



POND INLET MARINE  
INFRASTRUCTURE  
PROJECT

NUNAVUT WATER BOARD  
ANNUAL REPORT 2020

WATER LICENCE:

**8BW-PIM14821**

**CONTRACT NUMBER:** 15255-00331-07

**PROJECT NUMBER:** 15255-00331

**TA PROJECT NUMBER:** 21807

**DOCUMENT NUMBER:** TA\_NWB\_POND INLET MARINE INFRA  
PROJECT\_ANNUAL\_REPORT\_2020

**SUBMITTED BY:** TOWER ARCTIC LTD.

**SUBMITTED TO:** NUNAVUT WATER BOARD

**DATE SUBMITTED:** MARCH 31, 2021

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- A. 2020 Photographic Records
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## 1. Purpose Of The Report

This annual report has been prepared to comply with the Nunavut Water Board (NWB) License no. 8BW-PIM1821 Part B condition 1. This condition requires the licensee to provide an annual report to the Board no later than the 31st of March of the year following the calendar year being reported. The requested information by the Part B item 1 are provided in **Table 1**.

*Table 1: Table of Concordance*

Requested information	Location of the information
a. Summary report of all construction activities including photographic records before, during and after construction	Refer to section 3.2.
b. Summary report of acid rock drainage and metal leaching characterization of the borrow material to be used for construction as required under Part C, Item 1	Information provided through the Annual Report 2018 (refer to the document named TA_NWB_8DW-PIM1821_Annual_Report_2018).
c. All monitoring information required under Part H of the Licence	No reclamation and closure activity has been started.
d. A list of unauthorized discharges and a summary of follow-up action taken	Refer to section 3.5.
e. A summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year	No abandonment and restoration work occurred since the issuance of this license.
f. Any revision to approved plans and manuals as required by Part B, Item 8 submitted in the form of an addendum	Refer to section 3.4.
g. A summary of any studies or reports requested by the Board that relate to the use of Water and the deposit of Waste, or restoration, and a brief description of any future studies planned	Refer to section 3.6 and 3.7.
h. Any other details on water use or Waste disposal requested by the Board by the 1st of November of the year being reported	Refer to section 3.6 and 3.7.

## 2. Small Craft Harbour Project

The Hamlet of Pond Inlet is a northern community of Baffin Island, on the shore of Eclipse Sound. The Government of Nunavut (GN) has initiated the construction of a marine infrastructure project in Pond Inlet, Nunavut. The Marine Infrastructure Project in Pond Inlet is developed to improve the safety and functionality of the marine services. The project included a new Small Craft Harbour (SCH), the development of a new Quarry and the construction of a Haul Road.

The GN has mandated Tower Arctic (TA) as the general contractor for the construction operations. The equipment mobilization by sealift took place in 2018, 2019 and 2020 during the open-water season. As requested by the GN, TA started the SCH construction in September 2018 and the construction activities were scheduled until the end of November 2020. Due to delay in the project schedule, TA must continue to construct the SCH during the 2021 open-water season.

### 2.1. Environmental Management

A Construction Environmental Management Plan (CEMP) was developed for the Pond Inlet Marine Infrastructure Project by TA to outline the implemented measures to avoid, manage or mitigate the impact of the marine based and land-based construction activities. During the project construction, TA implement these measures during the development of the Quarry, the construction of the Haul Road and the construction of the new SCH.

### 2.2. Environmental Team of Tower Arctic

The environmental team during the 2020 season was formed by three (3) on site Environmental Monitors (EM), one (1) environmental advisor and one (1) Environmental Coordinator (EC). The environmental team was also supported by delegates who were on site engineers and local workers.

## 3. Haul Road Project

A seven (7) kilometres road is necessary to haul over 200,000 tonnes of blasted rock from the Pond Inlet Municipal Quarry “Quarry” to the SCH to be built. According to the contractual requirements, TA was responsible to obtain the Water Licence for the haul road construction. In July 23, 2018, Water Licence No. 8BW-PIM1821 was issued by the NWB and the licence authorized the installation of the necessary culverts to cross the encountered watercourses. Seven (7) culverts were installed in 2018 to cross the encountered watercourses. These culverts have diameters ranging from 600 mm to 1,200 mm. The culverts sizes were determined on site by the engineer according to the width of the crossed watercourses. **Figure 1 and Table 3** provides the culverts location and sizes.

At the end of the SCH construction phase, the Haul Road will be blocked by TA using a fill berm with the objective to prevent community vehicles to enter the zone. The road will be handed over to the Municipality of Pond Inlet in useful condition and without any potholes.

### 3.1. Regulatory Authorizations

**Table 2** provides the Regulatory Authorizations obtained for the construction of the Haul Road. As the construction of the SCH must be extended after July 22, 2021, TA is in the process of renewing the license number 8BW-PIM1821 from the NWB.

*Table 2: List of Regulatory Authorizations*

Regulatory Authority	License	License no.	Expiration Date	License Holder
Nunavut Water Board	Type “B”	8BW-PIM1821	July 22, 2021	Tower Arctic Ltd.
Nunavut Impact Review Board	Screening Decision	17QN015	-	Gov. of Nunavut

Figure 1 – Map of The Haul Road and Culverts Location



Table 3: Haul Road Culverts Location and Diameter

Culvert Identification	Latitude	Longitude	Culvert Diameter (mm)
CS01	72°41'25.26"N	77°52'52.44"W	900
CS02	72°41'22.52"N	77°53'8.12"W	900
CS03	72°41'4.32"N	77°55'18.96"W	600
CS04	72°40'55.74"N	77°55'43.05"W	1200
CS05	72°40'49.61"N	77°56'13.95"W	600
CS06	72°40'37.00"N	77°58'40.61"W	600
CS07	72°41'38.15"N	77°58'57.96"W	1200

### 3.2. Construction Summary

During the first season, the Haul Road construction operations were from August 2018 to September 2018. The road was used to haul rock materials from September 2018 to October 2018. **Table 4** provides the date when the activities started and finished in 2018. During the second and the third season, the Haul Road has been maintained and used from September 2019 to November 2019 and from June 2020 to October 2020. **Table 5** and **Table 6** provides the starting and finishing dates of the construction activities during the 2019 and 2020 respectively. Refer to **Appendix A** which presents the photographic records of the culverts during the 2020 season (July 31, 2020).

Table 4: 2018 Construction Activities Limited to Haul Road

<b>Construction Activity</b>	<b>Date activity started</b>	<b>Date activity finished</b>	<b>Completion Status</b>
Contractor mobilization	August 5, 2018	September 15, 2018	± 75 %
Quarry development	August 11, 2018	October 18, 2018	± 15 %
Haul road construction	August 11, 2018	September 23, 2018	± 100 %
Haul road maintenance	September 24, 2018	October 18, 2018	Work in progress
Rock hauling	September 24, 2018	October 18, 2018	± 20 %
Winterizing	October 18, 2018	October 20, 2018	± 25 %

Table 5: 2019 Construction Activities Limited to Haul Road

<b>Construction Activity</b>	<b>Date activity started</b>	<b>Date activity finished</b>	<b>Completion Status</b>
Contractor mobilization	September 7, 2019	October 4, 2019	± 100 %
Quarry development	September 21, 2019	October 30, 2019	± 50 %
Haul road maintenance	September 21, 2019	October 30, 2019	Work in progress
Rock hauling	September 24, 2019	October 30, 2019	± 50 %
Winterizing	October 30, 2019	November 12, 2019	± 50 %

Table 6: 2020 Construction Activities Limited to Haul Road

<b>Construction Activity</b>	<b>Date activity started</b>	<b>Date activity finished</b>	<b>Completion Status</b>
Contractor mobilization	August 28, 2020	August 30, 2020	± 100 %
Quarry development	June 10, 2020	October 22, 2020	± 60 %
Haul road maintenance	June 10, 2020	October 22, 2020	Work in progress
Rock hauling	June 10, 2020	October 22, 2020	± 60 %
Winterizing	October 21, 2020	October 28, 2020	100%

Because of the delay with the construction schedule of the SCH project, the Haul Road shall be maintained during the 2021 season and the road should be closed at the end of this season. **Table 7** provides the planned activities during the next season.

*Table 7: 2021 Planned Construction Activities*

<b>Construction Activity</b>	<b>Planned Date to Start</b>	<b>Planned Date to Finish</b>
Quarry development	May 1, 2021	July 1, 2021
Haul Road maintenance	May 1, 2021	August 15, 2021
Rock hauling	May 1, 2021	August 15, 2021
Haul Road closure	August 15, 2021	August 15, 2021
Contractor demobilization	August 15, 2021	September 15, 2021

### 3.3. Regulatory Agency Inspection

On August 11, 2020, an inspector from the Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) conducted a site inspection and the report has been transmitted to the NWB on March 1, 2021. During the inspection, the onsite EM from TA and the representative from the GN were present. **Appendix B** provides the inspection report.

#### 3.3.1. Required Actions

Actions have been required by the Inspector (refer **Appendix B** sections 2 and 3). TA proposes the following actions:

- **Uncover all Culverts:**

During the 2020 freeze-up period, TA monitored the condition of the 7 water crossings of the Haul Road and no covered culvert has been observed by the onsite EM. For the 2021 freshet period, TA will monitor the water crossings to make sure that the water flow is not obstructed by a frozen culvert. If the water flow is obstructed, TA will act to defrost the problematic culvert.

- **Spill Reporting:**

For each spill located on the Haul Road, TA will report the spill immediately to the 24-Hour Spill Line at (867) 920-8130 and to the Inspector at (867) 975-4295. TA will submit to the Inspector, no later than thirty (30) days after initially reporting the event, a detailed report that will include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain and clean-up the spill site.

- **Remediation of Hazardous Waste Spill**

For each spill located on the Haul Road, TA will visually make sure the spill sites are well remediated. The sites will be pictured to show that all hazardous spilled wastes are recovered. If it cannot be confirmed visually that a spill is fully recovered, TA will prepare a remediation plan to meet the Canadian Environmental Quality Guidelines. Prior to its implementation, the remediation plan will be submitted and approved by the Inspector. The results of the implementation will be provided to the Inspector.

### 3.4. Monitoring Plan

An updated Monitoring Plan (MP) to describe how TA implemented the monitoring activities was produced before the 2019 season. The water crossing monitoring plan has been updated following the receipt on October 11, 2019, of the NWB Technical Review of the 2018 Annual Report. Discussion occurred between the NWB and TA to state the necessary improvement for the monitoring methods. During this meeting TA and NWB agreed on the stability condition and the runoff discharge monitoring methods and TA adjusted the monitoring methods accordingly. These updated monitoring methods have been used by the environmental team of TA during the 2020 season. **Appendix C** provides the used monitoring methods.

### 3.5. Unauthorized Discharge in Watercourse

On August 6, 2020, due to an equipment breakage, biodegradable hydraulic oil has been accidentally discharged in a watercourse. The quantity of oil discharged in the watercourse is unknown, but it can be visually estimated at less than 5 liters. The oil has been mostly recovered using absorbent pads. **Appendix D** provides the spill report transmitted to the Nunavut 24-Hour Spill Line.

### 3.6. Water Use

The water used for the accommodation of the workforce was provided directly by the Municipality of Pond Inlet. No water has been pumped from or in a watercourse during the construction of the Haul Road.

### 3.7. Waste Disposal

The non-hazardous wastes have been temporarily stored at the garage area of TA or directly shipped to the municipal landfill. The hazardous wastes are stored at the garage area of TA and it will be shipped by sealift to a proper disposal facility during the demobilization process anticipated in September 2021.

## 4. Closure

Expecting this report is to your entire satisfaction and provides the required information about the 2020 construction season.

Report prepared by:

**TOWER ARCTIC LTD.**



Olivier Bédard-Richard, Environmental Coordinator



## Appendix A

### 2020 Photographic Records



CS01-Downstream



CS01-Upstream



CS02-Downstream



CS02-Upstream



CS03-Downstream



CS03-Upstream



CS04-Downstream



CS04-Upstream



CS05-Downstream



CS05-Upstream



2020-07-31 08:20

CS06-Downstream



2020-07-31 08:21

CS06-Upstream



CS07-Downstream



CS07-Upstream



## Appendix B

### Site Inspection Report from CIRNAC



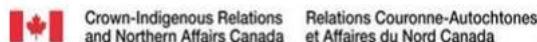
## WATER LICENCE INSPECTION FORM

Original  
 Follow-Up Report

Licensee Tower Arctic Ltd.	Licensee Representative Simon-Pier Laberge
License No. / Expiry 8BW-PIM1821	Representative's Title Project Manager
Land / Other Authorizations N2019X0012	Land / Other Authorizations 03QN074
Date of Inspection August 11, 2020	Inspector Joseph Monteith
Activities Inspected <input checked="" type="checkbox"/> Camp <input checked="" type="checkbox"/> Roads/Hauling <input type="checkbox"/> Drilling <input checked="" type="checkbox"/> Other: Spill Report sites <input type="checkbox"/> Mining <input type="checkbox"/> Construction <input type="checkbox"/> Reclamation <input type="checkbox"/> Other: Fuel Storage	

Conditions:	A- Acceptable	U-Unacceptable	C-Concern	NI-Not Inspected	NA- Not applicable
<b>PART:</b>					
A: SCOPE, DEFINITIONS AND ENFORCEMENT					
B: GENERAL CONDITIONS					
C: CONDITIONS APPLYING TO SECURITY					
D: CONDITIONS APPLYING TO WATER USE					
E: CONDITIONS APPLYING TO WASTE DISPOSAL AND MANAGEMENT					
F: CONDITIONS APPLYING TO MODIFICATIONS					
G: CONDITIONS APPLYING TO CONSTRUCTION					
H: CONDITIONS APPLYING TO EMERGENCY RESPONSE AND CONTINGENCY PLANNING					
I: CONDITIONS APPLYING TO ABANDONMENT, RECLAMATION AND CLOSURE PLANNING					
J: CONDITIONS APPLYING TO MONITORING					
SCHEDULES					
<i>*The observation number corresponds with specific comments provided below.</i>					
Samples taken by Inspector:	Location(s): N66° 09' 00" , Longitude: W65° 40' 34"				
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					

SECTION 1	<input type="checkbox"/> Comments (s. __)	<input type="checkbox"/> Non-Compliance with Act or Licence (s. __)	<input type="checkbox"/> Action Required (s. __)
<b>BACKGROUND</b> Construction of the Pond Inlet Marine Infrastructure Project has been underway through two open-water seasons, which initiated in 2018. The CIRNAC LUP was not issued until June 6, 2019 as CIRNAC confirmed in late 2018 that a LUP was required. This was in addition to the License of Occupation provided by Public Services and Procurement Canada (PSPC). The Water License from the Nunavut Water Board Construction is ongoing seasonally and will continue in 2020. Led by the Government of Nunavut (GN) - Community and Government Services (CGS), ownership and responsibility will transfer to the GN - Economic Development and Transportation (EDT) once operational.			
A map of the construction of the Pond Inlet Marine Infrastructure Project (photo 1)			
<b>Inspector Statement</b> On August 20, 2020, Water License inspections were conducted at the site of the Pond Inlet Infrastructure Project, Pond Inlet, Qikiqtani Region, Nunavut, to verify compliance with the terms and conditions of the Water Licence 8BW-PIM1821.			
<b>General Condition</b> 1. On Tuesday, April 07, 2020 at 3:47 PM the Nunavut Water Board uploaded to their FTP site a copy of Tower Arctic's 2019 Annual Report. <a href="ftp://ftp.nwb-oen.ca/registry/8%20MISCELLANEOUS/8B/8BW%20-%20Watercourse/8BW-PIM1821%20Tower%20Arctic%20Ld/3%20TECH/1%20GENERAL%20(B)/2%20ANNUAL%20RPT/2019/">ftp://ftp.nwb-oen.ca/registry/8%20MISCELLANEOUS/8B/8BW%20-%20Watercourse/8BW-PIM1821%20Tower%20Arctic%20Ld/3%20TECH/1%20GENERAL%20(B)/2%20ANNUAL%20RPT/2019/</a> 2. A copy of the Water License was posted at the time of the inspection (Photo 16).			
<b>Conditions Applying to the Protection of Water</b> A map of the Stream Crossings – (See photo 1)			



3. A total of 7 water crossings along the hauling road from the municipal quarry to the site of the Pond Inlet Infrastructure Project (Photo2).
4. CS-07 Water Crossing (Photo 3)
5. CS-06 Water Crossing (Photo 4)
6. CS-06 Water Crossing (Photo 5)
7. CS-05 Water Crossing (Photo 6)
8. CS-04 Water Crossing (Photo 7)
9. CS-03 Water Crossing (Photo 8)

#### Quarry Site

10. Top of the Quarry Pit, looking in (photo 9)
11. Inside the Quarry Pit (Photo 10)
12. Quarry Stock Pile, was observed to be inland and 31 metres away from any water body. Located between CS-07 and CS-06 (Photo 2).

#### Waste

13. An agreement with the community of Pond Inlet was struck to receive all waste from the construction to the community landfill
14. All hazardous waste is contained in sea cans, in secondary containment. To be shipped to an approved Hazardous Waste Storage Facility (Photos 13, 14, & 15).

#### Spill Reports

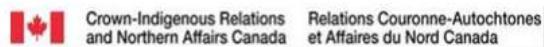
15. A total of 23 Spill Reports reported for 2020 that Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) is the lead on. The majority of the spills will be closed as they are below the reportable threshold of the NT/NU Spills working Group Agreement. As per the water license, all spills, regardless of size and quantity will be reported; with a follow up written report.

SECTION 2	<input type="checkbox"/> Comments	<input type="checkbox"/> Non-Compliance with Act or Licence	<input checked="" type="checkbox"/> Action Required
The following information is a summary of the Actions Required by the licensee to promote and ensure compliance. Please provide a response to the following Actions Required within 30 days of receiving this report proposing timelines to address the concerns noted:			
<ul style="list-style-type: none"> <li>• Uncover all Culverts, so that the water doesn't freeze in the culverts, and plug them up for freshet in 2021.</li> <li>• As per the water license, all spills, regardless of size and quantity will be reported; with a follow up report after 30 days on the status can be summarized in one report for the minor spills to satisfy the requirements of the license, to follow up with a written report. The larger spills which go over the reportable limit will individually require proper follow up, with individual reports.</li> <li>• Follow the CCME guidelines for proper remediation of a hazardous waste spill.</li> </ul>			

SECTION 3	<input type="checkbox"/> Comments	<input checked="" type="checkbox"/> Non-Compliance with Act or Licence	<input type="checkbox"/> Action Required
Part G: Conditions Applying to Spill Contingency Planning			
Item 4;			
If during the term of this Licence, an unauthorized discharge of Waste occurs, or if such a discharge is foreseeable, the Licensee shall:			
a. Employ the Spill Contingency Plan; b. Report the spill immediately to the 24-Hour Spill Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and c. For each spill occurrence, submit to the Inspector, no later than thirty (30) days after initially reporting the event, a detailed report that will include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain and clean-up the spill site.			

Licensee or Representative	Inspector's Name
	Joseph Monteith
Signature	Signature
Date	Date
	November 28, 2019

CC: Licensing Department, NWB  
 Justin Hack, Manager of Field Operations, CIRNAC


**PHOTO LOG**

Date	Camera	Inspector	
August 20, 2020	Nikon Coolpix	Joseph Monteith	8BW-PIM1821
Photo Log #	Location		
Photo 1	Pond Inlet, Qikiqtani Region, Nunavut		



Description: The Pond Inlet Marine Infrastructure Project is to build the small craft harbour. On site Construction map.

Photo Log #1	Location
Photo 2	Pond Inlet, Qikiqtani Region, Nunavut
 <p>Small Craft Harbour Project</p> <p>Developed Quarry Limit</p> <p>Watercourse Crossing (CS)</p> <p>Haul Road</p> <p>CS 01, CS 02, CS 03, CS 04, CS 05, CS 06, CS 07</p> <p>Google Earth</p>	

Description: Construction Map of the Pond Inlet Marina Infrastructure Project. Haul Road from Quarry to the Construction site.





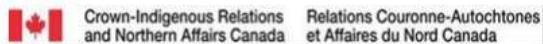


Photo Log #1	Location
Photo 7	Pond Inlet, Qikiqtani Region, Nunavut
	
<p>Description: CS-04 Culvert. Culvert is covered by Rip Rap to mitigate any damage to the culvert, and to mitigate warm air melting permafrost.</p>	

Photo Log #1	Location
Photo 8	Pond Inlet, Qikiqtani Region, Nunavut
	
<p>Description: The first Culvert between the Quarry and the construction site. CS-03, with Rip Rap and silt fencing appear to have been put down to help mitigate sedimentation.</p>	

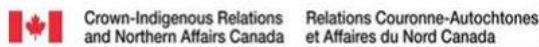


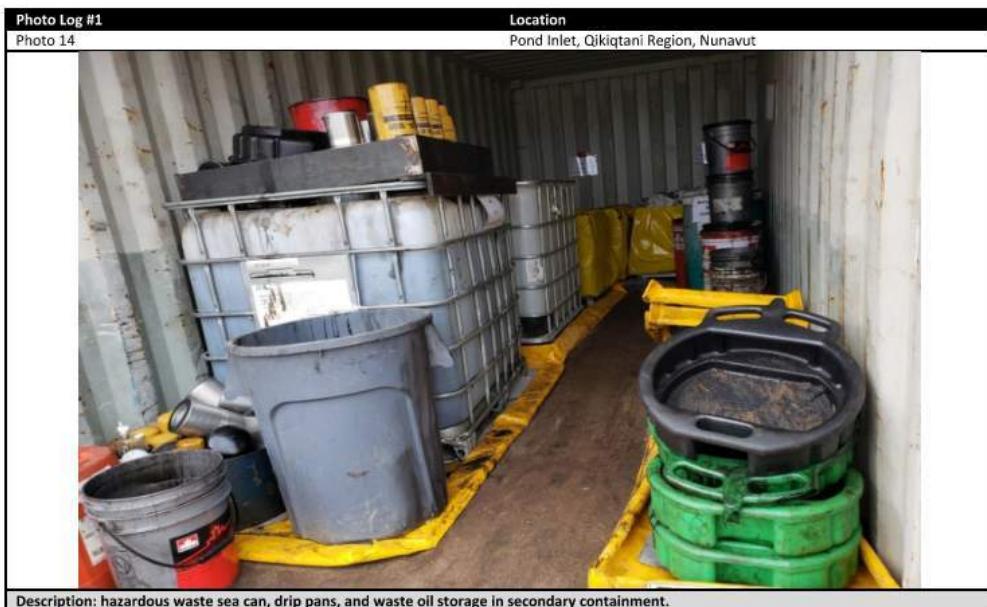
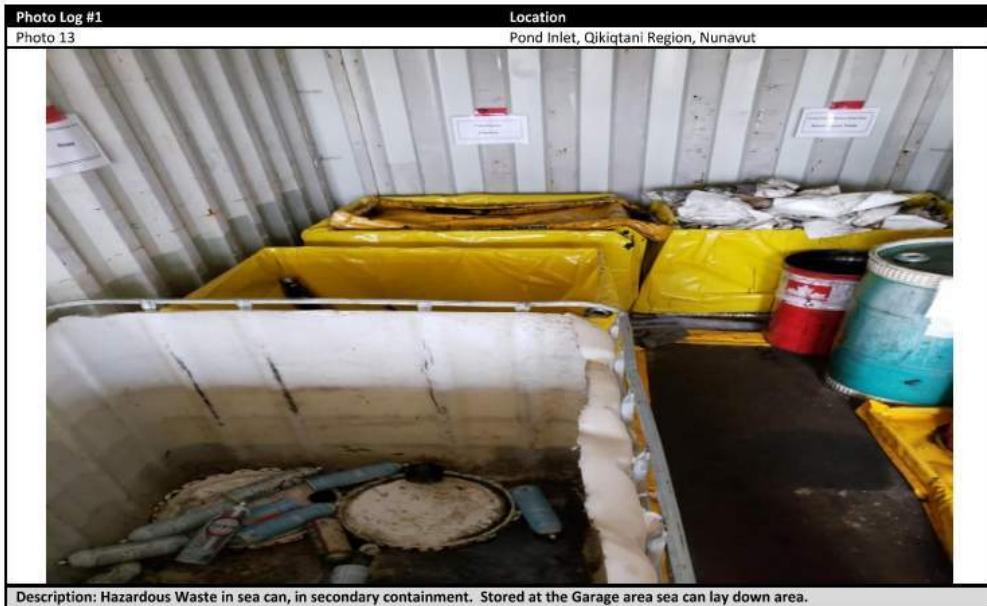
Photo Log #1	Location
Photo 9	Pond Inlet, Qikiqtani Region, Nunavut
	
<p>Description: The first Culvert between the Quarry and the construction site. CS-03, with Rip Rap and silt fencing appear to have been put down to help mitigate sedimentation.</p>	

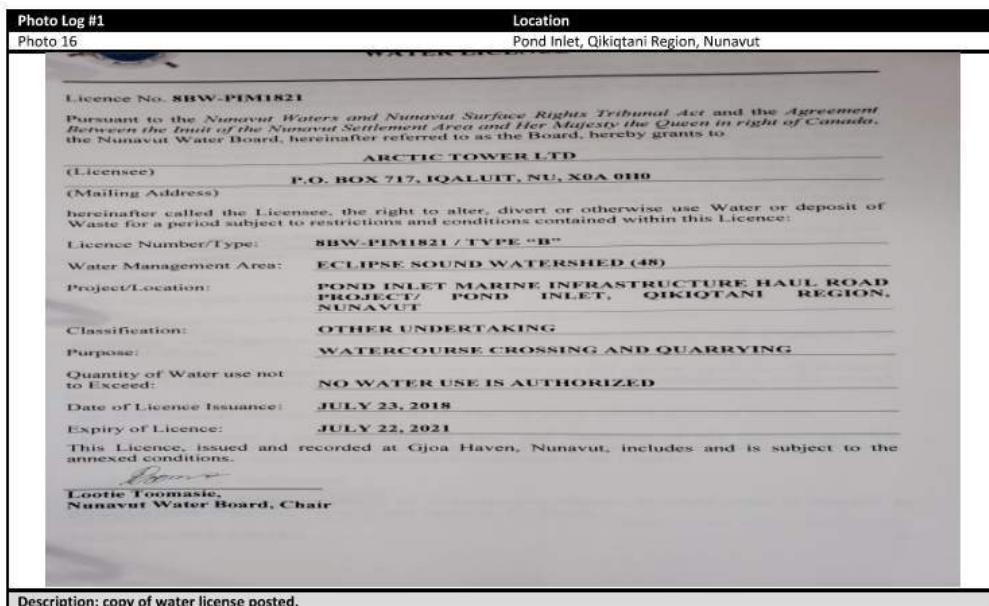
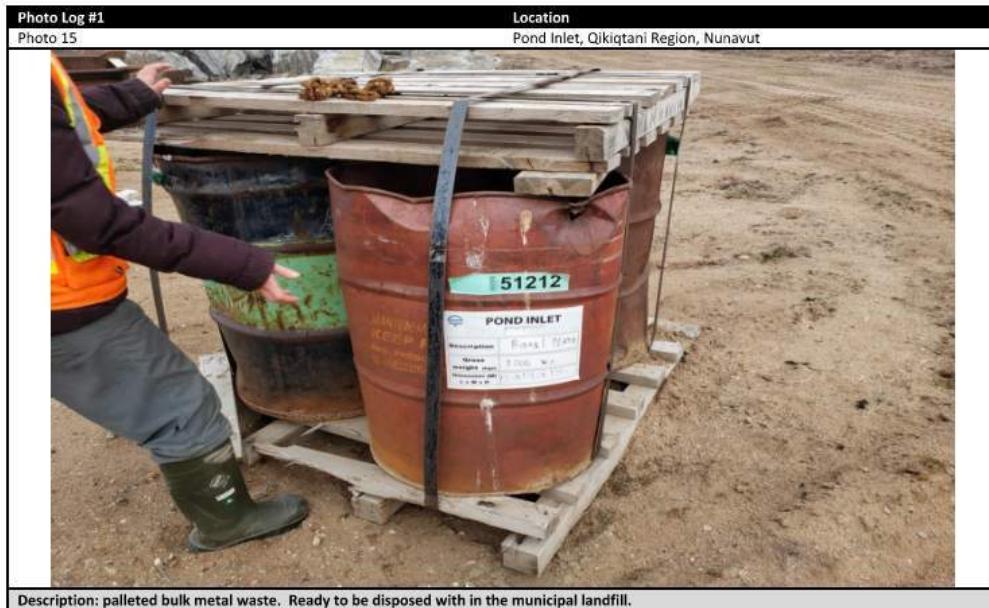
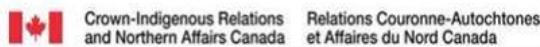
Photo Log #1	Location
Photo 10	Pond Inlet, Qikiqtani Region, Nunavut
	
<p>Description: Quarry Pit. Fresh Water interaction in</p>	

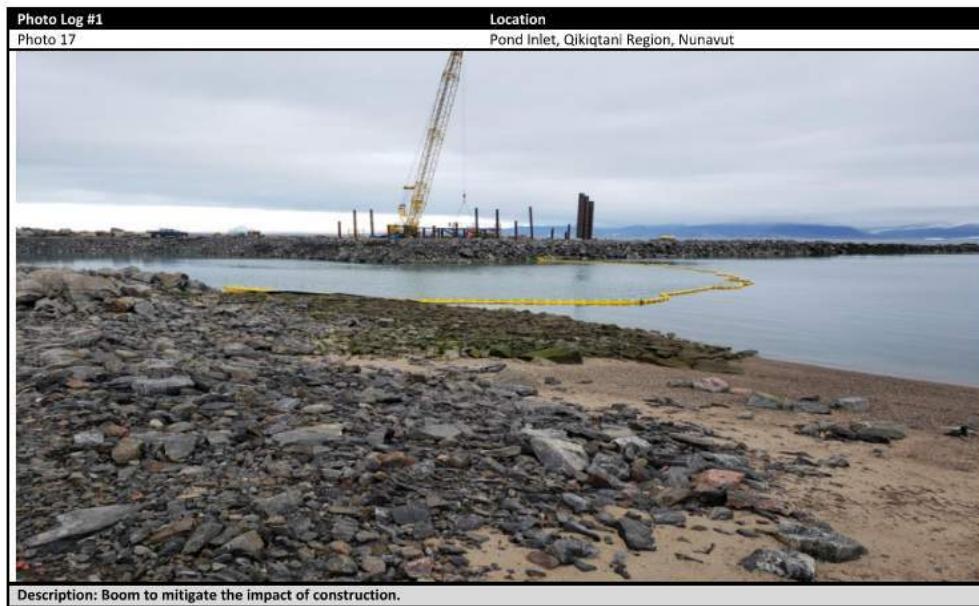


Crown-Indigenous Relations  
and Northern Affairs Canada   Relations Couronne-Autochtones  
et Affaires du Nord Canada











## Appendix C

### Monitoring Plan



POND INLET MARINE  
INFRASTRUCTURE  
PROJECT

## WATER CROSSING MONITORING PLAN

**CONTRACT NUMBER:** 15255-00331-07

**PROJECT NUMBER:** 15255-00331

**TA NUMBER:** 21807

**DOCUMENT NUMBER:** TA\_POND INLET\_  
WCMP\_20200318

**SUBMITTED BY:** TOWER ARCTIC LTD.

**SUBMITTED TO:** NUNAVUT WATER BOARD

**DATE SUBMITTED:** MARCH 31, 2020

**REVISION:** 0



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## 1 WATER CROSSING MONITORING PLAN

The water crossing monitoring plan include the stability condition (refer to section 2) and the runoff discharge (refer to section 3) monitoring method. Both monitoring must be conducted during the haul road use by Tower Arctic (TA) including hauling of aggregates and road repairs.

Seven (7) culverts have been placed on the road to cross the creeks. Refer to figure 1 to locate the road and the culverts. Table 1 provides culverts GPS coordinates and diameter.

**FIGURE 1 – MAP OF THE POND INLET HAUL ROAD CULVERT LOCATION**



**TABLE 1 – CULVERT GPS COORDINATES AND DIAMETER**

Culvert identification	X	Y	Diameter (mm)
CS01	72°41'25.26"N	77°52'52.44"W	900
CS02	72°41'22.52"N	77°53'8.12"W	900
CS03	72°41'4.32"N	77°55'18.96"W	600
CS04	72°40'55.74"N	77°55'43.05"W	1200
CS05	72°40'49.61"N	77°56'13.95"W	600
CS06	72°40'37.00"N	77°58'40.61"W	600
CS07	72°41'38.15"N	77°58'57.96"W	1200

## 2 WATER CROSSING STABILITY MONITORING

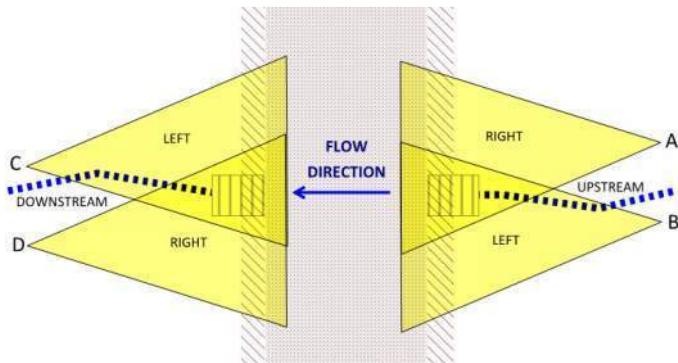
The water crossings stability monitoring shall be conducted twice a year, once at the beginning of a new construction season and once at the beginning of the freeze-up season. Also, the monitoring must be conducted prior to and during freshet and after major precipitation. The monitoring will be conducted by a TA's employee after reviewing the monitoring procedure with TA's Environmental Monitor (EM).

### 2.1 Visual Monitoring

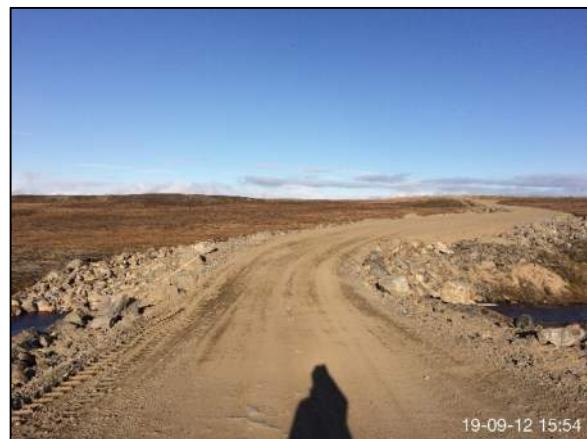
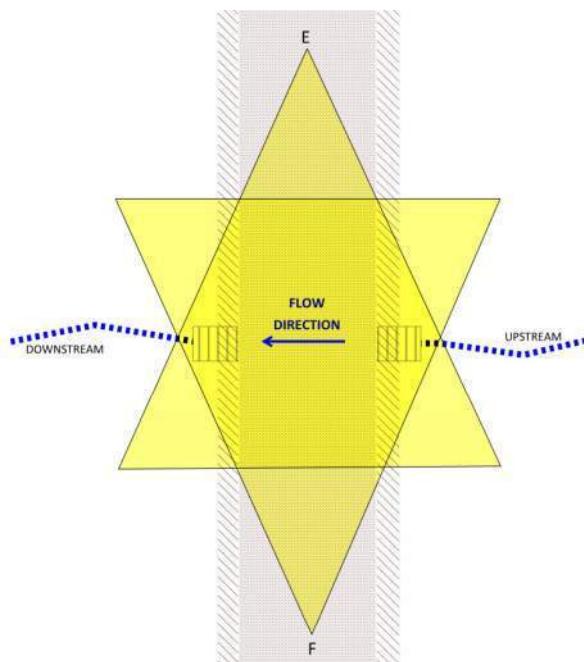
For each culvert on Table 1, the monitoring steps as follow:

- 1) Stand from 5 m to 10 m from the culvert and photograph:

- A. Upstream side, culvert right side
- B. Upstream side, culvert left side
- C. Downstream side, culvert left side
- D. Downstream side, culvert right side



- 2) Stand in the middle of the road at about 20 m from the culvert and photograph the road where the culvert is located. Photograph twice, one of each side of the culvert (E and F).





- 3) If erosion or slope collapse is present, it's required to photograph with detail the condition of the culvert and/or the road where the erosion or slope collapse is present.
- 4) Transmit the pictures to the EM after renaming them using the following structure:

*CULVERT NAME\_FLOW SIDE\_CULVERT SIDE\_DATE (e.g.: CS01\_DOWNSTREAM\_RIGHT\_190716)*

The EM will review the pictures and prepare a report summarizing the water crossing stability condition. The report template is provided in Appendix A.

## 2.2 Stability Improvement Measures

If erosion and/or slope collapse are observed which has or could result in water course runoff discharge, the EM will recommend to the superintendent temporary and/or permanent stability improvement measures.

The measures should be as follow:

Temporary measure

- Silt fence installation

Permanent measure

- Redirecting flow into vegetation
- Rip rap placement
- Localize re-grading of the road

Following the improvement measures, the water crossing site will be photographed again to allow the EM to evaluate the efficiency of the measures. A summary of the evaluation will be added to the visual monitoring report.



### 3 WATER QUALITY MONITORING

The water quality monitoring must be conducted according to Table 2. The monitoring shall be conducted by a TA's employee after reviewing the monitoring procedure with TA's EM. The monitoring is to be conducted during the haul road use by TA including hauling of aggregates and road repairs.

**TABLE 2 – MONITORING FREQUENCY ACCORDING TO THE PERIOD**

Period	Monitoring frequency
Melting and summer condition	Once a week and after precipitation
Winter condition (Frozen watercourse)	Not required

#### 3.1 Visual Monitoring

For each culvert in Table 1, the monitoring step are the following:

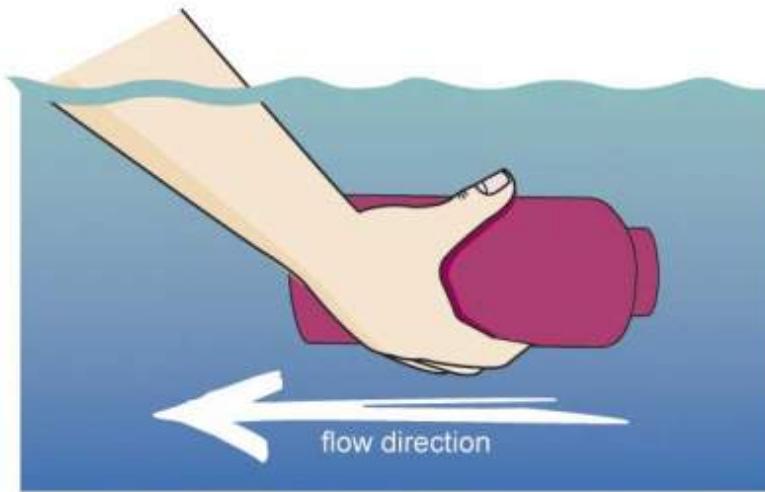
- 1) Reach the culvert site and observe the water course upstream and downstream. Observe if there's a presence of turbidity in the clear water. If yes, investigate the origin of the turbidity. Refer to Image 1 to see an example of runoff discharge.
- 2) If the turbidity comes from a runoff discharge from the road proceed immediately to the water sample collection (refer to section 3.2).
- 3) Collect information on the duration and the origin of the runoff discharge. Photograph the origin and any factor which can influence the runoff discharge.

#### 3.2 Water Sample Collection<sup>1</sup>

The method chosen to sample water in the watercourse is near the surface “Grab sampling” using a 500 ml bottle. The sampler shall collect one (1) sample 10 m upstream of the turbidity generated by the runoff discharge (use for background levels) and one (1) sample 10 m downstream of the runoff discharge (use as compliance samples). The steps to collect water samples are as follow:

- 1) Before sample collection, rinse all sampling equipment (if necessary) in the body of water to be sampled. Dispose of all rinse water downstream of the site, or in such a way that it does not contaminate or disturb the site to be sampled.
- 2) Start sampling in areas of lowest turbidity, followed by areas of highest turbidity. This reduces the potential for cross contamination of samples. As the watercourse to be sampled are not deep (< 30 cm), the sampler must make sure the bottle does not disturb the watercourse bed to prevent sediment entering in the bottle. All samples must be taken while the opening is facing upstream.
- 3) Plunge the bottle, neck downward, below the surface and immediately turn the bottle until the neck points slightly upwards with the mouth directed into the current. Hold the bottle facing upstream at arm's length while it fills. Fill all bottles with the sample water to approximately 0.5 cm from the top and cap each bottle immediately after filling. Identify the bottle according to the type of site sampled (background or compliance) and the location (e.g. culvert name) of the sampling.

<sup>1</sup> Adapted from *Northern Waters: A Guide to Designing and Conducting Water Quality Monitoring in Northern Canada*.



*Note: Be sure not to touch the cap liner, or the inside of the bottles. Touching may result in contamination of the sample. Remove all jewelry and watches. Roll up sleeves to avoid sample contamination, or wear gauntlet gloves. Don't smoke while taking or handling the samples. During sampling by hand don't use insect repellent, as this may cause sample contamination.*

- 4) Photograph the location of the sampling sites and rename the pictures according to Section 2.1 step 4. The pictures must be transmitted to the EM with the turbidity and pH measurement report.
- 5) Immediately after collecting both water samplings and site pictures, turbidity (refer to section 3.3) and pH (refer to section 3.4) measurement shall be conducted.

### 3.3 Turbidity Measurement<sup>2</sup>

For each water compliance and background samples, turbidity is measured in nephelometric turbidity units (NTU) using a turbidimeter and the procedure is as follow:

- 1) Verify the turbidimeter calibration using the calibration standard of 15 NTU and if necessary, adjust the calibration using the calibration standard.
- 2) Fill a cuvette with shaken field water sample to the line marked on the cuvette.
- 3) Dry the cuvette with a clean, lint-free, laboratory-grade paper towel.
- 4) Place the cuvette, with the orientation mark facing forward, in the chamber.

*Note: Handle cuvette with care and do not touch the area of the cuvette below the line. Keep the cuvettes absolutely clean.*

- 5) Measure the turbidity of the sample. Rinse the cuvette with deionized water before storage.
- 6) Note the measurement results and details in the field report (Appendix B provides the report frame).

For additional information on the turbidimeter use, refer to the manufacturer's user manual.

<sup>2</sup> Adapted from CCME: *Protocols manual for water quality sampling in Canada*.



### 3.4 pH Measurement<sup>3</sup>

For each water compliance sample, pH is measured using a pH meter and the procedure is as follows:

- 1) Adjust the temperature reading (if needed) to the temperature of the field sample.
- 2) Shake the sample and rinse the electrode with sample.
- 3) Place the electrode in the sample.
- 4) Select pH measurement mode.
- 5) Swirl the sample and measure the pH. Allow sufficient time for the meter to stabilize.

*Note: Be sure to rinse the electrode with deionized water before storage. Store the electrode in a potassium Chloride (KCl) storage solution according to the manufacturer's instructions. pH electrode sensors should be kept wet with sample water or tap water, and not in a standard solution, at all times during storage.*

- 6) Note the measurement results and details in the field report (Appendix B provides the report frame).

For additional information on the pH meter use, refer to the manufacturer's user manual.

### 3.5 Water Quality Limit

Each water compliance samples must be compliant with the criteria provided in Table 3.

**TABLE 3 – WATER QUALITY CRITERIA LIMIT**

Parameter	Criteria
Turbidity	Maximum increase of 33 NTU from background levels <sup>4</sup>
Oil and Grease	No visible sheen <sup>5</sup>
pH	Between 6.0 and 9.5 <sup>6</sup>

If sample is not compliant with the water quality criteria, immediately runoff control measures must be put in place to stop the runoff discharge. The measures should be the same as indicated in Section 2.2 Stability Improvement Measures.

Until the control measures are in place, the water quality shall be monitoring twice a day (Sections 3.1 to 3.5). After the measure's placement, the efficiency must be photographed and sampled to confirm compliance. The pictures and data shall be transmitted to the EM with all turbidity and pH measurement report.

<sup>3</sup> Adapted from CCME: *Protocols manual for water quality sampling in Canada*.

<sup>4</sup> According to the NWB Licence No. 8PW-PIM1821 and *Canadian Water Quality Guidelines for the Protection of Aquatic Life: Total Particulate Matter*

<sup>5</sup> According to the NWB Licence No. 8PW-PIM1821

<sup>6</sup> According to the NWB Licence No. 8PW-PIM1821



## Appendix D

### Spill Report



Canada

# 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 <b>08-06-2020</b>	REPORT TIME <b>8:00 pm</b>	<input type="checkbox"/> ORIGINAL SPILL REPORT, OR <input checked="" type="checkbox"/> UPDATE # <b>1</b> TO THE ORIGINAL SPILL REPORT	REPORT NUMBER <b>20 -20261</b>
B	OCCURRENCE DATE: MONTH – DAY – YEAR <b>08-06-2020</b>	OCCURRENCE TIME <b>12:00 pm</b>		
C	LAND USE PERMIT NUMBER (IF APPLICABLE) <b>N2019X0012</b>	WATER LICENCE NUMBER (IF APPLICABLE) <b>8BW-PIM1821</b>		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION <b>Haul road for Pond Inlet Marine Infrastructure</b>	REGION <input type="checkbox"/> NWT <input checked="" type="checkbox"/> NUNAVUT <input type="checkbox"/> ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE DEGREES <b>72</b> MINUTES <b>40</b> SECONDS <b>57</b>	LONGITUDE DEGREES <b>-77</b> MINUTES <b>59</b> SECONDS <b>47</b>		
F	RESPONSIBLE PARTY OR VESSEL NAME <b>Tower Artic Ltd</b>	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION <b>1502 Federal Road, Iqaluit, Nunavut P.O. Box 717</b>		
G	ANY CONTRACTOR INVOLVED <b>-</b>	CONTRACTOR ADDRESS OR OFFICE LOCATION <b>-</b>		
H	PRODUCT SPILLED <b>biodegradable hydraulic oil</b>	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES <b>120L</b>	U.N. NUMBER <b>n/a</b>	
	SECOND PRODUCT SPILLED (IF APPLICABLE) <b>-</b>	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES <b>-</b>	U.N. NUMBER <b>-</b>	
I	SPILL SOURCE <b>hydraulique hose</b>	SPILL CAUSE <b>Breakage</b>	AREA OF CONTAMINATION IN SQUARE METRES <b>along the road, about 550m</b>	
J	FACTORS AFFECTING SPILL OR RECOVERY <b>fresh water</b>	DESCRIBE ANY ASSISTANCE REQUIRED <b>none</b>	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT <b>water quality</b>	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS <b>The rock truck spilled on about 550 m of haul road before the operator stopped the equipment. The spill started close from the creek located at this coordinates: 72°40'45.47"N, 77°59'26.63"O. The rock truck need to be repaired before being moved from the main contaminated area and to know the quantity of spilled oil. Most of the spill under the truck was recovered. Absorbents and spill trays have been used under the truck and some adsorbents are in place to recover the spilled oil on the water of the creek .</b>			
L	REPORTED TO SPILL LINE BY <b>Sara Dubosq</b>	POSITION <b>enviro monitor</b>	EMPLOYER <b>SNC-Lavalin</b>	LOCATION CALLING FROM <b>Pond Inlet</b>
M	ANY ALTERNATE CONTACT <b>Simon Brochu</b>	POSITION <b>Project manager</b>	EMPLOYER <b>Tower Arctic Ltd</b>	ALTERNATE CONTACT LOCATION <b>Pond Inlet</b>

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY <b>STATION OPERATOR</b>	POSITION <b>STATION OPERATOR</b>	EMPLOYER	LOCATION CALLED <b>YUKON, NT</b>	REPORT LINE NUMBER <b>(867) 920-8130</b>
LEAD AGENCY <input type="checkbox"/> EC <input type="checkbox"/> CCG <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> INAC <input type="checkbox"/> NEB <input type="checkbox"/> TC			SIGNIFICANCE <input type="checkbox"/> MINOR <input type="checkbox"/> MAJOR <input type="checkbox"/> UNKNOWN	FILE STATUS <input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED	
AGENCY		CONTACT NAME	CONTACT TIME	REMARKS	
LEAD AGENCY					
FIRST SUPPORT AGENCY					
SECOND SUPPORT AGENCY					
THIRD SUPPORT AGENCY					

SPILL REPORT # 20-20261

