"**Grab Sample**" means an undiluted quantity of material collected at a particular time and place that may be representative of the total substance being sampled at the time and place it was collected;

"**Greywater**" means the component of Effluent produced from domestic use (i.e. washing, bathing, food preparation and laundering), excluding Sewage;

"**Hazardous Waste**" means materials or contaminants categorized as dangerous goods under the *Transportation of Dangerous Good Act* (1992), no longer used for their original purpose and intended for recycling, treatment, disposal or storage at appropriate facilities;

"**High Water Mark**" means 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 (ref. *Department of Fisheries and Oceans Canada, Operational Statement: Mineral Exploration Activities*);

"**Inspector**" means an Inspector designated by the Minister under section 85 (1) of the Act;

"**Licence**" means this Type "A" Water Licence No. 3AM-IQA1626, issued by the Nunavut Water Board to the City of Iqaluit in accordance with the Act;

"**Licensee**" means the entity to whom Licence No. 3AM-IQA1626 is issued or assigned;

"**Minister**" means the Minister of Indigenous and Northern Affairs Canada (INAC);

"**Modification**" means an alteration to a physical work that may introduce a new structure or eliminates an existing structure and does not alter the purpose or function of the work;

"**Monitoring Program**" means the program to collect data on surface water and groundwater quality to assess impacts to the environment of an appurtenant undertaking;

"**Monthly**" means, in the context of monitoring frequency, one sampling event occurring within calendar month with a minimum of twenty-one (21) days between sampling events;

"**Nunavut Land Claims Agreement**" (NLCA) means the "*Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*," including its preamble and schedules, and any Amendments to that agreement made pursuant to it;

"**Quality Assurance / Quality Control (QA/QC)**" Quality Assurance means the system of activities designed to better ensure that quality control is done effectively; Quality Control means the use of established procedures to achieve standards of measurement for the three principle components of quality: precision, accuracy and reliability;

"**Quarterly**" means divisions of the calendar year, comprised of three month intervals from January to December, inclusive (January – March, April – June, July – September and October – December);

"**Regulations**" means the *Nunavut Waters Regulations* (SOR/2013/669 18th April, 2013);

"**Sewage**" means all toilet wastes and greywater;

"**Sewage Lagoon Facility**" refers to the waste disposal facility and associated structures designed and constructed to treat Sewage in the City of Iqaluit since 1978, which has also been upgraded in subsequent years;

"**Sludge Management Facility**" means the facility located within the West 40 Landfill that is used for the disposal and treatment of sludge generated by the Wastewater Treatment Plant;

"**Solid Waste Facility**" means the West 40 Landfill, Sludge Management Facility and all other facilities identified in the Application that are designed and constructed to manage solid waste generated by the City of Iqaluit;

"**Surface Drainage**" means all surface waters resulting from the flow over, through or out of an operations area and is collected by means of Engineered structures;

"**Undertaking or Undertakings**" means an undertaking or undertakings in respect of which Water is to be used or Waste is to be deposited, as classified in Schedule 1 of the *Regulations*;

"**Upgraded Wastewater Treatment Plant (UWWTP)**" means the current Wastewater Treatment Plant, which was designed, constructed, and commissioned under Phase 1, for the preliminary treatment of Wastewater, in addition to the infrastructure scheduled for construction and commissioning by December 2018, under Phase 2, for the secondary treatment of Wastewater as described in the Application;

"**Use**" means use as defined in section 4 of the Act;

"**Waste**" means Water as defined in section 4 of the Act;

"**Waste Treatment Facilities**" refers to all facilities constructed and operated by the City of Iqaluit to manage solid and liquid Waste associated with this licence.

"**Wastewater**" means the water generated by site activities or originates on-site that requires treatment or any other water management activity;

"**Wastewater Treatment Facilities**" means the Sewage Lagoon, Wastewater Treatment Plant, Upgraded Wastewater Treatment Plant and associated facilities authorized under this Licence;

"**Wastewater Treatment Plant**" means the engineered system, located adjacent to the Sewage Lagoon Facility that is designed for the containment and preliminary treatment of Sewage generated by the City of Iqaluit as described in the Application;

"**Water or Waters**" means water as defined in section 4 of the *Act*;

"**Water Treatment Facility**" means the engineered facilities and appurtenances designed and constructed for the withdrawal storage treatment and distribution of fresh water for domestic purposes, described in the Application; and

"**West 40 Landfill**" means the Solid Waste Facility or original landfill facility along with its Northern Expansion and Sludge Management Facility that is designed to manage solid waste generated by the City of Iqaluit.

Schedule B: Annual Reporting Requirements

The Annual Report referred to in Part B, Item 1, shall include the following:

a. The monthly and annual quantities in cubic metres of fresh Water withdrawn from the Lake Geraldine Reservoir at Monitoring Station No. IQA-01;
b. The monthly and annual quantities in cubic metres of any Discharges from the Wastewater Treatment Facilities at Monitoring Stations IQA-02, IQA-04, and IQA-08;
c. Copy of reports generated from Dam Safety Inspections and Dam Safety Reviews along with the Licensee's proposed actions to address issues identified and/or updates on continuing actions to address issues;
d. The monthly and annual quantities in cubic metres of sludge removed from the Wastewater Treatment Facilities;
e. The monthly and annual quantities of Wastes disposed of at the West 40 landfill;
f. A summary report which includes all data and information generated under the Monitoring Program, including the QA/QC program, in electronic and printed formats acceptable to the Board;
g. A summary of all construction activities carried out for facilities under the Licence;
h. A summary of modifications and/or major maintenance work carried out on the potable Water Treatment and Waste Treatment Facilities, including all associated structures;
i. A progress report and revisions (if applicable) to any studies requested by the Board that relate to Waste management, Water use or reclamation and a brief description of any future studies planned by the Licensee including, a non-technical executive summary for the general public, translated into Inuktitut;
j. Any revisions required, in the form of addenda, to Plans, Manuals and Reports approved under the Licence;
k. A list and description, including volumes and Spill Report Line Identification Number, of all un-authorized Discharges, spills and summaries of follow-up action taken;
l. A summary of any closure and reclamation work undertaken and an outline of any work anticipated for the next year, including any changes to implementation and scheduling;
m. A summary of actions taken to address concerns or deficiencies listed in the inspection reports and/or compliance reports filed by an Inspector;
n. A brief update on the implementation plan of all facilities within the scope of this Licence including changes projected implementation and status of the Upgraded Wastewater Treatment Plant;
o. A summary of any studies, reports and plans requested by the Board that relate to Waste disposal, Water use or reclamation and a brief description of any future studies planned; and
p. Any other details on the use of Water or Waste disposal requested by the Board by November 1st of the year being reported.

Schedule I: Condition Applying to Monitoring

Table 1 – Water Quality Parameters		
Test Groups	**Analytical Parameters**	**Units**
Routine (R)	Alkalinity, Acidity, Chloride, Carbonate, Bicarbonate, Total Hardness, Hydroxide, Sulphate, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Total Organic Carbon (TOC), Total Inorganic Carbon (TIC)	mg/L
	pH (field and lab)	pH units
	Oxidation-Reduction Potential (ORP) (field)	mV
	Conductivity (field and lab)	uS/cm
	Temperature (field)	°C
	Turbidity	NTU
Effluent (E)	Total Suspended Solids (TSS)	mg/L
	Temperature (field)	°C
	Conductivity (field and lab)	uS/cm
	pH (field and lab)	pH units
Acute Lethality (AL)	Based on Environment Canada's *Procedure for pH Stabilization During the Testing of Acute Lethality of Wastewater Effluent to Rainbow Trout* (EPS 1/RM/50, March 2008), if single concentration test fails and un-ionized ammonia concentration is less than or equal to 1.25 mg/L	"Pass" / "Fail"
ICP- Metals Scan (Total)	Al, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Li, Mn, Mo, Ni, Se, Sn, Ag, Sr, Tl, Ti, U, V, Zn, Hg	mg/L
Nutrients (N)	Ammonia-N, Nitrate-N, Nitrite-N	mg N/L
	Total Phosphorus, Orthophosphate	mg/L
Biological (B)	Biochemical Oxygen Demand	mg/L
	Total and Fecal Coliform	CFU/100 mL
Potable Water (PW)	Fecal Coliform	CFU/100 mL
	ICP Metals (Total and dissolved)	mg/L
	Total Suspended Solids –TSS	mg/L
Flow (F)	Volume	m^3
Landfill Specific (LS)	Polychlorinated Biphenyls (PCBs) Benzene, Toluene, Ethylbenzene and Xylene (BTEX)	mg/L

Table 2[1] - Water Quality Monitoring Criteria

Station ID	Description	Status	Parameter	Testing / Measurement Frequency	Reporting Frequency
IQA-01	Lake Geraldine Reservoir – Raw Water	Active	R, PW	Monthly	Biannually
			F	Monthly	
IQA-01(#)	Based on Part I, Item 4 of Expired Licence	Inactive	N/A	N/A	N/A
IQA-02	Sewage Lagoon – Effluent Discharge Point	Active	B, N, E, ICP	Once prior to discharge; once during discharge; and once prior to the completion of discharge	Annually
			F	During decant	
IQA-03	Sewage Lagoon – Influent	Inactive	N/A	N/A	N/A
IQA-04	Wastewater Treatment Plant - Effluent	Active	B, N, E, ICP	Quarterly – Prior to commissioning of the WWTP	Annually
			B, N, E, ICP	Monthly – Following commissioning of the WWTP	
			AL	Annually – following commissioning of the WWTP	
			F	During Discharge	
IQA-05	Wastewater Treatment Plant - Influent	Active	B, E, N, ICP	Biannually – Prior to commissioning of the WWTP	Annually
				No testing requirements following commissioning of the WWTP	N/A
IQA-06	Sludge – From WWTP	Active	B, E, N, ICP	Quarterly	Annually
IQA-07	Surface Water entering West 40 Landfill – Based on Part E, Item 4 of the Expired Licence	Inactive	N/A	N/A	N/A

Station ID	Description	Status	Parameter	Testing / Measurement Frequency	Reporting Frequency
IQA-08	West 40 Landfill – Effluent Discharge Point, Based on Part E, Item 4 of the Expired Licence	Active	B, E, N, ICP, F, LS	Once prior to discharge; once during discharge; and once prior to the completion of discharge	Annually
			F	During Discharge	
IQA-08(#)	Based on E, Item 17, Part F, Item 10 & Part I, Item 4 of the Expired Licence	Inactive	N/A[2]	N/A	N/A
IQA-08A	Station situated up-gradient of West 40 Landfill	Active	B, E, N, ICP, F, LS	Annually	Annually
IQA-08B	Station situated down-gradient of West 40 Landfill	Active			
IQA-09	Contaminated soil accepted at the West 40 Landfill	Inactive	NA	N/A	N/A

[1] Table 2 may be modified by the Board and re-issued where necessary. Re-issuance is not considered an Amendment to the application or Licence as defined in the *Act*.
[2] Means not applicable

Appendix I

Landfill Emergency Response Plan

Landfill Emergency Response Plan

1. Overview

1.1 Introduction

The purpose of the landfill emergency response plan sets out appropriate procedures to address foreseeable emergencies. The key elements of this plan are:

1. What is the nature and severity of the emergency?
2. What is to be done?
3. Who does it?

The emergency response plan addresses the following items:

- Fires (Section 2);
- Accidents and Medical Emergencies (Section 3); and
- Environmental and Operational Emergencies (Section 4).

1.2 Emergency Plan Updates

The Departments of Public Works, and Emergency and Protective Services will review the emergency plan annually or following an emergency incident to ensure that:

- Emergency response procedures for the landfill are effective and updated as necessary;
- Appropriate individuals are appointed to manage emergency situations;
- Regular fire prevention meetings are conducted with all landfill employees and the Fire Department; and
- Regular safety and emergency meetings are held with landfill employees.

1.3 Emergency Coordination

The key to success of the emergency plan is to assign a responsible person to take charge of an emergency situation. The Landfill Foreman is designated to have the primary responsibility to manage emergency situations at the landfill.

The Landfill Foreman will have full authority of the emergency until Emergency and Protective Services arrives. This, together with proper training of operating personnel, practice drills to test emergency response activities, and continual review and updating of the plan, will be undertaken to ensure an efficient and effective response to any emergency that may occur.

The Landfill Foreman's responsibilities include to:

- Declare an emergency;
- Review and update the emergency response procedures;
- Ensure that all emergency response procedures are appropriate;

- Respond to all emergencies and contact appropriate emergency response agencies;
- Establish control of the emergency prior to the arrival of appropriate emergency response agencies;
- Direct personnel and site visitors to a safe marshalling area;
- Liaise with the emergency response representatives upon their arrival;
- Correct any potential emergency or unsafe situations; and
- Complete necessary documentation with respect to emergencies.

The Landfill Foreman will report any emergency or contingency situations to the Superintendent. The Superintendent will contact appropriate agencies to report incidents related to environmental or health and safety issues associated with the emergency or contingency activities.

2. Evacuation Procedures

In the event that an area or structure at the landfill must be evacuated due to a fire, gaseous, or other situations, landfill employees, customers, and site visitors will be evacuated via the closest exit and will proceed to a designated marshalling area.

In the event of a fire or gaseous release from active areas of the landfill, the Landfill Foreman will direct all staff and site visitors to immediately leave the area and proceed to the designated marshalling area. Visitors will be requested to remain at the marshalling area until otherwise notified.

The marshalling area is to be designated for each emergency situation according to the nature of the emergency, the location of the emergency, and the location of a safe exit route. A marshalling area must not be used when it is unsafe or is downwind of a fire or gaseous release.

Marshalling areas are:

1. Primary: The road outside the main gate and building; and
2. An alternate area designated by the Landfill Foreman.

When the evacuation is complete, the Landfill Foreman will proceed to the marshalling area.

The prime consideration for the Landfill Foreman is to ensure that all employees and site visitors are safely evacuated. The Landfill Foreman will:

- Await appropriate emergency response personnel; and
- As required, establish perimeter security, conduct searches, and/or take other actions that may be warranted by specific circumstances.

It is imperative that all employees and visitors remain at the marshalling area until the Landfill Foreman gives permission to return to the working disposal areas or to leave the site.

3. Fire

3.1 Fire Prevention

The landfill will be operated in a manner that will minimize the potential for landfill fires. Fire prevention techniques will include:

- Thoroughly compacting all waste;
- Maintaining a comprehensive load checking program to prevent the dumping of hot/burning, explosives or combustible waste;
- Maintaining a program of separating the dumping of ash barrels from general waste tipping face;
- Site inspection, in particular of the working face, with regard to any trail of smoke etc before finishing work;
- Training employees on early fire hazard recognition; and
- Conducting emergency response drills at least bi-annually, which are to be documented and reviewed with landfill staff.

NOTE: FOR ALL FIRE OCCURANCES, AN INCIDENT REPORT MUST BE COMPLETED AND FILED, WITH A COPY SENT TO THE SAFETY OFFICER

3.2 General Fire Response Procedures

Fires may occur at the following locations:

- Fires in the site building;
- Fires in the recycling storage area or hazardous waste storage compounds; or
- Fires at the active landfill working face.

All fires will be reported as an emergency situation. Should an emergency occur, employees shall report to the primary marshalling area. Should the primary marshalling area be inaccessible, employees shall report alternate safe site as directed by the Landfill Foreman.

3.3 General Instructions

The greatest danger lies not in fighting the fire, but in the panic that arises from a fire. Spend a few minutes getting a handle on the situation. A landfill fire will not travel fast, so a 10 minute delay is not going to make any difference to the outcome of the fire. Go through the steps to notify the appropriate authorities and follow the basic steps in the fire control plan, including:

- Contact other nearby employees;
- Summon the appropriate landfill equipment;
- Notify Emergency Services and tell them the location and type of fire and whether or not it looks like it will spread out of the immediate area;
- Notify surrounding property owners, particularly if it appears that the fire could spread beyond the landfill;
- When Emergency Services arrive, follow their instructions;
- Do not fight fire alone; and
- Do not place yourself or others in danger while fighting the fire.

3.4 General Fire-Fighting Guidelines

A landfill fire is controlled better with the use of a bulldozer and dirt. If it is safe to do so, dig out to the source and isolate the burning waste. Then either let it burn out or cover with dirt. Lots of water will not necessarily extinguish the fire and can cause more problems than it solves.

- Do not overuse water. Remember that most landfill fires can be controlled with a relatively small amount of water. In most cases, soil is more effective than water to smother the fire;
- If two or more water trucks are being used, try to use shifts so that at least one water truck is at the fire at all times;
- Do not waste time trying to fight a large fire with a fire extinguisher;
- Do not approach any fire with a tractor unless a water truck is close by for backup;
- Never risk personal injury or death attempting to save a machine or building; and
- Remember, SAFETY FIRST.

3.5 Small Contained Fires

- Do not attempt to fight a fire alone;
- Secure the area and re-direct customers to a safe area;
- Work with other site staff to extinguish the fire ONLY if safe to do so;
- If the fire becomes uncontained, or if it gives off toxic fumes, do not attempt to extinguish the fire; and wait for the Emergency Services to arrive.

3.6 Uncontained Fires

- Do not attempt to fight the fire;
- Follow evacuation procedures; and
- Call the Fire Department: (867) 979-5650.

3.7 Site Building Fires

Prevention

- Staff training and awareness.
- Coordination with the Fire Department.

Response

Action	Time Frame	Who?	Resources
Evacuate building	Immediately	All staff	
Call Emergency Services & Superintendent	Immediately	Landfill Foreman/Operator	
Secure area	Immediately	Landfill Foreman/Operator	

3.8 Fires at the Working Face

Prevention

- Staff training and awareness.
- Waste acceptance procedures and policies.
- Diversion of hot loads, combustible and/or explosive material from working face.
- Application of cover soils to minimize size of the active working face.

Response

Action	Time Frame	Who?	Resources
Evacuate and secure the area	Immediately	Landfill Foreman	Site staff
Call: • Emergency Services • Superintendent	Immediately	Landfill Foreman	Site staff
Isolate the burning wastes	As soon as it is determined safe to do so	Landfill Foreman Emergency Services	Landfill Equipment
Determine the nature and extent of the fire	Immediately	Landfill Foreman Emergency Services	Site staff
Excavate, remove, and soak the burning waste	As soon as it is determined safe to do so	Landfill Foreman and Emergency Services	Site staff Fire Department Water Truck Water pumps
Cover the burning area	Immediately after the source of burning waste has been excavated and removed, and as soon as it is safe to do so	Landfill Foreman and Emergency Services	Site staff Fire Department Landfill equipment
Appoint staff for fire guard	After fire is extinguished	Landfill Foreman	Site staff Fire Department
Confirm the fire is extinguished	Immediately	Landfill Foreman	Fire Department
Review the cause of fire and prepare appropriate mitigative measures	Within 1 month	Landfill Foreman Superintendent Director of Emergency and Protective Services	Site staff Fire Department

3.9 Stored Material Fires

Prevention

- Site security.
- Separation of stored materials according to the Fire Code.

Response

Action	Time Frame	Who?	Resources
Evacuate and secure the area	Immediately	Landfill Foreman	Site staff
Call: • EMS • Superintendent •	Immediately	Landfill Foreman Superintendent	Site staff
Determine the nature of the burning material and potential for emission of toxic fumes	Immediately	Landfill Foreman	Fire Department Safety Officer Superintendent Material Safety Data Sheets (MSDS)
Isolate the burning material	Immediately when safe to do so	Landfill Foreman Emergency Services	Fire Department Landfill Equipment
Determine the nature and extent of the fire	Immediately	Emergency Services	Site staff
Extinguish the fire as appropriate; according to the nature of the material	As soon as it is safe to do so	Emergency Services	Site staff Fire Department Landfill equipment Water truck Water pumps Safety Officer MSDS
Confirm the fire is extinguished	Immediately	Emergency Services	Fire Department
Review cause of fire and prepare appropriate mitigative measures	within 1 month	Landfill Foreman Superintendent Director of Emergency and Protective Services	Site staff Fire Department

4. Medical Emergencies

All injuries, even minor ones, should be considered important and should be reported as a safety incident to the Landfill Foreman.

First Aid should be applied in a manner that is appropriate to the nature of the injury. If the injury requires medical assistance, the individual should be taken to a medical emergency centre or an ambulance service contacted.

A medical doctor should be consulted for all injuries that may result in infections as a result of working with waste materials. This includes injuries such as cuts and scrapes, skin punctures with sharp items, and fire or chemical burns.

If the person injured on-site is a customer or visitor, Landfill Foreman employees are to provide any assistance necessary and will apply appropriate First Aid.

NOTE: FOR ALL MEDICAL EMERGENCY OCCURRENCES AN ACCIDENT/INCIDENT REPORT MUST BE COMPLETED AND FILED, WITH A COPY SENT TO THE SAFETY OFFICER AND WSCC.

4.1 Minor Medical Injuries

Prevention

- Safety plan and procedures;
- Employee safety training and awareness; and
- First Aid training.

Response Plan

Action	Time Frame	Who?	Resources
Apply appropriate First Aid	Immediately	Trained First Aider	
Recommend that the injured person consult a physician	Immediately	Trained First Aider	
Take the injured person to a medical emergency centre or contact an ambulance service if deemed appropriate	Immediately	Trained First Aider Emergency Services	
Contact Safety Officer and Superintendent	Immediately	Landfill Foreman	
Report Injury to WSCC	Within 3 days	Landfill Foreman Safety Officer	
Record injury in the daily report	To the end of the work day	Landfill Foreman	Landfill Foreman
Review cause of the injury and prepare appropriate mitigative measures	Within 1 month	Landfill Foreman Superintendent Director of Emergency and Protective Services	Landfill Foreman Occupational Health and Safety Committee

4.2 Serious Medical Injury

Prevention

- Safety plan and procedures.
- Employee safety training and awareness.
- First Aid training.

Response Plan

Action	Time Frame	Who?	Resources
Assess site conditions for personal safety and safety of others, and take appropriate actions to secure unsafe areas	Immediately	Landfill Foreman Trained First Aider	Landfill Foreman
Attend to the injured person and apply First Aid	Immediately when safe to do so	Trained First Aider	
Contact: • Emergency Services/ Ambulance • Superintendent • Safety Officer • WSCC	Immediately	Trained First Aider Landfill Foreman	
Stay with the injured person until medical assistance arrives	Duration of medical emergency	Trained First Aider	
Report to WSCC	Within 24 hours	Landfill Foreman Safety Officer	
Record injury in the daily report	By the end of the work day	Landfill Foreman or Designated Alternate	Landfill Foreman
Conduct an investigation to determine the cause of injury and prepare appropriate mitigative measures	Investigate immediately following the incident Complete mitigative measures within 1 month of the incident	Landfill Foreman Superintendent Director of Emergency and Protective Services	Site Personnel Occupational Health and Safety

4.3 Vehicle or Equipment Accidents

All vehicle accidents should be reported to Municipal Enforcement and an investigation as to the cause should be carried out. Following the investigation, appropriate mitigative measure should be determined and implemented to avoid future accidents.

Prevention

- Safety plan and procedures.
- Employee safety training and awareness.
- Traffic control signs.
- Vehicle spotting during heavy traffic situations.

Response Plan

Action	Time Frame	Who?	Resources
Report the accident to the Landfill Foreman	Immediately	All employees	
If damage is minor, have the vehicle driver report the accident to the Iqaluit Municipal Enforcement Department	Immediately	Landfill Foreman	Accident Investigation Program
If the damage is significant, call the Iqaluit Municipal Enforcement Department	Immediately	Landfill Foreman	Accident Investigation Program
If an injury is involved, the RCMP ((867) 979-1111), and implement medical response actions	Immediately	Landfill Foreman	Accident Investigation Program
Secure the area for a follow-up investigation	Immediately	Landfill Foreman RCMP or Iqaluit Municipal Enforcement	Accident Investigation Program
Record the injury in the daily report	By the end of the work day	Landfill Foreman or Designated Alternate	Landfill Foreman Accident Investigation Program
Conduct an investigation into the cause of the accident and prepare appropriate mitigative measures	Within 1 month of the accident	Landfill Foreman Superintendent RCMP Director of Emergency and Protective Services	Occupational Health and Safety Accident Investigation Program

5. Environmental and Operational Contingencies

Environmental and Operational contingencies may vary in nature and degree of seriousness. Therefore, actual situations will dictate the appropriate actions and responses that should be undertaken. Generally, the response plan includes the following steps:

- Secure and contain the problem;
- Verify and validate the problem;
- Investigate the cause and potential risk;
- Assess appropriate corrective actions;
- Implement the corrective action; and
- Review operations procedures and preventative measures.

5.1 Spills

In the event of a spill, the Landfill Foreman is to immediately implement the spill response plan. The Superintendent should be notified of the nature of the release as well as the activities and corrective actions being taken.

A spill report must be filled out and sent to the Spill Line once the spill is contained and clean up has started. Please see Appendix B: Forms for a copy of the Spill Report Form that includes contact information.

5.2 Prohibited Wastes Delivered to the Landfill

Prevention

- Waste acceptance policies and procedures.
- Employee training and awareness.

Response Plan

Action	Time Frame	Who?	Resources
Deny entry of the load	Immediately	Landfill Foreman	Operations and Maintenance Plan Waste Acceptance Procedures NWB
Determine if load is safe for transport on local roads	Immediately	Landfill Foreman	Transport Canada Transport of Dangerous Goods Regulations
Inform the waste generator of the infraction	Immediately	Landfill Foreman	
Document the nature of incident and actions taken	Within 1 hour	Landfill Foreman	Daily Activity Log Book Hazardous Material Load Check Form
Review waste acceptance procedures and implement necessary mitigative measures	Within 1 month	Landfill Foreman Superintendent	Safety Officer

5.3 Prohibited Waste Discovered at the Landfill

Prevention

- Waste acceptance policies and procedures.
- Employee training and awareness.

Response Plan

Action	Time Frame	Who?	Resources
Isolate waste and cease operations in the area of the waste	Immediately	Landfill Foreman	Safety Officer Environmental Consultant
Construct containment around perimeter of the waste if necessary	Immediately	Landfill Foreman	Landfill equipment
Determine how to safely handle the waste	Immediately	Landfill Foreman	MSDS Safety Officer Superintendent
Determine source of waste, and if possible the waste hauler and generator	Within 1 week	Landfill Foreman	Daily Activity Log Book Staff observations Tipping Receipt Book
If identified, contact the hauler and waste generator to review options	Within 1 to 2 weeks	Landfill Foreman	
Document nature of incident and actions taken	Within 1 hour	Landfill Foreman	Daily Activity Log Book Hazardous Material Load Check Form
Inform Nunavut Water Board	When results have been confirmed	Landfill Foreman	
Review waste acceptance procedures and practices, and implement mitigative measures	Within 1 month	Landfill Foreman Superintendent	Safety Officer

5.4 Hot Loads Delivered to the Landfill

Prevention

- Waste acceptance policies and procedures; and
- Employee training and awareness.

Response Plan

Action	Time Frame	Who?	Resources
Direct the load to the designated area away from the working face	Immediately	Landfill Foreman	
Contain burning material within soil berms	Immediately	Operating staff	
Apply appropriate measures to extinguish the fire: wet, smother with soil, or allow to burn out	Within 1 hour	Landfill Foreman	Water truck Landfill Equipment
Monitor fire	For duration of fire	Landfill Foreman	
Remove extinguished material and dispose at working face	Within 2 to 3 days after being extinguished	Landfill Foreman	Landfill Equipment

5.5 Elevated Parameters Detected in Surface Water Monitoring System

Prevention

- Annual groundwater monitoring program; and
- Environmental auditing.

Response Plan

Action	Time Frame	Who?	Resources
Re-sample to verify or validate	Within 1 month	Landfill Foreman Environmental Consultant	Environmental Consultant Laboratory
Assess the nature and risk of the problem	Following re-sampling	Landfill Foreman Environmental Consultant	Environmental Consultant AANDC Water Inspector NWB
Investigate corrective measures	Following assessment of the problem	Superintendent	Environmental Consultant AANDC Water Inspector NWB
Implement corrective measures	Following assessment of the problem	Superintendent	Environmental Consultant AANDC Water Inspector NWB

5.6 Leachate Seepage through Cover System

Prevention

- Minimize leachate generation by application of intermediate and final cover;
- Remove or penetrate intermediate cover before overfilling and/or implement vertical drain; and
- Prohibition of liquid waste disposal.

Response Plan

Action	Time Frame	Who?	Resources
Isolate the area and implement containment to prevent leachate from entering off-site and on-site drainage systems	Immediately	Landfill Foreman	Environmental Consultant AANDC Water Inspector NWB
Investigate the cause of the seep	Within 2 days	Landfill Foreman	Environmental Consultant
Investigate corrective measures	Within 1 week	Landfill Foreman	Environmental Consultant AANDC Water Inspector NWB
Implement corrective measures	Within 2 weeks	Landfill Foreman	Environmental Consultant
Review operating procedures and revise if appropriate	Within 2 months	Landfill Foreman Superintendent	Environmental Consultant

5.7 Breach of the Final Cover System Prevention

- Inspection of final cover, twice a year, for vegetative growth, animal burrows, erosion, settlement, or cracking.

Response Plan

Action	Time Frame	Who?	Resources
Identify the nature and significance of the problem	Within 1 month	Landfill Foreman	Environmental Consultant
Develop a corrective plan for the breach	Within 2 to 6 months	Landfill Foreman	Environmental Consultant
Reconstruct the breached area	Within 2 to 6 months	Landfill Foreman Superintendent	Environmental Consultant

5.8 Wind-Blown Litter

Prevention

- Encourage covers on inbound loads;
- Maintain as small a working face as is practical;
- Maintain portable litter catchment fences around active areas; and
- Maintain perimeter fencing.

Response Plan

Action	Time Frame	Who?	Resources
Review working face and litter catchment fence placement	Immediately	Landfill Foreman	Environmental Consultant
Implement off-site litter pick-up	Within 1 week	Landfill Foreman	Temporary staff
Implement on-site litter pick-up	Within 1 month	Landfill Foreman	Temporary staff
Review litter control program and revise if necessary	Within 2 month	Landfill Foreman Superintendent	Environmental Consultant

5.9 Extreme Dust Emissions

Prevention

- Paved access road to disposal area;
- Controlled speed limits on on-site gravel roads;
- Road maintenance;
- Seed soil stockpiles;
- Cover inbound loads;
- Special handling procedures for waste loads prone to emission of dust; and
- Employee training and awareness.

Response Plan

Action	Time Frame	Who?	Resources
Apply water to road surfaces as necessary	Within 2 hours	Landfill Foreman	
Deposit dusty loads in sheltered area	Upon unloading	Vehicle Foreman	
Pre-wet waste load	Prior to delivery when pre-arranged with waste generator	Waste Generator	
Cover dusty wastes with other waste or soil	Immediately upon unloading	Landfill Foreman	
Review waste handling procedures with waste generator for a specific problem material	Immediately	Landfill Foreman Superintendent	

Appendix J

Spill Contingency Plan

City of Iqaluit

Spill Contingency Plan

Updated: March 2007

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1.0 INTRODUCTION

The purpose of this spill contingency plan is to outline a formal practical response system which can be implemented immediately in the event of a deleterious material, such as sewage or fuels, being spilled to the natural environment. **The scope of the document includes spills resulting from activities carried out by the City of Iqaluit or from the failure of a system component in the City's infrastructure only.** This plan is intended to promote the safe handling of potentially hazardous materials to minimize health hazards, environmental damage and clean up costs. The plan is written so it can be easily understood and be reasonably comprehensive in providing access to all information required for handling a spill.

Included with this plan is a one page "If You Discover a Spill" response sheet that is intended to be carried in City vehicles and posted in municipal work areas. In an emergency situation, prompt action is important and quick access to a response checklist may reduce the seriousness of a spill.

A sites plan has been included in Appendix A showing the existing layout of all buildings and waste handling/disposal facilities in the City.

2.0 REPORTING PROCEDURES

City of Iqaluit employees have access to mobile radios and key personnel can be reached through dispatch by pager on a 24-hour basis. The dispatch number is monitored 24 hours a day. **All spills are determined to be the responsibility of the City and only these spills are reported to the dispatch number.**

All spills exceeding reportable quantities are to be reported immediately to the NWT 24-hour Spill Report Line (867) 920-8130. Spill Report Line personnel will provide direction and will ensure that an investigation is undertaken by the appropriate government authority. Appendix C contains a listing of material and the quantities that are reportable in the event of a spill:

The following are contact numbers for municipal response personnel:

CITY OF IQALUIT			
CONTACT	**PAGER #**	**WORK #**	**CELL #**
Dispatch	NA	979-5680	
Chief Administrative Officer (CAO)	N/A	979-5666	
Director of Public Works	N/A	975-8501	975-1877
Operations Superintendent, Public Works	N/A	979-5653	975-1774
Director of Engineering	N/A	975-8502	975-1780
Fire Chief	45	979-5657	975-1446
Chief By-Law	N/A	979-5670	975-1930
Utilidor Foreman	32	979-5648	975-1443
Garage/Roads Foreman	12	979-5638	975-1463
Truck Sewer Water Foreman	N/A	979-5612	975-1473

Equipment may be dispatched for City spill clean-up by the Director of Public Works only. As and when contracts are negotiated on a yearly basis with local contractors to provide equipment and manpower to the City of Iqaluit. See Appendix G for a list of current as and when Contracts.

The 24-Hous Spill Line is currently being run by the GWNT – Resources, Wildlife and Economic Development division. Callers to the spill line will be provided with expert advice regarding hazardous materials spills. The personnel at the spill line will also ensure that the government agencies with jurisdiction over the spill are contacted.

EXTERNAL ASSISTANCE – GOVERNMENT RESOURCES	
AGENCY	**TELEPHONE #**
24-Hour Spill Line	(867) 920-8130

The effectiveness of this spill contingency plan will greatly depend upon the following factors:

- The proper distribution of the plan to those personnel most likely to encounter a spill or release of deleterious substance during the course of their normal work.
- Training of these same personnel as to the objectives and contents of this plan and how they should react upon encountering a spill or system failure that may result in a subsequent release of deleterious substances.
- Training of the response personnel as to what steps they are to take in the event of the plan being put into action.

2.1 Spill Finder's Response

a. Be alert and consider your personal safety first.

b. Assess the hazard to persons in the vicinity of the spill and where possible take action to control danger to human life. If possible, identify the material or products involved in this particular incident.

c. If the spill creates a fire, explosion or other hazard to human life, remove all potential ignition sources, if possible, evacuate the area, contact the RCMP.

d. If safe and practical try to take appropriate action to stop the release of material

e. Contact Dispatch and report the spill.

f. Mark the spill scent to warn the public and prevent access.

2.2 Director of Public Works Response

Once notified by the Fire Department or Dispatch, the Director of Public Works shall:

a. Proceed to the spill location.

b. Liaise with the Fire Chief.

The Fire Chief and Director of Public works are then responsible to ensure the following steps are carried out:

a. Make the necessary arrangements for first aid and removal of injured personnel. Take the necessary action, where possible, to secure the site to protect human safety.

b. If not already done and if it is safe to do so take the appropriate action to stop the flow or release of material. If at all possible take the necessary action to contain or prevent the spread of the spilled material.

c. Gather information on the status of the situation.

d. Fill out as completely as possible, a spill report form (attached) and then contact the 24-Hour Spill Line at (867) 920-8130.

e. If required, contact the CAO.

The Director of Public Works will be the overall municipal coordinator for any spill response action and as such he will:

- Work in conjunction with the lead agency to coordinate clean up personnel.
- Be responsible for evaluating the initial situation and assessing the magnitude of the problem.
- Activate the response plan and call out the key personnel in the response team, as deemed appropriate to meet the situation.
- Assist in developing the overall plan of action for containment and clean up of the specific incident and delegate the responsibility for implementing the plan.
- Ensure that the assigned responsibilities are carried out and that coordination exists between supervisory team members.
- Assess the requirements for men, equipment, materials and tools to contain the spill in light of what resources are immediately available. The urgency will depend on the nature and magnitude of the spill

Additionally it will be the Director of Public Works responsibility to ensure that all City spill response personnel receive adequate training in order to fulfill their responsibilities as part of the spill response team.

3.0 SITE INFORMATION AND FAILURE PREVENTION

3.1 Sewage Spills

It is the purpose of this section to outline possible failures of the waste handling/treatment system and the control measures in place to prevent such failures. The location of the lift stations and force main are shown in Figure 1 in Appendix A. Material that is released due to a spill will be collected and disposed of in the sewage lagoon.

3.1.1 Sewage Lift Station

There are two lift stations currently servicing the sewage system in Iqaluit. Lift Station No. 1 is located by the break water and Lift Station No. 2 is located by the sea lift beach. In the event of a pump shut down, both sewage lift stations will overflow into Koojesse Inlet. The pumps are electrically powered and will not operate if there is a power failure.

In the event of a pump shutdown, there is approximately 20 minutes storage capacity in the wet wells before the sewage will overflow. Each lift station is equipped with fluid high level alarms that trigger auto dialers which contact the 20 Hour Dispatch number. Sewage trucks are dispatched to manually pump out the wet wells. The lift stations are equipped with diesel powered pumps and piping that may be connected for manual operation during power outages.

The lift stations are physically checked on a daily basis.

3.1.2 Sewage Force main

The sewage force main is routed entirely beneath the ground surface and is not monitored.

3.1.3 Sewage Lagoon

The sewage lagoon is located at the head of Kojessee Inlet on the southwest side of the Municipality. Sewage is conducted to the lagoon by truck and through the force main. The inlet is located on the north side of the lagoon. Outflow from the lagoon is primarily through the west dyke, which was designed to be “leaky”. Seepage through the dyke provides some level of solids removal. The effluent discharges directly into Koojesse Inlet.

3.2 Fuel and Gasoline Storage

Diesel fuel and gasoline is stored in aboveground self-contained tanks at the main municipal garage. Diesel is kept in a 20,000L tank and gasoline is kept in a 4,500L tank. Spill clean-up material at the garage consists of “Absorball” pellets which are taken to the landfill and burned after use.

A 2,000L above ground self contained tank is located adjacent to the water treatment plant. It is used to store heating fuel.

The fuel storage tanks are not located near areas that are considered environmentally sensitive.

3.3. Chlorine Gas

Chlorine gas is stored at the water treatment plant. Two class A response suites, 2 Scott pack and personal chlorine detectors are stored at this location. A fixed chlorine detector is also mounted in the storage area.

3.4 Calcium Chloride

Calcium chloride for use on the roads is stored in Tyvex bags at the main garage.

3.5 Glycol

Glycol in 45 gallon drums is stored at the main garage. There are generally no more than 10 drums present at any given time.

3.6 Hydorfluosilicic Acid

Hydrofluosilicic acid for fluoridating the City water supply is stored at the water treatment plant.

3.7 Lime

A maximum of 150 – 25lb bags of lime are stored at the water treatment center for use in controlling the pH of the municipal water supply.

3.8 Sodium Hypochlorite, 12%

Up to 12 -20L containers of sodium hypochlorite are stored at the entrance to the water treatment plan.

3.9 Propane

Two 40lb. propane cylinders, used to fuel the Zamboni, are stored in the Zamboni room at the arena.

4.0 Sodium Hydroxide Solution

(Caustic Soda 50%) is stored at the water treatment plant.

4.1 Carus UPZ 985

(Zinc Ortho Phosphate) is stored a the water treatment plant.

4.0 SYSTEM COMPONENT FAILURE PREVENTION

4.1 Sewage Lift Station

The lift stations are physically checked on a daily basis. The wet are equipped with high fluid level alarms connected to an autodialed which contacts the dispatch number. In he event of pump shutdown, the wet wells approximately 20 minutes worth of storage capacity before they overflow.

Diesel pumps and piping are located in the stations, and may be installed for emergency operations when the electrical pumps are down. Sewage trucks are on call and may be mobilized by Dispatch in case of pump shutdown.

4.2 Sewage Force Main

The sewage force main is completely buried and is not monitored.

4.3 Sewage Lagoon

The sewage lagoon is routinely checked seven days per week for levels and leaks. If problems are suspected, the frequency of monitoring would increase.

4.4 Chlorine Gas Storage

A fixed chlorine gas detector is installed in the chlorine gas storage room.

5.0 RESPONSE TEAM, ACTION AND EQUIPMENT

Key personnel have been identified for emergency spill response. They are identified below with their key role in the event of a spill:

Director of Public Works	-	Manpower, Loaders and Trucks
Chief Administrative Officer	-	Media
Fire Chief	-	Trucks, Fire Retardant Foam and Emergency Measures Organizations

The Director of Public Works and the Fire Chief work together to coordinate the mobilization of men and equipment as required to contain the spill. The Chief Administrative Officer is in charge of coordinating the information and messages flow to the media. The Fire Chief will provide men and equipment to assist in a spill response action. If the situation is deemed to require it, the Fire Chief will call out the Emergency Measures Organization (EMO).

The following details the response to be taken in case of a spill or leak at the locations outlined in section 3.

5.1 Sewage Spills

Should a sewage spill become apparent, the Director of Public Works would be responsible to:

- Ensure the public safety at all times and if required, notify the Fire Department and CAO
- Contact the NWT 24-hour Spill Report Line (867) 920-8130
- Mobilize staff to determine the cause of the problem, and act to stop the release of the sewage
- Mobilize equipment as required to contain the spill through trenching, berming, etc. to prevent sewage from entering Koojesse Inlet
- Clean up contaminated areas with suction trucks, loaders, dump trucks and absorbent materials as required.

5.2 Fuel and Gasoline Spills

In the event of a fuel or gasoline spill, the Fire Chief would be contacted by Dispatch and would be responsible to:

- Ensure the public safety at all times and notify the Director of Public Works and the CAO.

The Director of Public Works is then responsible to:

- Contact the NWT 24-hour Spill Report Line (867) 920-8130
- Mobilize staff to determine the cause of the problem, and to act to stop the release of the product
- Mobilize equipment as required to contain the spill through trenching, berming, etc.
- Clean up contaminated areas with hand tools, suction trucks, loaders, dump trucks and absorbent materials as required.

5.3 Chlorine Gas Leaks

In the event of a chlorine gas leak, the Fire Chief would be contacted by dispatch and would be responsible to:

- Ensure the public safety at all times and to notify the Director of Public Works and the CAO

The Director of Public Works is then responsible to:

- Contact the 24-hour Spill Report Line (867) 920-8130
- Mobilize staff to determine the cause of the problem and to act to contain the material, if possible to do so in a safe manner, using the available capping tools
- If the cylinder cannot be capped, arrange for their transport to a safe area and allow the gas to escape.
- Dispose of the faulty cylinders in such a manner as to minimize the risk to human health

5.4 Hydofluosilicic Acid

Spills of this material less than 5L will be cleaned up by the Water Treatment Plant Operator using acid neutralizing material. The Water Treatment Plant Operator will notify the Utilidor Foreman of the spill. For spills in excess of 5L, the Water Treatment Plant Operator will evacuate the immediate area and notify Dispatch. Dispatch will contact the Fire Department. The Fire Chief will then be responsible to:

- Ensure the public safety at all times and notify the Director of Public Works and the CAO

Upon notification by the Fire Chief or Dispatch, the Director of Public Works will be responsible to:

- Contact the 24-hour Spill Report Line (867) 920-8130
- Mobilize staff to determine the cause of the problem and act to contain the material if possible to do so in a safe manner.
- Dispose of the neutralized material according to GNWT regulations.

5.5 Sodium Hypochlorite

Spills of this material less than 5L will be cleaned up by the Water Treatment Plant Operator using appropriate neutralizing material. The Water Treatment Plant Operator will notify the Utilidor Foreman of the spill. For spills in excess of 5L, the Water Treatment Plant Operator will evacuate the immediate area and notify Dispatch. Dispatch will contact the Fire Department. The Fire Chief will then be responsible to:

- Ensure the public safety at all times and notify the Director of Public Works and the CAO

Upon notification by the Fire Chief or the Dispatch, the Director of Public Works will be responsible to:

- Contact the 24-hour Spill Report Line (867) 920-8130
- Mobilize staff to determine the cause of the problem and act to contain the material if possible to do so in a safe manner.
- Dispose of the neutralized material according to GNWT regulations.

6.0 GENERAL SPILLS

The following sections provide general information on the handling of large volume spills to a variety of receptors. In Iqaluit, sewage and petroleum products are stored in sufficient quantities that a large volume spill could occur.

6.1 Sewage Spills

6.1.1 Containment on Land

Containment of large volume sewage spills on land is generally accomplished using minor earthworks such as earth dams or dykes and trenches.

Dykes and dams may be used to contain and direct spilled materials. The dam or dyke may be lined with a synthetic liner to render it impermeable to the spilled product. The location and size of the barrier should allow for the volume of material to be contained.

When the ground is thawed, trenches may be used to intercept and collect spilled materials. A synthetic liner may be places on the trench floor and walls to contain the contaminant in the trench. The location and size of the trench should take into account the volume of material to be contained. Trenches placed down slope of the spill may be effective in containing both surface and subsurface movement of spilled material.

6.1.2 Containment on Surface Water

As sewage will readily mix with water it may prove impossible to contain the spill once water is reached. Strong action should be taken to prevent the material from entering a water body and to stop the material discharge at the

source. Care should be taken to ensure public health safety (eg. Protect water intakes, etc.) and the long term environmental effects of the spill should be monitored.

If the water is flowing through a drainage or smaller stream a channel should be constructed to divert the water flow around the spill area. A dam should be constructed to contain the water the sewage has already entered.

6.1.3 Containment on Ice

Containment of spills on ice will be affected by the load bearing strength of the ice. If it is determined that the ice is safe to work on, containment bill be achieved using dykes and dams constructed of earth or snow. The dam or dykes should be lined with plastic to make it impermeable to the sewage. Water may be sprayed on snow dams/dykes to form a impermeable ice layer. Absorbent materials may be used in conjunction with barriers to prevent further spread and seepage.

6.1.3 Containment on Snow

Snow will readily absorb liquids which may facilitate the removal of spilled material to a recovery or disposal site. Saturated contaminated snow may be collected relatively easily and hauled away. Compacted snow can be used to create an effective physical barrier to reduce the spread of spilled materials.

Several types of snow containment structures may be constructed to contain spilled materials. Snow dykes and dams can be erected and then lined with an impermeable liner or sprayed with water to form an impermeable ice layer. Initially the snow around the perimeter of the spill can be compacted, eg. With a snowmobile, to slow the movement of contaminants. The saturated snow can be collected with hand tools or heavy equipment and removed to the sewage lagoon for disposal.

Caution should be exercised as spilled materials can migrate under snow cover for considerable distances and not be visible from above.

6.1.4 Material Removal

Removal of the spilled sewage may be accomplished using several techniques depending on the nature of the spill. Generally, methods used include suction mechanical removal and the application of absorbent material.

Suction methods may be used initially if there is a significant quantity of free product on the ground. Equipments used to recover material in this fashion may include vacuum trucks, portable pumps or shop vacuums.

Suction screens may be required to prevent hose plugging and possible pump drainage.

Mechanical recover using hand tools or heavy equipment should be used to collect soils or other loose material contaminated by the sewage. Caution should be exercised when using heavy equipment on a spill site as it is possible to cause a greater environmental impact from the operation of the equipment than form the spill itself.

Recovered liquids and saturated soils will be disposed of in the sewage lagoon.

6.2 Fuel and Gasoline Spills

Extreme caution should be exercised when containing and cleaning up spilled petroleum products due to high fire and explosion hazards associated with these materials.
Depending on the size of the spill and surrounding conditions, personal protective equipment such as rubber gloves (nitrile, neoprene, butyl rubber or PVC), rubber boots (neoprene or butyl rubber), chemical safety goggles and NIOSH/MSHA approved half mask respirators with organic vapor cartridges may be required. In poorly ventilated areas where there is the potential for vapors to concentrate, the use of heavy equipment should be carefully evaluated due to the potential explosion hazard.

6.2.1 Containment on Land

Containment of large volume fuel spills on land is generally accomplished using minor earthworks such as earth dams or dykes and trenches.

Dykes and dams may be used to contain and direct spilled materials. The dam or dyke may be lined with a synthetic liner to render it impermeable to the spilled product. The location and size of the barrier should allow for the volume of the material to be contained.

When the ground is thawed, trenches may be used to intercept and collect spilled materials. A synthetic liner may be placed on the trench floor and walls to contain the contaminant in the trench. This location and size of the trench should take into account the volume of material to be contained. Trenches placed down slope of the spill may be effective in containing both surface and subsurface movement of spilled material.

6.2.2 Containment on Surface Water

As diesel fuels and gasoline are less dense than water, they will float on the surface. Spills of these materials to surface water bodies may be contained using booms and their floating devices.

In standing water, booms should be deployed to contain the floating material close to the shore, thereby facilitating contaminant recovery. If the water is flowing, the booms should be stretched across the width of the water surface and angled against the current to allow for shore side collection.

If the water is flowing through a drainage ditch or smaller stream, an underpass or water bypass should be constructed. An earthen dam is constructed to completely stop the flow of water. Piping is than installed to allow water to flow through below the level of the floating fuel. Alternately, a channel may be constructed to divert the water flow around the spill area. A dam should be constructed to contain the water the fuel has already entered.

Weirs constructed of sheet metal, plywood, etc, may be constructed to prevent material flow through culverts or ditches. The sheet is inserted into the stream to below the level of the fuel. The water flows under the weir and spilled material will collect at the surface for removal.

If commercial booms are not readily available, improvising booms can be constructed of virtually any material that will float and form a barrier, eg. logs, inflated fire hoses, etc. These materials may be used alone or preferably as supports for absorbent materials.

6.2.3 Containment on or Under Ice

Containment of spills on ice will be affected by the load bearing strength of the ice. If is determined that the ice is safe to work on, containment will be achieved using dykes and dams constructed of earth or snow. The dam or dyke should be lined with plastic to make it impermeable to the fuel. Water may be sprayed on snow dams/dykes to form an impermeable ice layer. Absorbent materials may be used in conjunction with barriers to prevent further spread and seepage.

If the spill penetrated the ice, containment becomes more difficult. If the water beneath the ice is standing, the ice will be broken to install a containment boom.

If the water is flowing slowly, ice slotting may be used. A trench is cut into the ice downstream of the spill and at an angle to the current to deflect and concentrate the spill. Spilled material that collects in the ice slot may be pumped out, absorbed or burned in place.

Vertical barriers, e.g. plywood sheets, may be inserted into the ice to deflect the movement of spilled material. Trenches should be cut in the ice at an angle to the direction of flow. The vertical barriers are inserted in the slots and allowed to freeze into place. The extent of the under ice spill may be monitored by boring observation holes into the ice with an auger.

6.2.4 Containment on Snow

Snow will readily absorb liquids which may facilitate the removal of spilled material to a recovery or disposal site. Saturated contaminated snow may be collected relatively easily and hauled away. Compacted snow can be used to create an effective physical barrier to reduce the spread of spilled materials.

Several types of snow containment structures may be constructed to contain spilled material. Snow dykes can be constructed and then lined with an impermeable liner or sprayed with water to form an impermeable ice layer. Initially the snow around the perimeter of the spill can be compacted, eg. with a snowmobile, to slow the movement

of contaminants. The saturated snow can be collected with hand tools or heavy equipment and removed to the land fill for disposal or recovery.

Caution should be exercised as spilled material can migrate under snow cover for considerable distances and cannot be visible from above.

6.2.5 Fire or Explosion

The first step to be taken at a site where there is a fire or explosion risk, or if the material is on fire is to evacuate people from the surrounding area. Dykes or trenches are then constructed down slope of the spilled material to minimize spread of unburned liquids and/or the fire. The fire may then be extinguished using suitable methods and action may be taken to prevent further spillage, contain the material and begin clean-up procedures.

6.2.5 Material Removal

Removal of the spilled fuels may be accomplished using several techniques. Generally, methods used include suction, mechanical removal and the application of absorbent material.

Suction methods may be used initially if there is significant quantity of free product on the ground or on the surface of a water body. Equipments used to recover material in this fashion may include vacuum trucks, portable pumps or shop vacuums.

Suction screens may be required to prevent hose plugging and possible dump damage.

Mechanical recovery using hand tools or heavy equipment should be used to collect soils or other loose material contaminated by the fuel. Caution should be exercised when using heavy equipment on a spill site as it is possible to cause a greater environmental impact form the operation of the equipment than from the material itself.

Absorbents may be used to soak up petroleum product. They are commonly used for final clean-up, recovery of small amounts of fuel or to remove fuel from places which are inaccessible to other spill clean up methods. Snow and soil can be used as absorbent material for a variety of petroleum products. The saturated absorbent can be collected mechanically and moved to a suitable disposal location.

Recovered liquids will be disposed of in accordance with appropriate GNWT regulations. Saturated soils and absorbents will be transported to the landfill for disposal.

6.3 Chlorine Gas Leak

Chlorine is a very toxic gas. Appropriate personal safety equipment must be worn by personnel attempting to contain a leak. Two Class A response suites with Scott packs are located at the Fire Department for use in the event of a leak.

6.3.1 Containment and Disposal

Capping tools are available for sealing leaking cylinders. If a cylinder is capped successfully, it may be returned to the supplier for disposal. If the cylinder cannot be capped, remove the cylinder to a safe location downwind of any populated area and allow the gas to escape.

7.0 SPILL EQUIPMENT INVENTORY

7.1 Spill Equipment Inventory

The following is a listing of equipment owned by the City of Iqaluit that may be used in the event of a spill emergency. The usual location of the equipment is also indicated.

MUNICIPAL SPILL EMERGENCY EQUIPMENT	
EQUIPMENT	**STORAGE LOCATION**
2 Cat 950 Loaders	1 at the Municipal Garage 1 at 1552 Parking Garage
1 Rubber Tired Backhoe	Municipal Garage (outside)
2 Dump Trucks	1 at the Apex Parking Garage 1 at the Municipal Garage
1 Cat 814 Wheel Dozer	1 at the Air Base Garage
2 Road Graders	1 at 1552 Parking Garage 1 at the Apex parking Garage
1 Cat M322 Excavator with hammer	1 at the Municipal Garage (outside)
4 Sewage Trucks	4 at the Airbase Parking Garage
5 Water Trucks	1 at the Airbase Parking Garage 4 at the Apex Parking Garage
1 Cat 966 Loader	1 at the Apex Parking Garage

7.2 Resource Contact

The following is a listing of internal and external resources that may be contacted for aid in the event of a spill.

RESOURCES		
CONTACT	**CONTACT #**	**RESOURCE PROVIDED**
Fire Department: Volunteers	979-4422	Manpower, Trucks, Foam
Fire Department: Ambulance	979-4422	Medical, Rescue Equipment
Fire Department: EMO	979-4422	Evacuation, Rescue
24-Hour Spill Report Line	(867)920-8130	Expert Advice
External Contractors	See Appendix G for As and When Contracts	Manpower, Equipment

8.0 TRAINING EXERCISES

Training and communication exercises should be carried on an annual basis to determine the actual readiness and ability of the City to handle a spill emergency. The exercised should be served to train key personnel and determine any weaknesses in the plan prior to the occurrence of an emergency situation. A variety of scenarios should be tested, eg. sewage spills from the force main, sewage lagoon dam failures, chlorine gas leaks, fuel spills, etc. to ensure that appropriate action can be take quickly.

The Fire Department and the Emergency Measures Organization (EMO) currently conduct disaster training exercises in the City of Iqaluit. Neither of these groups target hazardous material scenarios specifically, but a spill situation is often included as part of the larger exercise.

The Worker's Compensation Board will provide funding for employees to participate in hazardous material courses if contact with hazardous materials is a component of the employee's job description. Courses available include Materials Safety Data Sheets (MSDS), Workplace Hazardous Materials Systems (WHMIS) and First Aid.

Appendix K

West 40 Landfill Spill Contingency Plan Water Treatment Program & Leachate Treatment

SPILL CONTINGENCY PLAN

CITY OF IQALUIT LANDFILL WATER TREATMENT PROGRAM

IQALUIT, NUNAVUT

REVISION 0

Iqaluit
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24-Hour Non-Emergency Dispatch: 867 979-5650

Operations Superintendent: 867 222-2956

November 30, 2016

O/Ref. No.: QE15-107-5

Confidential and priviledged document

Qikiqtaaluk environmental
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Spill Contingency Plan

City of Iqaluit Landfill Water Treatment Program

Iqaluit, Nunavut

REVISION 0

Privileged and confidential document presented to

CITY OF IQALUIT

Prepared and verified by:

Greg Johnson, P.Eng., M.Sc.A.
Project Director – Northern Projects

Approved by:

Benoît Dion, B.Sc., M.Env.
Director – Northern Projects

Qikiqtaaluk environmental

November 25, 2016

O/Ref. No.: QE15-107-5

PREAMBLE

This Emergency and Spill Response Plan covers the works that are related to the treatment of contaminated landfill contact water.

The Plan will be updated and revised as necessary if operations are modified or if type and quantity of waste stored changes.

Formal distribution of the Plan has been made to:

Aboriginal Affairs and Northern Development Canada - Nunavut Field Operations
969 QIMUGJUK BUILDING
PO BOX 2200
IQALUIT (Nunavut) X0A 0H0
Fax: 867 979-6445

Additional copies and updates of this Plan may be obtained from:

City of Iqaluit
Att.: Matthew Hamp
PO Box 460
Iqaluit, Nunavut
X0A 0H0
Phone: (867) 979-5600

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1. GENERAL

The Spill Contingency Plan (Plan) was developed to assist with implementing measures to protect the environment and minimize impacts from spill events. It provides precise instructions to guide all personnel in emergency spill response situations. The Plan outlines procedures for responding to spills, while minimizing potential health and safety hazards, environmental damage, and clean-up costs.

This Emergency and Spill Response Plan covers the work related to the treatment of contaminated landfill contact water.

The activities listed in this Plan will be located near the City of Iqaluit Landfill (hereinafter referred to as the "Site"). The following table presents the approximate location of the water treatment activities:

TABLE 1
Approximate Location of Area Impacted by the Airport Project

Coordinate	Latitude	Longitude	Description
1	63°44'0.0"	68°31'40.0"	Northeastern Corner of Site
2	63°44'0.0"	68°32'15.0	Northwestern Corner of Site
3	63°43'42.0	68°32'15.0	Southwestern Corner of Site
4	63°43'42.0	68°31'40.0	Southeastern Corner of Site

The site is bordered by Koojesse Inlet to the east of the site, Frobisher Bay to the south, and the outlet of the Sylvia Grinnell River to the west of the site. The approved discharge location is into Koojesse Inlet, and the drainage from the Site runs toward the south, into Frobisher Bay.

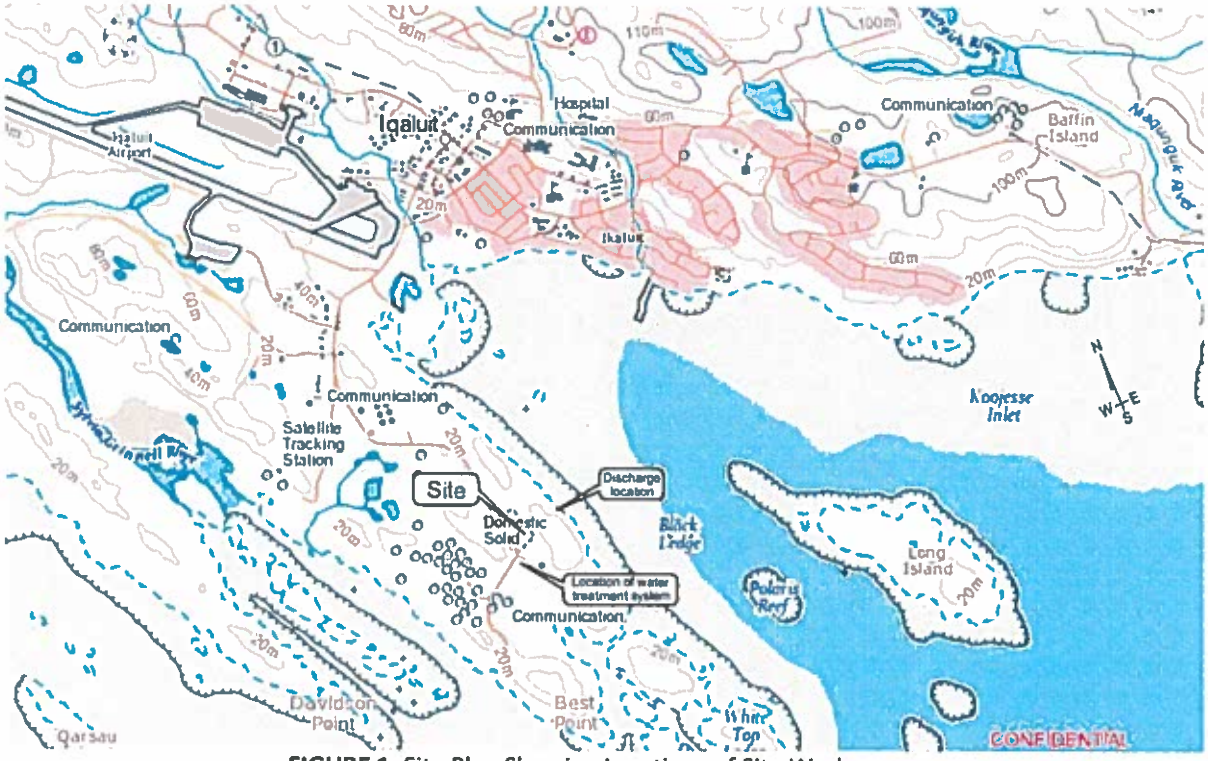


FIGURE 1: Site Plan Showing Locations of Site Works
Source: Google Maps, 2015

The Plan will be implemented to ensure that the storage and treatment of contaminated water respects all applicable federal and territorial laws, regulations and requirements. The City of Iqaluit will obtain, and comply with, all required permits, approvals and authorizations required for the operations. The following applicable Regulations and documents constitute an integral part of the Spill Contingency Plan:

- The *Canadian Environmental Protection Act* controls hazardous substances from their production and/or import, their consumption, storage and/or disposal;
- The federal *Transportation of Dangerous Goods Act* and *Regulations* ensure the protection of public health and safety, and the environment during the handling and transport of dangerous goods. The Regulations apply to all modes of transportation, by road, by sea, and by air;
- The *Nunavut Environmental Protection Act* governs the protection of the environment from contaminants. The act defines offences and penalties as well as the powers of government inspectors;
- The *Nunavut Spill Contingency Planning and Reporting Regulations* describe requirements for spill reporting and emergency planning;
- The *Land Transportation Emergency Response Guideline for Petroleum Spills* developed by the Canadian Petroleum Products Institute outlines scope, emergency response code of practice, response time guidelines, response equipment and personnel capability requirements;

2. STORAGE OF CONTAMINATED WATER

As part of the spill emergency response plan, the City of Iqaluit is responsible for implementing, through the subcontractor responsible for the treatment of contaminated water at the landfill, the following procedures:

Contaminated water will be stored on-site in holding basins with the following maximum volumes:

- Leachate Containment Pond – 4,000,000 L;
- Retention Pond – 3,500,000 L;
- Bioreactor – 4,500,000 L.

The holding basins will be inspected weekly for signs of leaks. Any leaking water will be collected and pumped into another basin, or if there is no space back into the same basin, and the source of the leak will be determined and repaired.

3. STORAGE OF PETROLEUM HYDROCARBONS

As part of the spill emergency response plan, the City of Iqaluit is responsible for implementing, through the subcontractor responsible for the treatment of contaminated water at the landfill, the following procedures:

Liquid hydrocarbons will be stored at the water treatment site. Diesel generators will be used to power the treatment unit. These generators have their own storage tanks. In addition, there are 2 diesel-fired water heaters on-site; each will have its own storage tank. The storage site will be inspected daily, for signs of leaks or spills. The list of hydrocarbon products including the size and type of storage container and estimated volume to be stored at each location is listed below:

- Water Heaters:
  - Diesel Fuel – 2 reservoirs of 1,000 L each;
- Generators:
  - 25 kW generator – diesel fuel – 300 L;
  - 125 kW generator – diesel fuel – 1,000 L.

An emergency spill response kit will be installed at each of the liquid storage locations. The spill kits will be inspected and maintained during the inspection of the storage sites, if required. All spill kits will contain the appropriate type, size and quantity of equipment for the volume and type of product present at the storage location, as well as for the environment likely to be affected by a spill (i.e., soils/water). The spill kits will also include a fire extinguisher.

4. ACID, LIME AND POLYMER STORAGE

As part of the treatment program, the pH[1] of the water must be adjusted. First, the pH is raised above 8.5 using lime to cause the metals to come out of solution. Immediately following this, a polymer is added to the water to remove the suspended solids including the metals. Both the lime and the polymers are in a powder form. They are stored in a locked marine container, according to the manufacturer's instructions. They are not stored with incompatible products.

The lime is in 25 kg bags, and the maximum quantity of lime to be stored on the Site will be 6,000 kg. The polymer also comes in 25 kg bags, and the maximum quantity of polymer to be stored on-site will be 750 kg.

Any powder form of either of the lime or the polymer that is spilled will be collected using a shovel, placed in a water-tight container, and disposed of as per the manufacturer's instructions and local regulations.

In the final stage of the treatment, sulphuric acid is added to the water to lower the pH to between 7 and 7.5. The acid is shipped in a liquid form in 1000 L tote tanks. Only one tote tank is at the treatment site at any given time. The remainder of the acid is stored at Qikiqtaaluk Environmental's (QE) EWPF[2] located at 2027 Iqaluit Lane in Iqaluit.

At the Site, the acid is contained in a spill tray of sufficient capacity to hold the entire volume of the tote tank should the containment be breached. Furthermore, access to the area where the tote tank is stored is restricted by a plywood barrier with labelling indicating the danger, so as to ensure that no unauthorized and untrained personnel come in contact with the acid. Furthermore, the acid is stored in a location that, should a spill of acid occur, it will flow into the bioreactor.

The maximum quantity of acid stored on the Site is 1,000 L. The maximum quantity of acid stored at the EWPF is 3,000 L.

1 Measure of acidity or alkalinity
2 Environmental Waste Processing Facility

5. CONTAMINATED WATER

The contaminated water is stored in 2 holding basins and in the bioreactor. During normal operations, a spill from the holding basins should not occur. The only time that there is potential of a spill from the holding basins is during the transfer of water from one basin to another. To prevent spills, all hoses and pumps will be visually inspected hourly to ensure that there are no leaks or breaks in the lines. Pumping operations will be supervised by a QE Technician specialized in water treatment and spill response.

Should a spill of contaminated water be found, the water will be immediately contained, and pumps will be used to pump the spilled water into the nearest holding basin compatible with the type of water spilled. Soil testing will be performed to ensure that no residual contamination remains in the soils following the removal of the contaminated water.

6. DUTIES AND RESPONSIBILITIES

As part of the spill Emergency Response Plan, the City of Iqaluit and QE are responsible for implementing, through their respective management teams, the following procedures:

- Training of Site personnel in spill response procedures and the proper use of response equipment and materials;
- In the event of a spill, mobilize all available site personnel, equipment and tools, as required;
- Implement all required health and safety procedures at the site of the spill;
- Eliminate all fire hazards and potential ignition sources near the spill area;
- Control the source of the spill (i.e., reduce or stop product discharge);
- Contain the spilled product using the most appropriate methods and equipment (i.e., dykes, ditches, sorbent materials, containment booms, and other barriers);
- Evaluate the possibilities of recovering spilled materials;
- Obtain, if required, assistance from government agencies such as Environment Canada and the Government of Nunavut's Department of Environment;
- Comply with all applicable guidelines and regulations;
- Conduct a preliminary assessment of environmental impacts;
- Report the spill to the Government of Nunavut Spill Report Line, within 24 hours of the event, and submit a written spill report using the appropriate form (see below for the list of information required in the report).

Table 2 presents the management team members responsible for overseeing emergency spill response operations and their contact information.

TABLE 2
City of Iqaluit Landfill Water Treatment Program Management Contact Information

Position	Contact	Telephone Number
Incident Commander	Raphael Gagnon	514 809-0496
Back-up Incident Commander	Martin Lemay	867 222-3246
Project Manager	Olivier Simard	867 222-8194
Project Director	Greg Johnson	514 717-7604
City of Iqaluit Fire Department	Shift Supervisor	867 979-4422
City of Iqaluit Project Manager	Richard Sparham	867 979-6363, ext. 259
City of Iqaluit Back-up Contact	Matthew Hamp	867 979-5653

As part of the spill response plan, the Incident Commander is responsible for implementing the following procedures:

- Assume authority over the spill scene and personnel involved;
- Activate the Spill Response Plan;
- Evaluate the initial situation and assess the magnitude of the spill;
- Develop an overall action plan;
- Report to the Project Manager and provide recommendations on resource requirements (additional manpower, equipment, materials, etc.) to complete the clean-up effort. The responsibility of the Project Manager is to mobilize personnel and equipment to implement the clean-up.

The responsibilities of the Project Manager also include the following:

- Report the spill to NT-NU 24-hour Spill Report Line at 867 920-8130;
- Provide liaison with Management and the City of Iqaluit to keep them apprised of clean-up activities;
- Obtain additional required resources not available on-site for spill response and clean-up;
- Document the cause of the spill and effectiveness of the clean-up effort, and implement the appropriate measures to prevent a recurrence of the spill;
- Prepare and submit follow-up documentation required by appropriate regulators;
- Ensure that the spill is cleaned up and all follow-up communications and reports are filed with the GN DoE[1] and ECCC[2] offices.

The responsibilities of the Project Director include the following:

- Work with the Project Manager on regulatory follow-up, as necessary;
- Act as the spokesperson with government agencies on any significant spill events.

The responsibilities of the City of Iqlaluit Project Manager include the following:

- Act as the spokesperson with government agencies as well as the public and the media as appropriate.

Once a spill event has been reported, the Incident Commander, will establish a specific strategy for containing and controlling the spill, and to initiate the clean-up activities. The Project Manager, along with other external resources such as the Iqaluit Fire Department, may act as technical advisers prior to and during the intervention. The trained Spill Response Team will conduct all emergency spill response operations under the leadership of the Incident Commander. During the clean-up phase of the intervention, other site personnel (e.g., heavy equipment operators, labourers, etc.) may be involved in the intervention. Figure 2 presents an organizational chart of the Spill Response Team.

1 Government of Nunavut Department of Environment
2 Environment and Climate Change Canada

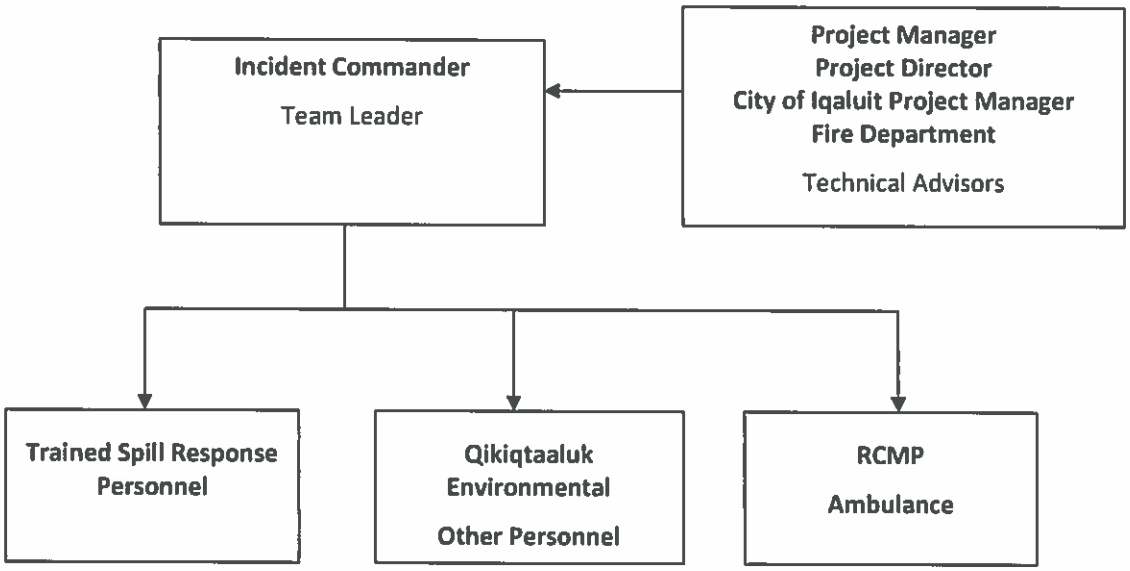


FIGURE 2: Spill Response Team Organization Chart

7. TRAINING AND DRILLS

All Site personnel will be advised that any spill of contaminated soils, whatever the extent, must be immediately reported to the Incident Commander.

The Incident Commander will select a certain number of workers to form the Spill Response Team. Crew members will be trained in emergency spill response procedures and operations. Training will include knowledge in the:

- Properties of the contaminated soils;
- Common causes of spills;
- Environmental effects of spills;
- Worker health and safety during emergency interventions;
- PPE[1] and clothing;
- Spill response procedures and techniques on land; and,
- Spill response equipment and materials.

Training will also include analysis of potential spill events that are more likely to occur during waste management operations. Spills are more likely to be caused by:

- Human error during the handling of hazardous waste containers;
- Rupture of waste containers due to accidental damage, deterioration or equipment failure.

Training will include spill response drills and classroom training.

1 Personal protective equipment

8. MATERIALS AND EQUIPMENT

In order to prevent spills and to provide adequate response in case of spill events, the City of Iqaluit and QE will maintain the appropriate types and quantities of response equipment and materials on the Site.

To facilitate immediate first response in the event of a release on land, 2 spill kits will be strategically placed in areas of contaminated soil excavation and placement. The contents of the spill kits are detailed in Table 3.

TABLE 3
Spill Kit Contents

Description	Minimum Contents	Quantity
1 yd^3 capacity For Contaminated Soil Excavation Areas	1 yd^3 Quatrex Bag	1
	Shovel	2
	Pairs of gloves	2
45 gallon capacity	45 gallon plastic drum	3
	Sorbent pads of 15" X 19" X 12 oz	300
	Sorbent socks 3" X 48"	15
	Sorbent booms 5" x 10'	6
	Epoxy sticks	3
	Disposal bags 40" x 60" x 6 mil	9
	Pairs of nitrile gloves	6

In addition to the spill response materials listed above, a loader, excavator, bulldozer and a dump truck are available to aid with spill response and recovery efforts.

9. SPILL RESPONSE PROCEDURES

A spill is defined as the discharge of contaminated soils, or any hazardous liquid, out of its containment and into the environment. Potential hazards to humans, vegetation, and wildlife vary in severity, depending on several factors including the nature of the material, the quantity spilled, the location and the season. Hazardous liquids are the principle types of waste materials that may be spilled, and therefore spill response procedures will focus on these types of materials.

All Site personnel will be briefed on the procedures to be followed to report a spill and initiate spill response. The first person to notice a spill will take the following steps:

1. Immediately warn other personnel working near the spill area;
2. Evacuate the area if the health and safety of personnel is threatened;
3. Notify the Incident Commander, who will initiate the spill response operations;
4. In the absence of danger, and before the spill response team arrives at the scene, take any safe and reasonable measures to stop, contain and identify the nature of the spill.

All spill response interventions carried out by the spill response team will follow these general procedures:

Source Control - Reduce or stop the flow of product without endangering anyone. This may involve very simple actions such as sealing a puncture hole with almost anything handy (e.g., a rag, a piece of wood, tape, etc.);

Protection - Evaluate the potential dangers of the spill in order to protect sensitive ecosystems and natural resources. Block or divert the spilled material away from sensitive receptors. This can also be achieved by using various types of barriers;

Clean up the Spill – Recover and containerize as much soil as possible. Recover and containerize/treat contaminated soils, water, and snow;

Report the Spill - Provide basic information such as date and time of the spill, type and amount of product discharged, location and approximate size of the spill, actions already taken to stop and contain the spill, meteorological conditions and any perceived threat to human health or the environment. Reporting requirements are presented in Section 10.

Response procedures specific to spills on land and snow are presented in the following sections. Because of the nature of the contaminated soils, and because the soils will not be crossing any waterbodies, response to spills on water are not discussed in this Plan.

Procedures will vary depending on the season. Spill response operations, techniques, equipment and materials are further detailed in the spill response training course manual.

9.1 Spills on Land

Response to spills on land will include the general procedures previously detailed. The main spill control techniques involve the removal of any soils contaminated by contact with contaminated water. Barriers should be used to limit the spreading of water to reduce the impacts on the surrounding soils and flora.

9.2 Spills on Water

Response to spills on water will include the general procedures previously detailed. The main spill control techniques involve the immediate stopping of the drainage of liquid into the waterbody. Barriers should be used to prevent any liquid from flowing into a waterbody.

10. POTENTIAL SPILL ANALYSIS

In order to prepare for emergency spill response, potential spill analysis was conducted on the worst case scenario. The exercise serves to identify potential risk areas, as well as to determine the fate of spilled products and their environmental effects. The potential spill scenario identified for this activity is:

1 Spill of tote tank full of acid.

This spill scenario is analysed in detail in the following page.

➢ Scenario #1: Spill of a Full Tote Tank of Acid

Description of incident: Spill of 1,000 L of hydrochloric acid from a tote tank;

Potential causes: resulting from operation over uneven ground or while putting the tote tank in place, human error, accident;

Hazardous products spilled: Hydrochloric acid;

Maximum volume spilled: 1,000 L;

Estimated time to spill entire volume: 30 seconds;

Immediate receiving medium: Soils;

Most probable direction of contamination migration: Since the area where the operations will occur is relatively flat, the soils will remain next to the tote tank;

Distance and direction to nearest receiving body of water: Bioreactor holding basin immediately adjacent and a drainage ditch approximately 10 m north-northeast of the containment area;

Resources to protect: Drainage ditch, which is away from the Site. The drainage ditch drains into Frobisher Bay, located 270 m from the Site. It should be noted that the operations will not pass over or near the drainage ditch, and since the contamination is on the top of the soils, there is no risk of it spreading quickly;

Estimated emergency spill response time: 5 minutes after spill is noticed;

Spill response procedures: Evacuate the area and call the fire department.

Safety hazards associated with the spill event: The acid spill could result in someone being splashed with the acid, which could cause chemical burns.

Measures and procedures to prevent such events from occurring: Include regular inspections of vehicles and heavy equipment on-site; establish speed limits on the worksite and further limit speed over rough or uneven areas; proper training of heavy equipment operators; safety orientation of workers, and use of a spotter when reversing; wearing of proper acid-resistant PPE when in proximity of the acid or during movement of totes containing acid.

Scenario #2: Heating Oil Storage Tanks

The heating oil will be stored in a 1,000 L tank that will be located next to the marine container that holds the heating units.

Description of incident: 2 potential situations could occur that would cause a spill:

1. The accidental spill of fuel due to a fuel line break, or
2. The rupture of the storage tank, possibly due to a violent impact caused by a collision with a vehicle or heavy equipment;

Potential causes: Collision with the storage tank by heavy equipment or a vehicle, vandalism;

Hazardous products spilled: Petroleum, oil, lubricants, glycol;

Maximum volume spilled: In the first case, the spilled volume would be, at worst, 1,000 L, which represents the entire volume of the reservoir. In the other case, it can be assumed that the impact would occur at mid-height on the tank and, at worst, the spilled volume would not exceed ½ of the total volume (i.e., 500 L);

Estimated time to spill entire volume: In either case, the spill flow rate would be moderate to high, and it can be assumed that the entire volume would be spilled within 15 to 20 minutes;

Immediate receiving medium: Soils;

Most probable direction of contamination migration: The general direction of migration would be along the natural drainage pathway. This would cause the fuel to flow towards the bioreactor containment basin. A depression along the road between the road and the containment basin would most likely collect the fuel;

Distance and direction to nearest receiving body of water: Drainage ditch, approximately 10 m north-northeast of the containment area;

Resources to protect: Frobisher Bay, which is approximately 270 m away from the Site. It should be noted that the operations will not pass over or near the creek, and since the contamination is on the soil surface of the, there is no risk of it spreading quickly;

Estimated emergency spill response time: The spill would be communicated by the witness to the scene to the Incident Commander, or in his absence, the Back-up Incident Commander. The latter would then proceed down the chain of command and advise the appropriate persons of the immediate actions to be taken. Between 7:00 and 17:00, there should always be someone on the Site to supervise the operation of the water treatment unit;

Spill response procedures: The personnel responsibilities are outlined in previous sections of this document. The witness to the spill would be advised to try to stop the source of the spill, while waiting for assistance to arrive; his actions would be immediate. The Incident Commander would coordinate the spill response activities carried out by the containment unit. Members of this unit would be mobilized to the spill site.

Mobilization of containment equipment to the spill site can be carried out rapidly. A bucket loader can reach the Site of the spill within 15 minutes. Stockpiles of sand and gravel are also located in the vicinity, if required for berm construction. Spill response kits containing sorbent materials will be kept next to the fuel tank. Containment would be carried out by the construction of soil berms and the installation of sorbent booms. After containment, clean-up equipment can be mobilized to the Site. Excavators, loaders and dump trucks are all available as part of the project works. Should none be available, local contractors with the necessary equipment will be hired. There is a vacuum trailer unit in Iqaluit available for the collection of free product resulting from a spill;

Safety hazards associated with the spill event: These include the risk of fire. This can be minimized by preventing personnel from smoking near the spill scene. Risks to personnel (from inhalation and dermal contact) can be prevented by the proper use of PPE;

Measures and procedures to prevent such events from occurring: Include regular inspection of the fuel storage tank and containment system, and safety rules concerning the use of vehicles and heavy equipment on-site, especially in close proximity to this area (e.g., speed limits, training of heavy equipment operators, restricted area posting, worker safety orientation, etc.).

Scenario #3: Fuel Delivery

Description of incident: The fuel delivery operations (fuel truck) to supply fuel to the heating oil storage tank present some risk of spills. Any accident involving the fuel delivery truck could result in the loss of its entire volume of fuel. Such an accident could occur almost anywhere on-site, anywhere the fuel truck has access;

Potential causes: Damage to the truck, accident with another vehicle, roll-over of the truck;

Hazardous products spilled: Diesel fuel;

Maximum volume spilled: This would be the volume of the storage tank on the back of the fuel truck. The largest truck holds 18,488 L;

Estimated time to spill entire volume: Depends on nature of incident, anywhere from 10 to 15 minutes to up to an hour;

Immediate receiving medium: Soils, possibly a waterbody, depending on where the incident occurs;

Most probable direction of contamination migration: The spill will proceed downgradient from the spill location. The direction will depend on the topography of the area where the spill occurs;

Distance and direction to nearest receiving body of water: The nearest body of water is the bioreactor, approximately 20 m away. Drainage then leads to Frobisher Bay, approximately 260 m away;

Resources to protect: Any nearby waterbodies or drainage ditches, structures and minimize the area of impacted soils;

Estimated emergency spill response time: The personnel responsibilities are outlined in previous sections of this document. The witness to the spill would be advised to attempt to stop the source of the spill, while waiting for assistance to arrive; his actions would be immediate. The Contractor's Site Technical Advisor would coordinate the spill response activities carried out by the containment unit. Members of this unit would be mobilized to the spill area. It is anticipated that an initial mobilization to a spill site would take no more than 10 minutes;

Spill response procedures: Any spills would be communicated by the witness to the Incident Commander, or in his absence, the Back-up Incident Commander. The latter would then proceed down the chain of command and advise the appropriate persons of the immediate actions to be taken. Radio communication will be used at all times on the Site; as such, key team members will carry a radio with them at all times.

Mobilization of containment equipment to the spill site can be carried out rapidly. Sorbent booms may be required to contain the oil slick and prevent further spreading or migration to any discharge stream. If the construction of an oil-water separator in the discharge stream is necessary, the following equipment and materials would be required: heavy equipment (loader or excavator), sand and gravel, piping, and tarp/geomembrane. This equipment and materials could all be mobilized within 20 to 30 minutes. If the fuel reaches a discharge stream, spill response measures may need to be implemented further downstream. After containment, clean-up equipment will be mobilized to the area. Excavators, loaders and dump trucks are all available as part of the project works. Should none be available, local contractors with the necessary equipment will be hired, including a vacuum unit, if required. However, due to the size of the temporary fuel tanks used for delivery/supply, potential impacts from spills are likely to be rapidly contained;

Safety hazards associated with the spill event: These include the risk of fire. This can be minimized by preventing personnel from smoking near the spill scene. Risks to personnel (from inhalation and dermal contact) can be prevented by the proper use of PPE;

Measures and procedures to prevent such events from occurring: These include regular safety regulations regarding the use of vehicles on the Site, especially in close proximity to sensitive areas (e.g., speed limits, training of truck drivers, etc.).

11. REPORTING REQUIREMENTS

Quantities of hazardous substances spilled which require reporting are listed in Schedule B of the Nunavut Spill Contingency and Reporting Regulation[1]. For example, all flammable liquid (Class 3) spills of volume equal to or greater than 100 L (half a drum) require reporting.

After the initial field emergency response to the spill event, the spill will be reported to the 24-hour Spill Report Line:

24-Hour Spill Report Line

Tel. 867 920-8130

or

Fax 867 873–6924

Additionally, the spill must be reported to AANDC[2] to the following person:

Erik Allain

Manager Field Operations

Tel. 867 975-4295

Fax: 867 975-6445

Should the spill be of a nature, or in a location, that affects airport activities, the airport authorities will also be notified of the spill immediately following the notification of the Spill Report Line and AANDC.

Failure to report a spill can lead to fines. It is the responsibility of the Project Manager to prepare the proper reports and transmit them to regulatory authorities. Table 4 presents an additional contact list for spill reporting.

TABLE 4
Contact List for Spill Reporting

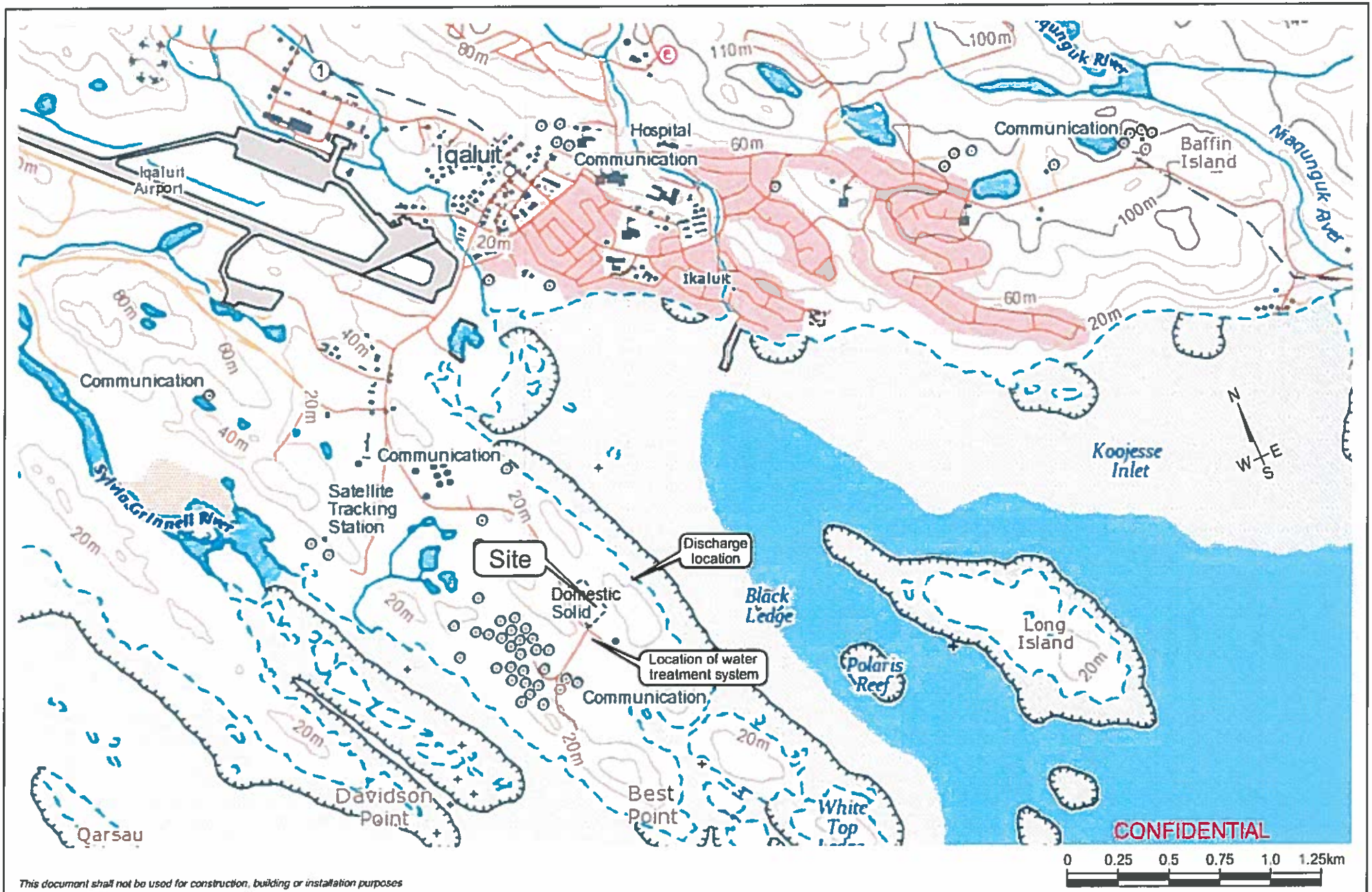
Department	Person	E-mail	Telephone
GN DOE	Kristi Low	klowe@gov.nu.ca	867 975-7748
Fire Department (general) Fire Department (emergency)	-	-	867 979-5655 867 979-4422
Royal Canadian Mounted Police - Iqaluit	-	-	867 979-0123
Ambulance	-	-	867 979-4422

Afterwards, the spill event will be reported in writing using the standard Spill Report Form presented in Appendix A.

1 https://www.justice.gov.nt.ca/en/files/legislation/environmental-protection/environmental-protection.r2.pdf
2 Aboriginal Affairs and Northern Development Canada

The written report will include the following information:

- Date and time of the incident;
- Location or map coordinates and direction of spill movement, if not at steady-state;
- Party responsible for the spill;
- Type and estimated volume of spilled contaminant(s);
- Specific cause of the incident;
- Status of the spill indicating if spilled materials are still moving or now at steady-state;
- Approximate surface of contaminated area;
- Factors affecting spill or recovery such as temperature, wind, etc.;
- Status on containment actions indicating whether a) naturally, b) booms, dykes or other, c) no containment has been implemented;
- Corrective action taken, or proposed, to clean, contain or dispose of spilled material;
- Whether assistance is required and in what form;
- Whether the spill poses a hazard to persons or property (i.e., fire, drinking water);
- Comments and recommendations;
- Name, position and employer of the person reporting the spill; and,
- Name, position department of the person to whom the spill is reported.



This document shall not be used for construction, building or installation purposes

Presented to:
Iqaluit

Property located at:
City of Iqaluit, Nunavut
Solid Waste Facility

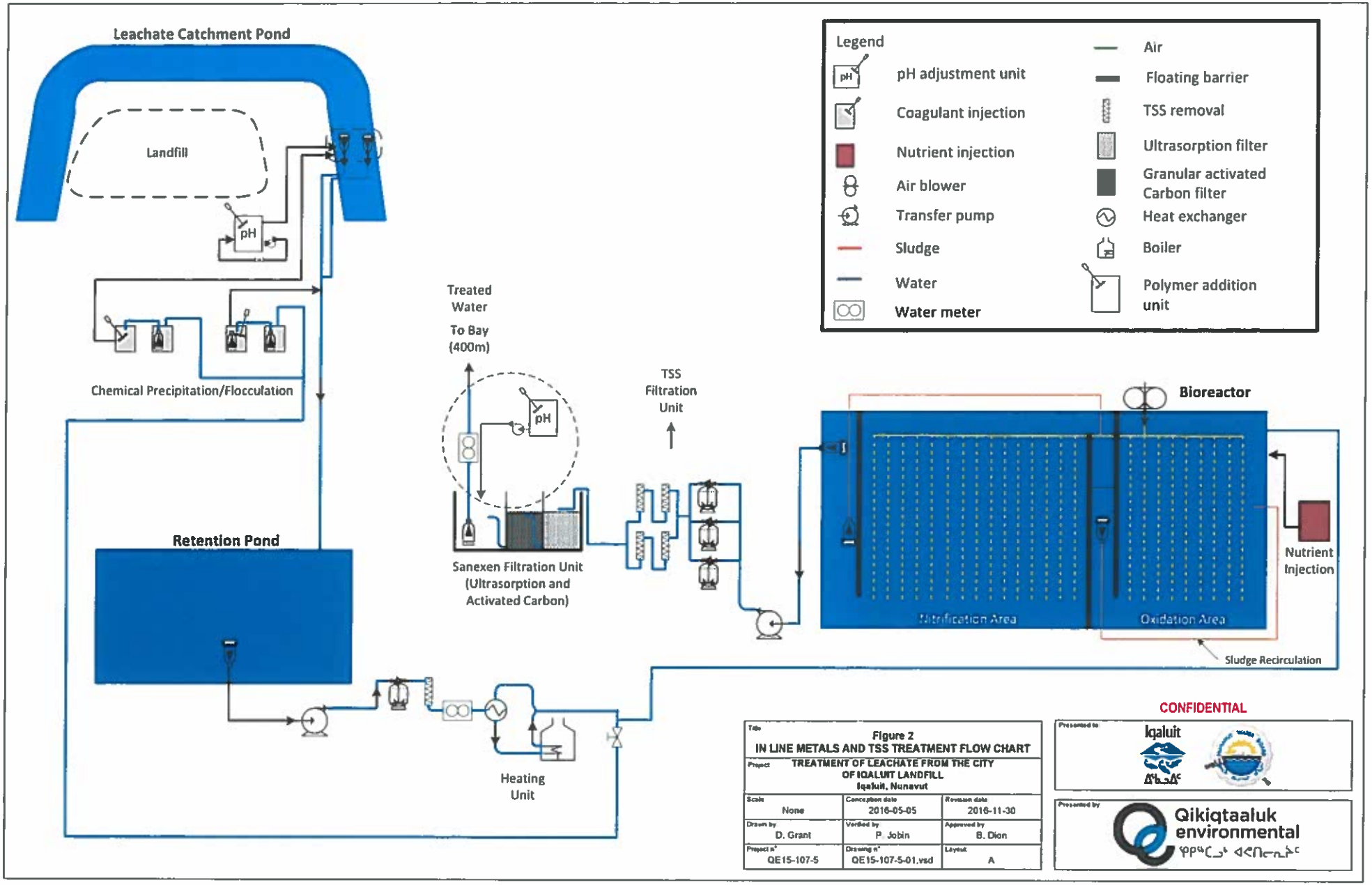
Figure 1

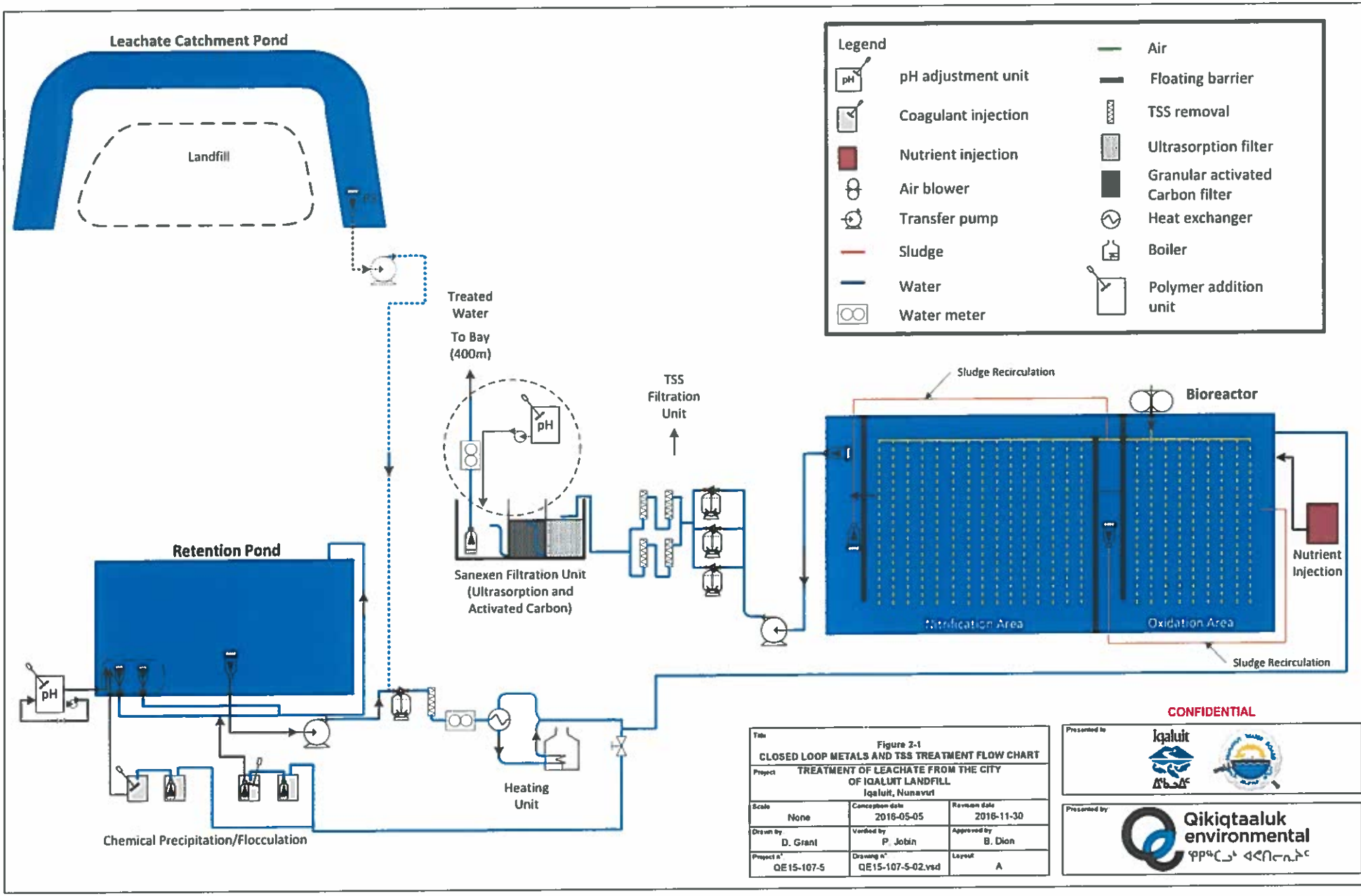
Site Plan Location

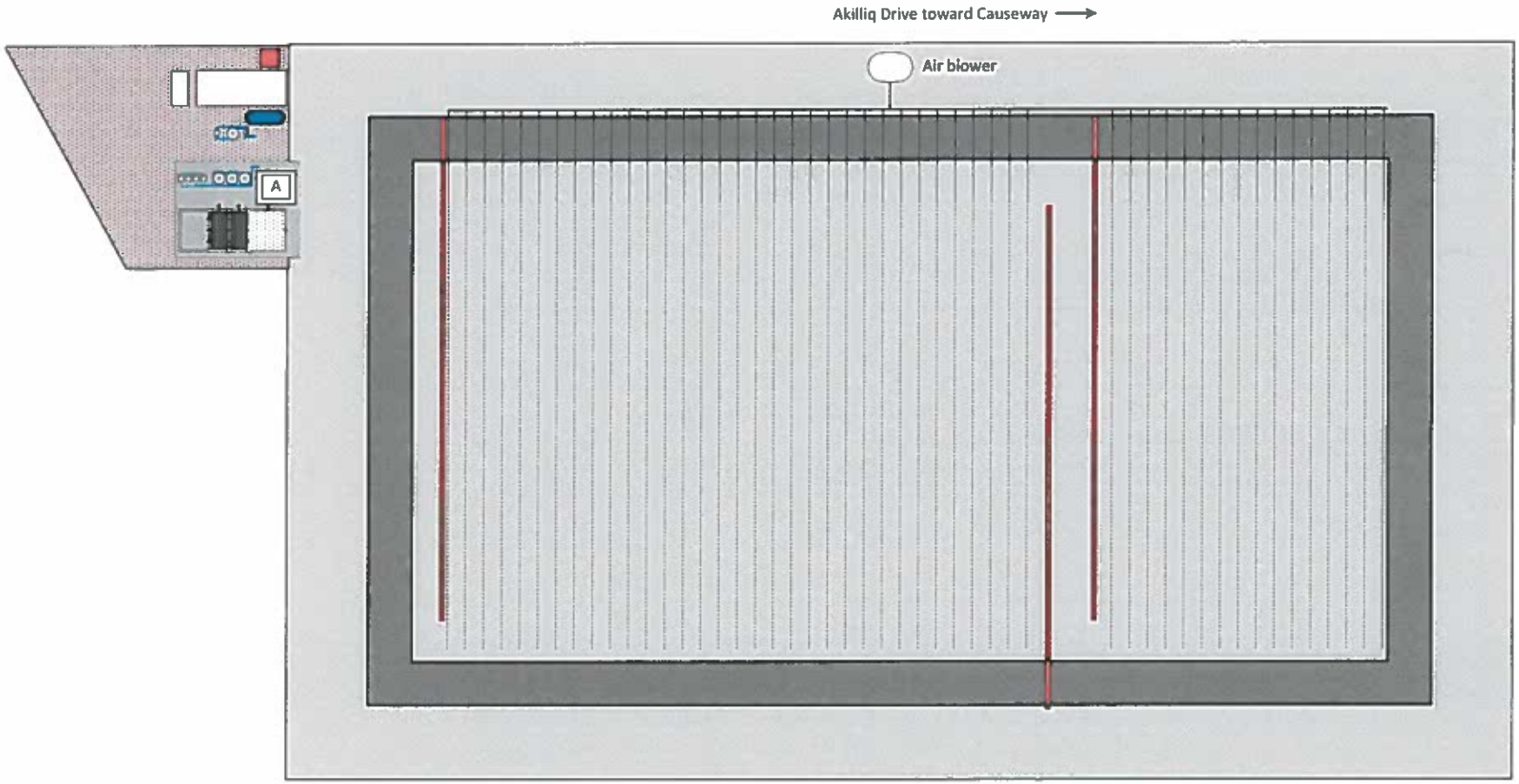
TREATMENT OF LEACHATE FROM THE CITY OF IQALUIT
LANDFILL, IQALUIT, NUNAVUT

Drawn by:	Verified by:	Approved by:	
D. Grant	G. Johnson	B. Dion	
Date:	Drawing no.:	Geodetic reference:	
2016-11-30	QE15-107-5-01 | A	None	None

Qikiqtaaluk environmental


Leachate Catchment Pond
Landfill
pH
Chemical Precipitation/Flocculation
Retention Pond
Treated Water
To Bay (400m)
pH
Sanexen Filtration Unit (Ultrasorption and Activated Carbon)
TSS Filtration Unit
Bioreactor
Nutrient Injection
Nitrification Area
Oxidation Area
Sludge Recirculation
Heating Unit
Legend
pH adjustment unit
Coagulant injection
Nutrient injection
Air blower
Transfer pump
Sludge
Water
Water meter
Air
Floating barrier
TSS removal
Ultrasorption filter
Granular activated Carbon filter
Heat exchanger
Boiler
Polymer addition unit
CONFIDENTIAL
Figure 2
IN LINE METALS AND TSS TREATMENT FLOW CHART
TREATMENT OF LEACHATE FROM THE CITY OF IQALUIT LANDFILL
Iqaluit, Nunavut
Scale: None
Conception date: 2016-05-05
Revision date: 2016-11-30
Drawn by: D. Grant
Verified by: P. Jobin
Approved by: B. Dion
Project n°: QE15-107-5
Drawing n°: QE15-107-5-01.vsd
Layout: A
Iqaluit
Qikiqtaaluk environmental


Leachate Catchment Pond
Landfill
Legend
pH adjustment unit
Coagulant injection
Nutrient injection
Air blower
Transfer pump
Sludge
Water
Water meter
Air
Floating barrier
TSS removal
Ultrasorption filter
Granular activated Carbon filter
Heat exchanger
Boiler
Polymer addition unit
Treated Water
To Bay (400m)
TSS Filtration Unit
Sludge Recirculation
Bioreactor
Retention Pond
Sanexen Filtration Unit (Ultrasorption and Activated Carbon)
Nutrient Injection
Nitrification Area
Oxidation Area
Sludge Recirculation
Heating Unit
Chemical Precipitation/Flocculation
CONFIDENTIAL
Figure 2-1
CLOSED LOOP METALS AND TSS TREATMENT FLOW CHART
TREATMENT OF LEACHATE FROM THE CITY OF IQALUIT LANDFILL
Iqaluit, Nunavut
Scale: None
Conception date: 2016-05-05
Revision date: 2016-11-30
Drawn by: D. Grant
Verified by: P. Jobin
Approved by: B. Dion
Project n°: QE15-107-5
Drawing n°: QE15-107-5-02.vsd
Layout: A
Presented to: Iqaluit
Presented by: Qikiqtaaluk environmental



Legend

- Generator
- Fuel tank
- A — Acid injection (H_2SO_4, 93%) with spill containment protection

Title: Figure 3 LOCATION OF FUEL TANK AND HAZARDOUS MATERIALS ON SITE		
Project: TREATMENT OF LEACHATE FROM THE CITY OF IQALUIT LANDFILL Iqaluit, Nunavut		
Scale: None	Conception date: 2016-10-27	Revision date: 2016-11-30
Drawn by: D. Grant	Verified by: P. Jobin	Approved by: B. Dion
Project n°: QE15-107-5	Drawing n°: QE15-107-5-03.vsd	Layout: A

CONFIDENTIAL

Presented to: Iqaluit

Presented by: Qikiqtaaluk environmental

Appendix L

Montintoring Locations Plan

Project Management Initials: Designer: Checked: Approved: ANSI B 279.4mm x 431.8mm

Last saved by: EROSC (2018-12-06) Last Plotted: 2018-12-06
Filename: P:\60571501\900-CAD_GIS\910-CAD\30-FIGURES\B\03\60571501-FIG-03-0000-B-0001.DWG

Iqaluit West 40 Landfill

City of Iqaluit, Nunavut
Project No.: 60571501 Date: 2018-12-06

Iqaluit West 40 Landfill
Monitoring Locations
Plan

AECOM

Figure: 1

Appendix M

AirBurners Operating Manual

Operating Manual

S-220

Equipped With Kubota V2403-TE Diesel Engine
(2018 Model)

Self-Contained Refractory Walled Air Curtain Burner

"Better Environmentally - Better Economically "

Factory and Main Office
Air Burners, Inc.
4390 SW Cargo Way
Palm City, FL 34990

Phone: 772-220-7303 or 888-566-3900
FAX: 772-220-7302
E-mail: support@airburners.com

Visit Our Web Site at:
www.AirBurners.com

Rev. 12.08.2017a

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