Hamlet of Tuktoyaktuk

Water

Water Licence Reporting

Sewage

September 2004 Sewage Lagoon Condition Assessment

Solid Waste

EarthTech
A tyco International Ltd. Company

July, 2005

Tuktoyaktuk Sewage Lagoon

Condition Assessment Report – Fall 2004

Prepared 2005 07 19

1. 0 General Description

The Incorporated Hamlet of Tuktoyaktuk maintains a sewage lagoon retention facility (365 day retention) to provide waste treatment to the community's sanitary sewage. The facility is a natural lake, 5.9 Hectares in area, that has been modified with perimeter structures at the south edge to provide a retention structure (See Figure 1. Facility Location).

The facility is located approximately 5.8 kilometres due south from the Hamlet Office and approximately 3.9 kilometres due south from the Airport Terminal Building. The facility is also 1.5 kilometres southwest of the Reindeer Point Subdivision.

The area surrounding the lagoon is influenced by winds primarily from a northwesterly direction, and tides of 30 to 60 centimetres. The lagoon is discharged in the mid to late fall of each year to a saltwater inlet. The lagoon is 3.0 kilometres southeast from the open ocean, and approximately 6.5 kilometres from the ocean by way of several channels, which vary in depth from 1 metre to 4 metres (See Figure 2, Site Plan).

The Hamlet's new water licence (June 28, 2005) stipulates the following discharge parameters for the sewage lagoon (SNP 0714-2).

Table 1. Tuktoyaktuk Sewage Lagoon Discharge Parameters

Effluent BOD_5	**120 mg/L**
Effluent Suspended Solids	**180 mg/L**
Effluent pH	**6 to 9**
Oil and Grease	**No visible sheen**

The discharge The operating parameters for the lagoon stipulate maintaining a freeboard of not less than 0.5 metres.

The sewage lagoon is estimated to have a capacity to serve a population of 1900, depending upon the level of commercial and industrial activity that occurs in the future. The anticipated growth of Tuktoyaktuk over the next 15 years, as presented in Table 1, suggests that the lagoon has capacity well beyond the year 2020.

Table 2. Tuktoyaktuk Population Growth (NWT Bureau of Statistics)

Year	**2005**	**2010**	**2015**	**2020**
Population	**960**	**1,000**	**1,050**	**1,100**

2.0 Facility Access

The lagoon facility is accessed by an all-weather gravel road from the Hamlet. The access to the facility is not controlled in any manner, however a fence with an open gate provides access to the lagoon discharge point. The SNP sign (0714-2) is attached to the fence.

The access roads to the sewage lagoon appear to be in reasonably good condition for all vehicles accessing the site. The access road to the truck discharge area is appropriately constructed and maintained for truck access. The access road the seasonal discharge point is appropriately constructed and maintained for pickup truck access to operate and maintain the discharge point, and the adjacent area.

3.0 Truck Discharge

The truck discharge area into the lagoon consists of a 30 metre by 40 metre gravel area (approximate size) with two gravel ramps backing to a welded steel chute and pipe system for the vacuum trucks to discharge into (See Figure 3. Facility Photos – September 15, 2005 (Upper Photo)).

The steel chute is welded to steel piles, and the pipe system is welded to the chute, and resting on the timber retaining wall adjacent to the chute. The chute and pipe system appear to be in reasonably good condition.

The trucks discharge by elevating the vacuum tank at the front end of the truck and opening a valve at the back of the truck. The truck discharge area appears to be in reasonably good condition with sufficient operating area for the vehicles.

4.0 Dispersion Structures and Adjacent Area

The dispersion structures to the sewage lagoon consist of a timber retaining wall, and a sheet metal ramp from the base of the retaining wall into the lagoon. The sheet metal ramp provides a means of effluent dispersion into the lagoon and provides erosion protection to the retaining wall. The retaining wall and ramp appear to be in reasonably good condition. The area around the dispersion structures appears to be quite pristine, in spite of the sewage disposal activity.

5.0 Lagoon Discharge Point and Adjacent Area

The sewage lagoon seasonal discharge point is located at a constructed berm area at the south edge of the lagoon (See Figure 3. Facility Photos – September 15, 2005 (Lower Photo)). The berm provides the retaining structure to maintain the water level in the lagoon. The lagoon is discharged into the adjacent ocean inlet in the fall of each year using a temporary pumping system set up on top of the berm (See Figure 4. Lagoon Discharge – October 2004).

The granular berm is well vegetated on the inside and outside faces of the lagoon, however there is some erosion on the outside face of the berm. This erosion appears to be the result of the seasonal discharge of the lagoon.

6.0 Lagoon Area and Lagoon Performance

The 5.9 Hectare lagoon is formerly a natural lake and in spite of the sewage lagoon function, remains visibly pristine. Some floatables from the sewage effluent may be observed near the discharge point (0714-2). The water in the lagoon has a very significant green colour which indicates very active biodegradation.

The height of land around is setback approximately 40 to 60 metres, which provides a minimal input for additional runoff into the lagoon.

The annual discharge of the sewage lagoon was undertaken in October, 2004. The lagoon discharge was successful as noted in the 2004 water licence compliance inspection – "all parameters, with the exception of pH were sampled on time and met license effluent quality standards; the Hamlet was diligent and made every effort, through sampling and delaying discharge, to meet discharge criteria." An elevated pH was noted at the time of the discharge.

The annual seasonal discharge from the sewage lagoon is approximately 40,000 cubic metres.

7.0 Future Assessments

Although the lagoon technology is appropriate for the Hamlet of Tuktoyaktuk and the lagoon performance is good, some concern remains about the environmental impacts and potential public health impact of the seasonal effluent discharge. This concern is expressed in the new water licence with the requirement to complete an assessment of Kugmallit Bay, and specifically those water immediately adjacent to the season discharge point.

A first phase of the study was completed in October 2004, and a second phase of the study is anticipated in the fall of 2005. The Hamlet of Tuktoyaktuk is requesting assistance from the Department of Municipal and Community Affairs for funding assistance to complete the second phase of the assessment.

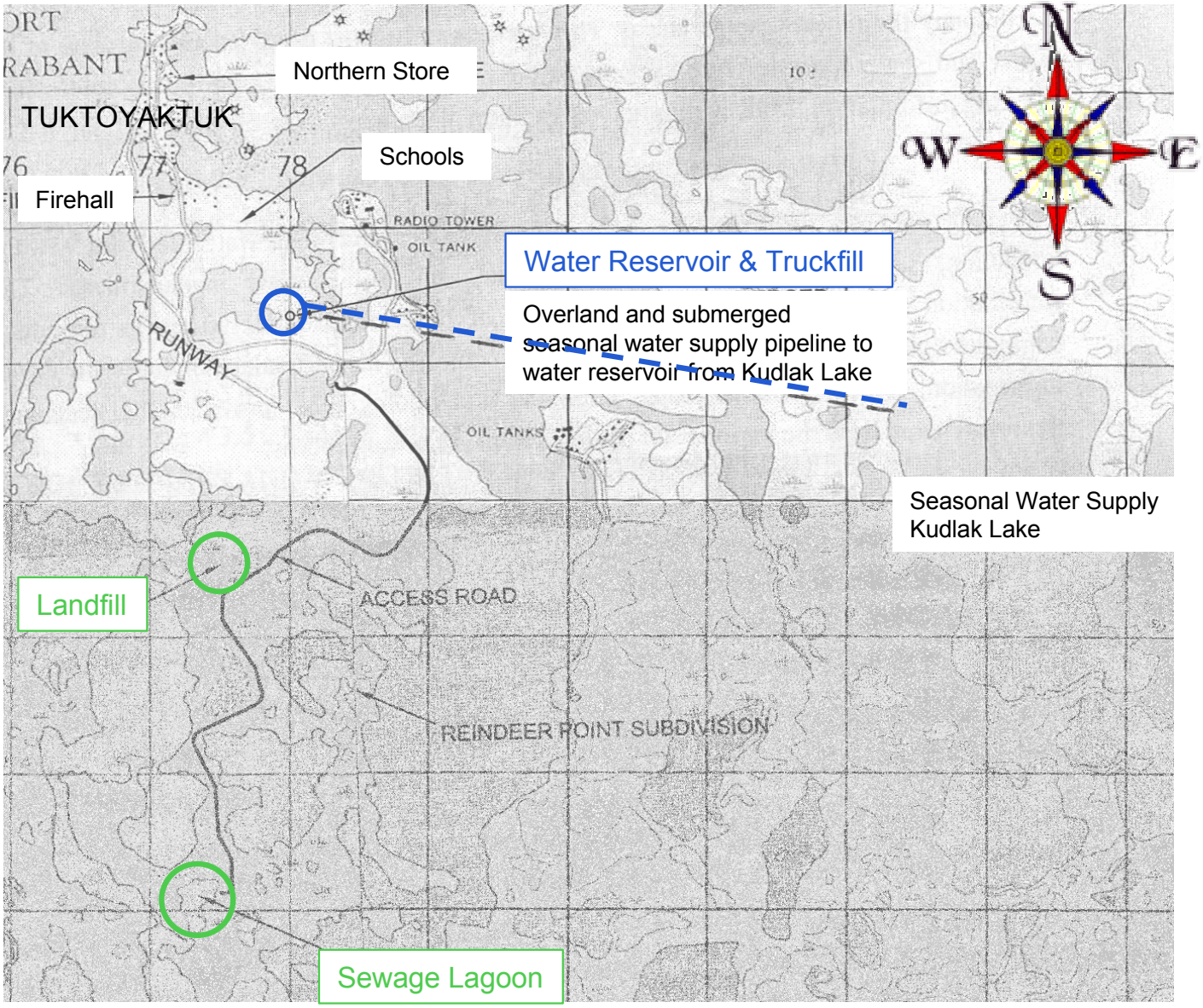

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Figure 1. Facility Location

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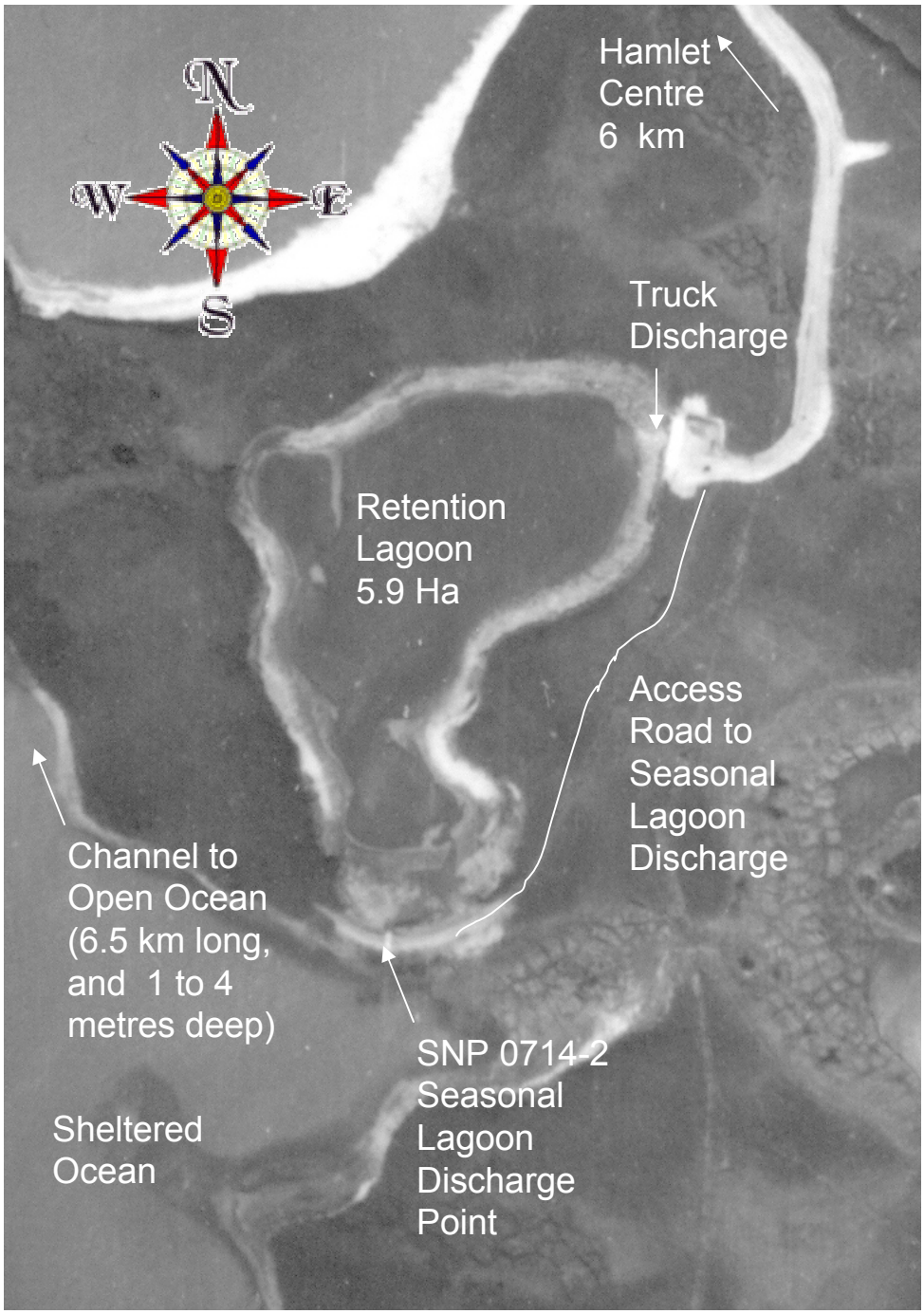

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Figure 2. Site Plan

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Figure 3. Lagoon Site - September 15, 2004

Photo Courtesy of IEG

Outlet of pumped lagoon seasonal discharge into ocean.

Photo Courtesy of IEG

Pumping system for seasonal discharge into ocean.

Photo Courtesy of IEG

Inlet of pumped lagoon seasonal discharge into ocean.

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Figure 4. Lagoon Discharge - October 2004

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