APPENDIX-A

CONSTRUCTION PROGRESS REPORT OF SEWAGE DISPOSAL FACILITY

Trow

Project Progress Report
New Sewage Lagoon and Rehabilitation of Existing Sewage Lagoon for the Hamlet of Clyde River

Prepared for:
Department of Community Government and Services
Government of Nunavut

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1.0 Introduction

Trow Associates Inc. was retained by Government of Nunavut to prepare a Project Process Report as part of the permitting process for the ongoing management of the Hamlet's wastewater treatment facility.

Clyde River is a small, arctic community located on the west shore of Patricia Bay within Clyde Inlet. The average annual rainfall in Clyde River is 4.6 cm and the average annual snowfall is 203 cm (RWDI, 2008). Temperatures in the summer range between 0 and 8°C and in winter between -22.5°C and -30°C. It is generally quite windy with an average wind speed of 14.4 km/h (Dillon, 2003). Permafrost is present in the soil; it recedes to approximately 1 m below the surface in the summer time.

The location of the existing sewage lagoon is approximately 1.2 km west of the Hamlet, 800 m north of Patricia Bay. It is adjacent to a scrap metal dump which is located to the north and the community landfill to the east. There is a small watercourse to the west of the lagoon which runs south to Patricia Bay. The existing sewage lagoon does not have sufficient holding capacity for the present population size of Clyde River of 800 people. The berms of the lagoon are failing and raw sewage is leaking out of the toes of the berms in several places. It is an unlined earth lagoon with a reported capacity of approximately 11,600 m^3 and was designed to hold sewage for 365 days with manual discharge.

The existing sewage lagoon does not meet the storage requirements of the Hamlet, and effluent samples taken in August 2006 did not meet the regulatory requirements of the Hamlet's water licence. The intention of this project is to upgrade the sewage treatment facility to meet the needs of the Hamlet for 20 years, and the requirements of their water licence.

1.1. Award of Contract

In 2008 the Government of Nunavut awarded the construction of the new sewage lagoon and rehabilitation of the existing sewage lagoon for the Hamlet of Clyde River to Kudlik Construction Ltd. Kudlik held the lowest bid amongst competing companies and after the Nunavummi Nangminiqaqtunik Ikajuuti (NNI) adjustment has been applied for northern and local content.

Kudlik Construction Ltd is an Inuit firm that was incorporated under Companies Ordinance of the Northwest Territories in 1982. The head office is located in Iqaluit, the capital of Nunavut Territory. With their northern experience and massive equipment fleet, Kudlik Construction Ltd has the ability to handle various projects of this nature.

2.0 Quarry Development

During the site visit in August 2007 Trow staff visited several granular supplies identified by the Hamlet.

These included:

- a granular source located just north of the community behind the arena which is currently an active gravel deposit,
- a granular source on the road to the water lake, which is an active granular deposit,
- a granular source located near the airport, and
- a quarry where a recent drill and blast operation had occurred.

The existing granular sources, although able to meet the annual granular needs of the Hamlet, were not felt to be sufficient to meet the requirements of this project.

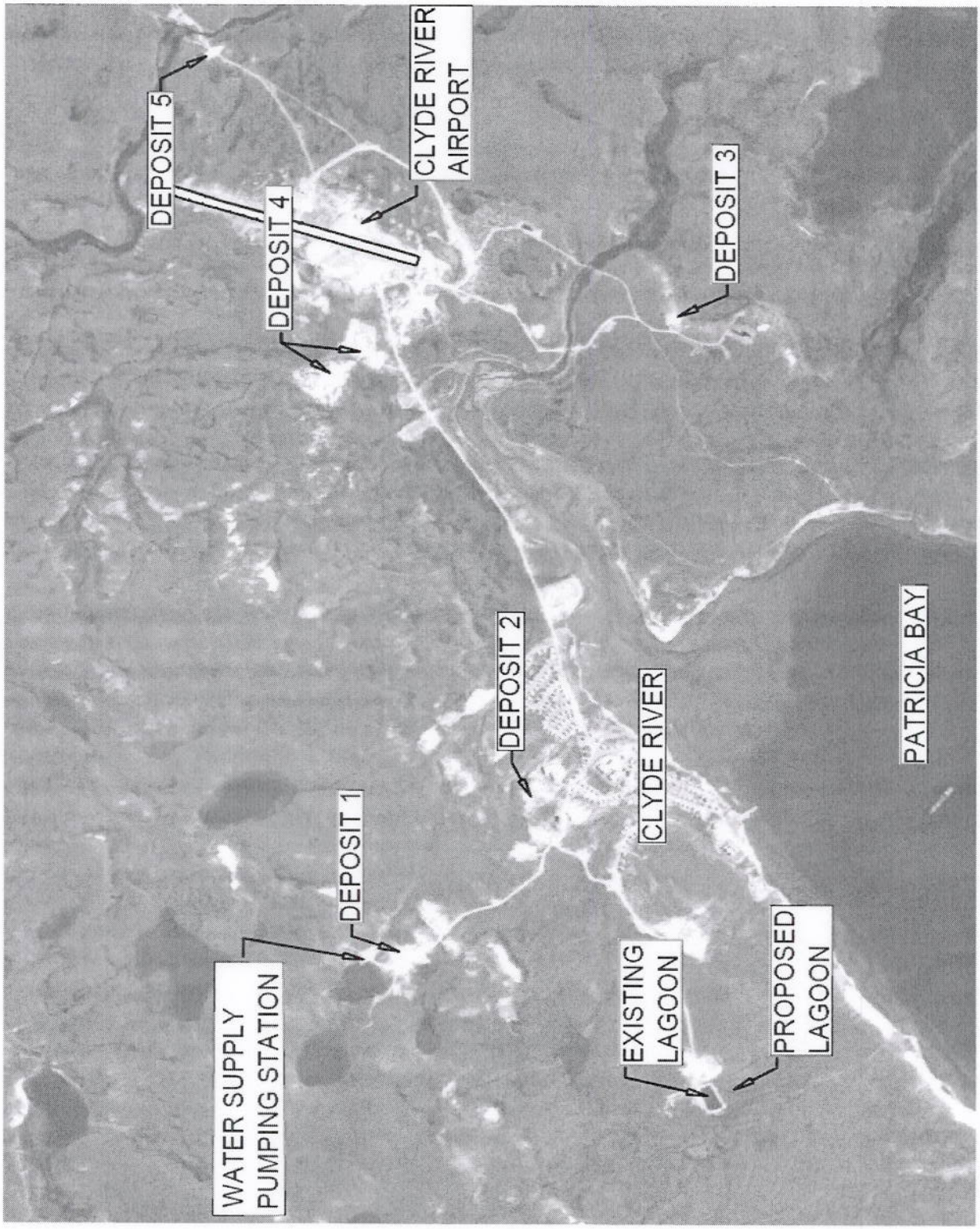
Subsequently, Trow reviewed two reports regarding the granular material, including "*Evaluation of Granular Material Deposits near Clyde River, N.W.T.*" prepared by Terrain Analysis and Mapping Services Limited in the early 1980's as well as the "*Granular Resource Management – 12 Communities, Baffin Region, Nunavut*" prepared by Trow Associates in 2004.

2.1. Evaluation of Deposits

The "Evaluation of Granular Deposits near Clyde River, N.W.T." report identified a total of twenty potential deposits. Of these, four deposits were deemed to be unsatisfactory, eight deposits were very limited quantities of material – 10,000 m^3 or less, five deposits had between 25 – 65,000 m^3 and three deposits had over 70,000 m^3. It is estimated that 60,000 m^3 of material will be required to complete the proposed works. Of these three deposits, Deposit 4 is behind the existing arena and believed to be part of the deposit currently being used by the Hamlet, therefore, it has been depleted from its original capacity and would no longer be able to provide the required material. In addition, it is felt that the deposit should be left to meet the Hamlet's annual granular needs. Deposit 4 is reported to have between 75 and 150,000 m^3 of material. It is located to the north of the road to the airport and may be a potential source of aggregate supply for this project. Deposit 5 has a reported 300,000 m^3 of available material and is located to the east of the runway but the exact boundaries of the deposit were not identified in the report therefore it is not known if it lies within the existing airport boundary or if the material would be available. Deposit 1, located south of the Hamlets water supply and within close proximity to the project location was considered for the granular supply. This deposit was not described in the "Evaluation of Granular Deposits near Clyde River, N.W.T." and currently not in used by the Hamlet for granular material. The location of the deposit allowed trucks to flow freely between the source and the stockpiles without interfering with residential roads within the community.

Deposit 1 was chosen as the granular supply after on-site inspections of the quality and quantity of the material.

Image 2.1.1 Deposit Location Plan



3.0 Contractor Mobilization

Kudlik Construction Ltd began mobilizing equipment and supplies for the project during the summer season of 2008. The mobilization process was broken into three phases to accommodate the stages of project development, short construction seasons, and machinery fleet necessary for construction.

3.1. Phase I Mobilization

Phase I mobilization began in the summer season of 2008 where Kudlik barged in the necessary equipment to produce granular materials in the quarry, and to stockpile on-site materials processed. The main objective of Phase I was to prepare for the upcoming 2009 construction season by establishing the quarry, setting up the crusher and screener at the quarry, and preparing the raw materials for construction.

Equipment	Quantity
8 ton Vibratory Highway Type Roller	1
WA500 loader	1
komatsu hm300 trucks	3
Bulldozer	1
komatsu 400 excavator	2
10 wheel dumptruck	1
crusher	1
screener	1

3.2. Phase II Mobilization

Phase II mobilization began in the spring of 2009 and involved supplying the necessary construction supplies, materials and sea-cans for housing. Housing shortages in the Hamlet forced Kudlik to supply onsite housing for the labours in the form of sea-cans.

Operational materials for the lagoon were supplied at this stage. Liners for the interior perimeter of the berm were delivered, as well as the pump for decanting the lagoon during the fall. Thermosters and monitoring wells where delivered and stored on-site for installation into the core of the berms.

3.3. Phase III Mobilization

Materials necessary to complete the project will be supplied at this time. Extra liner for the berms, as well as any required equipment to complete or operate the lagoons properly will be delivered. This Phase will accommodate any change orders or unforeseen conditions by supplying the required materials and machinery to the site.

3.4. De-mobilization

Proposed de-mobilization summer/fall 2010.

Image 3.3.1 Machinery Mobilized for Stockpile Operations

4.0 Material Stockpile

Materials stockpiled by the contractor were inspected by Trow's geotechnical inspector on-site. The inspector tested the quality of the granular, size of crushed stone and the granular type, and moisture content. Materials required and tested were:

4.1. Type A Material

Crushed stone or gravel consisting of hard, durable, angular particles free from clay lumps, cementation, organic material, frozen material, and other deleterious materials.

4.2. Type C Material

Natural sand and gravel consisting of hard, durable, angular particles free from clay lumps, cementation, organic material, frozen material, and other deleterious materials.

4.3. Riprap

Hard, with specified gravity no less than 2.65 durable quarry stone, free from seams, cracks or other structural defects.

4.4. Stone Boulders

Hard, with specified gravity no less than 2.65 durable field stone, free from seams, cracks or other structural defects, with a minimum size of 0.9 m^3 and a maximum size of 1.4 m^3. The long dimension of the stone can not be greater than 1.5 times the shortest dimension

4.5. 2008 Quantities

Quantities quarried for the first season are as follows:

Table 4.1

Material	Estimated Quantity m3	Processed Material m3
Granular A	160	0
Granular C	53,000	2,419
Rip-rap	52	0
Sand	5,150	1,488

4.6. 2009 Quantities

The cumulative quantities quarried for the second season are as follows, and completes the necessary volumes of stockpiled material for the project:

Table 4.2

Material	Estimated Quantity m3	Processed Material m3
Granular A	160	160
Granular C	53,000	53,000
Rip-rap	52	52
Sand	5,150	5,150

Image 4.6.1 Quarry Operations