge is committed to maintaining a healthy stock of fish, and to achieve this we have initiated a fish management program which involves the use of barbless hooks and fish gloves, and a catch and release protocol.

2.9 – SCP – Potential Spill Materials Inventory

Taiga Sports Fishing Ltd.(c/o Blachford Lake Lodge) Materials Onsite				
Material	Container	#OS	M#OS	Location
CLEANING SUPPLIES				
Chafing fuel	24/per box	4	5	Gizzerville
Laundry bleach	3.6l bottle	21	25	Gizzerville
Enviro care liqui bac	9.5l jag	2	3	Gizzerville
Plumbing antifreeze liquid	3.78l jag	2	3	Gizzerville
Cleaner red liquid	9.5l jag	2	3	Gizzerville
Disinfectant	9.5l jag	2	3	Gizzerville
All-propose cleaner (Tide)	16.3kg/a box	2	3	Gizzerville
FUELS				
Diesel	Barrel of 205 L	35	35	Kodiak, Gen Deck
Jet B	Barrel of 205 L	9	9	Heli Pad
Gas	Barrel of 205 L	8	9	Gastown
Propane	Bottle of 108L	16	40	Gen Deck
	Bottle of 43 L	3	5	Gen Deck
	Bottle of 21 L	5	5	Gen Deck
Pellet	Bags of 40 Lbs	250	400	Pellet Tent
CHAINSAW SUPPLIES				
Winter Chain oil	4L	3	6	Gizzerville
Summer Chain oil	3,79L	2	6	Gizzerville
Sthil two strokes engine oil	1L	16	20	Gizzerville
	0,5L	16	20	Gizzerville
SNOWMOBILES SUPPLIES				
Fuel stabilizer	943mL	3	6	Gizzerville
4 strokes engine oil	946mL	4	6	Gizzerville
2 strokes engine oil	8oz	7	12	Gizzerville
	1US gal	3	3	Gizzerville
Synthetic Gear Oil	946mL	12	12	Gizzerville
BOATS SUPPLIES				

4 Strokes marine engine oil	4L	7	12	Gizzerville
Gear lube marine	1.5L	2	6	Gizzerville
Outboard Gear Oil	500mL	3	6	Gizzerville
GEN SUPPLIES				
Synthetic blend diesel engine oil	5L	5	6	Gizzerville
Diesel antifreeze/coolant	3,78L	3	6	Gizzerville
CAUKING ... (gun recharge)				
Acoustical Sealant	gun recharge	10	10	Gizzerville
insulating foam sealant	manual spray	5	10	Gizzerville
Roof patch	gun recharge	11	12	Gizzerville
No more draft		2	10	Gizzerville
Fire barrier sealant IC 15WB+ (intumescent)		1	10	Gizzerville
Stove and Gasket cement		2	10	Gizzerville
Acrilyc latex caulk plus sillicone (white)		4	10	Gizzerville
Sillicone (kitchen, bath, plumbing), white		4	10	Gizzerville
Sillicone weather proof (brown)		4	10	Gizzerville
Sillicone weather proof (clear)		3	10	Gizzerville
Sillicone weather proof (light grey)		6	10	Gizzerville
PAINT, STAIN AND BIG JUG				
Green ext/int enamel high gloss (porch and floor)	3.79L	2	10	Gizzerville
White paint for basement	3.79L	6	10	Gizzerville
Tile red paint for Floor and Patio	3,46L	6	10	Gizzerville
Waterbone ext stain deck and sidding (Solid)	3,4L	4	10	Gizzerville
Teinted wood protector	3,79L	6	10	Gizzerville
The ultimate roof repair	4kg	2	10	Gizzerville
Log home sealant	50lbs	½ bucket	2	Gizzerville
Latex exterior Stain	17L	1	2	Gizzerville
Roof and foundation coating	approx 17L		2	Gizzerville

Drywall compound	20kg	4	6	Gizzerville
Drywall compound	4,5kg	1	2	Gizzerville
HOT TUB SUPPLIES				
Refresh (oxidizes contaminants / Non chlorine)	3Kg	2	10	Gizzerville
Adjust down	1kg	7	10	Gizzerville
Adjust up	1kg	3	10	Gizzerville
Perfect balance	680g	1	10	Gizzerville
Fresh Start	32oz	1	10	Gizzerville

2.10 – SCP Response Flowchart

The following steps are the response organization for our SCP:

1) Spill or release identified by individual
2) Personal safety and safety to others assessed
3) If possible identify the content of the spill
4) Notification of the lodge/site manager
5) Manager reassess spill, safety and delegates staff to act accordingly
6) Stop the flow of the spill if possible.
7) If classified a minor spill then engage stop, report and cleanup
8) If classified a major spill, contact the NWT Spill Line
9) If classified a major spill involve other needed external sources, ENR etc.
10) Consult and notify systems support and lodge owner
11) Proceed to contain and clean up the spill as to regulation
12) Document, record and review entire spill and process during and upon completion
13) Reassess the Spill Contingency Plan to make an amendments if necessary.

2.11 – SCP Action Plan

Response Strategy In the event of a spill:

• Be alert and consider safety first. If possible, identify the product spilled and the source of the spill.

• Assess the fire and safety hazard to human life; warn people in and around the spill area to vacate the area if necessary

• Shut off the source of the spill, if safe to do so.

• Shut off all machinery or equipment, for example: lights, motors, furnaces, truck engines that may cause sparks, etc. to start a fire, no smoking.

• Tend to the injured, if any.

• Secure the area by not letting any vehicles or persons enter the area.

• Use good judgment to safely stop the spill product from spreading, if possible, by creating a barrier to keep the area of spill from getting larger

• Notify the manager that a spill has occurred. The manager will deploy the plan of:

Step 1: Activate the Spill Recovery Plan.

Step 2: Consult with on-site staff and determine appropriate level of response.

Step 3: Notify all relevant government departments using the 24-hour Spill Line.

Step 4: Deploy appropriate staff resources, including Rubber Tire Loader, Municipal Works staff, Spill Containment Kit

Step 5: Commence spill containment and collection activities.

Step 6: See that the contaminated materials are disposed within the solid waste disposal area.

Step 7: Complete spill report.

General Community Operations

On a daily basis the community conducts operations that have the potential to be a small spill situation. Reporting for these spills will be in accordance with the Environmental Protection Act and the volumes outlined in the list of Immediately Reportable Spill Quantities appended to this document.

Immediately Reportable Spill Quantities

TDG Class	Substance for NWT 24 Hour Spill Line	Immediately Reportable Quantities
1	Explosives	Any amount
2.3	Compressed gas (toxic)	
2.4	Compressed gas (corrosive)	
6.2	Infectious substances	
7	Radioactive	
None	Unknown substance	
2.1	Compressed gas (flammable)	Any amount of gas from containers with a capacity greater than 100 L
2.2	Compressed gas (non-corrosive, non-flammable)	
3.1	Flammable liquids	> 100 L
3.2		
3.3		
4.1	Flammable solids	> 25 kg
4.2	Spontaneously combustible solids	
4.3	Water reactant	
5.1	Oxidizing substance	> 50 L or 50 kg
9.1	Miscellaneous products or substances excluding PCB mixtures	
5.2	Organic peroxides	> 1 L or 1 kg
9.2	Environmentally hazardous	
6.1	Poisonous substances	> 5 L or 5 kg
8	Corrosive substances	
9.3	Dangerous wastes	
9.1	PCB mixtures of 5 or more ppm	> 0.5 L or 0.5 kg

None	Other contaminants (e.g., crude oil, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, waste water, etc.)	> 100 L or 100 kg
None	Sour natural gas (i.e., contains H2S), sweet natural gas	Uncontrolled release or sustained flow of 10 min or more
TDG Class	Substance for NWT 24 Hour Spill Line	Immediately Reportable Quantities
1	Explosives	Any amount
2.3	Compressed gas (toxic)	
2.4	Compressed gas (corrosive)	
6.2	Infectious substances	
7	Radioactive	
None	Unknown substance	
2.1	Compressed gas (flammable)	Any amount of gas from containers with a capacity greater than 100 L
2.2	Compressed gas (non-corrosive, non-flammable)	
3.1	Flammable liquids	> 100 L
3.2		
3.3		
4.1	Flammable solids	> 25 kg
4.2	Spontaneously combustible solids	
4.3	Water reactant	
5.1	Oxidizing substance	> 50 L or 50 kg
9.1	Miscellaneous products or substances excluding PCB mixtures	
5.2	Organic peroxides	> 1 L or 1 kg
9.2	Environmentally hazardous	
6.1	Poisonous substances	> 5 L or 5 kg
8	Corrosive substances	
9.3	Dangerous wastes	
9.1	PCB mixtures of 5 or more ppm	> 0.5 L or 0.5 kg
None	Other contaminants (e.g., crude oil, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, waste water, etc.)	> 100 L or 100 kg
None	Sour natural gas (i.e., contains H2S), sweet natural gas	Uncontrolled release or sustained flow of 10 min or more

Note: In addition, all releases of harmful substances, regardless of quantity, are to be reported to the NWT spill line if the release is near or into a water body, is near or into a designated sensitive environment or sensitive wildlife habitat, poses imminent threat to human health or safety, poses imminent threat to a listed species at risk or its critical habitat, or is uncontrollable.

(Source: AANDC, Guidelines for Spill Contingency Planning. April 2007)

Potential spill sizes and sources for each hazardous material on site

In Table 2, a list of potential discharge events, with associated discharge volumes and directions is presented for the primary hazardous materials stored on site. The most likely discharge volume is indicated and the spill clean up procedures will focus on spills of this quantity. A worst case scenario is also presented. Specific discharge rates are not indicated for each fuel type as these would vary from a few minutes to several hours, based on the source of leak or puncture.

List of hazardous materials, potential discharge events, potential discharge volumes (worst case scenario in brackets) and direction of potential discharge

Material (sources)	Potential Discharge Event	Discharge Volume (worst case)	Direction of Potential Discharge
Diesel Fuel (drill rig, oil stoves)	1. Over pumping of fuel from drum into drill rig. 2. Leaking from drill rig. 3. Minor leaking fuel drum in/outside fuel storage area. 4. Large puncture, fast leaking drum in/outside fuel storage area. 5. From drum connection to stoves in communal buildings. 6. All drums punctured and leaking at once (very unlikely).	Likely under 200 L/1 drum (max 11,000 L/ 55 drums)	Toward stream from drill site or fuel storage area near drill site. In camp on flat ground, from fuel storage area or communal buildings with potential underground seepage to Blachford Lake and/or stream.
Jet B Fuel (twin otter, helicopter)	1. Over Filling of aircraft. 2. Leak from drum or hose while filling aircraft. 3. Minor leaking fuel drum in/out side fuel storage area. 4. Large puncture, fast leaking drum in/outside fuel storage area.	Likely under 200 L/1 drum (max 4,000 L/ 20 drums)	In camp on flat ground, from fuel storage area or helicopter pad with potential underground seepage to Blachford Lake and/or stream. In Blachford Lake while refuelling twin otter.

	5. All drums punctured and leaking at once (very unlikely).		
Gasoline (ATVs, snow machines)	1. Overfllling of ATVs or snow machines (smallspill) 2. Leak from drum or hose while filing ATVs or snow machines. 3. Minor leaking fuel drum in/outside fuel storage area. 4. Large puncture, fast leaking drum in/outside fuel storage area. 5. All drums punctured and leaking at once (very unlikely)	Likely under 200 L/1 drum (max 2,000 L/ 10 drums)	In camp on flat ground, from fuel storage area with potential underground seepage to Blachford Lake and/or stream. Toward stream from fuel storage area near drill site.
Propane (kitchen stove and fridge)	1. Leak while connected to kitchen stove or fridge. 2. Minor leaking cylinder in or outside fuel storage area. 3. Large puncture, fast leaking drum in/outside fuel storage area. 4. All drums punctured and leaking at once (very unlikely).	Likely under 45 kg/ 1 cylinder (max 900 kg/ 20 cylinders)	In camp on flat ground, from fuel storage area or communal buildings with potential underground seepage to Blachford Lake and/or stream.

Waste oil stored in empty 200 L drums, could potentially leak. The quantity of waste oil drums would be quite limited as they would be shipped out by plane as they are filled up. The risk of a spill from a waste oil drum impacting the environment is very low as waste oil is stored in a bermed site designated for certain wastes.

Potential environmental impacts of spill (include worst case scenario)

Overall for all hazardous materials discussed below, impacts are lower during winter as snow is a natural sorbent and ice forms a barrier limiting or eliminating soil or water contamination, thus spills can be more readily recovered when identified and reported.

Gasoline

Environmental impacts: Gasoline may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Gasoline is quick to volatize. Runoff into water bodies must be avoided.

Worst case scenario: All fuel drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Diesel Fuel

Environmental impacts: Diesel may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Diesel burns slowly and thus risk to the environment is reduced during recovery as burn can be more readily contained compared with volatile fuels. Runoff into water bodies must be avoided.

Worst case scenario: All fuel drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Jet B Fuel

Environmental impacts: Jet B fuel may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Jet B fuel volatizes relatively quickly. Runoff into water bodies must be avoided.

Worst case scenario: All fuel drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Propane

Environmental impacts: Propane may be harmful to wildlife and the surrounding environment. It has the potential to accumulate in the environment. Propane is extremely volatile and is the most flammable material stored on site, thus immediate impacts to the surrounding environment are a concern.

Worst case scenario: All cylinders were punctured or failed simultaneously and contents leaked into the surrounding environment and ignited leading to an explosion. This could cause serious environmental impacts in the immediate surroundings. Safety during emergency response to a propane spill is of the utmost concern.

Waste Oil and Miscellaneous Oils/Grease

Environmental impacts: Waste oils may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Runoff into water bodies must be avoided.

Worst case scenario: All storage drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Defensive Spill Position General Community operations include:

• Retain sufficient supplies (sorbent) in potential spill locations to contain potential spill volumes.

• Using Storage tanks that meet the fire code and Fire Marshal's recommendations (Dyked tanks or double-walled).

• Training personnel in safe, sensible operational procedures.

• Material Safety Data Sheets (MSDS) for all chemicals in use. All of the fuels, greases, oils, chemicals and hazardous materials listed in the inventory chart above have MSDS sheets located on site and at easy access in the area of the source.

Spill Reporting Procedures

Spills should be reported immediately to the onsite manager, who will determine if the spill is to be reported to the NWT 24-Hour Spill Line at 867- 920-8130, based on the volumes in the Immediately Reportable Spill Quantities table cited above. Copies of the Spill Report form are available in each spill kit and below. The form will be filled out by the onsite manager (or designate), and faxed or emailed to the NWT Spill Line.

Contact information is as follows:

NWT 24-Hour Spill Line Phone: (867) 920-8130

Fax: (867) 873-6924

Email: spills@gov.nt.ca

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spillreport@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR ☐ UPDATE #	REPORT NUMBER –
B	OCCURRENCE DATE: MONTH – DAY – YEAR	OCCURRENCE TIME		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION	REGION ☐ NT ☐ NUNAVUT ☐ ADJACENT JURISDICTION		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE	SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS			

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: Station operator	EMPLOYER	LOCATION CALLED: Yellowknife, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG/TCMSS ☐ GNWT ☐ GN ☐ ILA ☐ AANDC ☐ NEB ☐ OTHER: _____

SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN

FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Procedures for the Protection of Human Health and Safety

Following a spill, the health and safety of workers as well as the general public is a priority. Actions taken will depend on the type of spill.

• In the event of a chemical spill: Restrict public access to the spill area. Workers involved in the clean-up of the spill should wear personal protective equipment (PPE).

• In the event of a flammable or combustible material spill: Disconnect electrical equipment, evacuate adjacent buildings and restrict public access to the spill area. Only spark-arresting equipment should be used during clean-up of the spill. PPE should also be worn by workers involved in the clean-up.

• In the event of a sewage spill: Restrict public access (including pets and animals) to the spill area.

Procedures for Containing and Controlling Spills

General procedures noted below will be used to contain and control all spills. Specific procedures for spills on land, water, snow and ice follow.

• First anticipate what will be affected by the spill.

• Assess direction and speed of spill, and any factors that could affect these (water, wind and slope).

• Determine best location for containing spill, avoiding any water bodies.

Containment of Spills on Land: Dykes and trenches can be constructed to contain spills on land. Soil surrounding the spill area can be dug out, and piled up, to create a barrier for the spill. A plastic tarp can be placed at the base of the dyke, so that the pooled material can be removed with sorbent materials. Conversely, trenches can be excavated to permafrost, which will provide a natural containment of the spill. Once the material is contained, it can be pumped out, or removed by using sorbent materials. If the spill is moving very slowly, such structures Page 22 of 26 may not be necessary and the material can be removed before migrating away from the spill location.

Containment of Spills on Water: Spills on water are considered the most serious types of spills, as there is often no containment of the spilled material and water quality and aquatic life are negatively impacted. Booms, weirs, sediment curtains and fencing can be installed to contain the spill. Booms are designed to float, and are made of absorbent material to soak up the spilled fuel. They are deployed from the shore or a boat, to create a circle around the spill or to contain a spill from migrating further into the receiving water bodies. Weirs are installed across creeks/drainages, to prevent further migration. Plywood or other materials found onsite can be used. Barriers made of fence or netting can be used as well, with sorbent material placed at the base of the barrier. Once contained, the fuel can be removed by absorbent materials, pumped out or allowed to volatilize.

Containment of Spills on Snow: Snow acts as a natural sorbent for spilled fuel. Impacted snow is easily visible, and can be shoveled into empty drums or barrels for proper disposal. If the spill is migrating down a hill, a snow dyke can be constructed to contain the spill. A plastic tarp can be placed at the base of the dyke, where spilled fuel is expected to pool. The collected fuel and impacted snow can be removed with absorbent materials, pumped out, or shoveled into barrels for disposal.

Containment of Spills on Ice: Ice is considered impermeable to fuel, so these spills are generally easy to clean up. Small spills can be cleaned up by placing absorbent materials on top of the ice. Impacted snow and slush can then be removed by shovels, and placed in barrels for disposal. For larger spills, dykes of snow and trenches can be constructed to contain the spill. Pooled fuel can then be removed by absorbent materials or pumped out. Impacted snow and slush can be shoveled into barrels for disposal.

Worst Case Scenarios: Worst case scenarios include a dyke or trench overflowing and a large spill on water that cannot be contained with materials available in the community. In the first case, a trench or collection pit could be constructed downstream to collect the fuel. In the second case, an emergency response team would need to be called, with appropriate equipment to deal with the spill.

Procedures for Transferring, Storing and Managing Spill Related Wastes

Spills are generally cleaned up starting at the outer limit of the spill, and working towards the point of the spill. Sorbent materials and hand tools such as cans and shovels are used for smaller spills. Larger spills can be contained with the use of a pump and/or heavy equipment. Spill wastes include used absorbent materials and containers of impacted water and snow. Sorbent materials should be placed in plastic bags for proper disposal. The containers of impacted water and snow should be sealed and stored until disposal at an approved facility can be arranged. For most of the containment procedures, spilled petroleum products and materials used for containment will be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility. Following a spill, all used materials need to be properly washed and/or replaced.

Procedures for Restoring Affected Areas

Once a spill has been contained, community personnel will consult with the Inspector assigned to the file to determine the level of clean-up required. The Inspector may request that a site specific study be conducted, to ensure appropriate clean-up levels are met. After clean-up has been completed, the community should follow up with the NWT 24-hour Spill Line to ensure that the spill report file has been closed. Closure of the spill file provides evidence that the spill was cleaned up to the regulator's satisfaction. This will help prevent the spill from being considered an environmental liability for the community in the event of a change of ownership, refinancing, or closure of the site. A copy of the spill report marked "Closed" can be provided on request for the community's files. The Spill Line also keeps copies of these reports on file.

2.12 – SCP – Resource Inventory

Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) has shovels, hand tools, snow and ice tools, water tools, and storage containers, etc located onsite if needed to contain and clean up in the event of a spill.

All of the designated fuel storage and pumping locations have regulated spill control kits onsite.

Contents of Spill Kits:

4 tyvek splash suits

4 pairs of chemical master gloves

10 large bags with ties for temporary use

2 oil only booms (5" x 10')

50 oil only mats (16" x 20")

5 sorbent socks

10 sorbent pads

2 large tarps

1 roll duct tape

1 utility knife

1 field notebook and pencil

1 rake

1 pick axe

3 aluminium scoop shovels

1 instruction binder

Earth moving and other equipment

1 small loader

2 all-terrain vehicles

3 snow machines

1 zodiac boat

1 chain saw

3 fuel transfer hoses with pumps tool kit including hack saw, hammer, screwdrivers, etc.

Off Site Resources would be provided by the following:

NWT 24-Hour spill line
(867) 920-8130

GNWT Department of Lands Inspector
(867) 767-9188

Environment Canada (Emergency) Yellowknife
(867) 669-4725

GNWT Environmental Protection Division
(867) 873-7654

GNWT Environmental Health Office
(867) 669-8979

RCMP (Yellowknife)
(867) 669-1111

Medivac (Yellowknife)
(867) 669-4115

Great Slave Helicopters (Yellowknife)
(867) 873-2081

Air Tindi (Yellowknife)
(867) 669-8218 or 669-8200

2.13 – SCP Training

Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) managers, staff, and volunteers are all put through an intensive training at arrival onsite. All individuals working at the operation (and usually those who are just visiting too!) are required to participate in an orientation session. During the orientation, all locations of the Spill Contingency Plan and spill kits are indicated. During the orientation, an overview of the Spill Contingency Plan is provided. All managers are required to have their basic first aid training, as well as WHMIS training, before working on the site. There are no training records kept as all individuals have to go through the process and training.

August 24, 2017

Erica Janes
Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O. Box 2130
Yellowknife, NT
X1A 2P6

Dear Ms. Janes,

Re: Blachford Lake Lodge and Wilderness Resort
Water Licence Application – MV2017L3-0005
Land Use Permit Application – MV2017J0029
Blachford Lake Lodge and Cultural Camp
Request for Review and Comments

The Department of Environment and Natural Resources, Government of the Northwest Territories has reviewed the applications at reference based on its mandated responsibilities under the *Environmental Protection Act,* the *Forest Management Act*, the *Forest Protection Act, the Species at Risk (NWT) Act, the Waters Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board..

Topic 1: Water Intake

Comment(s):

It is indicated that collection of water is done via two systems pending on the season. In the summer, water is taken from the lake through a submersible pump located 10 m from shore and is connected to a 40 m above ground pipeline that runs to the storage tanks. The map provided does not outline where the water pump is within the lake. Additionally, it is not explained how this procedure changes during the winter.

Recommendation(s):

1) ENR recommends Taiga Sports Ltd. (c/o Blachford Lake Lodge) indicate on the map the location of water intake within the lake.

2) ENR recommends Taiga Sports Ltd. (c/o Blachford Lake Lodge) explain how the water collection procedure changes during the winter.

Topic 2: Greywater

Comment(s):

It is indicated in the Water Licence Application that liquid effluent collected from the composting toilet is pumped out of the composter daily and filtered into the lodge's grey water system. Toilet wastes are referred to as blackwater and or sewage. So by definition, the receiving water system or sump should no longer be considered or referred to as a greywater system.

Recommendation(s):

1) ENR recommends the Board include in the Water Licence, effluent quality criteria (EQC) and Surveillance Network Program (SNP) stations to monitor the sump quality prior to discharge. It is recommended that the SNP stations be located at the discharge point where the waste leaves the sump. The Board should also consider adding some SNP sites in the surrounding environment such as the water bodies already being monitored by Taiga Sports Ltd. (c/o Blachford Lake Lodge) as indicated in the Waste Management Plan.

Topic 3: Waste Water Operation and Maintenance Plan

Comment(s):

Along with the Water Licence and Land Use Permit Application, Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) has completed and submitted a Waste Management Plan and a Spill Contingency Plan. Currently at site greywater, along with blackwater, is pumped to a sump. The application makes reference to a covered sump, but the sump itself is not explained in sufficient detail.

ENR believes an Operation and Maintenance Plan for the covered sump should be developed. The plan should include information on the frequency of pumping water from holding tanks, the volume of water that reports to the sump, the capacity of the sump and, the freeboard limit of the sump.

ENR notes that the sump was designed and created with the owner, lands officer, engineers and contractors with a record of surrounding flora and fauna to monitor environmental changes.

Recommendation(s):

1) ENR recommends Taiga Sports Ltd. (c/o Blachford Lake Lodge) develop and submit an Operation and Maintenance Plan for the lodge water and the operation of the sump. The plan should include historical information such as the inventory of surrounding flora and fauna and the plan should be for board approval.

Topic 4: Sump Operation and Treatment

Comment(s):

The application explains that wood chips and saw dust were added to the sump as a cover during construction and are added annually for decomposition. In addition, bacteria are added to encourage smell reduction and environmental stability.

ENR is curious why wood chips and saw dust are added to the sump. Additional information about this practice should be provided and include if it is done once the sump is empty (as erosion control) or if they are added when the sump is full? ENR is curious as to how wood chips and saw dust would enhance decomposition rather than act as an absorption medium. ENR notes that UV light is a good treatment mechanism for blackwater and greywater and that wood chips would actually prevent sun light from penetrating the sump during the summer months.

Recommendation(s):

1) ENR recommends Taiga Sports Ltd. (c/o Blachford Lake Lodge) provide additional rational for placing wood chips and saw dust in the sump.

2) ENR recommends Taiga Sports Ltd. (c/o Blachford Lake Lodge) consider alternative treatment techniques for greywater and blackwater such as solar powered aeration and UV penetration to promote biological activity and improve water quality within the sump.

Topic 5: Training Records

Comment(s):

In the Spill Contingency Plan, it is indicated that currently, Taiga Sports Fishing Ltd. (c/o Blachford Lake Lodge) does not keep records of training because as indicated, all individuals have to go through the process and training.

ENR notes that spill training is an ongoing requirement just like fire prevention and drills. During an emergency, responders must be familiar with techniques and steps to ensure proper and efficient response to a spill event. Spill response training should occur once a year regardless of previous training or experience in spill response.

Further, records should be kept that include participant names and training dates. ENR notes that the company is liable if a situation occurs and individuals on site did not receive training or do not properly respond to the spill.

Recommendation(s):

1) ENR recommends that spill training exercises occur once annually. The operator may decide to do this once an individual arrives or collectively during periods of low occupancy.

2) ENR recommends Taiga Sport Fishing Ltd. (c/o Blachford Lake Lodge) keep a training record which includes names and dates for all personnel.

Comments and recommendations were provided by ENR technical experts in the Water Resources Division and the North Slave Region and were coordinated and collated by the Environmental Assessment and Monitoring Section, Conservation, Assessment and Monitoring Division (CAM).

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email patrick_clancy@gov.nt.ca.

Sincerely,

Patrick Clancy
Environmental Regulatory Analyst
Environmental Assessment and Monitoring Section
Conservation, Assessment and Monitoring Division
Department of Environment and Natural Resources
Government of the Northwest Territories

September 28, 2017

Erica Janes
Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O. Box 2130
Yellowknife, NT
X1A 2P6

Dear Ms. Janes,

Re: Blachford Lake Lodge and Wilderness Resort
Water Licence Application – MV2017L3-0005
Land Use Permit Application – MV2017J0029
Draft Water Licence and Land Use Permit Review
Request for Review and Comments

The Department of Environment and Natural Resources, Government of the Northwest Territories has reviewed the documents at reference based on its mandated responsibilities under the *Environmental Protection Act,* the *Forest Management Act*, the *Forest Protection Act, the Species at Risk (NWT) Act, the Waters Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board.

Topic 1: Definition of Sewage Disposal Facilities

Comment(s):

In the Draft Water Licence, Sewage Disposal Facilities is defined as the area and associated infrastructure designated to contain Sewage as identified as the composting toilet, deep pit outhouses, and the covered sump in the application. ENR notes that it is indicated in the Water Licence Application that liquid effluent collected from the composting toilet is pumped out of the composter daily and filtered into the lodge's grey water system. The holding tanks that contain the wastewater prior to discharge into the sump should therefore also be included in the definition of Sewage Disposal Facilities.

Recommendation(s):

1) ENR recommends the Board amend the definition of Sewage Disposal Facilities to include the wastewater holding tanks.

Topic 2: Effluent Quality Criteria

Comment(s):

The draft Water Licence currently requires two Surveillance Network Program (SNP) stations; one at the water intake in Blachford Lake and a second at the shore of Blachford Lake, east of Blachford Lake Lodge, at the closest point directly downstream of the sump. ENR remains of the opinion that since liquid effluent collected from the composting toilet is pumped out of the composter daily and filtered into the lodge's grey water system which is then discharged into the sump, this effluent is now considered sewage.

Recommendation(s):

1) ENR recommends the Board set an SNP station and effluent quality criteria (EQC) to monitor the sump quality prior to discharge. It is recommended that the SNP station be located at the discharge point where the waste leaves the sump.

Topic 3: Closure and Reclamation Plan

Comment(s):

In the draft Water Licence Part I: Conditions Applying to Closure and Reclamation, clause 1. b) Sewage Disposal Facilities only considers contamination and remediation and leachate prevention. In Water Licences associated with similar developments such as Great Slave Lake Lodge, types and sources of cover materials are also considered for closure and reclamation.

Recommendation(s):

1) ENR recommends the Board include the types and sources of cover materials in clause 1, Part I of the Water Licence.

Topic 4: SNP Station BLL-2

Comment(s):

The Board has requested comment on the location, parameters and frequency of the SNP Station BLL-2. ENR agrees with the proposed location at the shore of Blachford

Lake, east of Blachford Lake Lodge, at the closest point directly downstream of the sump and the proposed parameters being $CBOD_5$, Total Suspended Solids, Nutrients and Faecal Coliforms. ENR notes that Blachford Lake Lodge is operational approximately 10 months of the year and it is assumed that during the winter months, the sump is in a frozen state. ENR therefore agrees with the proposed sampling frequency being set at the beginning and end of the open water season. Should it be known or become known that seepage enters Blachford Lake during the months before freshet or after freeze-up, the monitoring frequency should be increased to capture this time period.

Recommendation(s):

1) ENR recommends the Board set the SNP Station BLL-2 at the proposed location and sample for the proposed parameters set in the Draft Water Licence.

2) ENR recommends the Board set the SNP Station BLL-2 sampling frequency at the beginning and end of the open water season, unless it is known or becomes known that seepage from the sump occurs outside of this timeframe.

Topic 5: Security

Comment(s):

The Board has requested comment on the appropriate security amount for this undertaking. ENR has estimated a total security amount for land and water liability using the RECLAIM model version 7.0. ENR's calculation for the water liability amounted to a total of $31,536. Of this amount, $23,315 should be held under a Land instrument and $8,220 under the Water Licence.

Recommendation(s):

1) ENR recommends that the total security for this undertaking held under the Water Licence should be $8,220.

Comments and recommendations were provided by ENR technical experts in the Water Resources Division and the North Slave Region and were coordinated and collated by the Environmental Assessment and Monitoring Section, Conservation, Assessment and Monitoring Division (CAM).

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email patrick_clancy@gov.nt.ca.

Sincerely,

Patrick Clancy
Environmental Regulatory Analyst
Environmental Assessment and Monitoring Section
Conservation, Assessment and Monitoring Division
Department of Environment and Natural Resources
Government of the Northwest Territories

Att: Reclaim 7.0

Conditions Annexed to and Forming Part of Land Use Permit #MV2017J0029

Part A: Scope of Permit

1. This Permit entitles Blachford Lake Lodge to conduct the following land-use operations at Blatchford Lake, NT :
    a) Operation and maintenance of lodge/camp facilities, and
    b) Establishment and use of a petroleum fuel storage facility.

2. This Permit is issued subject to the conditions contained herein with respect to the use of land for the activities and area identified in Part A, item 1 of this Permit.

3. Compliance with the terms and conditions of this Permit does not absolve the Permittee from the responsibility for compliance with the requirements of all applicable federal, territorial, and municipal legislation.

Part B: Definitions (defined terms are capitalized throughout the permit)

Act - the *Mackenzie Valley Resource Management Act*.

Board - the Mackenzie Valley Land and Water Board established under Part 4 of the *Mackenzie Valley Resource Management Act*.

Fuel Storage Container - a container for the storage of **petroleum** or **allied petroleum products** with a capacity of less than 230 litres.

Fuel Storage Tank - a closed container for the storage of **petroleum** or **allied petroleum products** with a capacity of more than 230 litres.

Greywater - all liquid wastes from showers, baths, sinks, kitchens, and domestic washing facilities but not including toilet wastes.

Habitat - the area or type of site where a species or an individual of a species of wildlife naturally occurs or on which it depends, directly or indirectly, to carry out its life processes.

Inspector - an Inspector designated by the Minister under the *Mackenzie Valley Resource Management Act*.

Minister - the Minister of Indian Affairs and Northern Development Canada or the Minister of the Government of the Northwest Territories – Department of Lands, as the case may be.

Ordinary High Water Mark - the usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands, or marine environments, it refers to those parts of the Watercourse bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic

vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs, this refers to normal high operating levels (full supply level).

Permafrost - ground (soil or rock) that remains at or below 0°C for at least two consecutive years.

Secondary Containment - containment that prevents liquids that leak from Fuel Storage Tanks or containers from reaching outside the containment area and includes double-walled tanks, piping, liners, and impermeable barriers.

Sewage Disposal Facilities - Sump(s) and/or Sewage collection tank(s) and/or storage containers designed to hold Sewage.

Spill Contingency Plan - a document, developed in accordance with Aboriginal Affairs and Northern Development Canada's *Guidelines for Spill Contingency Planning* (April 2007), that describes the set of procedures to be implemented to minimize the effects of a spill.

Sump - a man-made pit or natural depression in the earth's surface used for the purpose of depositing waste material, such as non-Toxic Drilling Waste or Sewage, therein.

Toxic - a substance that enters or may enter the environment in a quantity or concentration or under conditions such that it:

a) Has or may have an immediate or long-term harmful effect on the environment or its biological diversity;
b) Constitutes or may constitute a danger to the environment on which life depends; or
c) Constitutes or may constitute a danger in Canada to human life or health.

Waste Management Plan (WMP) - a document, developed in accordance with the Board's *Guidelines for Developing a Waste Management Plan,* that describes the methods of waste management from waste generation to final disposal.

Watercourse - a natural body of flowing or standing water or an area occupied by water during part of the year, and includes streams, springs, swamps and gulches but does not include groundwater.

Part C: Conditions Applying to All Activities (headings correspond to subsection 26(1) of the Mackenzie Valley Land Use Regulations)

	Condition	Category
	26(1)(*a*) Location and Area	
1.	The Permittee shall use an existing campsite, as described in the accepted application.	**Existing Camp**
2.	The Permittee shall not conduct this land-use operation on any lands not designated in the accepted application.	**Location of Activities**
	26(1)(*b*) Time	
3.	At least 48 hours prior to the commencement of this land-use operation, the Permittee's Field Supervisor shall contact an Inspector at (867) 767-9188.	**Contact Inspector**
4.	At least 48 hours prior to commencement of this land-use operation, the Permittee shall provide the following information, in writing, to the Board and an Inspector: (a) the name(s) of the person(s) in charge of the field operation; (b) alternates; and (c) all methods for contacting the above person(s).	**Identify Agent**
5.	At least ten days prior to the completion of the land-use operation, the Permittee shall advise an Inspector of: (a) the plan for removal or storage of equipment and materials; and (b) when final cleanup and reclamation of the land used will be completed.	**Reports Before Removal**
	26(1)(*c*) Type and Size of Equipment	
6.	The Permittee shall not use any equipment except of a similar type, size, and number to that listed in the accepted application.	**Only Approved Equipment**
	26(1)(*d*) Methods and Techniques	
7.	The Permittee shall not erect camps or store material other than that required for immediate use on the ice surface of a Watercourse.	**Storage on Ice**
	26(1)(*e*) Type, Location, Capacity, and Operation of All Facilities	
8.	The Permittee shall ensure that the land use area is kept clean at all times.	**Clean Work Area**
9.	The Permittee shall not locate any Sump within 100 metres of the Ordinary High Water Mark of any Watercourse, unless otherwise authorized in writing by an Inspector.	**Sumps From Water**

	26(1)(*f*) Control or Prevention of Ponding of Water, Flooding, Erosion, Slides, and Subsidence of Land	
10.	The land-use operation shall not cause obstruction to any natural drainage.	**Natural Drainage**
	26(1)(*g*) Use, Storage, Handling, and Ultimate Disposal of Any Chemical or Toxic Material	
11.	At least seven days prior to the use of any chemicals that were not identified in the accepted application, the MSDS sheets must be provided to an Inspector and the Board.	**Chemicals**
12.	Prior to the expiry date of this Permit or the end of operations, whichever comes first, the Permittee shall backfill and restore all Sumps, unless otherwise authorized in writing by an Inspector.	**Backfill Sumps**
13.	The Permittee shall maintain a record of all spills. For all reportable spills, as defined in the *NT-NU Spill Report Form,* the Permittee shall: (a) immediately report each spill to the 24-hour Spill Report Line (867) 920-8130; (b) report each spill to an Inspector within 24 hours; and (c) submit, to the Board and an Inspector, a detailed report on each spill within 30 days.	**Report Spills**
14.	The Permittee shall dispose of all Toxic substances as described in the approved Waste Management Plan.	**Waste Chemical Disposal**
15.	The Permittee shall dispose of all combustible waste petroleum products by removal to an approved disposal facility.	**Waste Petroleum Disposal**
	26(1)(*h*) Wildlife and Fish Habitat	
16.	The Permittee shall take all reasonable measures to prevent damage to wildlife and fish Habitat during this land-use operation.	**Habitat Damage**
	26(1)(*i*) Storage, Handling, and Disposal of Refuse or Sewage	
17.	The Permittee shall adhere to the approved Waste Management Plan and shall annually review the plan and make any necessary revisions to reflect changes in operations, technology, chemicals, or fuels, or as directed by the Board. Revisions to the plan shall be submitted to the Board for approval.	**Waste Management**
18.	The Permittee shall keep all garbage and debris in a secure container until disposal.	**Garbage Container**
19.	The Permittee shall dispose of all garbage, waste, and debris as described in the approved Waste Management Plan, unless otherwise authorized in writing by an Inspector.	**Remove Garbage**
20.	The Permittee shall dispose of all Sewage and Greywater as described in the approved Waste Management Plan.	**Sewage Disposa**l

	26(1)(*j*) Protection of Historical, Archaeological, and Burial Sites	
21.	The Permittee shall not operate any vehicle or equipment within 150 metres of a known or suspected historical or archaeological site or burial ground.	**Archaeological Buffer**
22.	The Permittee shall not knowingly remove, disturb, or displace any archaeological specimen or site.	**Site Disturbance**
23.	The Permittee shall, where a suspected archaeological or historical site, or burial ground is discovered: (a) immediately suspend operations on the site; and (b) notify the Board at (867) _____ or an Inspector at (867) 767-9188, and the Prince of Wales Northern Heritage Centre at (867) 920-6182 or 873-7688.	**Site Discovery and Notification**
	26(1)(*l*) Security Deposit	
24.	All costs to remediate the area under this Permit are the responsibility of the Permittee.	**Responsibility for Remediation Costs**
	26(1)(*m*) Fuel Storage	
25.	The Permittee shall not place any Fuel Storage Containers or tanks within 100 metres of the Ordinary High Water Mark of any Watercourse, unless otherwise authorized in writing by an Inspector.	**Fuel Near Water**
26.	The Permittee shall ensure that all fuel caches containing 20 or more Fuel Storage Containers have adequate Secondary Containment.	**Fuel Cache Secondary Containment**
27.	The Permittee shall set up all refueling points with secondary containment.	**Secondary Containment - Refueling**
28.	The Permittee shall not allow petroleum products to spread to surrounding lands or Watercourses.	**Fuel Containment**
29.	The Permittee shall mark all Fuel Storage Containers and tanks with the Permittee's name.	**Mark Containers**
30.	The Permittee shall seal all outlets of Fuel Storage Containers and store the containers on their sides with the outlets located at 3 and 9 o'clock, except for containers currently in use.	**Seal Outlet**
31.	The Permittee shall adhere to the approved Spill Contingency Plan and shall annually review the plan and make any necessary revisions to reflect changes in operations, technology, chemicals, or fuels, or as directed by the Board. Revisions to the plan shall be submitted to the Board for approval.	**Spill Contingency Plan**
32.	Prior to commencement of operations, the Permittee shall ensure that spill-response equipment is in place to respond to any potential spills.	**Spill Response**
33.	The Permittee shall clean up all leaks, spills, and contaminated material.	**Clean Up Spills**

	26(1)(*n*) Methods and Techniques for Debris and Brush Disposal	
34.	The Permittee shall progressively dispose of all brush and trees and shall complete all brush disposal; all disposal shall be completed prior to the expiry date of this permit.	**Brush Disposal/ Time**
35.	The Permittee shall not clear areas larger than identified in the accepted application.	**Minimize Area Cleared**
	26(1)(*o*) Restoration of the Lands	
36.	Prior to the expiry date of this Permit, the Permittee shall complete all cleanup and restoration of the lands used.	**Final Cleanup and Restoration**
	26(1)(*p*) Display of Permits and Permit Numbers	
37.	The Permittee shall keep a copy of this permit on hand at all times during this land-use operation.	**Copy of Permit**

Project Name:

ord Lake Lodge

Reclaim Model - Overview of Program

All users are urged to read the Reclaim Model User Manual - Scroll down for overview description of program.

Important! Reclaim 7.0 works better with no other excel files open.
If other excel files are open ignore run time error and proceed

Reclaim Menu	The default Excel menu bar has an additional tab labelled "Add-Ins" that provides options specific to the Reclaim Model.
Clear	This option deletes all input data, deletes any duplicated elements and blanks out the project name. It also allows for segregation into land costs vs water costs if required.
Duplicate	This option Duplicates components of the project. E.g. if there is more than one Open Pit, use duplicate to add a second Open Pit. Quantities for the new Open Pit are erased, but the Activities and Cost Codes are carried over from the original Open Pit. The new Open Pit subtotal is added to the Summary page.
Unit Costs	This option opens a window of unit costs to provide easy reference. NOTE: the unit cost table has a filter in the 'UNITS' column. You can select to only see a particular unit (eg km) or multiple units (km and m3) or all units.
Print All	This option prints the Summary Worksheet, Unit Cost Worksheet, and the individual component worksheets having non-zero balances. Individual worksheets can be printed directly using standard printing methods, such as Ctl - P.
Quit	Select Quit to exit the program
Help	Redirects user to Instructions worksheet.

WorkSheets	
Summary	This worksheet contains a cumulative summary of costs for each component of the project. Associated costs such as engineering and project management are added as a percentage of the component costs.
Components	Costs are derived for individual closure and reclamation activities by multiplying a "quantity" of activity by a "unit cost". An activity can be edited, added, or deleted from worksheet. However, care should be taken not to modify cells that are defined and used elsewhere in the program. ***Do not change the content or column width of the first column of each component worksheet.***
Unit Costs	This worksheet contains a look up table with costs for typical work associated with each closure and reclamation activity

Limitations	***The Reclaim Program will NOT work if the worksheets are changed such that the following requirements are not met. Please review the following prior to modifiying worksheets.***
WorkSheet Names	*The names of the worksheets must not be changed.*
Defined Names	Certain cells have defined names, which must not be changed. Where the cell is named, the name will appear in the "Name Box" to the left of the formula bar.
First line of data	The first line of data for any component worksheet starts on line 4. ***Do not change the first line of a component worksheet, ie the component name.***
Cell A1	Cell A1 on the component sheet MUST always contain the count of that component for the duplicate function to operate. ***DO NOT CHANGE.***
Adding Lines	You can add lines to components and the unit cost table, as long as they are not the last lines. The last line might fall outside the named ranges. You can check the size of the named range by selecting the name from the drop down box at the top left of the sheet. Usually this box has a cell reference, or a name.
Printing	A component will only be printed if its sub-total is greater than zero. In addition, a component and the summary sheet cannot be printed if there is an error. Printing has been set to print 1 page per component.

Conditions of Use	The Reclamation Cost Estimating Model was prepared to serve as a guide for Government Agencies, mining companies, and others to estimate the cost of mine reclamation. This model is not intended to replace reclamation planning or to be used to determine the activities required to reclaim a site or to dictate how much should be spent on reclamation. Reclaim was prepared by Brodie Consulting Ltd. on behalf of AANDC. AANDC and Brodie Consulting Ltd. are not responsible for the completeness or accuracy of any reclamation estimate made using this model. The user agrees to check and take responsibility for all aspects of any cost estimate made using this model.

The following table provides guidance as to whether water management and treatment is considered short term or long term. Short term closure activities may be costed within a component (eg 'Open Pit' or 'Rock Pile') or 'Water Management'. Long term or post-closure water treatment is costed in 'Water Treatment'. and included in "Post-closure Monitoring and Maintenance".

		Short Term/ Capital Ex.	Long term
Open Pit	flood pit - install/operate pumping system	x	
	construct diversion ditches	x	
	treat 1st filling	x	
	install pump/decant system	x	
	passive/biological treatment	x	
	overflow treatment		x
Rock Pile/Heap Leach Facility	construct diversion ditches	x	
	install groundwater collection system	x	
	install toe seepage collection system	x	
	collect and treat groundwater		x
	collect and treat seepage (ARD/ML)		x
	install passive treatment system	x	
	operate and maintain passive treatment system		x
	operate pump and detoxify heap leach pile (cyanide destruction)	x	
Tailings Facility	construct diversion ditches	x	
	pump supernatant (to pit, U/G)	x	
	treat supernatant	x	
	install toe seepage collection system	x	
	collect and treat seepage (ARD/ML)		x
	install passive treatment system	x	
	operate and maintain passive treatment system		x
U/G Mine	accelerate flooding	x	
	install seepage collection system	x	
	install dewatering/pumping system	x	
	operate seepage/dewatering system (ARD/ML)		x
Water Management	refill lakes		
	redirect creeks/streams	x	
	stabilize water management ponds	x	
	stabilize/close sediment ponds	x	
	fresh water supply - breach embankment	x	
	fresh water supply - remove piping system	x	
	construct water treatment plant	x	
	construct sludge pond	x	
	water control in reclamation quarry	x	
	operate/maintain water treatment plant		x

SUMMARY OF COSTS

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY
OPEN PIT		$0	$0	$0
UNDERGROUND MINE		$0	$0	$0
TAILINGS FACILITY		$0	$0	$0
ROCK PILE		$0	$0	$0
BUILDINGS AND EQUIPMENT		$9,203	$8,700	$503
CHEMICALS AND CONTAMINATED SOIL MANAGEMEI		$7,923	$3,961	$3,961
SURFACE AND GROUNDWATER MANAGEMENT		$0	-	$0
INTERIM CARE AND MAINTENANCE		$0	-	$0
	SUBTOTAL: Capital Costs	**$17,125**	**$12,661**	**$4,464**
	PERCENT OF SUBTOTAL		**74%**	**26%**

INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY
MOBILIZATION/DEMOBILIZATION		$8,930	$6,602	$2,328
POST-CLOSURE MONITORING AND MAINTENANCE		$0	$0	$0
ENGINEERING	5%	$856	$633	$223
PROJECT MANAGEMENT	5%	$856	$633	$223
HEALTH AND SAFETY PLANS/MONITORING & QA/QC	1%	$171	$127	$45
BONDING/INSURANCE	1%	$171	$127	$45
CONTINGENCY	20%	$3,425	$2,532	$893
MARKET PRICE FACTOR ADJUSTMENT	0%	$0	$0	$0
	SUBTOTAL: Indirect Costs	**$14,410**	**$10,654**	**$3,756**

TOTAL COSTS	$31,536	$23,315	$8,220

1 **Open Pit Name:** **Pit # *1***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
CONTROL ACCESS									
Fence		m		#N/A	$0.00	$0		$0	$0
Signs		each		#N/A	$0.00	$0		$0	$0
Berm at crest		m3		#N/A	$0.00	$0		$0	$0
Block roads		m3		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
STABILITY STUDY									
Conduct stability and setback study		allow		#N/A	$0.00	$0		$0	$0
STABILIZE SLOPES									
Off-load crest, soil A		m3		#N/A	$0.00	$0		$0	$0
Off-load crest, soil B		m3		#N/A	$0.00	$0		$0	$0
Doze/trim overburden at crest		m3		#N/A	$0.00	$0		$0	$0
Drill & blast pit crest		m3		#N/A	$0.00	$0		$0	$0
Buttress slope		m3		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
COVER/CONTOUR SLOPES									
Place fill, soil A		m3		#N/A	$0.00	$0		$0	$0
Place fill, soil B		m3		#N/A	$0.00	$0		$0	$0
Rip rap		m3		#N/A	$0.00	$0		$0	$0
Vegetate slopes		ha		#N/A	$0.00	$0		$0	$0
Vegetate pit floor		ha		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
CONSTRUCT DIVERSION DITCHES									
Excavate ditches -soil		m3		#N/A	$0.00	$0		$0	$0
Excavate ditches -rock		m3		#N/A	$0.00	$0		$0	$0
Rip rap in channel base		m3		#N/A	$0.00	$0		$0	$0
CONSTRUCT SPILLWAY									
Excavate channel		m3		#N/A	$0.00	$0		$0	$0
Concrete		m3		#N/A	$0.00	$0		$0	$0
Rip rap		m3		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
RECLAIM QUARRIES									
Contour slopes		m3		#N/A	$0.00	$0		$0	$0
Place overburden		m3		#N/A	$0.00	$0		$0	$0
Vegetate		m3		#N/A	$0.00	$0		$0	$0
FLOOD PIT-Captital									
Remove stationary equipment (sump pumps)		each		#N/A	$0.00	$0		$0	$0
Remove dewatering pipeline		m		#N/A	$0.00	$0		$0	$0
Remove power lines		each		#N/A	$0.00	$0		$0	$0
Construct diversion ditches		m3		#N/A	$0.00	$0		$0	$0
-Ditch, mat'l A		m3		#N/A	$0.00	$0		$0	$0
-Ditch, mat'l B		m3		#N/A	$0.00	$0		$0	$0
Construct embankment/dam		m3		#N/A	$0.00	$0		$0	$0
Supply/install pump station		each		#N/A	$0.00	$0		$0	$0
Supply/install piping system		m		#N/A	$0.00	$0		$0	$0
Remove pump post-closure		each		#N/A	$0.00	$0		$0	$0
Remove pipeline post-closure		m		#N/A	$0.00	$0		$0	$0
FLOOD PIT-Annual Cost									
Operate pumps (power)		m3		#N/A	$0.00	$0		$0	$0
Maintain pump/pipeline		allow		#N/A	$0.00	$0		$0	$0
Labour:fuel management, comissioning/decom		$/h		#N/A	$0.00	$0		$0	$0
Chemical addition, _____ kg/m3 of water		tonne		#N/A	$0.00	$0		$0	$0
Chemicals, purchase and shipping		tonne		#N/A	$0.00	$0		$0	$0
Passive/biological additives		$/ha		#N/A	$0.00	$0		$0	$0
Passive additives purchase and shipping		tonne		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
					Annual pumping costs	$0			
Number of years of pump flooding		years							
					Total pumping costs	$0		$0	$0
					Total	$0		$0	$0
					% of Total			0%	0%

1 **Underground Mine Name** **UG Mine # *1***

ACTIVITY/MATERIAL	Notes	Unit	Qty	Code	Cost	Cost Land	Cost	Cost
CONTROL ACCESS								
Fence		m		#N/A	$0.00	$0	$0	$0
Signs		each		#N/A	$0.00	$0	$0	$0
Block roads		m3		#N/A	$0.00	$0	$0	$0
Berm		m3		#N/A	$0.00	$0	$0	$0
Concrete wall in portals		m3		#N/A	$0.00	$0	$0	$0
Backfill portal #1		m3		#N/A	$0.00	$0	$0	$0
Backfill portal #2		m3		#N/A	$0.00	$0	$0	$0
Cap raise # 1		m3		#N/A	$0.00	$0	$0	$0
Cap raise #2		m3		#N/A	$0.00	$0	$0	$0
Cap shaft #1		m3		#N/A	$0.00	$0	$0	$0
Cap shaft #2		m3		#N/A	$0.00	$0	$0	$0
Backfill adits		m3		#N/A	$0.00	$0	$0	$0
Backfill open stope		m3		#N/A	$0.00	$0	$0	$0
Concrete cap over open stope		m3		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
REMOVE HAZARDOUS MATERIALS								
Remove hazardous materials, U/G labor		mandays		#N/A	$0.00	$0	$0	$0
Remove/decontam. stationary & elect. equip		mandays		#N/A	$0.00	$0	$0	$0
Remove/decontam. mobile equipment		each		#N/A	$0.00	$0	$0	$0
Remove misc. haz. mat & explosives		kg		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
INSTALL BULKHEADS								
Bulkheads to control water flow		each		#N/A	$0.00	$0	$0	$0
Grout bulkhead		m3		#N/A	$0.00	$0	$0	$0
FLOOD MINE								
Supply/install pump		each		#N/A	$0.00	$0	$0	$0
Supply/install piping system		each		#N/A	$0.00	$0	$0	$0
Operate pumps to flood workings		m3		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
INSTALL GROUNDWATER COLLECTION SYSTEM								
Excavate/install sumps		m2		#N/A	$0.00	$0	$0	$0
Install pumping wells		m3		#N/A	$0.00	$0	$0	$0
Install pumps/pipelines/power supply		LS		#N/A	$0.00	$0	$0	$0
SPECIALIZED ITEMS								
Install water quality monitoring pipes		each		#N/A	$0.00	$0	$0	$0
Install permanent pumping system		each		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
					Total	$0	$0	$0
					% of Total		0%	0%

1 **Tailings Impoundment Name:** **Pond # *1***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost Land	Land Cost	Water Cost
CONTROL ACCESS								
Fence		m		#N/A	$0.00	$0	$0	$0
Signs		each		#N/A	$0.00	$0	$0	$0
Berm		m3		#N/A	$0.00	$0	$0	$0
Block roads		m3		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
STABILIZE EMBANKMENT(S)								
Toe buttress, drainage layer		m3		#N/A	$0.00	$0	$0	$0
Toe buttress, bulk fill		m3		#N/A	$0.00	$0	$0	$0
Rip rap		m3		#N/A	$0.00	$0	$0	$0
Vegetate		ha		#N/A	$0.00	$0	$0	$0
Raise crest		m3		#N/A	$0.00	$0	$0	$0
Flatten slopes		m3		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
COVER TAILINGS								
Grade/shape tailings surface		m3		#N/A	$0.00	$0	$0	$0
Liner bedding		m3		#N/A	$0.00	$0	$0	$0
Subgrade preparation - compact		m2		#N/A	$0.00	$0	$0	$0
Supply geotextile/geosynthetic		m2		#N/A	$0.00	$0	$0	$0
Install geotextile/geosynthetic		m2		#N/A	$0.00	$0	$0	$0
Soil cover		m3		#N/A	$0.00	$0	$0	$0
Rock cover		m3		#N/A	$0.00	$0	$0	$0
Vegetate		m2		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
BURY PAG ROCK								
Relocate PAG rock		m3		#N/A	$0.00	$0	$0	$0
Place cover over PAG rock		m3		#N/A	$0.00	$0	$0	$0
Raise crest of dam		m3		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
STABILIZE DECANT SYSTEM								
Excavate and replace		m3		#N/A	$0.00	$0	$0	$0
Plug/backfill with concrete or clay		m3		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
REMOVE TAILINGS DISCHARGE								
Cyclones		m3		#N/A	$0.00	$0	$0	$0
Pipe		m3		#N/A	$0.00	$0	$0	$0
Remove reclaim barge		allow		#N/A	$0.00	$0	$0	$0
CONSTRUCT DIVERSION DITCHES								
Excavate ditches -soil		m3		#N/A	$0.00	$0	$0	$0
Excavate ditches -rock		m3		#N/A	$0.00	$0	$0	$0
Rip rap in channel base		m3		#N/A	$0.00	$0	$0	$0
FLOOD TAILINGS								
Doze tailings to final contour		m3		#N/A	$0.00	$0	$0	$0
Raise crest of dam		m3		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
UPGRADE SPILLWAY								
Excavate channel, rock		m3		#N/A	$0.00	$0	$0	$0
Excavate channel, soil		m3		#N/A	$0.00	$0	$0	$0
Concrete		m3		#N/A	$0.00	$0	$0	$0
Rip rap		m3		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
CONSTRUCT SEEPAGE COLLECTION POND								
Excavate seepage collection pond		m3		#N/A	$0.00	$0	$0	$0
Doze & spread excavated material		m3		#N/A	$0.00	$0	$0	$0
Vegetate spread material		ha		#N/A	$0.00	$0	$0	$0
Bedding layer		m3		#N/A	$0.00	$0	$0	$0
Supply geomembrane		m2		#N/A	$0.00	$0	$0	$0
Install geomembrane		m2		#N/A	$0.00	$0	$0	$0
Erosion protection layer		m3		#N/A	$0.00	$0	$0	$0
INSTALL GROUNDWATER COLLECTION SYSTEM								
Excavate/install sumps		m3		#N/A	$0.00	$0	$0	$0
Install pumping wells		m3		#N/A	$0.00	$0	$0	$0
Install pumps/pipelines/power supply		LS		#N/A	$0.00	$0	$0	$0
SPECIALIZED ITEMS								
Install permanent instrumentation, supply & technican		each		#N/A	$0.00	$0	$0	$0
Install permanent instrumentation, drilling		each		#N/A	$0.00	$0		$0
TREAT SEEPAGE - see "Water Management" and "Water Treatment"								
TREAT SUPERNATANT								
Pump water (to pit, U/G)		m3		#N/A	$0.00	$0	$0	$0
Equipment maintenance and parts		allow		#N/A	$0.00	$0	$0	$0
Supply reagents		tonne		#N/A	$0.00	$0	$0	$0
			Annual treatment costs			$0		
Number of years of treatment		years						
			Total treatment costs			$0		$0
					Total	$0	$0	$0
					% of Total		0%	0%

* for construction of passive treatment system refer to "Water Management"

1 **Rock Pile Name:**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost Land	Land Cost	Water Cost
STABILIZE SLOPES								
Flatten slopes with dozer		m3		#N/A	$0.00	$0	$0	$0
Flatten "bubble dump" areas		m3		#N/A	$0.00	$0	$0	$0
Divert runon, ditch mat'l A		m3		#N/A	$0.00	$0	$0	$0
Divert runon, ditch mat'l B		m3		#N/A	$0.00	$0	$0	$0
Toe buttress, drain mat'l		m3		#N/A	$0.00	$0	$0	$0
Toe buttress, fill mat'l A		m3		#N/A	$0.00	$0	$0	$0
Toe buttress, fill mat'l B		m3		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
COVER ROCK PILE								
Subgrade preparation - doze surface		m3		#N/A	$0.00	$0	$0	$0
Soil cover - excavate,haul,spread&compact		m3		#N/A	$0.00	$0	$0	$0
Rock cover - excavate,haul & spread		m3		#N/A	$0.00	$0	$0	$0
Excavate downslope drainage channel & chute		m3		#N/A	$0.00	$0	$0	$0
Rip rap drainage channel and chute		m3		#N/A	$0.00	$0	$0	$0
Vegetate		ha		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
VERY LOW PERMEABILITY COVER (in addition to above)								
Liner subgrade preparation - compact		m2		#N/A	$0.00	$0	$0	$0
Supply geomembrame		m2		#N/A	$0.00	$0	$0	$0
Install geomembrane		m2		#N/A	$0.00	$0	$0	$0
Protective cover - excavate,haul,spread&compact		m3		#N/A	$0.00	$0	$0	$0
Vegetate		ha		#N/A	$0.00	$0	$0	$0
Install infiltration/seepage instrumentation		allow		#N/A	$0.00	$0	$0	$0
CONSTRUCT DIVERSION DITCHES								
Excavate ditches -soil		m3		#N/A	$0.00	$0	$0	$0
Excavate ditches -rock		m3		#N/A	$0.00	$0	$0	$0
Rip rap in channel base		m3		#N/A	$0.00	$0	$0	$0
CONSTRUCT SEEPAGE COLLECTION POND								
Excavate seepage collection pond		m3		#N/A	$0.00	$0	$0	$0
Doze & spread excavated material		m3		#N/A	$0.00	$0	$0	$0
Vegetate spread material		ha		#N/A	$0.00	$0	$0	$0
Bedding layer		m3		#N/A	$0.00	$0	$0	$0
Supply geomembrane		m2		#N/A	$0.00	$0	$0	$0
Install geomembrane		m2		#N/A	$0.00	$0	$0	$0
Erosion protection layer		m3		#N/A	$0.00	$0	$0	$0
INSTALL GROUNDWATER COLLECTION SYSTEM								
Excavate/install sumps		m3		#N/A	$0.00	$0	$0	$0
Install pumping wells		m3		#N/A	$0.00	$0	$0	$0
Install pumps/pipelines/power supply		allow		#N/A	$0.00	$0	$0	$0
RELOCATE DUMPS								
Load, haul, dump or doze		m3		#N/A	$0.00	$0	$0	$0
Add lime		tonne		#N/A	$0.00	$0	$0	$0
Contour reclaimed area		ha		#N/A	$0.00	$0	$0	$0
Other				#N/A	$0.00	$0	$0	$0
SPECIALIZED ITEMS								
Install permanent instrumentation		each		#N/A	$0.00	$0	$0	$0
Install permanent instrumentation, drilling		each		#N/A	$0.00	$0	$0	$0
TREAT ROCK PILE SEEPAGE - see "Water Treatment"								
HEAP LEACH SEEPAGE TREATMENT - Cyanide Detox								
Cyanide destruction water treatment pumping		m3		#N/A	$0.00	$0	$0	$0
Reagents		tonnes		#N/A	$0.00	$0	$0	$0
Electrician/mechanic to maintain treatment plant		allow		#N/A	$0.00	$0	$0	$0
Equipment maintenance and parts		allow		#N/A	$0.00	$0	$0	$0
				Annual treatment costs		$0		
Number of years of treatment		years						
				Total treatment costs		$0		$0
HEAP LEACH SEEPAGE TREATMENT - ARD/ML**								
Upgrade/modify pumping system - report to WTP		allow		#N/A	$0.00	$0		$0
					Total	$0	$0	$0
					% of Total		0%	0%

* For construction of passive treatment system refer to "Water Management". ARD/ML seepage treatment becomes post-closure water treatment cost

**Heap leach ARD/ML seepage treatment becomes post-closure water treatment cost

1 **Chemicals/Soil Area Name:**

Note: The procedures, equipment and packaging for clean up and removal of chemicals or contaminated soils are highly dependent on the nature of the chemicals and their existing state of containment. Government guidelines should be consulted on an individual chemical basis. Any estimate made here should be considered very rough unless specific evaluations have been conducted.

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
HAZARDOUS MATERIALS AUDIT									
Hazardous materials audit		mandays		#N/A	$0.00	$0		$0	$0
BUILDING DECONTAMINATION & CONSOLIDATION OF HAZARDOUS MATERIALS									
Environmental technician/coordinator		mandays		#N/A	$0.00	$0		$0	$0
Decontaminate: oil, fuel		mandays		#N/A	$0.00	$0		$0	$0
Decontaminate maintenance shop		mandays		#N/A	$0.00	$0		$0	$0
Decontaminate power plant		mandays		#N/A	$0.00	$0		$0	$0
Decontaminate bulk fuel storage		mandays		#N/A	$0.00	$0		$0	$0
Decontaminate ANFO plant		mandays		#N/A	$0.00	$0		$0	$0
Decontaminate offices/warehouse/accom		mandays		#N/A	$0.00	$0		$0	$0
Removal of asbestos siding on buildings		m2		#N/A	$0.00	$0		$0	$0
Removal of friable asbestos on equipment		m2		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
HAZARDOUS MATERIALS REMOVAL									
Waste oils		litre	330	Orh	$1.20	$396	50%	$198	$198
Waste fuel		litre	38	Orl	$0.43	$16	50%	$8	$8
Waste batteries		kg	23	PCRl	$0.45	$10	50%	$5	$5
Assay & environmental lab reagents		kg		#N/A	$0.00	$0		$0	$0
Machine shop paints, solvents etc		litre		#N/A	$0.00	$0		$0	$0
Glycol		litre		#N/A	$0.00	$0		$0	$0
Process reagents		kg		#N/A	$0.00	$0		$0	$0
Nuclear sources		allow		#N/A	$0.00	$0		$0	$0
Other hazardous materials		allow		#N/A	$0.00	$0		$0	$0
HAZARDOUS MATERIALS									
Transportation to disposal facility		allow		#N/A	$0.00	$0		$0	$0
Disposal fees		allow		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
CONTAMINATED SOILS									
Contam. soil investigation - Phase 1	Clean-up and restoration work requirements	each	1	cs1l	$7,500.00	$7,500	50%	$3,750	$3,750
Contam. soil investigation - Phase 2		each		#N/A	$0.00	$0		$0	$0
CONTAMINATED SOIL REMOVAL									
Excavate and transport to onsite facility		m3		#N/A	$0.00	$0		$0	$0
Manage hydrocarbon remediation at facility		m3		#N/A	$0.00	$0		$0	$0
Reagents/stabilizing agent		m2		#N/A	$0.00	$0		$0	$0
Excavate and transport to offsite facility		m3		#N/A	$0.00	$0		$0	$0
Contour decontaminated area		m3		#N/A	$0.00	$0		$0	$0
CONTAMINATED SOIL VERY LOW PERMEABILITY COVER									
Supply geomembrame, HDPE, ES3, GCL		m2		#N/A	$0.00	$0		$0	$0
Upper and lower bedding layers		m3		#N/A	$0.00	$0		$0	$0
Install geomembrane, HDPE, ES3, GCL		m2		#N/A	$0.00	$0		$0	$0
Erosion protection layer		m3		#N/A	$0.00	$0		$0	$0
Vegetate		m2		#N/A	$0.00	$0		$0	$0
Install infiltration/seepage instrumentation		allow		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
OTHER									
				#N/A	$0.00	$0		$0	$0
					Total	$7,923		$3,961	$3,961
					% of Total			50%	50%

1 **Building / Equip Name:** **Bldg / Equip #: *1***

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
DISPOSE MOBILE EQUIPMENT									
Decontaminate and ship off-site		allow		#N/A	$0.00	$0		$0	$0
Decontaminate and dispose on-site		allow		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
REMOVE BUILDINGS - see note below									
Accomodation Complex		m2	200	brwh	$41.00	$8,200	100%	$8,200	$0
Process Facilities		m2		#N/A	$0.00	$0		$0	$0
Offices, Repair, Lab, Warehouse		m2		#N/A	$0.00	$0		$0	$0
Storage Facilites		m2		#N/A	$0.00	$0		$0	$0
Water and Wastewater Treatment Facilities		m2		#N/A	$0.00	$0		$0	$0
U/G Heating Plant		m2		#N/A	$0.00	$0		$0	$0
Emulsion Plant		m2		#N/A	$0.00	$0		$0	$0
AN Storage Facility		m2		#N/A	$0.00	$0		$0	$0
Warehouse, Shops and Other		m2		#N/A	$0.00	$0		$0	$0
Storage Facility at Laydown/Airstrip		m2		#N/A	$0.00	$0		$0	$0
Fuel tanks		m2		#N/A	$0.00	$0		$0	$0
Fuel Tanks		m2		#N/A	$0.00	$0		$0	$0
Freshwater intake		m2		#N/A	$0.00	$0		$0	$0
Reclaim pumps		m2		#N/A	$0.00	$0		$0	$0
Outfall & Diffuser		m2		#N/A	$0.00	$0		$0	$0
Airstrip lighting, navigation, electrician		mandays		#N/A	$0.00	$0		$0	$0
Airstrip lighting, navigation, mechanical		mandays		#N/A	$0.00	$0		$0	$0
Break foundation slabs - concrete footings	total of all buildings	alloc	1	#N/A	$500	$500	100%	$500	$0
Consolidate & dump boneyard debris		m3		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
LANDFILL FOR DEMOLITION WASTE									
Place rock cover	soil cover	m3		SB3l	$5.10	$0	50%	$0	$0
Place soil cover		m3		#N/A	$0.00	$0		$0	$0
Treat Septic Field and Landfill	Lime	kg	5	limel	$0.56	$3		$0	$3
Vegetate		ha		#N/A	$0.00	$0		$0	$0
GRADE AND CONTOUR PADS									
Accomodation Complex		ha		#N/A	$0.00	$0		$0	$0
Process Facilities		ha		#N/A	$0.00	$0		$0	$0
Offices, Repair, Lab, Warehouse		ha		#N/A	$0.00	$0		$0	$0
Storage Facilites		ha		#N/A	$0.00	$0		$0	$0
Water and Wastewater Treatment Facilities		ha		#N/A	$0.00	$0		$0	$0
U/G Heating Plant		ha		#N/A	$0.00	$0		$0	$0
Emulsion Plant		ha		#N/A	$0.00	$0		$0	$0
Warehouse, Shops and Other		ha		#N/A	$0.00	$0		$0	$0
Place rock cover		m3		#N/A	$0.00	$0		$0	$0
Vegetate		ha		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
PUNCTURE LINED SUMPS									
Puncture liner and place soil cover		m3		#N/A	$0.00	$0		$0	$0
RECLAIM ROADS									
Remove culverts		each		#N/A	$0.00	$0		$0	$0
Remove bridges		each		#N/A	$0.00	$0		$0	$0
Scarify and install water breaks		ha		#N/A	$0.00	$0		$0	$0
Scarify airstriip		ha		#N/A	$0.00	$0		$0	$0
Scarify laydown areas		ha		#N/A	$0.00	$0		$0	$0
Vegetate		ha		#N/A	$0.00	$0		$0	$0
Other				#N/A	$0.00	$0		$0	$0
SPECIALIZED ITEMS									
Dispose of misc. debris and laydown area refuse		alloc	1	#N/A	$500	$500		$0	$500
					Total	$9,203		$8,700	$503
					% of Total			95%	5%

Note: Unit costs are based on 3m high, single storey building. Scale larger building areas accordingly. E.g. 10m high building multiply area by 3.3 (10/3)

1 **Capital Expenditures and Short Term Water Treatment identified in 'Instructions' worksheet**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
BREACH DYKE EMBANKMENT						
Remove fill		m3		#N/A	$0.00	$0
Contour water intake area		m3		#N/A	$0.00	$0
STABILIZE SEDIMENT PONDS/WATER MANAGEMENT PONDS						
Place soil cover		m3		#N/A	$0.00	$0
Doze & spread excavated material		m3		#N/A	$0.00	$0
Vegetate spread material		ha		#N/A	$0.00	$0
Rip rap in channel base		each		#N/A	$0.00	$0
REDIRECT RUNOFF/CONSTRUCT DIVERSION DITCHES						
Excavate ditches -soil		m3		#N/A	$0.00	$0
Excavate ditches -rock		m3		#N/A	$0.00	$0
Stabilize side slopes		m3		#N/A	$0.00	$0
Rip rap in channel base		m3		#N/A	$0.00	$0
BREACH DITCHES						
Excavate breaches		m3		#N/A	$0.00	$0
Backfill/recontour		m3		#N/A	$0.00	$0
Install flow dissipation		m3		#N/A	$0.00	$0
Vegetate remainder of ditch		m2		#N/A	$0.00	$0
DECOMISSION FRESH WATER SUPPLY						
Breach embankment		m		#N/A	$0.00	$0
Remove pump		LS		#N/A	$0.00	$0
Remove pipeline		m		#N/A	$0.00	$0
WATER CONTROL IN RECLAMATION QUARRY						
Install pumping system		LS		#N/A	$0.00	$0
Remove pumping system		LS		#N/A	$0.00	$0
REMOVE PIPELINES						
Remove pipes		m		#N/A	$0.00	$0
Concrete plug deep pipes		m3		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
GROUNDWATER COLLECTION SYSTEM						
Excavate/install sumps		m3		#N/A	$0.00	$0
Install pumping wells		m3		#N/A	$0.00	$0
Install pumps/pipelines/power supply		LS		#N/A	$0.00	$0
CONSTRUCT CONTAMINATED WATER STORAGE POND						
Excavate pond		m3		#N/A	$0.00	$0
Doze & spread excavated material		m3		#N/A	$0.00	$0
Vegetate spread material		ha		#N/A	$0.00	$0
Bedding layer		m3		#N/A	$0.00	$0
Supply geomembrane		m2		#N/A	$0.00	$0
Install geomembrane		m2		#N/A	$0.00	$0
Erosion protection layer		m3		#N/A	$0.00	$0
CONSTRUCT PASSIVE TREATMENT SYSTEM (e.g. Constructed Wetland)						
Construct access roads		km		#N/A	$0.00	$0
Install HDPE piping system from collection pond		m		#N/A	$0.00	$0
Inter-cell flow structures		allow		#N/A	$0.00	$0
Install liners		m2		#N/A	$0.00	$0
Install growth media		m3		#N/A	$0.00	$0
Wetland vegetation		ha		#N/A	$0.00	$0
CONSTRUCT WATER TREATMENT PLANT						
Build treatment plant		LS		#N/A	$0.00	$0
Build sludge containment facility		LS		#N/A	$0.00	$0
SHORT TERM WATER TREATMENT*						
Annual water treatment cost, from "Water Treatment"						$0
					Total	$0

*Note: include water treatment cost from "Water Treatment" worksheet if treatment is considered short term and is not included in a particular component worksh

1 **Water Treatment**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
ADDITION OF REAGENTS						
H2O2		kg		#N/A	$0.00	$0
lime		kg		#N/A	$0.00	$0
ferric sulphate		kg		#N/A	$0.00	$0
ferrous sulphate		kg		#N/A	$0.00	$0
flocculents		kg		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
LABOUR AND SUPPLIES						
Annual fuel		litres		#N/A	$0.00	$0
Annual power		kW-h		#N/A	$0.00	$0
Electrician/mechanic to maintain treatment plant		allow		#N/A	$0.00	$0
Equipment maintenance and parts		allow		#N/A	$0.00	$0
Misc. supplies, hoses, tools		allow		#N/A	$0.00	$0
Communications		allow		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
WATER SAMPLING AND ANALYSES						
Sampling equipment		allow		#N/A	$0.00	$0
Analyses		allow		#N/A	$0.00	$0
Shipping to laboratory		allow		#N/A	$0.00	$0
Reporting		allow		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
SITE ACCESS						
Road maintenance (incl. snow removal)		allow		#N/A	$0.00	$0
Winter road tariff		allow		#N/A	$0.00	$0
Truck rental		allow		#N/A	$0.00	$0
Air support		allow		#N/A	$0.00	$0
			Annual water treatment costs			$0
Number of years of water treatment		years				
				Total		$0

Note: Short term water treattment is intended to be included in "Water Management", whereas long term, or post-closure, water treatment is included in "Post-Closure Monitoring and Maintenance"

1 Post-Closure Monitoring & Maintenance:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MONITORING & INSPECTIONS						
Annual geotechnical inspection		each		#N/A	$0.00	$0
Survey inspection		each		#N/A	$0.00	$0
Regulatory costs*		each		#N/A	$0.00	$0
Site water monitoring (AEMP and SNP)		each		#N/A	$0.00	$0
- Active closure and flooding		each		#N/A	$0.00	$0
- Post pit flooding		each		#N/A	$0.00	$0
Air Quality Monitoring Program (AQMP)		each		#N/A	$0.00	$0
Wildlife Effects Monitoring Program (WEMP)		each		#N/A	$0.00	$0
Vegetation Monitoring		each		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
COVER MAINTENANCE						
Repair erosion - infill gullies		allow		#N/A	$0.00	$0
Repair erosion - upgrade diversion ditches		allow		#N/A	$0.00	$0
Remove problem vegetation		allow		#N/A	$0.00	$0
Repair animal damage		allow		#N/A	$0.00	$0
Repair/upgrade access controls		allow		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
SPILLWAY MAINTENANCE						
Repair erosion		m3		#N/A	$0.00	$0
Clear spillway		each		#N/A	$0.00	$0
CWTS MAINTENANCE						
Maintain flow, restore vegetation		allow		#N/A	$0.00	$0
POST-CLOSURE WATER TREATMENT**						
Annual water treatment cost, from "Water Treatment"						$0
Subtotal, Annual post-closure costs						$0
Discount rate for calculation of net present value of post-closure cost, %			0.00%			
Number of years of post-closure activity				years		
Present Value of payment stream						$0

*Regulatory costs - annual reporting, management plans, progress reports etc.

Include water treatment cost from "Water Treatment" worksheet if treatment is considered long term, such as ARD/ML.

1 **Interim Care and Maintenance**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
INTERIM CARE & MAINTENANCE						
on-site caretaker		manmonths		#N/A	0	$0
extra personnel		manmonths		#N/A	0	$0
-electrician		manmonths		#N/A	0	$0
-mechanic		manmonths		#N/A	0	$0
annual fuel		litre		#N/A	0	$0
misc. supplies		allow		#N/A	0	$0
pick-up truck		each		#N/A	0	$0
small dozer		allow		#N/A	0	$0
small excavator		allow		#N/A	0	$0
snow machine		allow		#N/A	0	$0
communications		allow		#N/A	0	$0
SNP/AEMP water sampling & reporting		each		#N/A	0	$0
geotechnical assessment		each		#N/A	0	$0
interim water treatment				#N/A		$0
other		each		#N/A	0	$0
			Annual	Interim C&M Cost		$0
Number of years of ICM		years			**Total**	$0

1 Mobilization/Demobilization:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MOBILIZE HEAVY EQUIPMENT						
Excavators		each		#N/A	0	$0
Dump trucks		each		#N/A	0	$0
Dozers		each		#N/A	0	$0
Demolition shears		each		#N/A	0	$0
Crane		each		#N/A	0	$0
Loader		each		#N/A	0	$0
Compactor		each		#N/A	0	$0
Light duty vehicles		each		#N/A	0	$0
MOBILIZE MISC. EQUIPMENT						
Pump shipping		each		#N/A	0	$0
Pipe shipping		m		#N/A	0	$0
Minor tools and equipment		allow		#N/A	0	$0
Truck tires		allow		#N/A	0	$0
Other				#N/A	0	$0
MOBILIZE CAMP						
Reclamation activities		allow		#N/A	0	$0
Long term reclamation activities (eg pump flooding)		allow		#N/A	0	$0
MOBILIZE WORKERS						
Reclamation activities - transport	Caravan - mob workers and supplies	each	2	mwl	3000	$6,000
Reclamation activities - travel time		manhours	1	operH	65	$65
Long term reclamation activities (eg pump flooding) - transport		each		#N/A	0	$0
Long term reclamation activities (eg pump flooding) - travel time		each		#N/A	0	$0
Monitoring Airfare		each		#N/A	0	$0
WORKER ACCOMODATIONS						
Reclamation activities	4 workers, 1 week	nanday	28	accml	100	$2,800
Long term reclamation activities (eg pump flooding)		manmonths		#N/A	0	$0
MOBILIZE FUEL						
Fuel freight - reclamation activities		litre		#N/A	0	$0
Fuel freight - long term reclamation activities		litre		#N/A	0	$0
Fuel freight accomodations		litre		#N/A	0	$0
WINTER ROAD						
Construction and operation		km		#N/A	0	$0
Limited winter use		km		#N/A	0	$0
Winter road tarriff		km		#N/A	0	$0
DEMOBILIZE HEAVY EQUIPMENT						
Excavators		km		#N/A	0	$0
Dump trucks		km		#N/A	0	$0
Dozers		km		#N/A	0	$0
Demolition shears		km		#N/A	0	$0
Crane		km		#N/A	0	$0
Loader		km		#N/A	0	$0
Compactor		each		#N/A	0	$0
Light duty vehicles		km		#N/A	0	$0
Other		km		#N/A	0	$0
DEMOBILIZE CAMP						
		allow		#N/A	0	$0
DEMOBILIZE WORKERS						
crew travel time		Hours	1	operH	65	$65
crew transportation		each		#N/A	0	$0
WINTER ROAD						
Construction and operation		km		#N/A	0	$0
Limited winter use		km		#N/A	0	$0
Winter road tarriff		km		#N/A	0	$0
					Total	**$8,930**

Unit Cost Table (for refining unit costs see "Estimator" worksheet)

Filter by unit

ITEM	Detail	COST CODE	UNITS	LOW $	HIGH $	SPECIFIED $	COMMENTS
Accomodation							
		ACCM	manday	100.00	175.00		
Buildings - Decontaminate							
	Asbestos	BDA	m2	25.60	51.20		Low: removal of asbestos siding & flooring; High: removal of insulated pipes, friable asbestos
Buildings - Remove							Unit costs are based on 3m high, single storey building. Scale areas accordingly.
	Wood	BRW	m2	27.50	41.00		
	Concrete	BRC	m2	40.00	65.00	6.00	Specified: puncture concrete foundation slabs
	Steel - teardown	BRS1	m2	45.00	65.00		
	Steel - for salvage	BRS2	m2	67.00	100.00		
Concrete work							
	Small pour	CSF	m3	426.50	639.75		Low: YK; High=1.5xLow
	Large pour	CLF	m3	353.50	530.25	2,130.00	Specified: concrete crown pillar
Contaminated Soils							
	ESA Phase 1	CS1	each	7500.00		2,500.00	Low: small, "clean" site
	ESA Phase 1	CS2	each	50000.00			Low: small, "clean" site
	Remediate on site	CSR	m3	47.00	146.00		
Dozing							
	doze rock piles	DR	m3	1.05	2.40		Low cost: doze crest off dump
	doze overburden/soil piles	DS	m3	0.95	3.80		High cost: push up to 300 m
Excavate Rock; Low Spec's and QA/QC							
	drill/blast/load/short haul	RB1	m3	11.40	17.05		Low:quarry operations for bulk fill
	drill/blast/load/long haul	RB2	m3	12.05	17.80		
	RB1 + spread and compact	RB3	m3	12.05	17.80		
	RB2 + spread and compact	RB4	m3	12.50	30.75		
	Specified activity	RBS	m3				
Excavate Rock; High Spec's and QA/QC							(e.g. ditch/spillway excavation)
	drill/blast/load/short haul	RC1	m3	12.05	17.80		Low:foundation excavation;High:spillway excavation
	drill/blast/load/long haul	RC2	m3	12.70	18.40		
	RC1 + spread and compact	RC3	m3	12.70	18.40		e,g, cover construction
	RC2 + spread and compact	RC4	m3	13.50	19.20		e,g, cover construction
	Specified activity	RCS	m3			175.00	Specified-drift excavation
Excavate Rip Rap							
	drill/blast/load/short haul/place	RR1	m3	13.50	17.75		High: quarry & place rip rap in channel
	drill/blast/load/long haul/place	RR2	m3	14.20	20.65		
	source is waste dump/short haul	RR3	m3	7.00			cost includes sorting
	source is waste dump/long haul	RR4	m3	7.60			
	Specified activity	RRS	m3				
Excavate Soil; Low Spec's and QA/QC							
	clear & grub	SBC	m2	3.40	5.00		
	excavate/load/short haul	SB1	m3	4.30	5.90		
	excavate/load/long haul	SB2	m3	4.60	7.30		
	SB1 + spread and compact	SB3	m3	5.10	8.90		Low: non-engineered; High:engineered
	SB2 + spread and compact	SB4	m3	5.50	11.00		Low: non-engineered; High:engineered
	Specified activity	SBS	m3	3.20	6.30		Low: rehandle waste rock dump by dozing; High:rehandle waste rock by hauling
	Tailings	SBT	m3	1.35	3.70	15.50	High:contour surface - wet or frozen; Specified:haul/place wet infill
Excavate Soil, High Spec's and QA/QC							
	excavate/load/short haul	SC1	m3	6.80	9.30		
	excavate/load/long haul	SC2	m3	7.10	11.75		
	SC1 + spread and compact	SC3	m3	8.90	14.20		Low: non-engineered; High:engineered
	SC2 + spread and compact	SC4	m3	9.30	23.20		Low: non-engineered; High:engineered (e.g. complex covers, low volume dam construction)
	Specified activity	SCS	m3			18.80	Backfill adit with waste rock
Fence							
		FNC	m	13.55	203.00		
Fuel and Electricity							
	Fuel cost - gas	FCG	litre	1.05	1.40		
	Fuel cost - diesel	FCD	litre	0.99	1.39		
	Fuel mobilization	FCM	litre	0.22	0.42		High: winter road usage
	Electricity	FCE	kW-h	0.17	0.19	0.49	Low and High:Yellowknife; Specified:diesel generator
Geo-Synthetics							
	geotextile	GST	m2	3.44			Supply and install
	geogrid	GSG	m2	5.75			
	liner, HDPE	GSHDPE	m2	7.95			Supply and install; large quantity
	liner, ES3	GSES3	m2	20.20			FOB Yellowknife
	geosynthetic installation	GSI	m2	3.16	14.00		Low:geotextile; High:ES3 or HDPE
	bentonite soil ammendment	GSBA	tonne	308.30	348.50		FOB Edmonton, add shipping & mixing
Grouting (/m3 of rock grouted)							
		grout	m3	236.55	286.75		High: cement, FOB Yellowknife
Labour & Equipment Rates							
	Site manager	sman	$/hr	125.00	152.00		
	Supervisor	super	$/hr	52.00	91.84		
	Registered engineer	eng	$/hr	95.00	220.00		
	Environmental coordinator	envco	$/hr	74.16	130.00		
	Evironmental technologist	envtech	$/hr	36.00			

Unit Cost Table (for refining unit costs see "Estimator" worksheet)

	Filter by unit				
Electrician	elec	$/hr	74.00	95.00	
Journeyman - various	journey	$/hr	44.00	71.79	
Labour - skilled	lab-s	$/hr	41.00	49.60	
Labour - unskilled	lab-us	$/hr	31.00	43.98	
Equipment operator	oper	$/hr	41.00	65.00	
Heavy duty mechanic	mech	$/hr	49.00	72.85	
Water treatment plant operator	oper-wt	$/hr	41.00	59.86	
Security / first aid	safety	$/hr	36.00	66.97	
Administative staff	admin	$/hr	38.00	57.89	
Equipment rates include operator and fuel					
Loader - 4 cu.yd (3.06m3)	load-s	$/hr	175.00		
Loader - 7 cu.yd (5.35m3)	load-l	$/hr	315.00		
Excavator - 26.76-30.84 tonnes	exc-s	$/hr	190.00		
Excavator - 68.95+tonnes	exc-l	$/hr	420.00		
Grader	grad	$/hr	190.00		
Dump truck off hwy 30-50 tonnes	truck-s	$/hr	225.00		
Dump truck off hwy 55-75 tonnes	truck-l	$/hr	300.00		
dozer, small	dozers	$/hr	205.00	260.00	
dozer, large	dozerl	$/hr	490.00	565.00	
smooth drum compactor	comp	$/hr	155.00		
scooptram, 6 yd3 bucket	scoop	$/hr	170.00		
flat bed truck with hiab	hiab	$/hr	155.00		
fuel truck	ftruck	$/hr	150.00		
water truck	wtruck	$/hr	58.00	150.00	
Mobilize Heavy Equipment					
Road access	MHER	kmtonne	3.40	10.25	
Air access	MHEA	kmtonne	12.00		cargo rate>500lb
Mobilize Camp					
Road access	MCR	each	50000.00		refurbish existing camp
Mobilize Workers					
flight	MW	each	4500.00	9100.00	Low:e.g. 8 passenger; High: Dash 7
Oil Removal					
oil removal	OR	litre	0.43	1.20	Low:waste oil heater; High: ship offsite
PCB Removal					
Remove from site	PCBR	litre	40.20	46.90	Low: shipping, handling & disposal from Yellowknife
Pipes, small (<6in dia.)					
remove/dispose on site	PSR	m	1.00	24.00	Low: remove/dispose on site; High: remove/re-use
supply	PSS	m	6.10	11.10	Low:supply; High:supply and ship
install	PSI	m	25.00		
Pipes, large (>6in dia.)					
remove/dispose on site	PLR	m	22.00	72.00	Low: remove/dispose on site; High: remove/re-use
supply	PLS	m	129.00	143.00	Low:supply; High:supply and ship
install	PLI	m	50.00		
Power Lines					
remove/dispose on site	POWR	m	25.50		
Process Chemicals					
Remove from site	PCR	kg	0.45	2.50	Low: shipping, handling & disposal from Yellowknife
Pumps					
Pump capital cost	PC	each	#######		
Pump shipping	PS	each	2500.00		
Pump operating cost	POC	m3	0.12		pump operating costs should be calculated based on pump capacity, fuel costs, etc.
Pump maintenance	PM	allow	25000.00		
Pump sand BackFill					
	PBF	m3	85.00	300.00	
Scarify - road/mine site					
	SCFY	ha	4300	6030	2150
Shaft, Raise & Portal Closures					
Shaft & Raises	SR	m2	645.00	2132.00	Low:pre-cast concrete slabs, little site prep. Area=shaft+>1m all around
Portals	POR	m3	18.80	250.00	1200.00 Low:unit cost code SCS;High:excavate & backfill collapsed portal;Spec: installed pressure plug
Site Inspection Report					
	RPT	each	10000.00	20000.00	
SpillWay - Clear					
	SW	each	3000.00	7000.00	
Survey/Instrumentation					
	SI	each	1800.00	3600.00	2 person crew
Treatment Plant - Construct					
Small (< 1000 m3/d)	TPS	lump sum	9000000	15000000	
Large (> 1000 m3/d)	TPL	lump sum	1.5E+07	46000000	
Constructed Wetland	CWTS	ha	200000	300000	
Treatment Plant - Operate					
	TPO	m3	0.35	2.00	
Treatment Chemicals					
ferric sulphate	ferric	kg	1.19		
ferrous sulphate	ferrous	kg	1.32		
lime	lime	kg	0.56		

Unit Cost Table (for refining unit costs see "Estimator" worksheet)

	Filter by unit					
hydrogen peroxide, 35%	hperox	kg	1.50			
Sodium Metabisulfate	Nametab	kg	1.18			
Caustic soda, 50%	caustic	kg	0.74			
Sulfuric acid, 93%	sulfuric	kg	0.31			
flocculant	flocc	kg	6.00			
copper sulphate	copper	kg				
shipping	shipping	kg	0.20			
Vegetation						
Hydroseed, Flat	VHF	ha	4000.00			
Hydroseed, Sloped	VHS	ha	4500.00			
Veg. blanket/erosion mat	VB	ha	13000.00			
Tree planting	VT	ha	2600.00	6000.00		
Wetland species	VW	ha			47.72	Specified= /m3, Wetland Growth Media Substrate mixed and installed (sand, biochar and fertilizer, woodchips)
Water Sampling/Analysis/Reporting						
	WS	each	7000.00	10000.00		
Winter Road						
Construction	WRC	km	2000.00	11500.00		
Usage	WRU	kmtonne	0.29			

Unit Cost Estimator

1 Equipment Productivity Figures and Graphs have been reproduced from Caterpillar Performance Handbook - Edition 42

EXCAVATION

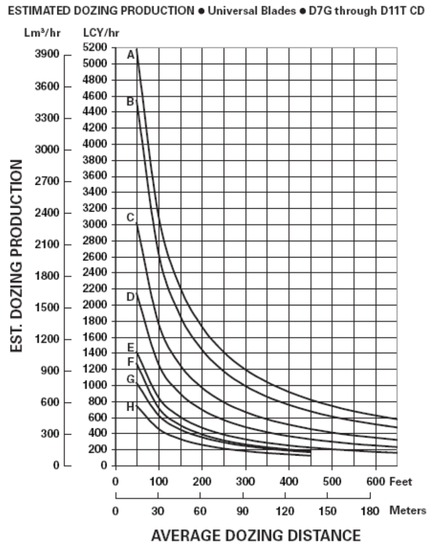
Productivity		
Machine Cat 336EL		
bucket capacity	3.16	m3
fill factor	75%	%
cycle time	45	seconds
operator skill	80%	%
machine availability	83%	%
altitude adjustment	100%	%
Hourly productivity	125.89	m3/hr
Operating Costs		
- Contractor		
Contractor hourly rate	$180.00	$/hr
Excavation cost - contractor rate	1.43	$/m3
- Owner		
ownership, daily		$/day
maintenance		$/hr
fuel		$/hr
consumables (cutters, tires)		$/hr
operator		$/hr
Owner hourly rate	$0.00	$/hr
Excavation cost - owner rate	$0.00	$/m3
Excavation cost - select contractor or owner rate (D22 or D31)		$/m3

HAUL AND DUMPING

Productivity		
Machine Cat 770		
truck capacity	25.1	m3
fill factor	80%	%
load time	6.0	min.
haul distance	1.5	km
average velocity	20.0	km/hr
haul time + return time	9.0	min.
wait time	0.5	min.
dump time	1.0	min.
cycle time	16.5	min.
machine availability	83%	%
altitude adjustment	100%	%
	13.7	we. min/cycle
Hourly productivity	88.0	m3/hr
Operating Costs		
- Contractor		
Contractor hourly rate	$225.00	$/hr
Haul and Dump - contractor rate	2.56	$/m3
- Owner		
ownership, daily		$/day
maintenance		$/hr
fuel		$/hr
consumables (cutters, tires)		$/hr
operator		$/hr
Owner hourly rate	$0.00	$/hr
Haul/Dumping Cost - owner rate	$0.00	$/m3
Haul/Dumping Cost - select contractor or owner rate (I22 or I31		$/m3

SPREADING/DOZING

Productivity		
Machine Cat D8		
Estimate production using example curves provided or	600	m3/hr
equivalent from other supplier		
Correction factors (see table provided)		
operator skill	0.75	
material type, see table	0.80	
slot dozing	1.00	
side by side dozing	1.00	
visibility	1.00	
job efficiency	0.83	
altitude adjustment	1.00	
slope adjustment	1.00	
Hourly productivity	298.8	m3/hr
Operating Costs		
- Contractor		
Hourly rate - contractor supplied	$260.00	$/hr
Dozing - contractor rate	0.87	$/m3
- Owner		
ownership, daily		$/day
maintenance		$/hr
fuel		$/hr
consumables (cutters, tires)		$/hr
operator		$/hr
Owner hourly rate	$0.00	
Spreading/Dozing Cost - owner rate	$0.00	$/hr
Spreading/Dozing Cost - select contractor or owner rate (N22 or N31)		$/m3



KEY
A — D11T CD
B — D11T
C — D10T
D — D9T
E — D8T
F — D7E
G — D7R Series 2
H — D7G

NOTE: This chart is based on numerous field studies made under varying job conditions. Refer to correction factors following these charts.

Excavator

	Cat 320	Cat 325B	Cat 375
heaped bucket capacity, m3	1.5	2.2	5.4
	Typical Cycle Times (seconds)		
easy digging, shallow digging, small swing angle	16	18	20
med. to hard digging, rocky soil, swing angle to 90 deg.	23	23	25
tough digging, sandstone, caliche, at max. machine depth, swing angle > 120 deg.	27	29	35

Material	Fill Factor (% of heaped bucket capacity
Moist loam or sandy clay	100 - 110
sand and gravel (not till)	95 - 110
hard tough clay	80 - 90
rock - will blasted	60 - 75
rock - poorly blasted	40 -60

Operator Skill	poor	average	good
Correction factor	0.6	0.75	1

Machine availability	poor	average	good
Correction factor	0.9	0.95	1

Trucking

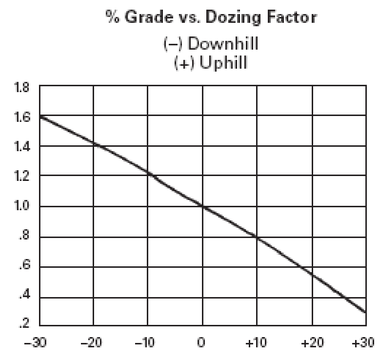
	Cat 771 D	Cat 777D	Cat 789C
Truck capacity - heaped, m3	27.5	60.5	137

Dozing

JOB CONDITION CORRECTION FACTORS

	TRACK-TYPE TRACTOR
OPERATOR —	
Excellent	1.00
Average	0.75
Poor	0.60
MATERIAL —	
Loose stockpile	1.20
Hard to cut; frozen —	
with tilt cylinder	0.80
without tilt cylinder	0.70
Hard to drift; "dead" (dry, non-cohesive material) or very sticky material	0.80
Rock, ripped or blasted	0.60-0.80
SLOT DOZING	1.20
SIDE BY SIDE DOZING	1.15-1.25
VISIBILITY —	
Dust, rain, snow, fog or darkness	0.80
JOB EFFICIENCY —	
50 min/hr	0.83
40 min/hr	0.67
BULLDOZER*	
Adjust based on SAE capacity relative to the base blade used in the Estimated Dozing Production graphs.	
GRADES — See following graph.	

*NOTE: Angling blades and cushion blades are not considered production dozing tools. Depending on job conditions, the A-blade and C-blade will average 50-75% of straight blade production.



The functions in this worksheet serve as a back up in the event that the menu item "Ad

Save file before clearing all data

Shows both active worksheet as well as table of Unit Costs in a se

Prints all worksheets having non-zero sums

d-Ins" is no

t shown in

Excel menu bar

These functions duplicate components within worksheet

General Procedures for the Administration of Licences
Issued Under the *Waters Act*
in the Northwest Territories

1. At the time of issuance, a copy of the Licence is placed on the Public Registry in the office of the Mackenzie Valley Land and Water Board (MVLWB or the Board) in Yellowknife and is then available to the public.

2. To enforce the term and conditions of the Licence, the Minister of Environment and Natural Resources has appointed Inspectors in accordance with subsection 65(1) of the *Waters Act*. The Inspectors coordinate their activities with staff of the MVLWB. The Inspector responsible for Licence MV2017L3-0005 is located in the North Slave office.

3. To keep the MVLWB and members of the public informed of the Licensee's conformity to the Licence's conditions, the inspectors prepare reports which detail observations on how each item in the Licence has been met. These reports are forwarded to the Licensee with a covering letter indicating which action, if any, should be taken. The inspection reports and cover letters are placed on the Public Registry, as are any responses received from the Licensee pertaining to the inspection reports. It is therefore of prime importance that you react in all areas of concern regarding all inspection reports so that these concerns may be clarified.

4. Licence MV2017L3-0005 will expire on October 24, 2024, if required; it is the responsibility of the Licensee to apply to the MVLWB for a new licence. The past performance of the Licensee, new documentation and information, and points raised during a public hearing, if required, will be used to determine the terms and conditions of any new licence. Please note that if the Licence expires and another has not been issued, then water and waste disposal must cease, or you, the Licensee, would be in contravention of the *Waters Act*. For a Type A Licence, an application for a new licence shall be made at least one year in advance of the Licence's expiry date. In the case of a Type B Licence, an application shall be made at least six months in advance of the Licence's expiry date.

5. If, for some reason, Licence MV2017L3-0005 requires amendment, a public hearing may be required. You are reminded that applications for amendments should be submitted as soon as possible to provide the MVLWB ample time to complete the amendment process. The process may take up to six months or more depending on the scope of the amendment requested.

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

Mackenzie Valley Land and Water Board:

Public Registry Clerk
Mackenzie Valley Land and Water Board
7th Floor - 4922 48 Street,
P.O. Box 2130
YELLOWKNIFE NT XIA 2P6
Phone: (867) 669-0506
Fax: (867) 873-6610

Analyst:

Street Address:
Taiga Environmental Laboratory
4601 – 52nd Ave
Yellowknife, NT
X1A 1L4

Mailing Address:
Taiga Environmental Laboratory
P.O. Box 1320
Yellowknife, NT
X1A 2L9

Phone: (867) 767-9235, ext 53151
Fax: (867) 920-8740
General Email: taiga@gov.nt.ca

Inspector:

Water Resources Officer - Department of Environment and Natural Resources
Government of the Northwest Territories
North Slave Regional Office
PO Box 2668, 3803 Bretzlaff Drive
Yellowknife, NT X1A 2P9
Phone: (867) 767-9238 ext. 53244
Fax: (867) 873-6230

7. Specific clauses of your licence may reference security. The contact person, address, and phone and fax numbers of the individual administering security deposits is:

Director, Water Resources - Department of Environment and Natural Resources
Government of the Northwest Territories
P.O. Box 1320
YELLOWKNIFE NT X1A 2L9
Phone: (867) 873-7401
Fax: (867) 669-2716