

CAM-2, Gladman Point DEW Line Site

# SEWAGE LAGOON CLOSE OUT REPORT



Nunavut Water Board issued Licence:  
1BR-GLA0308  
Pursuant to Condition Part D, Item 1

Prepared by:  
Defence Construction Canada  
on behalf of the Department of National Defence  
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# Site Conditions

## Site Description

The CAM-2 (Gladman Point) DEW Line site is located on the south side of King William Island, Nunavut (approximately 68° 40' 09" north latitude and 97° 48' 33" west longitude). The site is approximately 75 km west of Gjoa Haven and 300 km east of Cambridge Bay. The station is located north west of a spit named Gladman Point, which separates Simpson Strait from M'Clintock Bay. The DEW Line Station was decommissioned in the fall of 1992.

The facilities are spread out over several kilometres and include the Station Area, Airstrip Area and the Beach Area. The Station Area is situated on a drumlin 1.2 km inland. The Beach Area is located on a spit approximately 3 km to the south of the station. A Short Range Radar (SRR) facility is located approximately 600 m northwest of the module train.



Figure 1. CAM-2, Gladman Point Site Overview

## Geology

The Station and SRR facility are situated on a drumlin nearly 2.5 km long. The drumlin is approximately 2 m higher in elevation than the terrain to the west and up to 8 m higher than the terrain to the east. The surficial materials were reworked by the ocean when the area was submerged and are primarily coarse-grained sand and gravel with some cobbles, boulders and trace of silt. The material becomes silty with depth. Pile installation records from the SRR facility show that the till extends more than 5 m below the ground surface.

Raised marine beach ridges are located along Simpson Strait and on the spit at the south end of the site. The topography is characterized by linear strandlines of coarse-grained material. The beach ridges along Simpson Strait are comprised of angular, bedrock derived materials. The beach ridges along the spit at the south end of site comprise more rounded gravels and cobbles. The beach ridges are well drained. (UMA, 2002)

A modern marine beach area is located southeast of the Station at M'Clintock Bay. The area is low-lying and less than a few metres above sea level. The soils are predominately sand with some silt and variable amounts of gravel. The soils are moist to wet near the surface and saturated below. These soils are highly erodible and several surface runoff channels run through the area.

CAM-2 is located in the zone of continuous permafrost. The mean annual air temperature is -15.7°C. Pile installation records from the SRR facility indicate that the ground temperature was between -6°C and -8°C at 4 m depth at the end of September, nine days after pile installation (Thurber 1989). The mean annual ground temperature at the depth of zero annual amplitude is expected to be colder than this. The pile installation records indicate that the till has an average salinity of 5 ppt in the active layer and 23 ppt between a depth of 2.0 m and 4.7 m. The moisture content ranged from 4.6% to 10%. (UMA, 2002)

Many of the testpits excavated during the 2001 site investigation were taken to frozen ground, an average depth of 1.4 m. The active layer (maximum depth of annual thaw) may be slightly greater in September than it was in August when the testpits were excavated.

Ice wedge polygons exist in the low-lying till deposits and frost-crack polygons were noted along the drumlin and other raised areas. Minor thaw settlement is evident along the ice wedges in disturbed areas. Depressions up to 0.5 m deep were noted along the drumlin north of the SRR facility.

## Background

August 2003, during the remediation activities associated with CAM-2, Gladman Point a sewage lagoon was constructed to support the construction camp as per the specifications included in the water use licence application. The sewage lagoon was located more than 300 m distant from the nearest water body and greater than 500 m from the shoreline. Mobilization to CAM-2 occurred by sea in the fall of 2003. The first full remediation season began in June 2004 with the camp and site work in full operation; remediation work was completed September 2005.

The construction camp that was established at CAM-2 serviced an average of 40 persons during the construction season; the average volume of effluent deposited to the sewage lagoons was 200 m<sup>3</sup> per month from June to September. The exact GPS coordinates of the sewage lagoon are unknown, however the location of the sewage lagoons is shown in relation to other site features, please refer to Figure 2. Due to the estimated low volume of deposited effluent (approximately 200 m<sup>3</sup>/ month) and the distance to the nearest water body (>300m) the site was determined to not pose any significant risk to surrounding water resources.

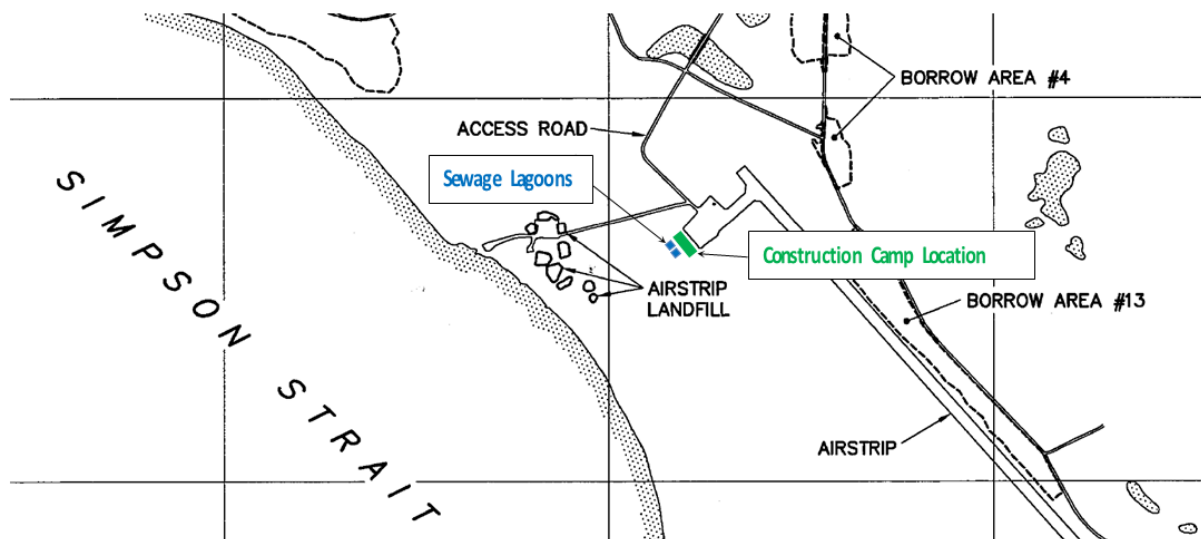


Figure 2. CAM-2, Gladman Point – Site Layout

## Operation

Due to the coarse-grained nature of the material available at the CAM-2 site; the effluent in the sewage lagoon infiltrated the ground and there was insufficient volume for sampling, similarly no sampling was conducted of the berms or base of the sewage lagoons.

## Closure

The sewage lagoon was closed in 2005 at the end of the construction/clean up program at the CAM-2 site. No effluent waters were discharged from the lagoon prior to closure.

The volume of liquid in the lagoon was small enough that the facility could be backfilled without discharge or overflow occurring. The sewage lagoon area was regarded to match the contours of the site topography.

No sampling was conducted of the berms or base of the sewage lagoon. Based on the types of potential contaminants that could be present, multiple months of below freezing temperatures would have significantly reduced the viability of the bacteria, and since there was no direct discharge to a water body, there would not have been any significant environmental impact due to BOD5 containing compounds. Consequently, the environmental risk due to the method of sewage treatment is considered negligible.

## References

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