Government of Nunavut

Environmental Assessment Screening under CEAA

Sewage Wetland Upgrade for the Hamlet of Whale Cove, Nunavut

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Executive Summary

The Government of Nunavut (GN), Department of Community and Government Services (CGS) retained **exp Services Inc.** (exp), (the new identity of Trow Associates Inc.)., to prepare a Screening Level Environmental Assessment (SLEA) under the *Canadian Environmental Assessment Act* in order to complete the detailed planning design for the sewage wetland upgrade for the Hamlet of Whale Cove, Kivalliq Region, Nunavut, hereinafter referred to as the 'Site'.

The objective of the SLEA is to identify and document the environmental effects of the proposed project components, and to determine the need to mitigate the adverse effects and modify the project plan, or recommend further assessment by a review panel. The SLEA will be completed in general accordance with the *Canadian Environmental Assessment Act*.

The justification for the project is based on the need of the Hamlet of Whale Cove to operate an upgraded sewage treatment system that is structurally sound, and has the necessary capacity to accommodate the projected growth of the community over the next 20 years.

All of the vegetation observed at the Site or expected to be present at the Site, are highly adapted to the extreme conditions of the subarctic region. Various species are also adapted to disturbed Sites, including fireweed. As such, the composition of the vegetation community observed to be present at the Site is considered suitable for the proposed upgrade and expansion of the existing long term sewage treatment system for the Hamlet of Whale Cove.

In general, the extent of disturbance at the Site is considered minimal. There is light, widespread evidence of colonizing plant species at various areas of the Site, and light, localized evidence of human encroachment, including some tracks or trails, and recreational activities. However, given the low evidence of disturbance at the Site, the proposed upgrade and expansion of the existing long term sewage treatment system is not expected to significantly alter the existing environment.

All of the wildlife observed at the Site or expected to be present at the Site, are highly adapted to the extreme conditions of the subarctic region. Various species are also adapted to disturbed Sites, including arctic ground squirrels and Canada geese. As such, the composition of the wildlife community observed to be present at the Site is considered suitable for the proposed upgrade and expansion of the existing long term sewage treatment system for the Hamlet of Whale Cove.

The SLEA revealed that the proposed upgrades and expansion of the existing long term sewage treatment system for the Hamlet of Whale Cove will have net positive effects on the community. This project will not have significant long term negative effects on the environment or local wildlife. Most effects are related to the construction activities, and are short term. All potential effects can be mitigated by applying suitable mitigation measures.

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Chapter 1 – Project Identification

1 Project Identification

Table 1-1: Project Identification

Project Title/Type	The Government of Nunavut, Community and Government Services, Project Management Division – Kivalliq Region Project Component 1: Improvements to existing two (2) berms Project Component 2: Construction of up to three (3) additional berms
Project Location	Hamlet of Whale Cove, Nunavut
Estimated Cost	Not applicable
EA Start Date	September 12, 2011
NOC Posting Date	Not applicable

Chapter 2 – Contacts

2 Contacts

Table 2-1: Project Contacts

Government of Nunavut, Department of Community and Government Services	Ralph Ruediger Regional Director, Kivalliq Region	Phone: (867) 645-8100
	Malli Aulakh, P.Eng. Senior Project Officer Projects Division, Rankin Inlet, NU	Phone: (867) 645-8185 Fax: (867) 645-8196
Consultants	Steven Burden, P.Eng. Project Manager, exp Services Inc. 100-2650 Queensview Drive, Ottawa, ON K2B 8H6	Phone: (613) 688-1899 Fax: (613) 225-7337 Email: steven.burden@exp.com
Proponent	Representatives of the Hamlet of Whale Cove, NU	Phone: (867) 896-9961 Fax: (867) 896-9109

Chapter 3 – Canadian Environmental Assessment Act (CEAA) Trigger

3 Canadian Environmental Assessment Act (CEAA) Trigger

Government of Nunavut, Community and Government Services

☐ is the proponent of the project;

☒ proposes to fund all or part of the project;

☐ proposes to sell, lease or otherwise dispose of land for the project; and/or,

☐ proposes to issue a permit, approval or other authorization on the CEAA Law List Regulations.

Federal departments notified in accordance with Federal Coordination Regulations:

Yes ☒ None identified ☐

Other federal involvement?

Yes ☐ None identified ☒

Chapter 4 – Project Description

4 Project Description

The Government of Nunavut (GN), Department of Community and Government Services (CGS) retained **exp Services Inc.** (exp), (the new identity of Trow Associates Inc.), to prepare a Screening Level Environmental Assessment (SLEA) under the *Canadian Environmental Assessment Act* in order to complete the detailed planning design for the sewage wetland upgrade for the Hamlet of Whale Cove, Kivalliq Region, Nunavut, hereinafter referred to as the 'Site' (refer to Figure 1).

The Hamlet of Whale Cove (Hamlet) is the proponent and Responsible Authority (RA) of the project, and as such, triggers the requirement for a screening level environmental assessment for the project under section 5(1)a of the *Canadian Environmental Assessment Act (CEAA)*. Due to the size and location of the proposed project(s) (i.e. leaving a footprint >25 m^2), it cannot be excluded under *CEAA*, and an environmental assessment as per *CEAA* must be completed prior to any physical work completed by the proponent. The Stakeholders for this project are the Hamlet of Whale Cove, the Government of Nunavut and the Nunavut Water Board

The Hamlet's existing sewage lagoon system is located approximately 300 m to the west of the community. It is comprised of a single cell lagoon, a berm and wetlands, as in Figure 1 (Appendix A).

4.1 Objectives

The objective of the SLEA is to identify and document the environmental effects of the proposed project components, and to determine the need to mitigate the adverse effects and modify the project plan or recommend further assessment by a review panel. The SLEA will be completed in general accordance with the *Canadian Environmental Assessment Act*.

The project components of the SLEA include the assessment of the current sewage treatment facility; the construction of a new impervious sewage lagoon cell and berm; and, increasing the capacity of the sewage system to meet the long term needs of the Hamlet.

Construction of a new impervious sewage lagoon cell is necessary since the existing sewage lagoon cell and berm is failing. **Exp** intends to improve the existing sewage lagoon and berm to withstand a larger capacity over the long term. The existing down gradient wetlands will be assessed for efficacy over time and increased capacity.

4.2 Project Scheduling

- Estimated Project Start Date : 2014
- Estimated Project Completion Date : 2015
- Estimated Transfer Date (if applicable) : Not applicable

4.3 Project Justification

The justification for the project is based on the need of the Hamlet of Whale Cove to operate an upgraded sewage treatment system that is structurally sound, and has the necessary capacity to accommodate the projected growth of the community over the next 20 years.

Alternatives to the project include a) the option to do nothing; and, b) to decommission the existing sewage treatment system and create a new facility at another location. The option to do nothing would most likely result in increased structural damage to the lagoon berm from permafrost and increased leaking of raw sewage into the existing wetlands and surrounding environments. The option to decommission the existing system and create a new facility would significantly increase the cost of the project.

The long term negative effects on the environment or wildlife from the proposed project are minimal, if any; and, the potential risk posed to aquatic species are also minimal, if any. Most effects are associated with the short term construction activities; and, all effects can be mitigated by applying the suitable mitigation measures.

Chapter 5 – Scope of Project

5 Scope of Project

The project phases of construction, operation and modification as well as the project components are provided in Table 5-1. A more detailed description of the project components and various Site activities are presented in Table 5-2.

Table 5-1: Project Component Identification

Project Phase	Project Components
Construction/Improvement	- Raising and widening of existing berm at the sewage lagoon output (West Berm) - Building up of existing berm at sewage lagoon input (East Berm) - Building additional berms along the low-lying areas around the perimeter of the lagoon to obtain proper freeboard levels

Table 5-2: Project Component Description

Project Components	Physical Works and Activities	Description
1. Raising and widening of existing berm at the sewage lagoon output (West Berm)	- Excavation and berm construction	- Excavate and grade - Build berm with clay material
2. Building up of existing berm at sewage lagoon input (East Berm)	- Excavation and berm construction	- Excavate and grade - Line berm with geotextile fabric - Build berm with clay material
3. Building additional berms along the low-lying areas around the perimeter of the lagoon to obtain proper freeboard levels	- Berm construction	- Excavate and grade - Line berm with geotextile fabric - Build berm with clay material

5.1 Scope of Assessment

Natural environment components, such as surface water, groundwater, soil, vegetation, wildlife, etc., are included in the scope of assessment. Refer to Table 5-3.

Table 5-3: Project-Environment Interaction Matrix

Component	Surface water	Groundwater	Soils and sediments	Air quality and climate change	Noise/vibration	Terrain and topography	Vegetation and wetlands	Fish and fish habitat	Wildlife and wildlife habitat	Migratory birds	Species-at-risk	Socio-economic conditions(1)	Heritage/ archaeology(1)	Land use(1)	Land use by First Nations	Human health(1)	Transportation and navigation(1)
Raising & Widening of West Berm	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**o**	**o**	**+**	**o**	**+**	**+**	**M**	**o**
Building up of East Berm	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**o**	**o**	**+**	**o**	**+**	**+**	**M**	**o**
Additional berms	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**o**	**o**	**+**	**o**	**+**	**+**	**M**	**o**

+ = positive effect; **M** = negative effect which can be mitigated; **o** = no interaction

(1) The indirect effects on the environmental components resulting from a project impact on the environment must be considered. Direct effects on these environmental components may also be considered at the discretion of the RA.

There are no temporal or spatial boundaries that guide the assessment. All components will be installed within a relatively short time frame; and, the Site itself is relatively small.

Chapter 6 –
Description of Existing Environment

6 Description of Existing Environment

6.1 Description of Biophysical Environment

Whale Cove is small, arctic community located on the western shore of Hudson Bay. It is located 161 km north of Arviat and 72 km south of Rankin Inlet. Whale Cove and the southern area of the community of Rankin Inlet has become one district comprising 1,330 people (GN, 2011). The population of Whale Cove alone is approximately 350 people, and is expanding rapidly (Atlas of Canada, 2004). The population is made up of mainly inland and coastal Inuit, with occasional non-Inuit peoples. Whale Cove's Inuktitut name is Tikirarjuaq, or "long point".

Whale Cove is situated in the Southern Arctic Terrestrial Ecozone, and is characterized by continuous permafrost 90 to100 % of the year. The Hamlet receives an average of 181.5 cm of rainfall and 119.7 cm of snowfall per year. Temperatures in the summer range between approximately 3 and 10^{o}C; and, in the winter between approximately -26 to -32^{o}C.

The subsurface stratigraphy at the Site is within the continuous permafrost zone, and is comprised of glacial till with lacustrine deposits of unconsolidated sand and gravel.

The Hamlet's existing sewage lagoon system is located approximately 300 m to the west of the community. It is comprised of a single cell lagoon, a berm and wetlands, as shown in Figure 1 (in Appendix A).

6.1.1 Climate

Climate summaries for precipitation and temperature were available from Rankin Inlet, NU, located 72 km north of Whale Cove for the 1971 to 2000 monitoring period, as presented in Table 6-1. For this period, the annual daily average temperature was -11°C; the annual daily maximum temperature was 1.3^{o}C; and, the annual daily minimum temperature was -7.3^{o}C. The extreme maximum temperature was observed on August 10, 1991 as 30.5 °C; and, the extreme minimum temperature was observed February 13, 1990 as -49.8°C.

Table 6-1: Climate Observations for the monitoring period of 1971 to 2000, collected at Rankin Inlet, NU

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature													
Daily Average (°C)	-31.9	-30.1	-25.2	-16.3	-5.9	4.2	10.4	9.5	3.4	-5.3	-17.8	-26.7	**-11**
Standard Deviation	2.8	3.2	2.8	2.6	2.1	1.9	1.7	1.1	1.5	1.9	3.3	3.5	**1.3**
Daily Maximum (°C)	-28.3	-26.2	-20.9	-11.7	-2.4	7.9	14.9	13	5.8	-2.4	-13.9	-22.9	**-7.3**
Daily Minimum (°C)	-35.5	-33.9	-29.5	-20.8	-9.2	0.4	5.9	5.9	0.9	-8.2	-21.6	-30.4	**-14.7**
Extreme Maximum (°C)	23.4	-4.4	1.3	3.4	14.1	26.1	28.9	**30.5**	20.6	9.3	0.9	-2.4	
Extreme Minimum (°C)	-46.1	**-49.8**	-43.4	-35.7	-23.8	-9.4	-1.9	-1.4	-9	-27.4	-36.5	-43.6	
Precipitation													
Rainfall (mm)	0	0.1	0	1	7.4	25	39.5	57.3	39.2	11.9	0.1	0	**181.5**
Snowfall (cm)	6.7	9.3	12.9	13.6	11.5	4.9	0	0.3	4.6	23.1	20.9	11.9	**119.7**

6.1.2 Site Visit

A Site visit was undertaken by **exp** staff from September 12th through 14th, 2011. All areas of the Site were accessible during the Site visit. The weather on September 12th was overcast with freezing rain in the late afternoon, with a daily mean temperature of 4°C and an average wind speed of 23 km/h. The weather on September 13th was clear and sunny all day, with a daily mean temperature of 5°C and an average wind speed of 24 km/h. The weather on September 14th was overcast, with a daily mean temperature of 6°C and an average wind speed of 15 km/h.

6.1.3 Southern Arctic Vegetation Community

Whale Cove is located within the Southern Arctic ecozone, characterized by long cold winter and short cool summers. The long hours of light and milder temperatures, when compared to more northerly ecozones, results in a longer growing season. This region also contains numerous surface water bodies and wetlands that serve as important wildlife habitat. Permafrost is continuous throughout the area, but there are active layers that thaw in the summer.

The area surrounding the existing sewage lagoon is predominantly exposed rock with subarctic vegetation. The berm is made up of compacted soil material with taller, herbaceous vegetation growing on top. The area between the lagoon and Hudson Bay is vegetated with subarctic tundra and subarctic wetland species, situated in a low-lying area between rock outcrops on both sides.

6.2 Ecological Land Classification

An Ecological Land Classification (ELC) approach was undertaken at the Site during the Site visit to classify the local ecosystem, and assess the suitability of the species present for the treatment of pre-treated sewage from the lagoon.

The ELC is an approach that attempts to identify the distribution and groupings of plant species, and categorize, organize and name ecosystems. When complete, the ELC can be used to improve the collective ability to manage both natural resources and the information that pertains to those resources.

Field notes were compiled with respect to community description and classification; stand characteristics; list of plant species present; extent of disturbance; and, a description of the wildlife habitat. Site photographs can be found in Appendix B of the report.

Animal and plant species significance or rarity on a National level was based on standard status lists obtained from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2011).

6.2.1 Stand Characteristics

A stand characteristic is the classification of a collection of plants having a relatively uniform composition and structure. The purpose of identifying the stand characteristics at a given Site is to categorize the type of habitats present so as to determine the kinds of natural features present and to investigate the wildlife expected to be at the Site. Refer to Figure 2 in Appendix A for the Site location identification.

The area surrounding the existing sewage lagoon is predominantly composed of rock outcrops with low-lying vegetation common to the subarctic region. These portions of the Site are generally open and have limited cover or shelter.

The area located at the western most edge of the lagoon is the berm, made up of a strip of compacted soil material with taller vegetation growing on the surface. The berm provides some shelter and food source to the local wildlife.

The western portion of the Site is dominated by subarctic tundra and subarctic wetland vegetation, ranging in height from ground cover species to grasses up to 60 cm tall. Rock outcrops on both sides of the wetlands provide some protection from wind; and, there is some shelter among this area.

6.2.2 Plant Community

A plant community is a unit of vegetation within a given area. Identifying a plant community within a Site is necessary to determine the type of environment present (e.g. shade-tolerant area) and to identify the type of wildlife expected to be at the Site, in addition to sensitive areas. This information will also aid in the identification of any locally, regionally or provincially rare, threatened or endangered vegetative species on the Site. If identified, these species will need to be preserved and protected.

A vegetation survey was carried out during the Site visit in September 2011, and divided into the different sections of the sewage system: a) near the sewage inlet; b) surrounding the sewage lagoon; c) at the berm; and, d) at the wetlands. The plant species lists for each section of the Site are presented in Table 6-2 to 6-5. It should be noted that a complete plant list is not available, given that the current survey only reflects the late summer season.

Table 6-2: Plant Species near the Sewage Inlet

Family	Common Name	Scientific Name
Mosses	Moss	*Sphagnum sp.*
Grasses (Poaceae)	Blue grass	*Poa sp.*
	Fescue	*Festica vivipera*
	Alpine reed grass	*Calanagrostis purpurascens*
	Bluejoint	*Calamagrostis canadensis*
	Grasses	*Poa spp.*
Sedge family (Cyperaceae)	Arctic cotton	*Eriophorum callitri*
	Sedges	*Carex sp.*
Willow family (Salicaceae)	Willows	*Salix sp.*
	Rock willow/arctic willow	*Salix arctica*
Saxifrage family (Saxifrageceae)	Saxifrage	*Saxifraga sp.*
Crowberry family (Empetraceae)	Crowberry	*Empetrum nigrum*
Heath family (Ericaceae)	Northern blueberry	*Vaccinium uliginosum*
	Northern Labrador tea	*Rhododendron tomentosum*
Primrose family (Onagraceae)	Fireweed	*Epilobium angustifolium*

Fireweed plants, known to colonize at disturbed sites, were abundant near the sewage inlet, as well as various grasses and sedges. Occasional willow, saxifrage, crowberry and heath species were also found near the sewage inlet.

Table 6-3: Plant Species Surrounding the Sewage Lagoon

Family	Common Name	Scientific Name
Lichens	Lichen	*Caloplaca sp.*
	Map lichen	*Rhizocarpon geographicum*

Family	Common Name	Scientific Name
	Rock tripe	*Umbilicaria sp.*
	Jewel lichen	*Xanthoria sp.*
Mosses	Moss	*Sphagnum sp.*
Grasses (Poaceae)	Blue grass	*Poa sp.*
	Fescue	*Festica vivipera*
	Alpine reed grass	*Calanagrostis purpurascens*
	Bluejoint	*Calamagrostis canadensis*
	Grasses	*Poa spp.*
Sedge family (Cyperaceae)	Arctic cotton	*Eriophorum spp.*
	Sedges	*Carex sp.*
Willow family (Salicaceae)	Net-veined willow	*Salix reticulate*
	Dwarf willow	*Salix herbacea*
	Willows	*Salix sp.*
	Diamond-leaf willow	*Salix pulcha*
Birch family (Betulaceae)	Dwarf birch	*Betula nana*
Buckwheat family (Polygonaceae)	Mountain sorrel	*Oxyria digyna*
Rose family (Rosaceae)	Cloudberry	*Rubus chamaemorus*
Saxifrage family (Saxifrageceae)	Saxifrage	*Saxifraga sp.*
Crowberry family (Empetraceae)	Crowberry	*Empetrum nigrum*
Heath family (Ericaceae)	White arctic heather	*Cassiope tetragona*
	Northern blueberry	*Vaccinium uliginosum*
	Bearberry	*Arctostaphylos sp.*
	Northern Labrador tea	*Rhododendron tomentosum*
Primrose family (Onagraceae)	Fireweed	*Epilobium angustifolium*

Lichen, moss, crowberry and heath species were abundant at the areas surrounding the sewage lagoon. Various lichen species were present on the rock outcrops; whereas the majority of plants were nestled in between or beneath the rocks to receive shelter from the wind. Grasses, sedges and fireweed were common to areas with exposed soils; and, occasional mountain sorrel, cloudberry and saxifrage species were also present. Low-lying willow and birch species were present throughout this area.

Table 6-4: Plant Species at the Berm

Family	Common Name	Scientific Name
Grasses (Poaceae)	Grasses	*Poa spp.*
	Fescue	*Festica vivipera*
	Alpine reed grass	*Calanagrostis purpurascens*

Family	Common Name	Scientific Name
	Bluejoint	*Calamagrostis canadensis*
Sedge family (Cyperaceae)	Arctic cotton	*Eriophorum spp.*
Willow family (Salicaceae)	Rock willow/arctic willow	*Salix arctica*
Saxifrage family (Saxifrageceae)	Saxifrage	*Saxifraga sp.*
Heath family (Ericaceae)	Northern Labrador tea	*Rhododendron tomentosum*
Primrose family (Onagraceae)	Fireweed	*Epilobium angustifolium*

The berm, located at the western-most edge of the sewage lagoon, was dominated by colonizing species including grasses, sedges and fireweed. It is noted that considerable evidence of wildlife foraging and nesting was observed at the berm. Other plants present at the berm included willow, saxifrage and heath species.

Table 6-5: Plant Species at the Wetlands

Family	Common Name	Scientific Name
Lichens	Lichen	*Caloplaca sp.*
	Map lichen	*Rhizocarpon geographicum*
Mosses	Alpine club moss	*Lycopodium alpinum*
	Moss	*Sphagnum sp.*
Grasses (Poaceae)	Blue grass	*Poa sp.*
	Fescue	*Festica vivipera*
	Alpine reed grass	*Calanagrostis purpurascens*
	Bluejoint	*Calamagrostis canadensis*
	Grasses	*Poa spp.*
Sedge family (Cyperaceae)	Arctic cotton	*Eriophorum spp.*
	Sedges	*Carex sp.*
Willow family (Salicaceae)	Net-veined willow	*Salix reticulate*
	Rock willow / arctic willow	*Salix arctica*
	Diamond-leaf willow	*Salix pulcha*
	Dwarf willow	*Salix herbacea*
	Willows	*Salix sp.*
Buckwheat family (Polygonaceae)	Mountain sorrel	*Oxyria digyna*
Saxifrage family (Saxifrageceae)	Saxifrage	*Saxifraga sp.*
Crowberry family (Empetraceae)	Crowberry	*Empetrum nigrum*
Heath family (Ericaceae)	Northern blueberry	*Vaccinium uliginosum*
	Bearberry	*Arctostaphylos sp.*

Family	Common Name	Scientific Name
	Northern Labrador tea	*Rhododendron tomentosum*
Primrose family (Onagraceae)	Fireweed	*Epilobium angustifolium*

The greatest species richness was present at the wetlands area, which is to be expected given the overall large surface area, in addition to the combination of various habitats including terrestrial, semi-aquatic and aquatic environments. Major portions of the wetlands area were also protected from the wind by adjacent rock outcrops. In general, the majority of the Site was covered by moss, grasses, crowberries, bearberries and other low-lying vegetation typical of a swamp/wetland region of the subarctic. Patches of taller grasses, sedges, northern Labrador tea and fireweed were scattered throughout the Site; and, several low-lying willow species were present.

Given that a complete plant list is not available since the current survey only reflects the late summer season, other plant species known to the subarctic Nunavut region are listed in Table 6-6.

Table 6-6: Other Plant Species Known to the Area

Family	Common Name	Scientific Name
Pink family (Caryophyllaceae)	Mouse-ear chickweed	*Cerastium sp.*
	Moss-campion	*Silene acaulis*
Buttercup family (Ranunculaceae)	Richardson's anemone	*Anemone richardsonii*
	Buttercup	*Ranunculus sp.*
	Anemone	*Anemone sp.*
Poppy family (Papaveraceae)	Arctic poppy	*Papaver radicatum*
Rose family (Rosaceae)	Mountain avens	*Dryas integrifolia*
	Blackberry	*Rubus fructicosus*
Saxifrage family (Saxifrageceae)	Alpine saxifrage	*Saxifraga nivalis*
	Purple mountain saxifrage	*Saxifraga oppositifolia*
Heath family (Ericaceae)	Mountain cranberry	*Vaccinium sp.*

All of the vegetation observed at the Site or expected to be present at the Site are highly adapted to the extreme conditions of the subarctic region. Various species are also adapted to disturbed Sites, including fireweed. As such, the composition of the vegetation community observed to be present at the Site is considered suitable for the proposed upgrade and expansion of the existing long term sewage treatment system for the Hamlet of Whale Cove.

6.2.3 Extent of Disturbance

A Site can also be described by the extent and intensity of which management or disturbance has occurred on the Site. It is important to note disturbance as it can influence community structure and function. Anthropogenic disturbances are usually more selective, and directly affect one (1) or several specific species, whereas physical forces such as earthquakes or drought can affect the entire plant community.

By applying the ELC protocol, disturbance such as alien species, gaps in forest canopy, plantations, tracks and trails, noise, disease and death of trees as well as wind throw are recorded and observed at a given on-site location.

In general, the extent of disturbance at the Site is considered minimal. There is light, widespread evidence of colonizing plant species throughout various areas of the Site, and light, localized evidence of human encroachment, including some tracks or trails, and recreational activities. However, given the low evidence of disturbance at the Site, the proposed upgrade and expansion of the existing long term sewage treatment system is not expected to significantly alter the existing environment.

6.2.4 Wildlife & Wildlife Habitat

In terms of wildlife and wildlife habitat, the Site may contain elements that can provide suitable habitats for wildlife. For example, small mammals often create burrows in the ground, and small insects often find ponds in order to survive winter months. In addition, the presence of vegetation that produce fruits such as berries may prove to be an important food source for some species.

There are numerous wildlife populations that inhabit the region of the southern arctic. There are massive migrations of caribou, as well as birds. Larger carnivores in the southern arctic include the grizzly bear, black bear and polar bear as well as wolves. The most common large herbivores are barren-ground caribou, woodland caribou, moose, and muskox. Smaller carnivores found in this ecozone include the red fox, arctic fox, lynx, coyote, weasels, wolverine and ermine. These animals prey on smaller herbivores which include the arctic ground squirrel, brown lemming, showshoe hare, arctic hare, masked shrew, tundra redbacked vole, and beaver. Aquatic mammals include walruses, various seals, beluga whales, and narwhals.

Many birds migrate to the southern arctic in the spring to breed, but spend the long cold winters further south. Many others pass over the southern arctic during their migrations to breed further north. Four characteristic birds of prey include the snowy owl, gyrfalcon, osprey, and rough-legged hawk. Waterfowl that can be found here include Canada goose, yellow billed loon, arctic loon, red-throated loon, tundra swan, whistling swan, snow goose, oldsquaw duck and sea ducks. Some common shorebirds and seabirds in the southern arctic are the semipalmated plover, red necked phalarope, lapland longspur and parasitic jaeger. Songbirds also live here, including the snow bunting, raven, American tree sparrow and hoary redpoll. Willow ptarmigan, rock ptarmigan and spruce grouse are a few of the ground-dwelling birds that are present in these colder regions.

This part of the world is too cold for reptiles and amphibians, but does contain three (3) species of mollusc which are the muskeg stagnicola, arctic-alpine fingernail clam, and globular pea clam.

Several wildlife species were observed at the Site and within the vicinity of the Site at the time the Site visit was conducted, as presented in Table 6-7.

Table 6-7: Wildlife Species Observed at the Site

Group	Common Name	Scientific Name
Birds	Least sandpiper	*Calidris minutilla*
	European herring gull	*Larus argentatus*
	Tundra swan	*Cygnus columbianus*
	Snow goose	*Chen caerulescens*
	Northern pintail	*Anas acuta*
	Common raven	*Corvus corax*

Group	Common Name	Scientific Name
	Canada goose	*Branta canadensis*
Mammals	Arctic ground squirrel	*Spermophilus parryii*

Arctic ground squirrels, locally known as 'siksiks', were abundant at the Site. Several large burrows, likely housing siksiks, were present within the western portion of the wetlands area, located on higher ground. Smaller burrows were also observed throughout the wetlands area, likely housing small mammals including lemmings, shrews and voles. Several flocks and individual birds were also observed throughout the Site.

The arctic ground squirrel inhabits areas with sandy or gravely soil, as it makes it easier for digging. They typically live near eskers, moraines, mountain slopes, river flats and banks, lake shores and tundra ridges. They house themselves in deep burrows that contain various tunnels, and hibernate through the entire winter (approximately seven (7) to eight (8) months). Their excavated nests are placed well within the burrow system and are made up of dry grasses, lichens and caribou hair. Siksiks are social animals that live in scattered colonies. They are omnivorous and eat a variety of tundra vegetation such as leaves, seeds, flowers, stems, grass roots and fruit. Siksiks also tend to feed on other ground squirrels from neighbouring colonies, as well as carrion, eggs and small nesting birds (GoN, 2011).

The least sandpiper, *Calidris minutilla*, was also a common occupant at the Site, found to be feeding on inverts within the lagoon as well as open water within the wetlands. The least sandpiper is the smallest shorebird in the world (COL, 1994). They occur in flocks of dozens or hundreds and tend to forage at the upper edge of mudflats along drier margins of inland ponds; and, mainly eat small crustaceans, fly larvae, insects and snails. Sandpipers tend to breed in mossy or wet grasses found in the tundra and migrate to wet meadows, mudflats, flooded fields, shores of pools and lakes (COL, 1994).

Common flocks of birds observed at the lagoon included the tundra swan, *Cygnus columbianus*. Tundra swans are known to form a long-term pair bond, and they nest in the wet tundra generally near the coast line. During the breeding season, tundra swans typically forage in the water on invertebrates and submerged aquatic vegetation; however, due to the decline of its food source at migratory stopover areas, they have shifted their diet to a typical winter diet of mostly grains and cultivated tubers and seeds left in agricultural fields (SAS, 2011a).

The snow goose, *Chen caerulescens*, is a colonial nester in the arctic tundra and inhabits areas within five (5) miles from the coast line. They are generally found in large flocks in the winter months and during migration. Snow geese feed almost exclusively on plant material such as seeds, leaves and roots of aquatic vegetation. Very young birds tend to eat invertebrates, with both young and adult birds randomly foraging on berries and grain in the winter (SAS, 2011b).

Northern pintail, *Anas acuta*, are typically found in shallow ponds and marshes in open areas during the breeding season, and in shallow wetlands, mudflats and flooded fields during the winter months. During the winter they feed on seeds and waste grain from agricultural fields, as well as roots, new shoots and aquatic invertebrates. The Northern pintail is among the earliest nesters, whereby they arrive on the breeding grounds as soon as they are free of ice. They do not form long-term pair ponds, with the female tending to the eggs alone (SAS, 2011c).

Canada geese, *Branta canadensis*, are the most widely distributed geese in North America. The Canada goose is known to breed in the northern temperate, subarctic and arctic regions, and nest in Canada, Alaska and the lower 48 United States. They typically feed on a variety of plants and aquatic vegetation. In the winter months, during migration periods, waste grains make up the majority of their diet; while during the summer months they feed on mollusks, crustaceans, green vegetation and occasionally small fish. Canada geese form long-term pair bonds, whereby the female incubates the eggs as the males stands guard nearby (SAS, 2011d).

Gulls and ravens were also observed circling the lagoon area as well as the wetlands. Gulls are birds in the family *Laridae*; most closely related to terns (family *Sternidae*), and are typically coastal and inland species, rarely found far out to sea. Gulls tend to nest in large, densely packed colonies. They have a prophylactic unhinging jaw, which allows them to consume large prey generally consisting of crabs and small fish (ABC, 2004). Ravens (*Corvus sp.*) are sometimes considered pests as they tend to coexist with humans. They have an omnivorous diet, feeding on carrion, insects, cereal grains, berries, fruit, small animals, and food waste. Young ravens may travel in flocks, but later mate for life, with each mated pair defending a territory (COL, 1999).

It should be noted that a complete wildlife list is not available, given that the current survey only reflects incidental wildlife sightings during the Site visit at the late summer season. Other wildlife species that are known to be present in the Hamlet of Whale Cove and the surrounding area, based on observations made by local residents and other reports, are presented in Table 6-8.

Table 6-8: Other Wildlife Species Known to the Area

Group	Common Name	Scientific Name
Birds of Prey	Peregrine falcon	*Falco peregrinus*
	Gyrfalcon	*Falco rusticolus*
Waterfowl	Lesser scaup	*Aythya affinis*
	Oldsquaw	*Clangula hyemalis*
	Common eider	*Somateria mollissima*
	King eider	*Somateria spectabilis*
Shorebird	Lapland longspur	*Calcarius lapponicus*
	Semipalmated plover	*Charadrius semipalmatus*
	Red necked phalarope	*Phalaropus lobatus*
	American tree sparrow	*Spizella arborea*
	Jaeger	*Stercorarius sp.*
	Arctic tern	*Sterna paradisea*
Ground dwelling birds	Willow ptarmigan	*Lagopus lagopus*
	Rock ptarmigan	*Lagopus muta*
	Arctic grey wolf	*Canis lupus arctos*
	Northern grey wolf	*Canis lupus occidentalis*
	Wolverine	*Gulo gulo*
	North American brown lemming	*Lemmus trimucronatus*
	Arctic hare	*Lepus arcticus*
	Ermine/stoat	*Mustela erminea*
	Least weasel	*Mustela nivalis*
	Barren-ground Caribou	*Rangifer tarandus groenlandicus*
	Polar bear	*Ursus maritimus*
	Arctic fox	*Vulpes lagopus*

Group	Common Name	Scientific Name
	Red fox	*Vulpes vulpes*
Marine mammals	Beluga whale	*Delphinapterus leucas*
	Bearded seal	*Erignathus barbatus*
	Narwhal	*Monodon monoceros*
	Atlantic walrus	*Odobenus rosmarus rosmarus*
	Ringed seal	*Pusa hispida*
Fish	Lake trout	*Salvelinus namaycush*
	Lake Whitefish	*Coregonus clupeaformis*
	Cod	*Gadus sp.*
	Arctic char	*Salvelinus alpinus*
	Arctic grayling	*Thymallus arcticus*

All of the wildlife observed at the Site or expected to be present at the Site are highly adapted to the extreme conditions of the subarctic region. Various species are also adapted to disturbed Sites, including arctic ground squirrels and Canada geese. As such, the composition of the wildlife community observed to be present at the Site is considered suitable for the proposed upgrade and expansion of the existing long term sewage treatment system for the Hamlet of Whale Cove.

6.3 Alternate Wetland

As part of the SLEA assignment, an alternate location for the Hamlet's sewage treatment system was considered. As such, the brief vegetation survey was carried out at the alternate wetland Site during the late afternoon on September 13th, 2011. The plant species list for the alternate wetland is presented in Table 6-9.

Table 6-9: Plants Species at the Alternate Wetland

Family	Common Name	Scientific Name
Lichens	Lichen	*Cladonia sp.*
	Caribou moss/reindeer lichen	*Cladonia rangiferina*
Mosses	Alpine club moss	*Lycopodium alpinum*
	Moss	*Sphagnum sp.*
Grasses (Poaceae)	Blue grass	*Poa sp.*
	Fescue	*Festica vivipera*
	Alpine reed grass	*Calanagrostis purpurascens*
	Bluejoint	*Calamagrostis canadensis*
	Grasses	*Poa spp.*
Sedge family (Cyperaceae)	Arctic cotton	*Eriophorum spp.*
Willow family (Salicaceae)	Rock willow/arctic willow	*Salix arctica*

Family	Common Name	Scientific Name
	Net-veined willow	*Salix reticulate*
	Diamond-leaf willow	*Salix pulcha*
	Willows	*Salix sp.*
Crowberry family (Empetraceae)	Crowberry	*Empetrum nigrum*
Heath family (Ericaceae)	Bearberry	*Arctostaphylos sp.*

All of the plant species observed at the alternate wetland location are similar to those species found at the existing sewage treatment Site, with the exception of the presence of caribou moss or reindeer lichen (*Cladonia rangiferina*) at the alternate wetland. This lichen is a common species to the subarctic region. Similar to the existing Site, all plant species found at the alternate wetland are highly adapted to the extreme conditions of the subarctic region, and various species are also adapted to disturbed Sites. As such, the composition of the vegetation community observed to be present at the alternate wetland may be considered suitable as an alternate location for the long term sewage treatment system for the Hamlet of Whale Cove.

6.4 Key Natural Heritage Features

For the purpose of this SLEA, the significance of a key natural heritage feature is identified as significant by a regional conservation authority or a regulatory agency or ministry. The sources of information consulted for the presence of significant features on or in the vicinity of the Site were the Natural Resources of Canada, The Atlas of Canada, Canada's Species at Risk Act (SARA) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

6.4.1 Heritage Rivers

Outstanding rivers of natural, cultural, historical and recreational values are insured long-term management and conservation by the Canada Heritage Rivers System (CHRS).

According to the Atlas Map of Canada, there are no Heritage Rivers located in the vicinity of the Site (AoC, 2011a).

6.4.2 National Parks

The Government of Canada's objective is to have a park representing each of Canada's 39 natural regions. Public appreciation and enjoyment through education are encouraged as long as they do not affect the ecological integrity of the park. Nunavut has three (3) National Parks.

According to the Atlas Map of Canada, there are no National Parks located in the vicinity of the Site (AoC, 2011c).

6.4.3 National Wildlife Areas

The Canadian Wildlife Service (CWS) of Environment Canada establishes and manages National Wildlife Areas to conserve essential wildlife habitats. These areas consist of land or water areas, with coastal waters extending out to twelve nautical miles from shore. While most human activities are prohibited in these areas, permits can be issued for activities that are compatible with conservation.

According to the Atlas Map of Canada, there are no National Wildlife Areas located in the vicinity of the Site (AoC, 2011d).

6.4.4 Migratory Birds Sanctuaries

The CWS of Environment Canada establishes bird sanctuaries to control and manage areas of importance for the protection of migratory birds, their nests and eggs. The sanctuaries can include a range of habitat types such as terrestrial, wetland or marine. The CWS establishes regulations determining what activities can be carried out within these areas. Prohibited activities include the harassment or killing of birds, and disturbing, destroying, or possessing nests or eggs.

Nunavut has an abundance of sites favourable to the migratory habits of several bird species. In 1999, ten (10) sites were legislated as Migratory Bird Sanctuaries. One of these, the Queen Maud Gulf Migratory Bird Sanctuary with an area of 61 765 sq km, is the largest in Canada.

According to the Atlas Map of Canada, there are no Migratory Bird Sanctuaries located in the vicinity of the Site (AoC, 2011b).

6.4.5 Species of Special Concern

COSEWIC is an independent committee of wildlife experts and scientists from federal, provincial and territorial governments, universities, and non-government organizations that use scientific processes to assess the risk of extinction for wildlife species. This committee meets on an annual basis to review status reports on species that are suspected of being at risk and provides an assessment to the government and public.

Once COSEWIC assesses whether a species is at risk or not, they assign designations based on status reports prepared by independent experts, scientific research, community knowledge and traditional Aboriginal insights. These designations are recommendations to the federal government, whereby the federal government makes the final decision on whether species will be listed under the *Species at Risk Act* (SARA).

Schedule 1 of SARA is the official list of wildlife species at risk in Canada. It includes species that are extirpated (extinct in Canada), endangered, threatened and of special concern. Once a species is listed on Schedule 1, protection and recovery measures are developed and implemented.

Species that were designated at risk by COSEWIC before the creation of SARA must be reassessed according to the new criteria of the Act before they can be added to Schedule 1. These species are listed on Schedules 2 and 3, and are not yet officially protected under SARA.

Once the species on Schedules 2 and 3 have been reassessed, the Schedules themselves will be eliminated, and species will simply be listed or not listed under the Act.

A general search of species of special concern, endangered and/or threatened was conducted for Nunavut, Canada. Both the SARA species list (GoC, 2011) and COSEWIC species assessment lists (COSEWIC, 2011) were consulted. The results were then screened against expected species home ranges, so as to refine the potential species expected at or near the Hamlet of Whale Cove. The results are presented in Table 6-10 (Wildlife) and Table 6-11 (Plants).

Table 6-10: Wildlife species that may be near the Site and corresponding COSEWIC, Schedule and SARA Status

Species Type	Scientific Name	Common Name	COSEWIC Status	Schedule	SARA Status
Terrestrial Mammals	*Rangifer tarandus groenlandicus*	barren-ground caribou	SC	1	SC
	Ursus maritimus	polar bear	SC	No Schedule	No Status
	Gulo gulo	wolverine	SC	No Schedule	No Status
	Canis lupus arctos	Arctic grey wolf	DD		
	Lepus arcticus	Arctic hare	NAR		
Marine Mammals	*Delphinapterus leucas*	Beluga whale (Eastern Hudson Bay population)	END	No Schedule	No Status
	Delphinapterus leucas	Beluga whale (Western Hudson Bay population)	SC	No Schedule	No Status
	Monodon monoceros	narwhale	SC	No Schedule	No Status
	Balaena mysticus	bowhead whale (Eastern Canada)	SC	2	END
	Odobenus rosmarus rosmarus	Atlantic walrus	SC	No Schedule	No Status
	Phoca vitulina concolor	harbour seal (Atlantic and Eastern subspecies)	NAR		
	Erignathus barbatus	bearded seal	DD		
	Phoca hispida	ringed seal	NAR		
Birds	*Calidris canutus rufa*	red knot (*rufa* subspecies)	END	No Schedule	No Status
	Calidris canutus islandica	red knot (*islandica* subspecies)	SC	No Schedule	No Status
	Falco peregrinus anatum/tundrius	Peregrine falcon	SC	No Schedule	No Status
	Asio flammeus	short-eared owl	SC	3	SC
	Falco rusticolus	gyrfalcon	NAR		

Species Type	Scientific Name	Common Name	COSEWIC Status	Schedule	SARA Status
	Buteo lagopus	rough-legged hawk	NAR		
	Gavia immer	common loon	NAR		
	Gavia adamsii	yellow-billed loon	NAR		
	Bubo scandiaca	snowy owl	NAR		

COSEWIC – Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2011; GoC, 2011)

DD – Data Deficient NAR – Not At Risk

END – Endangered SC – Special Concern

Table 6-11: Plant species that may be near the Site and corresponding COSEWIC, Schedule and SARA Status

Species Type	Scientific Name	Common Name	COSEWIC Status	Schedule	SARA Status
Shrubs	*Salix tyrrellii*	Tyrrell's willow	NAR		

COSEWIC – Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2011; GoC, 2011)

NAR – Not At Risk

6.4.6 Wildlife Corridors

Wildlife movement corridors are habitats that link two (2) or more other wildlife habitats that are critical to the maintenance of a population of a particular species or group of species. The key ecological function of wildlife movement corridors is to enable wildlife to move to and between areas of significant habitat or core natural areas with minimum mortality. They can provide critical links between shelter, feeding, watering, growing and nesting locations.

Wildlife and/or habitat corridors can help increase genetic diversity and aid in the re-establishment of populations after random events such as fires or disease outbreaks. These corridors can help to increase biodiversity and population stabilization.

In general, the subarctic region is characterized by vast expanses of natural habitat and low human presence. Annually, there are large migrations of various wildlife species that take place throughout Nunavut, including the Hamlet of Whale Cove. For example, Whale Cove is a known polar bear migration route, as well as a beluga whale breeding ground. Various fishing and hunting events are also known to the area; various game animals include geese, polar bears, caribou, wolves, wolverine and musk oxen. It should be noted that hunting and fishing are important cultural activities of the Inuit peoples; however, to maintain the local populations, quotas are managed in each community by hunters and trappers organizations as well as the Elders of a given community.

As such, given that the general subarctic region is historically and currently known for its presence of various wildlife migratory routes, wildlife corridors are expected to be present throughout the entire Hamlet of Whale Cove.

Chapter 7 –
Environmental Effects and Mitigation

7 Environmental Effects and Mitigation

The effects of the proposed project components on the Valued Ecosystem Components are presented in the following Sections.

7.1 Construction and Improvements

The potential effects from the construction and improvement activities at the Site, as described in Section 5.1, and each affected component, the recommended mitigation(s), the likelihood of residual effect and the significance of residual effect is presented in Table 7-1.

Table 7-1: Construction and Improvements

Effect	Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
Improvements to two (2) berms and construction of new berms may affect the water quality through fuel/sewage spills and run off.	Surface water	Ensure that no run off from construction/improvement activities enters water courses or Hudson Bay; a spill response kit must be on-Site in the event of a spill; immediately contain and clean up any spill in accordance with regulatory requirements. All equipment fuelling and maintenance must be carried out at a safe distance from water courses and Hudson Bay to ensure that no deleterious substances enter the surface water bodies.	Minimal potential due to the small magnitude, limited geographical extent and duration of project activities.	Not significant
Improvements to two (2) berms and construction of new berms may affect the water quality through fuel/sewage spills and run off.	Groundwater	Ensure that no run off from construction/improvement activities enters water courses or seeps into the ground; a spill response kit must be on-Site in the event of a spill; immediately contain and clean up any spill in accordance with regulatory requirements. All equipment fuelling and maintenance must be carried out at a safe distance from water courses and Hudson Bay to ensure that no deleterious substances enter the groundwater.	Minimal potential due to the small magnitude, limited geographical extent and duration of project activities.	Not significant
Excavation activities may affect the soil and sediment quality and composition through fuel/sewage spills and run off.	Soils and sediments	All equipment fuelling and maintenance must be carried out in designated locations to ensure that no deleterious substances percolate into soils or sediments; emergency clean-up protocols will be developed and implemented in the event of an accidental spill; fuels, oils and other hazardous substances have to be stored in designated, secure locations.	Minimal potential due to the small magnitude, limited geographical extent and duration of project activities.	Not significant

Effect	Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
Release of emissions from engines and equipment during construction and improvement activities.	Air quality and climate change	Vehicles, machinery and equipment must be in good repair and equipped with emission controls, where applicable. All work shall be carried out in accordance with all applicable air-emissions regulations and bylaws.	Minimal potential due to the small magnitude, limited geographical extent, and short duration.	Not significant
Presence of noise/vibration from engines and equipment during construction and other activities.	Noise and/or vibration	Vehicles, machinery and equipment must be in good repair. All work shall be carried out in accordance with all applicable noise regulations and bylaws.	Minimal potential due to the small magnitude, limited geographical extent and short duration.	Not significant
Improvements to two (2) berms and construction of new berms may influence the terrain and topography in regards to natural overland flow.	Terrain and topography	Ensure proper monitoring of function of sewage lagoon and wetland system. Ensure that grading takes place according to design specifications.	Minimal potential due to the small magnitude, limited geographical extent and short duration.	Not significant
Improvements to two (2) berms and construction of new berms may influence downgradient wetlands and natural overland flows, and may affect the composition of the local vegetation.	Vegetation and wetlands	Ensure proper monitoring of function of sewage lagoon and wetland system. Ensure that grading takes place according to design specifications.	Minimal potential due to the small magnitude, limited geographical extent and short duration.	Not significant
Improvements to two (2) berms and construction of new berms may disturb the existing fish and fish habitat conditions.	Fish and fish habitat	Ensure proper monitoring of function of sewage lagoon and water courses.	Minimal potential due to the small magnitude, limited geographical extent and short duration.	Not significant
Improvements to two (2) berms and construction of new berms may disturb existing wildlife and wildlife habitats.	Wildlife and wildlife habitat	Ensure proper monitoring of function of sewage lagoon and wetland system.	Minimal potential due to the small magnitude, limited geographical extent and short duration.	Not significant
Release of emissions and noise from activies, as well as movement of heavy equipment, during construction may affect the health and safety of workers.	Human health	Follow all applicable health and safety guidelines and proper use of personal protective devices (e.g. hard hats, steel-toed boots, safety glasses, etc.)	Minimal potential due to the small magnitude, limited geographical extent and short duration.	Not significant

7.2 Accidents and Malfunctions

The potential effect(s) from accident and malfunctions at the Site, and each affected component, the recommended mitigation(s), the likelihood of residual effect and the significance of residual effect is presented in Table 7-2.

Table 7-2: Accidents and Malfunctions

Effect	Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
Spills can affect surface water, groundwater, soil and sediment quality, as well as effect fish, wildlife and natural habitats.	Fuel/oil/other hazardous substance spills	All equipment fuelling and maintenance must be carried out in designated locations away from open drainage systems and surface water; emergency clean-up protocols will be developed and implemented in the event of an accidental spill; fuels, oils and other hazardous substances have to be stored in designated, secure locations.	Minimal potential due to the small magnitude, limited geographical extent and duration of project activities.	Not significant
Release of emissions and noise from engines and equipment, as well as movement of heavy equipment, during construction and improvement activities may affect the health and safety of workers.	Health and safety of workers	Follow all applicable health and safety guidelines and proper use of personal protective devices (e.g. hard hats, steel-toed boots, safety glasses, etc.)	Minimal potential due to the small magnitude, limited geographical extent and duration of project activities.	Not significant

7.3 Effects of the Environment on the Project

The potential effect(s) of the environment on the Project, and each affected component, the recommended mitigation(s), the likelihood of residual effect and the significance of residual effect is presented in Table 7-3.

Table 7-3: Effects of the Environment on the Project

Effect	Component	Recommended Mitigation	Likelihood of Residual Effect	Significance of Residual Effect
Extended periods of permafrost/freezing conditions may influence infiltration rates, reducing filtering time for effluent or impact retention times, thus increasing amount of untreated overflow.	Permafrost, freezing weather conditions	Ensure that retention times are long enough to prevent untreated/under treated effluent from entering the wetland/water courses and ocean.	Minimal potential due to the small magnitude, limited geographical extent and duration of project activities.	Not significant

7.4 Cumulative Effects

Cumulative effects resulting from this project are not expected.

7.5 Any Other Matter

No other matter was identified during this screening.

Chapter 8 –
Environmental Effects Summary Checklist

8 Environmental Effects Summary Checklist

A summary of the potential environmental effects expected at the Site, as well as potential mitigation and residual effects is presented in Table 8-1. The potential environmental effects, potential mitigation and residual effects for other factors and cumulative effects are presented in Tables 8-2 and 8-3.

Table 8-1: Environmental Effects Checklist

Environmental Component	Potential Project Effects						Residual Effects	
	Potential adverse effect?			Can it be mitigated?			Is it significant?	
	YES	NO	Uncertain	YES	NO	Uncertain	YES	NO
Topography	X			X				X
Species/Habitat of Special Status		X						
Vegetation	X			X				X
Wildlife/Habitat	X			X				X
Fish and Fish Habitat	X			X				X
Marine Resources	X			X				X
Soils	X			X				X
Drinking Water		X						
Groundwater	X			X				X
Surface water/Hydrogeology	X			X				X
Wetlands	X			X				X
Sediments	X			X				X
Climate and Air Quality	X			X				X
Noise	X			X				X
Vibration	X			X				X
Transportation and Navigation		X						
Land Use		X						

Environmental Component	Potential Project Effects						Residual Effects	
	Potential adverse effect?			Can it be mitigated?			Is it significant?	
	YES	NO	Uncertain	YES	NO	Uncertain	YES	NO
Human Health	X			X				X
Socio-economic conditions		X						
Physical/Cultural heritage		X						
Aboriginal use of traditional lands/resources		X						
Structures/Sites of significance		X						
Other		X						

Table 8-2: Other Factors

Environmental Component	Potential Project Effects						Residual Effects	
	Potential adverse effect?			Can it be mitigated?			Is it significant?	
	YES	NO	Uncertain	YES	NO	Uncertain	YES	NO
Accidents and Malfunctions	X			X				X
Effects of Environment on the Project	X			X				X

Table 8-3: Cumulative Effects

Environmental Component	Potential Project Effects						Residual Effects	
	Potential adverse effect?			Can it be mitigated?			Is it significant?	
	YES	NO	Uncertain	YES	NO	Uncertain	YES	NO
Project Component #1	X			X				X
Project Component #2	X			X				X

Mitigation measures that are required as a result of the Screening Level Environmental Assessment are summarized in Table 8-4.

Table 8-4: Mitigation Measures

Environmental Component Potentially Affected	Proposed Mitigation	Responsibility to ensure implementation
Surface water	- Ensure that no run off from construction/improvement activities enters water courses or Hudson Bay; a spill response kit must be on-Site in the event of a spill; immediately contain and clean up any spill in accordance with regulatory requirements. All equipment fuelling and maintenance must be carried out at a safe distance from water courses and Hudson Bay to ensure that no deleterious substances enter the surface water bodies. - Ensure proper function of lagoon and wetlands through monitoring program.	Consultants and the Hamlet of Whale Cove
Groundwater	- Ensure that no run off from construction/improvement activities enters water courses or seeps into the ground; a spill response kit must be on-Site in the event of a spill; immediately contain and clean up any spill in accordance with regulatory requirements. All equipment fuelling and maintenance must be carried out at a safe distance from water courses and Hudson Bay to ensure that no deleterious substances enter the groundwater. - Ensure proper function of lagoon and wetlands through monitoring program.	Consultants and the Hamlet of Whale Cove
Soils and Sediments	- All equipment fuelling and maintenance has to be carried out in designated locations away from open drainage systems and surface water to ensure that no deleterious substances percolate into soils or sediments; emergency clean-up protocols will be developed and implemented in the event of an accidental spill; fuels, oils and other hazardous substances have to be stored in designated, secure locations.	Consultants and the Hamlet of Whale Cove
Air Quality and Climate Change	- Vehicles, machinery and equipment should be in good condition and equipped with emission controls, as applicable. All work shall be carried out in compliance with all applicable air-emissions regulations and bylaws.	Consultants and the Hamlet of Whale Cove
Noise/Vibration	- Vehicles, machinery and equipment must be in good repair. All work shall be carried out in accordance with all applicable noise regulations and bylaws.	Consultants and the Hamlet of Whale Cove
Terrain and Topography	- Ensure proper function of lagoon and wetlands through monitoring program.	Consultants and the Hamlet of Whale Cove

Environmental Component Potentially Affected	Proposed Mitigation	Responsibility to ensure implementation
	- Ensure that grading takes place according to design specifications.	
Vegetation and Wetlands	- Ensure that no run off enters water courses, Hudson Bay or the wetlands; a spill response kit is to be on-Site in the event of a spill; immediately contain and clean-up any spills in accordance with regulatory requirements. All equipment fuelling and maintenance has to be carried out at a safe distance from water courses, Hudson Bay or the wetlands to ensure that no deleterious substances effect the vegetation and wetlands. - Ensure proper function of lagoon and wetlands through monitoring program. - Ensure that grading takes place according to design specifications.	Consultants and the Hamlet of Whale Cove
Fish and Fish Habitat	- Ensure that no run off enters water courses, Hudson Bay or the wetlands; a spill response kit is to be on-Site in the event of a spill; immediately contain and clean-up any spills in accordance with regulatory requirements. All equipment fuelling and maintenance has to be carried out at a safe distance from water courses, Hudson Bay or the wetlands to ensure that no deleterious substances enter the surface water bodies. - Ensure proper function of lagoon and wetlands through monitoring program.	Consultants and the Hamlet of Whale Cove
Wildlife and Habitat	- Ensure spill prevention measures are in place. - Ensure proper function of lagoon and wetlands through monitoring program.	Consultants and the Hamlet of Whale Cove
Human Health	- Follow all applicable health and safety guidelines and proper use of personal safety devices (e.g. hard hats, steel-toed boots, safety glasses, etc.)	Consultants and the Hamlet of Whale Cove
Accidents and Malfunctions	- All equipment fuelling and maintenance has to be carried out in designated locations away from open drainage systems and surface water; emergency clean-up protocols will be developed and implemented in the event of an accidental spill; fuels, oils and other hazardous substances have to be stored in designated, secure locations.	Consultants and the Hamlet of Whale Cove
Water level fluctuations	- Silt fencing is to be placed in areas of concern to prevent loose soils, sediments and debris from entering surface water bodies and the wetlands.	Consultants and the Hamlet of Whale Cove

Chapter 9 – Consultation

9 Consultation

9.1 Public Participation under Subsection 18(3) of the Canadian Environmental Assessment Registry (CEAR)

Is the public participation deemed necessary under Subsection 18(3):

Yes..... ☐

No ..... ☒

Scope of factors posed on the CEAR:

Yes..... ☐

Not applicable ..... ☒

Notice of public input posted on the CEAR:

Yes..... ☐

Not applicable ..... ☒

Public participation was not considered as part of this project since the project has no negative effects on the public, and is confined to the Site.

9.2 Consultation with the Public/Inuit People

Public consultation in the form of a meeting with Hamlet Council was held on August 15, 2011.

9.3 Consultation with other Federal Departments or Agencies

A request for information was sent to the Department of Fisheries and Oceans of Canada (DFO) and Indian and Northern Affairs Canada (INAC). No information has been provided by INAC or DFO for this project, as of March, 2013. Due to the extended period, no additional information is expected.

9.4 Consultation with other Jurisdictions

Consultation with other jurisdictions was not undertaken.

Chapter 10 – Summary

10 Summary

The SLEA revealed that the proposed upgrades and expansion of the existing long term sewage treatment system for the Hamlet of Whale Cove will have net positive effects on the community. This project will not have significant long term negative effects on the environment or local wildlife. Most effects are related to the construction activities, and are short term. All potential effects can be mitigated by applying suitable mitigation measures.

Chapter 11 –
General Limitations and Closure

11 General Limitations and Closure

The purpose of this report is to provide the Government of Nunavut with an evaluation of the potential environmental effects associated with the proposed upgrade to the existing long term sewage treatment system for the Hamlet of Whale Cove.

The information presented in this report is based on information provided by others and visual observations as identified herein. Achieving the objectives stated in this report has required us to arrive at conclusions based upon the best information presently known to us. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the information obtained and in the formulation of the conclusions. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

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The SLEA was prepared based on the available site information and evaluated the potential effects posed on the environment based on the proposed upgrade to the existing long term sewage treatment system for the Hamlet of Whale Cove. Should additional Site information become available, the SLEA should be re-evaluated to determine if the conclusions presented in the report are still valid.

Closure

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

Yours truly,

exp Services Inc.

Edyta Chorostkowska, M.Env.Sc., EPt
Ecological Specialist

Dean Fitzgerald, Ph.D.
Team Leader, Ecological Services

Chapter 12 – References

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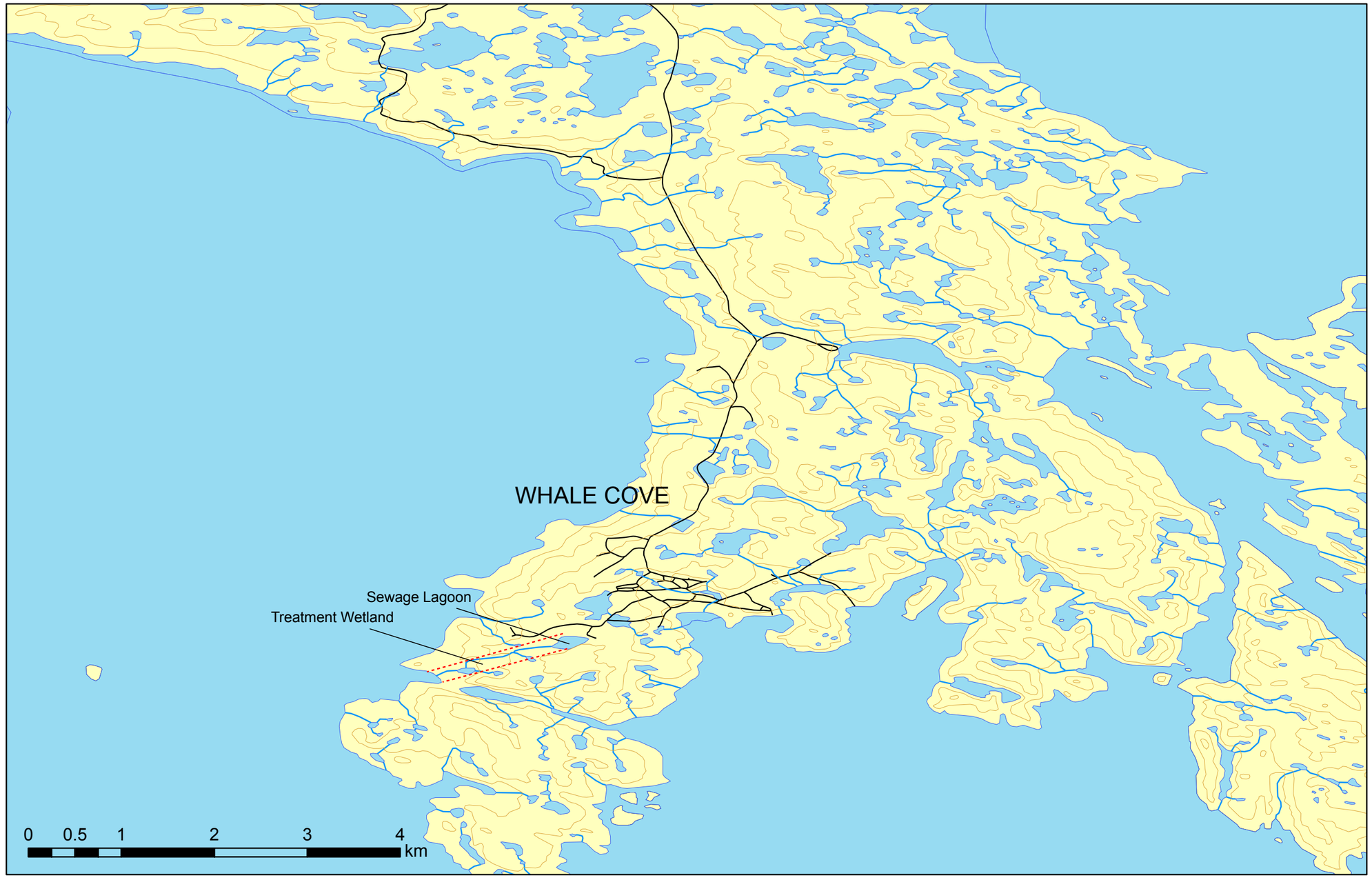
Appendix A – Figures



Legend

- Contour
- River/Stream
- Road
- Approx. Wetland Boundary

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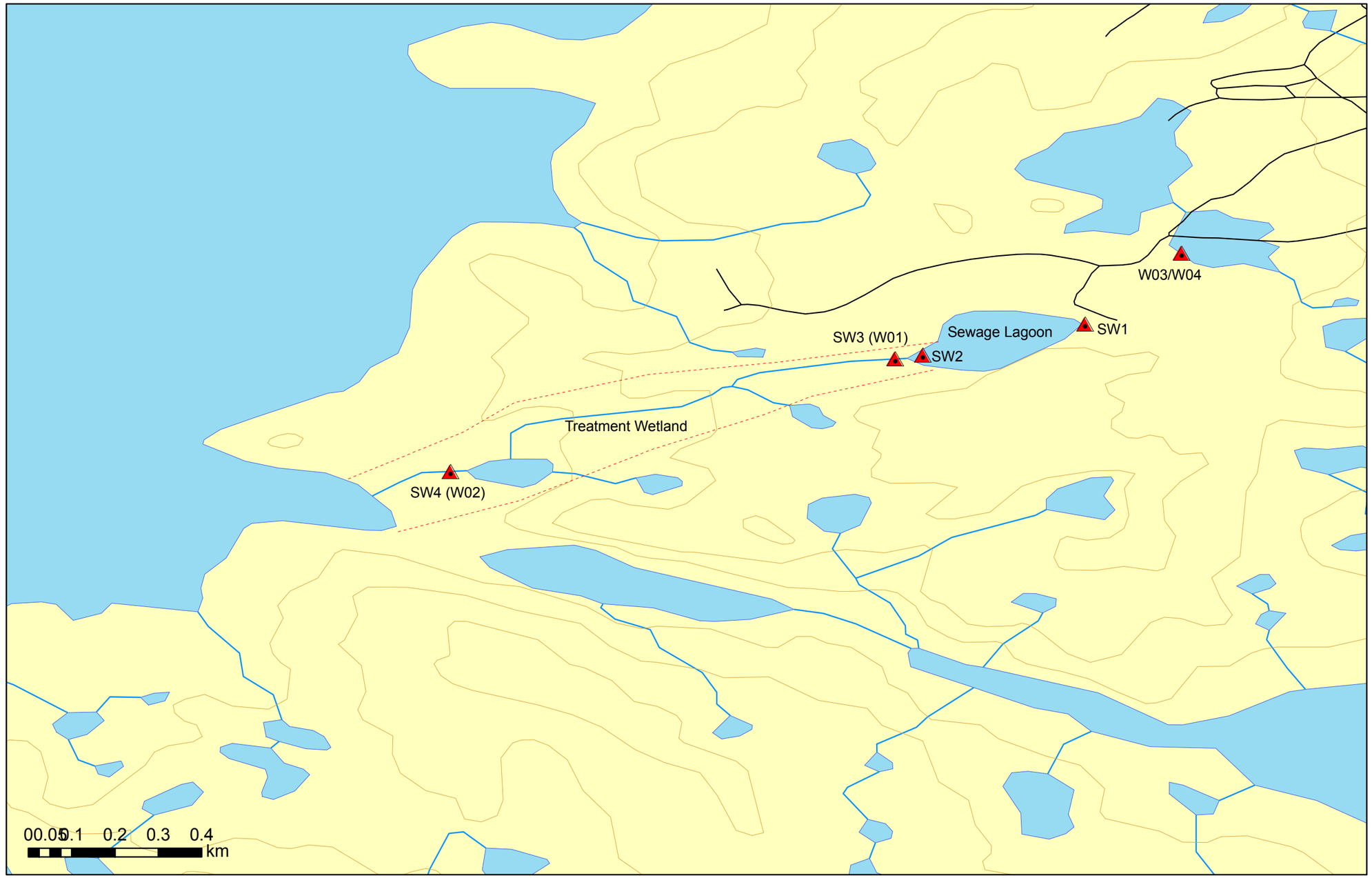
PROJECT TITLE:

Environmental Assessment
Screening under CEAA
Whale Cove, Nunavut

DRAWING TITLE:

SITE LOCATION PLAN

PROJECT No.: OTT-00201369-A0	DWN: EE
SCALE: AS NOTED	CHKD: DF/EC
DATE: MARCH 2013	FIG. No.: 1



Legend

- Contour
- River/Stream
- Road
- Approx. Wetland Boundary
- Approx. Surface Water Monitoring Location
- W0# Sample Collected by exp August 2011
- SW# Sample Collected by exp Sept. 2011

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PROJECT TITLE:

Environmental Assessment
Screening under CEAA
Whale Cove, Nunavut

DRAWING TITLE:

SITE PLAN & SURFACE
WATER MONITORING POINTS

PROJECT No.: OTT-00201369-A0	DWN: EE
SCALE: AS NOTED	CHKD: DF/EC
DATE: MARCH 2013	FIG. No.: 2