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Nunalingni Kavamatkunillu Pivikhaqautikkut
Department of Community Government Services
Ministère des Services communautaires et gouvernementaux

December 21, 2009

Phyllis Beaulieu
December 22, 2009
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Phone: (867) 360-6338, Ext. 26
Fax: (867) 360-6369

Phyllis,
In response to the teleconference meeting notes with NWB of dated December 7, 2009, I am writing you to confirm the followings:

a) CGS to discuss the fish bearing nature of the pond that drains to the large lake with the Hamlet and provide a memo to the NWB and reviewers:

   Ans: Please find attached the letter of the SAO of Hamlet of Kimmirut in **Appendix-A.** The Large Lake is Soper Lake which has fish habitants.

b) Trow to correct the table headers in its October 30, 2009 memo and provide a revised memo for submission to the NWB:

   Ans: Please find attached the revised memo of TROW in **Appendix-B**.

c) CGS to review condition D,10 of the Licence as well as reviewers comments on the Quarry Management Plan and provide a response (including spill contingency planning) to the NWB.

   Ans: Please find attached a draft Quarry Management Plan in **Appendix-C.**

d) CGS to provide a Plan for Compliance to address solid waste disposal;

   Ans: This facility was built next to the proposed sewage lagoon and intended to commission in 2000 but it was never completed nor commissioned. Additional funding has been requested to upgrade this facility to make it best fit for the community and to satisfy the requirements of the NWB. The Location map of the proposed landfill site is attached in **Appendix-D.**
   The existing facility which is being used will be decommissioned once the new facility is commissioned. Funding has been requested to complete this project.

P.O. Box 379, Government of Nunavut, Pond Inlet
☎ (867) 899-7301 (867) 899-7330

e) CGS to provide a Plan for Compliance to address the geotechnical engineer's inspection and report:

Ans: The geotechnical investigation for the Sewage Lagoon was conducted by TROW in 2008. Using this report, the design documents have been prepared for the modifications of this facility and they have been approved by NWB.

f) CGS to provide a Plan for Compliance to address abandonment and restoration plans.

Ans: The funding is expected to be available in 2010-11 fiscal year as requested. The abandonment and restoration works will be carried out on the existing solid waste site and existing sewage disposal site once the new facilities are commissioned. This is forecasted for 2013.

I hope this will satisfy your requirements. If you have any question, please feel free to contact me at any time.

Thanks.

Bhabesh Roy, M.A.Sc., P.Eng.
Municipal Planning Engineer
Community & Government Services
Baffin Region,Government of Nunavut
P.O.Box 379,Pond Inlet, X0A 0S0
Ph-867 899 7314
Fax-867 899 7328
E-mail: broy@gov.nu.ca

Copy to : Patricio Fuentes, Regional Projects Manager, GN-CGS, Baffin Region
Johnathan Palluq, Assistant Regional Director, GN-CGS, Baffin Region
Timoon Toonoo, Regional Director,GN-CGS, Baffin Region
Steven Burden, P.Eng., Trow Associates Inc.
Matthew Hamp, Project officer, GN-CGS
Akeego Ikkidluak, SAO, Hamlet of Kimmirut

Appendix-A

Municipality of Kimmirut
Box 120, Kimmirut, NU X0A 0N0
Ph. (867) 939-2247 Fx. (867) 939-2045

Facsimile Transmittal

To: Bhabesh Fax: 867 1899 1328

From: Akeego Ikkidluak Date: Dec 16, 2009

Re: Pages: 2
(Number of pages sending including cover)

CC:

□ **Urgent** □ **For Review** □ **Please Comment** □ **Please Reply** □ **Please Recycle**

CONFIDENTIAL

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Municipality of Kimmirut
Box 120, Kimmirut, NU X0A 0N0
Ph. (867) 939-2247 Fx. (867) 939-2045

December 16, 2009

Bhabesh Roy, M.A.Sc., P. Eng.
Community Government Services
Baffin Region
Government of Nunavut
P.O. Box 379
Pond Inlet, Nu
X0A 0S0

Dear Bhabesh,

The Wetlands of the proposed Sewage Lagoon discharge into a small lake before Soper Lake where natural treatment will continue. There is significant dilution from runoff from Lake Fundo. The wetlands of the Proposed Lagoon end into Soper Lake more than two km away. The Community people fish in Soper Lake.

Akeego Ikkidluak
Senior Administrative Officer

Appendix-B

Trow

Trow Associates Inc.
154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Telephone: (613) 225-9940
Facsimile: (613) 225-7337
E-mail: ottawa@trow.com
Web Site: www.trow.com

Reference: OTCD00018881A

December 16, 2009

Mr. Bhabesh Roy, M.A.Sc., P.Eng.
Municipal Planning Engineer
Community & Government Services
Baffin Region, Government of Nunavut
P.O. Box 379
Pond Inlet, NU X0A 0S0

Via Facsimile:
867-899-7328

Effluent Criteria at the Compliance Point
Kimmirut Sewage Lagoon

Dear Mr. Roy:

Further to the conference call on February 13th, 2009 regarding the Water Licence for the Kimmirut Sewage Lagoon, and subsequent comments received on our first submission, the following outlines our recommendations with regards to the location of the compliance point, the effluent criteria for the Kimmirut enhanced sewage treatment facility and the hydrological study of the wetlands.

Compliance Point Location

As per the Hamlet of Kimmirut's Water Licence 3BM-KIM0911, we proposed that the compliance point for the sewage treatment system be at the outlet of the lower lagoon, as this constitutes the last point of operator control over the facility. The rationale for the effluent criteria at the compliance point is based on the Guidelines for Discharge for Treated Municipal Wastewater in the Northwest Territories 1992, note 12 for table 4.1 which states "where wetlands are used as part of the treatment system, limits shall be chosen to suit the point of measurement and control". This point is interpreted to mean the effluent criteria shall take into consideration the additional treatment the effluent will receive in the wetlands when determining the effluent criteria at the compliance point. Therefore, the effluent criteria at the compliance point will be set by determining the effluent strength allowable at the compliance point that will result in the effluent strength required at the end of the wetlands.

Effluent Criteria

To determine the recommended effluent criteria at the compliance point, the following process was undertaken to account for runoff from the surrounding watershed:

1. Set criteria for the effluent at the end of the enhanced sewage treatment facility (i.e. the end of the wetlands).
2. Based on the removal rates of BOD_5 and TSS from the Kimmirut Wetlands Planning Study, determine the maximum concentrations for the effluent released from the lower lagoon (the compliance point).

3. Determine the average yearly precipitation.
4. Determine the reduction in the precipitation for various return periods to account for dry years.
5. Determine the percentage of precipitation which contributes to the runoff, i.e. the runoff coefficient.
6. Determine the dilution for the effluent based on the various return periods and runoff coefficient.
7. Recommend the effluent criteria based on the above calculations.

Step 1 – Set Effluent Criteria at the end of the Enhanced Wastewater Treatment Facility

We have assumed an effluent criteria of 45 mg/L of BOD_5 and 45 mg/L total suspended solids (TSS) at the end of the wetlands, based on the reference to similar criteria at the end of wetlands for the Cape Dorset facility during the conference call.

Step 2 – Calculate Maximum Effluent Concentrations for the Compliance Point

The Kimmirut Wetlands Planning Study prepared for this project estimated a quality of effluent at the end of the wetlands of 38 mg/L BOD_5 and 39 mg/L TSS, based on an influent quality of 230 mg/L and 245 mg/L BOD_5 and TSS respectively. Assuming a proportional removal rate to achieve the 45 mg/L and 45 mg/L effluent quality criteria, the influent entering the wetlands would require a level of 272 mg/L BOD_5 and 288 mg/L TSS.

Step 3 – Determine Yearly Precipitation Rates

When setting effluent criteria at the end of the sewage lagoon, consideration must be given to dilution through runoff. As Climatic Normals are not available for Kimmirut, precipitation records for Iqaluit were used. Based on the Climatic Normals for Iqaluit, the average annual precipitation for Kimmirut is estimated at 412 mm.

Step 4 – Determine Annual Precipitation for Various Return Periods

In determining the rate of dilution from precipitation, consideration must be given to yearly variance in the total precipitation.

Trow's original recommendation for adjusting the effluent criteria in our February 2009 letter was to reduce the precipitation rates to a 1:20 year minimum precipitation event, and provide an allowance for a non conformance to be reviewed based on precipitation records. In response to comments received, Trow suggests a 1:40 year event be used to calculate the dilution factor and the clause regarding reviewing of precipitation records be removed.

In the *"City of Iqaluit Raw Water Supply and Storage Review"* completed by Trow in 2004 an analysis was performed on precipitation data as recorded at the Iqaluit climate station from 1950 to 2001 to quantify the variability in yearly total precipitation. The percent of years with total precipitation less than, or equal to, the particular annual total precipitation were calculated. Results of this analysis are presented in the table below.

Table 1: Probability analysis on total yearly precipitation data from 1950 to 2001

Cumulative Percent of Years with Total Precipitation < X mm (%)	Total Annual Precipitation (mm)	Cumulative Percent of Years with Total Precipitation < X mm (%)	Total Annual Precipitation (mm)
100.0	645.1	48.9	412.8
97.8	636.7	46.8	412.7
95.7	613.0	44.6	401.1
93.6	565.1	42.5	397.1
91.4	538.4	40.4	396.0
89.3	529.6	38.2	386.1
87.2	523.1	36.1	379.4
85.1	501.0	34.0	377.8
82.9	481.4	31.9	366.9
80.8	474.7	29.7	360.4
78.7	474.0	27.6	356.5
76.5	469.2	25.5	350.5
74.4	467.5	23.4	347.6
72.3	466.2	21.2	345.6
70.2	458.0	19.1	338.5
68.0	454.1	17.0	338.4
65.9	442.8	14.8	335.4
63.8	442.2	12.7	335.3
61.7	436.8	10.6	334.1
59.5	431.1	8.5	330.0
57.4	430.7	6.3	313.0
55.3	429.0	4.2	306.9
53.1	428.7	2.1	294.5
51.0	426.6	0.0	266.3

A 5-year return represents an event for which there is a probability of 20% that a lower annual precipitation total could be observed in any given year. Similarly, there is a probability of 1% that less precipitation than the 100-year return total annual precipitation will occur in any given year. Return frequencies for annual precipitation were established based on 5-year, 20-year, 40-year and 100-year return periods and are listed in table below.

Table 2: Total Precipitation for Return Frequencies

Return Period	Total Yearly Precipitation
5-year (1:5)	340 mm
20-year (1:20)	310 mm
40-year (1:40)	295 mm
100-year (1:100)	280 mm

Step 5 – Determine the Runoff Coefficient for the Watershed

In addition, in reviewing our previous recommendations and background documentation, it was realized that dilution rates should also be adjusted to reflect runoff rates from arctic watersheds. As part of the *"City of Iqaluit Raw Water Supply and Storage Review"* the average yearly runoff ratios for the Apex River Basin were summarized and are shown in the table below. However, these ratios exhibit significant year-to-year variability, attributable to a wide range of factors including, but not limited to: total yearly snowfall, total yearly rainfall, temperature extremes, total degree days above 0 degrees and receipt of incoming solar radiation.

Table 3 - Yearly Runoff Ratios for the Apex River Basin

Year	Total Annual Flow (m^3)	Total Annual Precipitation (m^3)	Runoff/Precip Ratio
1982	11,927,000	25,552,800	0.467
1983	13,119,000	23,166,000	0.566
1985	21,000,000	28,161,900	0.746
1986	27,336,000	27,769,950	0.984
1988	20,292,000	19,544,850	1.038
1989	14,200,000	23,230,350	0.611
1990	21,700,000	22,101,300	0.982
1991	14,800,000	21,083,400	0.702
1992	14,000,000	19,796,400	0.707
1994	19,600,000	21,463,650	0.913
		Average	*0.772*

The average runoff ratio for the Apex River was calculated to be 0.77 with a minimum of 0.47 and a maximum of 1.038. For the purpose of calculating effluent criteria the average runoff ratio of 0.77 will be used.

Step 6 – Determine the Dilution of the Effluent

The average annual precipitation which falls within the drainage area of the enhanced sewage disposal system is 48,108 m^3. Based on a runoff coefficient of 0.77, the total runoff entering the Enhanced Wastewater Treatment Facility (lagoons) will be 37,043 m^3. The projected sewage generation rate for the year 2028 is 33,195 m^3, therefore the average dilution rate of the effluent is 47%. This rate varies during the time of discharge between approximately 44% and 52%.

The following table summarizes the estimated minimum yearly precipitation for a 5- year, 20- year, 40- year and 100- year return period, and the corresponding dilution rates based on the these minimum yearly precipitation rates.

Table 4: Average Dilution Rates

Return period	Estimated Precipitation (mm)	Percentage of Average Precipitation	Average Dilution Rate	Range of Dilution Rates
Average	412		48%	44% - 52%
5- year	340	82.5%	52%	49% - 57%
20- year	310	75.25%	54%	51% - 59%
40- year	295	71.6%	55%	52% - 60%
100- year	280	68%	57%	54% - 62%

Based on the estimated required effluent quality at the end of the lagoon of 272 mg/L and 288 mg/L of BOD_5 and TSS respectively, to meet the goal of 45 mg/L BOD_5 and 45 mg/L TSS and the dilution rates listed above, the following tables summarizes the required effluent criteria which will have to be met at the compliance point, based on the average precipitation and the 5 year, 20 year and 100 year return period minimum precipitation.

Table 5: Diluted BOD_5 Limits for Return Periods

Return Period	Average Dilution	Average BOD_5	Range of BOD_5
Average	48%	130 mg/L	120 - 141 mg/L
5- year	52%	141 mg/L	133 - 155 mg/L
20- year	54%	147 mg/L	139 - 160 mg/L
40- year	55%	150 mg/L	141 – 163 mg/L
100- year	57%	155 mg/L	147 - 169 mg/L

Table 6: Diluted TSS Limits for Return Periods

Return Period	Average Dilution	Average TSS	Range of TSS
Average	48%	138 mg/L	127 - 150 mg/L
5- year	52%	150 mg/L	141 - 164 mg/L
20- year	54%	156 mg/L	147 - 170 mg/L
40- year	55%	158 mg/L	150 - 173 mg/L
100- year	57%	164 mg/L	156 - 179 mg/L

Step 7 – Recommendations Regarding Effluent Criteria

We recommend the effluent criteria at the compliance point (the discharge of the Lower Lagoon) be based on a dilution factor for the minimum precipitation for a 40 year return period In recognizing the variance of runoff during the discharge period, we recommend the discharge criteria be based on the average of the three samples taken during the discharge period. It should also be recognized that the dilution rates are based on historical data for Iqaluit.

In summary, we recommend the water licence adopt the following clauses:

1. The performance of the Enhanced Sewage Disposal System shall be monitored at the outlet of the Lower Lagoon, KIM-6 and KIM-7.

2. All effluent discharged from the Enhanced Sewage Disposal Facility at the Monitoring Program Stations KIM-6 and KIM-7 shall not exceed the following effluent quality limits based on an average of samples taken throughout the discharge period, put forth in the Water Licence 3BM-KIM0911:

Table 7: Effluent Discharge Criteria

Parameter	Maximum Average Concentration
BOD_5	150 mg/L
Total Suspended Solids (TSS)	160 mg/L
Faecal Coliforms	1×10^6 CFU/100mL
Oil and Grease	No visible sheen
pH	Between 6 and 9

Hydrological Study

As part of the February 13th, 2009 conference call, Trow indicated that we would review the potential of determining a dilution factor for the wetlands. As detailed above, there are no records of precipitation available for Kimmirut, therefore any calculation of dilution would have to be based on several assumptions. These assumptions and the yearly differences in precipitation rates would introduce enough uncertainty to the calculated dilution rates to make them ineffective in measuring the performance of the wastewater treatment system.

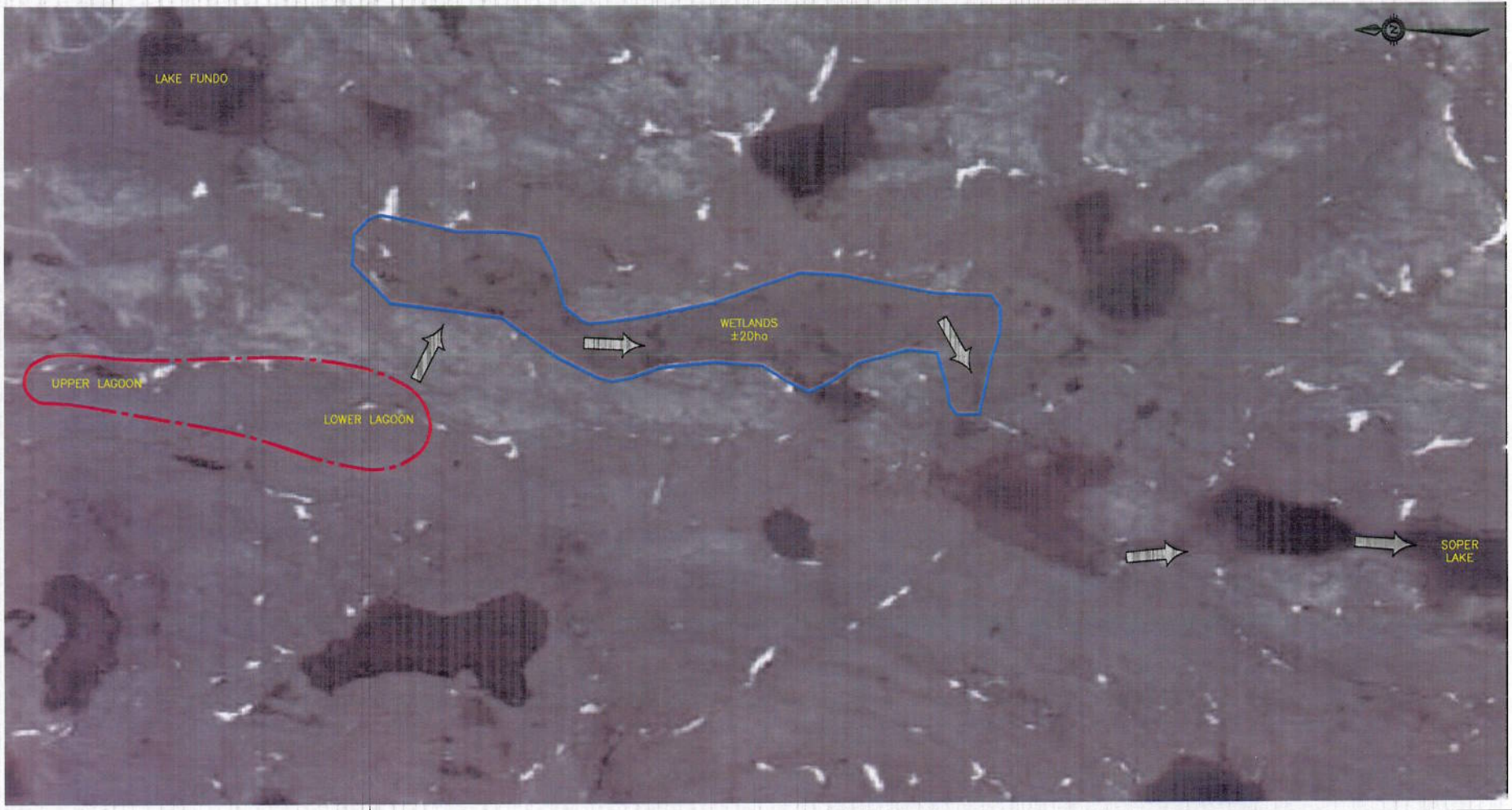
Should you have additional questions or require additional information please do not hesitate to contact Steven Burden at 613-225-9940 ext. 257.

Yours truly,

Trow Associates Inc.

Stephen A. Douglas
Senior Designer
Infrastructure Services

Steven L. Burden, P.Eng.
Project Manager
Infrastructure Services



LIMIT OF WETLANDS

LAGOONS WATERSHED

DIRECTION OF FLOW

Trow Associates Inc.
154 Colonnade Road South
Ottawa, Ont. K2E 7J5
PHONE: (613) 225-9940
FAX: (613) 225-7337

scale: 1:8000	CLIENT: GOVERNMENT OF NUNAVUT	project no. OTCD00018881A
date: 14/12/09	TITLE: DRAINAGE LOCATION PATH	FIG A
drawn by: M.BERRIGAN		

Appendix-C

Spill Contingency Plan

Municipality Of Kimmirut

Draft

2009

Table of Contents

1.0 Introduction

Hamlet of Kimmirut in Nunavut is to prepare a Spill Response Plan (SRP) as part of the permitting process for the ongoing management of the Hamlet's aggregate sources. This SRP also demonstrates the Hamlet's stewardship in environmental management.

The purpose of the SRP is to address potential environmental spill incidents that may occur during the routine operation of the borrow pits. The SRP is designed to be protective of the local natural environment and the new aggregate sources.

The SRP includes a review of appropriate government acts and regulations, the identification of foreseeable spill scenarios, spill response procedures and general health, safety and emergency response requirements necessary when conducting activities that may require contact with the subsurface materials. The SRP does not replace any Health & Safety protocols, procedures, etc. already established by the Hamlet but rather is intended to be complimentary to existing protocols.

Situations may arise during the site work that are beyond the scope of the safety procedures stated in this document. In such a situation, it may be necessary to stop on-site work until a revised procedure or SRP is prepared to reflect the changing conditions.

It is recommended that all persons involved with on-site operations read the SRP. If there are any questions regarding any aspect to this document, individuals are encouraged to contact CGS-Pond Inlet Office at 867 899 7314 for additional information or clarification.

2.0 Site Description

The aggregate deposits in the vicinity of the Hamlet, for which this SRP was developed, are shown in Appendix A. The locations are best described as borrow pits that contain no permanent or semi-permanent structures. As such, no potential contaminants are likely to be stored at the pits.

The Hamlet of Kimmirut does not currently have a long term granular source. The Granular Resource Management – 12 Communities, Baffin Region, Nunavut, prepared by Trow in 2004, referenced a aggregate study which was completed in 2001 by Fergus on, Simik Clark, Engineers and Architects for the Government of Nunavut. The study identified 6 existing deposits and 2 new deposits, and concluded the Hamlet had potential sources to meet their needs for 10 to 20 years. Deposit 1 is the largest one but not currently accessible. It needs an access road with two small bridges and the construction cost is too high.

This new Deposit No. 2A has a report potential yield of 35,000 to 50,000 m^3 of aggregate. The new deposit 2A is located one km from the Arena site and 750m up the sloping ground in deposit No.6. This deposit is at higher elevation and access is possible without crossing any water course. This is a significant deposit that is well worth the effort of constructing a new road to gain access to this area. Design and Technical specifications have been completed for this access road.

The Deposit 2 has been identified as the potential source to meet the current demand with minimum cost of construction of an access road. A detailed Map of locating all the deposits is attached.

3.0 Regulations

The Environmental Protection Act (R-068-93) requires that all spill response plans include:

1. The name, address and job title of the owner or person in charge, management or control of the facility;
2. The name, job title and 24-hour telephone number for the person(s) responsible for activating the spill response plan;
3. A description of the facility, a description of the type and amount of contaminants normally stored at the facility and a site map of the facility;
4. The steps to be taken to report, contain, clean up and dispose of contaminants in the case of a spill;
5. The means by which the spill response plan is activated;
6. A description of the training provided to employees to respond to a spill;
7. An inventory of and the location of response and clean-up equipment available to implement the spill response plan;
8. The date the spill response plan was prepared.

4.0 Contacts & Regulatory Authorities

The following table includes the contact information for the persons responsible for the facilities. The persons listed below should be contacted in the event of a spill at any of the facilities under their supervision.

Table 1: Municipal Contacts

In each instance that a spill is identified, the Hamlet of Kimmirut and the Emergency Spill Hotline should be contacted as soon as possible. A NT-NU Spill Report Form (Appendix B) should also be completed and faxed to the Emergency Spill Hotline. The necessity to contact the other agencies will be contingent upon direction from the Emergency Spill Hotline.

Hamlet of Hamlet of Kimmirut: Phone: 867-939-2247 Fax: 867-939-2002

Emergency Spill Hotline: Phone: 867 920-8130, Fax 867 873-6924

In addition to the local contacts described above, the following table summarizes the additional regulatory authorities that have a vested interest in the event of a spill.

Table 1

Additional Agencies

Agency	Legislation	Contact Phone #
Nunavut Water Board (NWB)	Nunavut waters and surface right tribunal Act	(867) 360-6338 Fax- (867) 360-6389
Nunavut Impact Review Board (NIRB)	Nunavut Land Claims *Agreement Act*	(867) 983-2593
Environment Canada (EC)	Canadian environmental Protection Act, 1999)	(867) 975-4464
Transport Canada (Coast Guard)	Transportation of Dangerous Good Act	(867) 979-5269 (867)979-5260 Fax-(867)979-4260
Department of Fisheries and Oceans)	Fisheries Act	

5.0 Potential Contaminants and Spill Scenarios

Potential spill scenarios are dependent on the types and volumes of materials that are being used on the sites and the activities being carried out. For the purpose of this SRP, spill sizes are described as small (<10 litres), medium (>10 litres and <100 litres) or large (>100 litres).

The materials (potential contaminants) that are anticipated to be used on the site include gasoline, diesel fuel, hydraulic oil, motor oil and other lubricants, antifreeze and coolants. Spills may be the result of any of the following occurrences:

1. Leaks or ruptures of storage tanks;
2. Valve or line failure in systems, vehicles or operating equipment;
3. Heat expansion due to overfilling;
4. Improper storage;
5. Vehicular accidents;
6. Spill during transfer of liquid; and/or,
7. Vandalism.

6.0 Reportable Spill Quantities

In the event of a spill, the following table is to be used as a guide to determine if the spill should be reported to the proper authorities. Any spilled quantities that exceed the specified amounts must be reported to the **Emergency Spills Hotline**. Spills of any quantity that occur near or into fish-bearing waters or sensitive environment, wildlife or habitat must be reported. In addition, spills of any quantity that pose an imminent threat to human health or life or listed species at risk or critical habitat must also be reported. It is recommended that any spill of significant size be reported and the advice received should be followed.

Table 2

Reportable Quantities[1]

Item	TDGA2Class	Contaminant	Amount Spilled
1	2	Explosives	Any Amount
2	2.1	Compressed Gas (Flammable)	Any amount of gas from containers with capacity greater than 1000kg
3	2.2	Compressed Gas (Non Corrosive, non flammable)	Any amount of gas from containers with capacity greater than 1000kg
4	2.3	Compressed Gas (Toxic)	Any Amount
5	2.4	Compressed Gas (Corrosive)	Any Amount
6	3.1,3.2,3.3	Flammable liquid	100L
7	4.1	Flammable Solids	25kg
8	4.2	Spontaneously flammable Solids	25kg
9	4.3	Water rectantant Solids	25kg
10	5.1	Oxidizing substances	50L or 50kg
11	5.2	Organic Peroxides	1L or 1kg
12	6.1	Poisonous Substances	5L or 5kg

Table 2 (Continued)

Item	TDGA	Contaminant	Amount Spilled
13	6.2	Infections Substances	Any Amount
14	7	Radioactive	Any Amount
15	8	Corrosive substances	5L or 5kg
16	9.1 (in Part)	Misc. products or Substances excluding PCB mixtures	50L or 50kg
17	9.2	Environmentally Hazardous	1L or 1kg
18	9.3	Dangerous wastes	5L or 5kg
19	9.1 (in Part)	PCB Mixtures of 5 or More parts per Million	0.5L or 0.5kg
20	None	Other Contaminants	100L or 100kg

Notes: 1) Environmental Protection Act, Consolidation of Spill Contingency Planning and Reporting Regulations

2) TDGA Class – Transportation of Dangerous Goods Class under the *Transportation of Dangerous Goods Act*.

7.0 Spill Response Procedures

The following section describes the appropriate spill response procedures that should be followed in the event of a spill to various media (bedrock, gravel, soil, water, ice or snow).

7.1. Spills on Land

For spills on land (soil, gravel, sand, rock, and vegetation), the following procedure should be followed;

1 Extinguish all sources of ignition (i.e., shut off engines, no smoking).

2 If possible, identify the spilled material.

3 Make sure the area is safe for entry and the spill does not represent a threat to the Health or safety of the responder or others at the spill site.

4 Assess whether the spill can be readily stopped or brought under control and if safe and possible, stop the source of the spill (i.e., plug hole, close valve, install upright container) or place tarp under spill source and build up tarp edges to contain spill.

5 If the spill is sufficiently large that it cannot be controlled with the materials at hand, the Spill should be reported immediately.

6 Stop spilled liquids from spreading or entering waterways using absorbent materials or a soil dyke down slope from the spill.

7 Contact facility supervisor and report the spill.

8 If possible with materials at hand, clean up remaining spilled material and store in a secure container for disposal. Do not flush area with water.

9 If possible, pump any contained liquid into drums.

10 Complete a Spill Reporting Sheet.

11 **Contact: Emergency Spill Hotline: Phone: 867 920-8130, Fax 867 873-6924** for additional advice.

7.2. Spills on Water

For spills on water, the following procedure should be followed

1 Extinguish all sources of ignition (i.e., shut off engines, no smoking).
2 If possible, identify the spilled material.
3 Make sure the area is safe for entry and the spill does not represent a threat to the Health or safety of the responder or others at the spill site.
4 Assess whether the spill can be readily stopped or brought under control and if safe and possible, stop the source of the spill (i.e., plug hole, close valve, upright container).
5 If the spill is sufficiently large that it cannot be controlled with the materials at hand, spill report the spill immediately.
6 Use sorbant booms to contain spill for recovery, place sorbant sheets on water within boomed perimeter. For narrow waterways, place one or more booms across the Waterway, downstream of
the spill location and anchor boom ends on each bank. Store saturated sorbant sheets and booms in drums for disposal.
7 Contact facility supervisor and report the spill.
8 If possible with materials at hand, clean up remaining spilled material and store in a secure container.
9 Complete a Spill Reporting Sheet.
10 **Contact: Emergency Spill Hotline: Phone: 867 920-8130, Fax 867 873-6924** for additional advice.

7.3. Spills on Snow and Ice

Spills on ice present the potential for immediate access of the contaminants to water therefore, immediate response to the spill is essential. For spills on snow and ice, the following procedure should be followed:

1 Extinguish all sources of ignition (i.e., shut off engines, no smoking).

2 If possible, identify the spilled material.

3 Make sure the area is safe for entry (i.e., ice thickness) and the spill does not represent a threat to the health or safety of the responder or others at the spill site.

4 If the spill is sufficiently large that it cannot be controlled with the materials at hand, the Spill should be reported immediately.

5 Assess whether the spill can be readily stopped or brought under control and if safe and possible, stop the source of the spill (i.e. plug hole, close valve, install upright container) or place tarp under spill source and build up tarp edges to contain spill.

6 Stop spilled liquids from spreading or entering waterways using absorbent materials or a snow/soil dyke.

7 Contact facility supervisor and report the spill.

8 If possible with materials at hand, clean up remaining spilled material and store in a secure container (i.e., drum, polyethylene bags). Store impacted snow in drums for disposal.

9 **Contact: Emergency Spill Hotline: Phone: 867 920-8130, Fax 867 873-6924** for additional advice.

7.4. Additional Spill Delineation/Monitoring

As a result of a large spill in which not all of the spilled material can be readily recovered as described above, additional delineation in the form of a subsurface investigation (i.e., test pits, boreholes, monitoring wells) may be required to determine the lateral and vertical extents of the impacts to the subsurface soil and/or groundwater. The additional delineation/monitoring information will be used to develop an appropriate remediation plan. In such cases, a qualified environmental consultant should be retained to provide advice with respect to how to proceed with the additional assessment.

8.0 Spill Kit and Training Requirements

The following section presents the recommended minimum requirements for the content and number of spill kits that should be present.

8.1. Spill Kit

Each spill kit should be inspected regularly to ensure that it contains, as a minimum, the following:

a. 1 – 205 litre, open top steel drum with a lid, bolting ring and gasket;
b. 1 Spark proof shovel;
c. 1 package of 10 disposable 5 mil polyethylene bags (approx. 65 cm x 100 cm);
d. 4 – 12.5 cm (approx. 5") x 3 m (approx. 10') sorbant (oil-absorbing) booms;
e. 10 kg bag of sorbant particulate;
f. 1 bail of 50 cm x 50 cm (approx.) sorbant sheet (100 Sheets/bail);
g. 1 x 5m x 5m approx. plastic tarp;
h. 2 pairs of oil resistant gloves; and,
i. 2 pairs of splash protective goggles.

8.2. Additional Spill Response Supplies

In addition to the materials contained in the spill kits, an inventory of the following supplies should be available for use if required.

a. 10 – 205 litre, open top steel drum with a lid, bolting ring and gasket;
b. 2 Spark proof shovels;
c. 5 packages of 10 disposable 5 mil polyethylene bags (approx. 65 cm x 100 cm);
d. 10 – 12.5 cm x 3 m sorbant (oil-absorbing) booms;
e. 5 x 10 kg bags of sorbant particulate;
f. 5 bails of 50 cm x 50 cm (approx.) sorbant sheet (100 Sheets/bail);

g. 2 pairs of oil resistant gloves; and,

h. 2 pairs of splash protective goggles.

8.3. Spill Kit Locations

The spill kit, with the exception of the shovel, can be contained within the 205 L drum which should be sealed securely to protect the contents. The drum should also be accessible without the use of tools (i.e., bolt ring only finger tight). The bolt ring should be inspected regularly to ensure that it turns freely and lubricated if it does not. At least one spill kit should be clearly identified and present on the site when a pit is being actively worked.

8.4. Training

To ensure the effectiveness of the SRP the following actions should be followed:

1 The SRP should be up dated as required and reviewed, as a minimum, on an annual basis.

2 The SRP should be distributed to the personnel on the site.

3 The personnel should be informed of the locations of all potentially hazardous materials and their associated Material Safety Data Sheets (MSDS).

4 The personnel should be trained in the use of the MSDS and the techniques and materials used to contain and remediate spilled materials.

5 The personnel should be informed as to the importance of first response with respect to the protection of human health and safety, the environment, property, wildlife and the Ecosystem by reducing the impact of spills.

It is noted that **Municipal Training Organization (MTO)** is conducting annual training program to all the municipal staffs on different activities. The Municipal foremen and Operators are having this opportunity to get trained sometimes in their own Region or different Regions within Nunavut. Their Program is attached in **Appendix-C.**

9.0 General Safety Practices and Site Rules

The following is a list of site rules that should be followed to maintain safe working conditions during a spill response:

1. Eating, drinking, chewing gum and smoking are prohibited in contaminated or potentially contaminated areas, or where the possibility for the transfer of contamination exists. This would include areas of active excavation.

2. Personnel who have worked on-site shall wash their hands and face thoroughly with soap and water and remove themselves from the spill area prior to eating, drinking or smoking.

3. All field crew workers should be aware of potentially dangerous situations that they should avoid (i.e. the presence of strong, irritating or nauseating odours). Field crew workers should also be familiar with the physical characteristics of the site including:

1. wind direction in relation to areas of known contamination;
2. accessibility to equipment and vehicles;
3. communications; and,
4. site access.

Table 3

Outside Emergency Contacts

Agency	Function	Phone Number
Ambulance	Medical Emergency	(867) 979-4422
Hospital	Medical emergency	(867) 979-7350
Fire	Fire, accident or rescue	(867) 979-4422
Police	Security, vandalism	(867) 979-5211
Hamlet of Kimmirut	On site-Supervisor	(867) 939-2247

10.0 Closure

This Spill Response Plan has been prepared for information purposes for the use of the Hamlet of Kimmirut during construction activities scheduled to take place during the construction season. It does not replace, nor is intended to replace, the general provision of the applicable Federal and Territorial statutes regarding workplace safety or any protocols previously established by Hamlet of Kimmirut. Instead, it may be used to augment any existing Spill Response Plans.

Reference: Spill Response Plan on Aggregate Deposits, Clyde River, Nunavut, by TROW Associates Inc. 2009.

Appendix –A

Location Map of Deposit 2A

KEY PLAN
LEGEND
PERMIT TO PRACTICE
TROW ASSOCIATES INC.
PERMIT NUMBER: P 184
BENCH MARK
BM 1
ELEV. = 102.72m
KIMMIRUT
KIMMIRUT AIRPORT
EXISTING SEWAGE TREATMENT FACILITY
EXISTING LANDFILL SITE
DEPOSIT 1A
DEPOSIT 1
DEPOSIT 2
WATER SUPPLY PUMPING STATION
PROPOSED LANDFILL
PROPOSED SEWAGE LAGOON
NEW DEPOSIT 2A
DEPOSIT 2A
DEPOSIT 3
DEPOSIT 5
DEPOSIT 6
Trow Associates Inc.
GOVERNMENT OF NUNAVUT
KIMMIRUT WASTEWATER LAGOON
TOPOGRAPHIC MAP
T-1

2/2

Appendix –B
Spill Contingency Plan

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

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

REPORT LINE USE ONLY

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

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

REPORT LINE USE ONLY

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

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

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

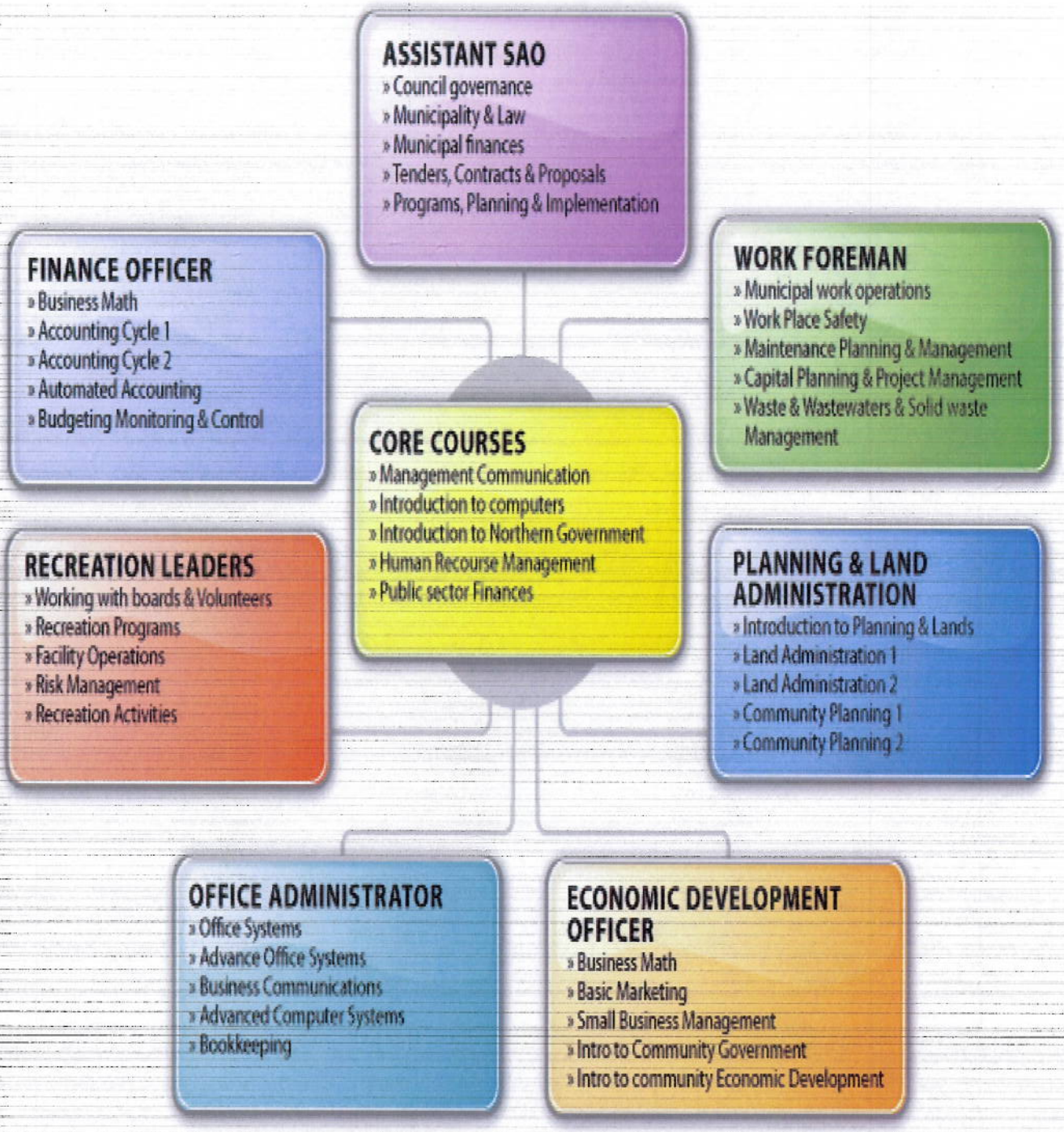
Instructions for Completing the NT-NU Spill Report Form

This form can be filled out electronically and e-mailed as an attachment to spills@gov.nt.ca. Until further notice, please verify receipt of e-mail transmissions with a follow-up telephone call to the spill line. Forms can also be printed and faxed to the spill line at 867-873-6924. Spills can still be phoned in by calling collect at 867-920-8130.

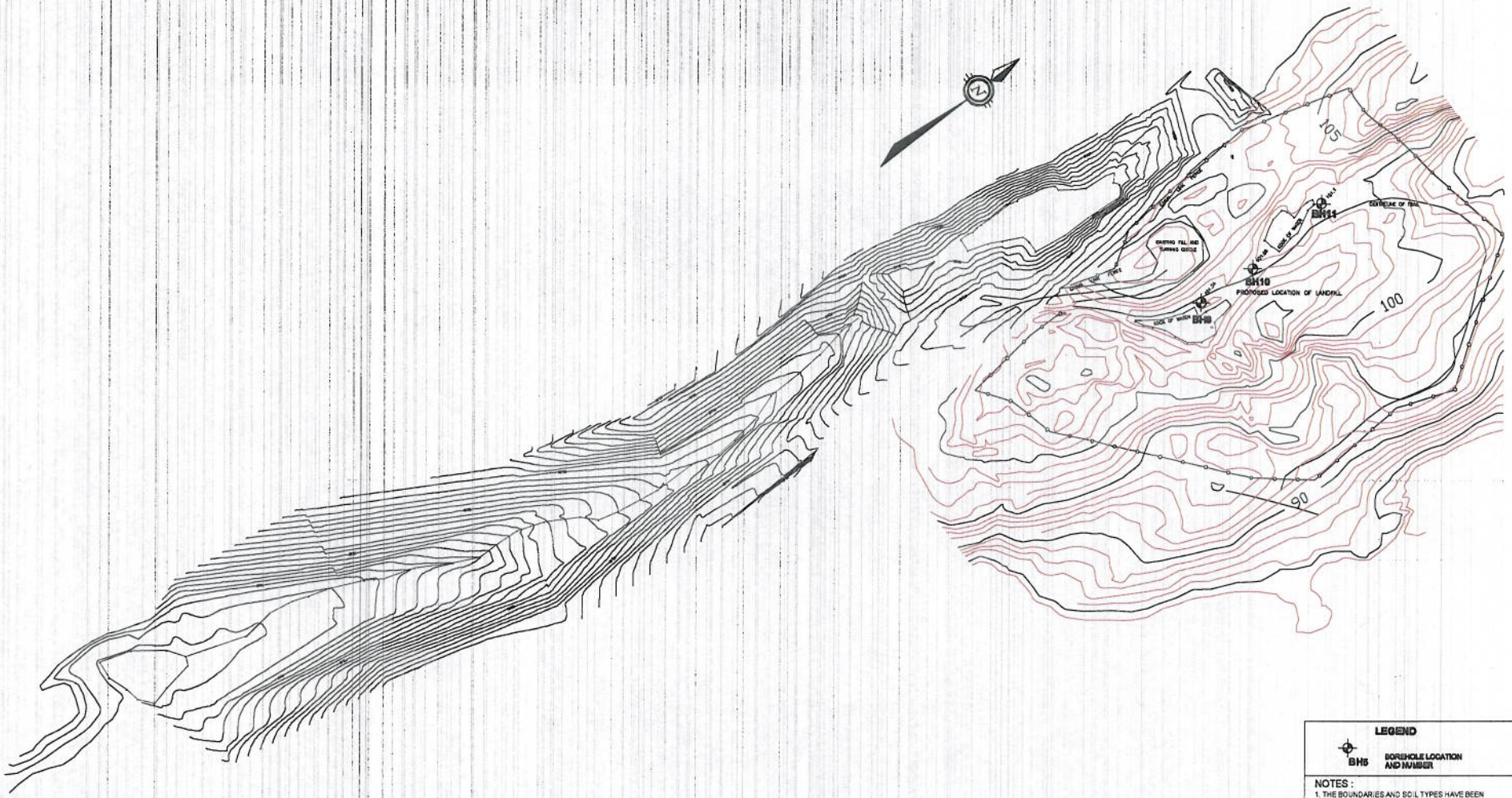
A. Report Date/Time	The actual date and time that the spill was reported to the spill line. If the spill is phoned in, the Spill Line will fill this out. **Please do not fill in the Report Number**: the spill line will assign a number after the spill is reported.
B. Occurrence Date/Time	Indicate, to the best of your knowledge, the exact date and time that the spill occurred. Not to be confused with the report date and time (see above).
C. Land Use Permit Number /Water Licence Number	This only needs to be filled in if the activity has been licenced by the Nunavut Water Board and/or if a Land Use Permit has been issued. Applies primarily to mines and mineral exploration sites.
D. Geographic Place Name	In most cases, this will be the name of the city or town in which the spill occurred. For remote locations – outside of human habitations – identify the most prominent geographic feature, such as a lake or mountain and/or the distance and direction from the nearest population center. **You must include the geographic coordinates** (Refer to Section E).
E. Geographic Coordinates	This only needs to be filled out if the spill occurred outside of an established community such as a mine site. Please note that the location should be stated in degrees, minutes and seconds of Latitude and Longitude.
F. Responsible Party Or Vessel Name	This is the person who was in management/control/ownership of the substance at the time that it was spilled. In the case of a spill from a ship/vessel, include the name of the ship/vessel. Please include full address, telephone number and e-mail. Use box K if there is insufficient space. **Please note that, the owner of the spilled substance is ultimately responsible for any spills of that substance, regardless of who may have actually caused the spill.**
G. Contractor Involved?	Were there any other parties/contractors involved? An example would be a construction company who is undertaking work on behalf of the owner of the spilled substance and who may have contributed to, or directly caused the spill and/or is responding to the spill.
H. Product Spilled	Identify the product spilled; most commonly, it is gasoline, diesel fuel or sewage. For other substances, avoid trade names. Wherever possible, use the chemical name of the substance and further, identify the product using the four digit UN number (eg: UN1203 for gasoline; UN1202 for diesel fuel; UN1863 for Jet A & B)
I. Spill Source	Identify the source of the spill: truck, ship, home heating fuel tank and, if known, the cause (eg: fuel tank overfill, leaking tank; ship ran aground; traffic accident, vandalism, storm, etc.). Provide an estimate of the extent of the contaminated/impacted area (eg: 10 m^2)
J. Factors Affecting Spill	Any factors which might make it difficult to clean up the spill: rough terrain, bad weather, remote location, lack of equipment. Do you require advice and/or assistance with the cleanup operation? Identify any hazards to persons, property or environment: for example, a gasoline spill beside a daycare centre would pose a safety hazard to children. Use box K if there is insufficient space.
K. Additional Information	Provide any additional, pertinent details about the spill, such as any peculiar/unique hazards associated with the spilled material. State what action is being taken towards cleaning up the spill; disposal of spilled material; notification of affected parties. If necessary, append additional sheets to the spill report. Number the pages in the same format found in the lower right hand corner of the spill form: eg. "Page 1 of 2", "Page 2 of 2" etc. **Please number the pages to ensure that recipients can be certain that they received all pertinent documents.** If only the spill report form was filled out, number the form as "Page 1 of 1".
L. Reported to Spill Line by	Include your full name, employer, contact number and the location from which you are reporting the spill. Use box K if there is insufficient space.
M. Alternate Contact	Identify any alternate contacts. This information assists regulatory agencies to obtain additional information if they cannot reach the individual who reported the spill.
N. Report Line Use Only	**Leave Blank**. This box is for the **Spill Line's use only**.

Appendix-C

MTO Training Program


ASSISTANT SAO
» Council governance
» Municipality & Law
» Municipal finances
» Tenders, Contracts & Proposals
» Programs, Planning & Implementation
FINANCE OFFICER
» Business Math
» Accounting Cycle 1
» Accounting Cycle 2
» Automated Accounting
» Budgeting Monitoring & Control
WORK FOREMAN
» Municipal work operations
» Work Place Safety
» Maintenance Planning & Management
» Capital Planning & Project Management
» Waste & Wastewaters & Solid waste Management
CORE COURSES
» Management Communication
» Introduction to computers
» Introduction to Northern Government
» Human Recourse Management
» Public sector Finances
RECREATION LEADERS
» Working with boards & Volunteers
» Recreation Programs
» Facility Operations
» Risk Management
» Recreation Activities
PLANNING & LAND ADMINISTRATION
» Introduction to Planning & Lands
» Land Administration 1
» Land Administration 2
» Community Planning 1
» Community Planning 2
OFFICE ADMINISTRATOR
» Office Systems
» Advance Office Systems
» Business Communications
» Advanced Computer Systems
» Bookkeeping
ECONOMIC DEVELOPMENT OFFICER
» Business Math
» Basic Marketing
» Small Business Management
» Intro to Community Government
» Intro to community Economic Development

Appendix-D



LEGEND

BH5 — BOREHOLE LOCATION AND NUMBER

NOTES :

1. THE BOUNDARIES AND SOIL TYPES HAVE BEEN ESTABLISHED ONLY AT BOREHOLE LOCATIONS. BETWEEN BOREHOLES THEY ARE ASSUMED AND MAY BE SUBJECT TO CONSIDERABLE ERROR.
2. SOIL SAMPLES AND ROCK WILL BE RETAINED IN STORAGE FOR THREE MONTHS AND THEN DESTROYED UNLESS THE CLIENT ADVISES THAT AN EXTENDED TIME PERIOD IS REQUIRED.
3. TOPSOIL QUANTITIES SHOULD NOT BE ESTABLISHED FROM THE INFORMATION PROVIDED AT THE BOREHOLE LOCATIONS.
4. BOREHOLE ELEVATIONS SHOULD NOT BE USED TO DESIGN CIVIL WORKS.
5. THIS DRAWING FORMS PART OF THE REPORT PROJECT NUMBER AS REFERENCED AND SHOULD BE USED ONLY IN CONJUNCTION WITH THIS REPORT.
6. BASE PLAN OBTAINED FROM TROW ASSOCIATES INC. PROJECT NO. OTCD0018881A, DATED AUGUST 1, 2007

KEY PLAN

LEGEND

BENCH MARK

HORIZONTAL 1:1000

No.	DESCRIPTION	DATE	BY	APP'D

REVISIONS

Trow Associates Inc.
154 COLONNADE ROAD SOUTH PHONE (613) 225-9640
OTTAWA, ONTARIO FAX (613) 225-7337

CLIENT: GOVERNMENT OF NUNAVUT

PROJECT: PROPOSED LANDFILL SITE KIMMIRUT

TITLE: BOREHOLE LOCATION PLAN

design by	S. AGGARWAL	project no.	OTCE0001888/9
drawn by	M. MUGENT	drawing no.	2
checked by	S. AGGARWAL		
date	21/08/2007		
scale	HORIZ. 1:1000		