Draft

ENVIRONMENTAL ASSESSMENT

Resolute Bay Utilidor Extension and Upgrades

Prepared for:

Infrastructure Canada

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January 2006

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1.0 INTRODUCTION

Since becoming a Territory, communities in Nunavut have been experiencing substantial growth. The continued growth and development of these communities is seen as a fundamental requirement to the further development of the territorial government and economy in Nunavut. Continued growth is, however, dependent upon appropriate infrastructure. Growing community water and wastewater needs must be met. To help relieve pressure on existing infrastructure, the Government of Canada has plans to contribute funding towards water and wastewater infrastructure projects in a number of Nunavut communities under the Strategic Infrastructure Fund. Multiple studies are underway in many communities to plan the needed water and wastewater projects. These plans will require review and approval by the Nunavut Water Board (NWB). In July 2004, G.A. Packman & Associates Inc. was retained by Infrastructure Canada to conduct screening level Environmental Assessments (EAs) for the various water and wastewater projects being reviewed. One of those projects is the proposed Resolute Bay Utilidor Extension and Upgrades project.

The objective of this report is to provide a screening level EA document that will meet the requirements of the *Canadian Environmental Assessment Act* (CEAA) and allow Infrastructure Canada to meet its responsibilities under the Act.

1.1 Regulatory Approval Framework

1.1.1 Canadian Environmental Assessment Act (CEAA) Requirements

Under the *Canadian Environmental Assessment Act* (CEAA), a CEAA screening must be completed for the Resolute Bay Utilidor Extension and Upgrades project because Infrastructure Canada is contributing funds and is therefore obligated under CEAA to complete an EA before taking decisions to release funds for projects that conform to the CEAA definition of a "project". The Resolute Bay Utilidor Extension and Upgrades project fits the CEAA definition of a "project" because it is a physical works that is not excluded under the CEAA Exclusion List Regulations.

The EA process is triggered under Subsection 5(1)(b) of CEAA, which identifies projects requiring environmental assessment as the following:

"5. (1) An environmental assessment of a project is required before a federal authority exercises one of the following powers or performs one of the following duties or functions in respect of a project, namely, where a federal authority:

(b) *makes or authorizes payments or provides a guarantee for a loan or any form of financial assistance to the proponent for the purpose of enabling the project to be carried out in whole or in part, except where the financial assistance is in the form of any reduction, avoidance, deferral, removal, refund, remission or other form of relief from payment of any tax, duty or impost imposed under any Act of Parliament, unless that financial assistance is provided for the*

purpose of enabling an individual project specially named in the Act, regulation or order that provides the relief to be carried out."

Pursuant to Subsection 1(1) of CEAA, Infrastructure Canada is the Federal Authority providing financial assistance to the Government of Nunavut for the purpose of enabling the project to be carried out, and therefore, is the Responsible Authority (RA). Infrastructure Canada is obligated to ensure that an EA is completed on the project before irrevocable decisions are taken to proceed. For this project, it has been determined that a screening level assessment is the appropriate level of EA. An EA screening is a self-directed environmental assessment in which the RA (Infrastructure Canada) must ensure that the screening report is prepared in accordance with CEAA.

Expert advice received from the Federal Authorities was incorporated into the EA. (**NOTE: FEDERAL COORDINATION HAS NOT YET BEEN COMPLETED**)

Based on the EA screening report for the proposed construction and operation of a utilidor extension and upgrades project in Resolute Bay, Infrastructure Canada must arrive at one of three decisions:

- Significant environmental effects are not likely to occur; or,
- There is need for further environmental assessment through Mediation or a Panel Review because significant adverse environmental effects are likely to occur, there is uncertainty surrounding the significance of adverse environmental effects, and/or there is public concern that warrants further review; or,
- Significant adverse environmental effects are likely to occur that cannot be justified in the circumstances.

The following key issues and elements are addressed in this Screening Report:

- Project and trigger, as defined by CEAA, are identified;
- Scope of the project, the scope of the assessment, and the environmental components, both human and natural environment, that are to be considered;
- Description of the project;
- Environmental conditions that currently exist at the site;
- Analysis of potential environmental effects of the project, and identification of mitigation measures; and,
- Recommended conclusion on the significance of environmental effects, as required under CEAA.

The Nunavut Water Board will give notice of the application to appropriate federal and territorial government departments and agencies, hamlet councils, hunters and trappers' organizations, Regional Inuit Organizations, Regional Wildlife Organizations, etc., and shall publish the notice in a newspaper of general circulation in the area affected or, if there is no such newspaper, in such other manner as the Board considers appropriate. Any comments will be considered in project approvals.
NOTE: THIS HAS NOT HAPPENED YET.

This screening document has been assembled to meet the objectives noted above.

1.1.1.1 Federal Coordination

As per the Federal Coordination Regulations under CEAA, information on the project has been circulated to other federal departments. This process determines whether other departments also have a decision-making role or can provide expert advice on the project in question. Information on the project was circulated to Fisheries and Oceans Canada (DFO), Environment Canada, Natural Resources Canada (NRCan), Indian and Northern Affairs Canada (INAC), Health Canada, and the Parks Canada Agency (PCA). The following departments / agencies responded as follows:

DFO: Responsible Authority (No)
Federal Authority with relevant Expert Knowledge (No)
EC: Responsible Authority (No)
Federal Authority with relevant Expert Knowledge (Yes)
INAC: Responsible Authority (No)
Federal Authority with relevant Expert Knowledge (Yes)
HC: Responsible Authority (No)
Federal Authority with relevant Expert Knowledge (Yes)
PCA: Responsible Authority (No)
Federal Authority with relevant Expert Knowledge (No)

NOTE: FEDERAL COORDINATION HAS NOT YET BEEN COMPLETED

1.1.2 Nunavut Water Board

The Nunavut Water Board is currently reviewing a water licence application and related documentation for the project.

1.1.3 Nunavut Impact Review Board

The proposed project is exempt from the screening process of the Nunavut Impact Review Board (NIRB) established under the Nunavut Land Claim Agreement. This exemption is pursuant to Schedule 12-1, Item 3 of the *Nunavut Land Claim Agreement Act* that states:

12-1 Types of Projects Exempt from Screening

3. *All construction, operation and maintenance of all buildings and services within an established municipality, except for bulk storage of fuel, power generation with nuclear fuels, or hydro power and any industrial activity.*

The Resolute Bay Utilidor Extension and Upgrades project is within an established municipality (Resolute Bay) and is therefore exempt from the requirements of the NIRB process.

2.0 PROJECT DESCRIPTION

2.1 Scope of Project

For the purpose of this EA screening report, Infrastructure Canada, under subsection 15(2) of CEAA, has determined that the scope of project includes construction and operation of a 225 m utilidor extension, as well as the installation of required upgrades to the existing utilidor system in Resolute Bay, Nunavut. The principal project is therefore defined as all physical works or activities related to the construction and operation of the utilidor extension, as well as the installation of the required utilidor upgrades. Figure 1 provides an overview of the location of the utilidor extension and upgrade project. Table 2.1 outlines the project components and activities, along with the rationale for their inclusion in, or exclusion from, the scope of project for this EA screening report.

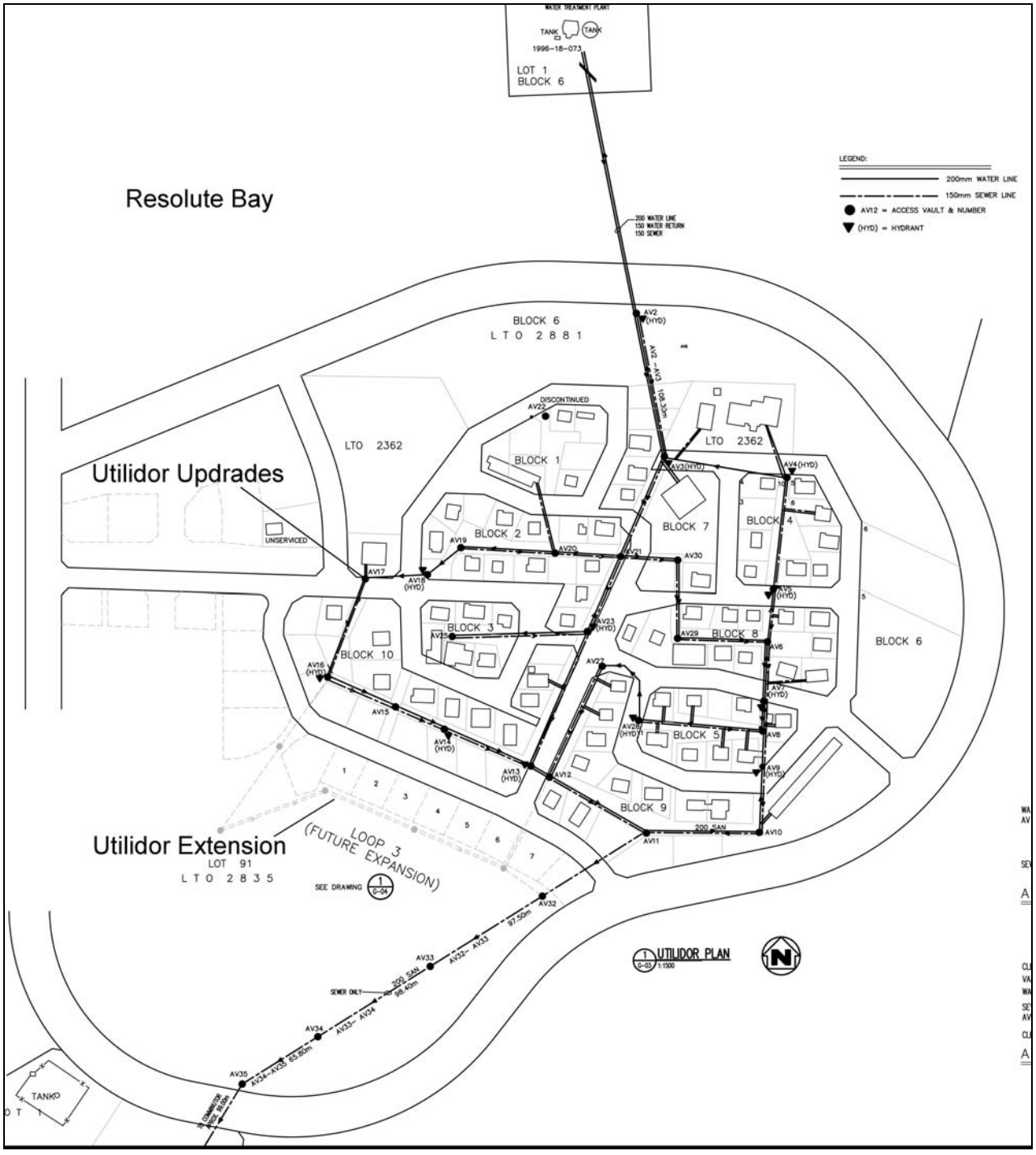

Figure 2.1 – Proposed Utilidor Location

Table 2.1 – Scope of Project - Project Components and Associated Activities

Project Component: Installation of Utilidor Upgrades				
Activity	**Included**		**Rationale**	**Boundary**
	Yes	**No**		
Mobilization (transportation of materials to the sites via northern sea lift)		√	Large quantities of materials are routinely transported to Nunavut communities via the northern sealift. There is no critical incremental increase in material transportation associated with this project.	
Site preparation	√		The construction site for the utilidor will have to be cleared of fences and other anthropogenic obstructions, as well as ice and snow, and any vegetation that may be present along the construction corridor.	Boundary of the construction corridor and adjacent areas for the duration of the construction period.
Excavation	√		The utilidor easement will be excavated to lines, grades, elevations and dimensions as approved by the Project Engineer. Excavation will be carried out using standard methods and equipment.	Boundary of the construction corridor and adjacent areas for the duration of the construction period.
Complete Required Upgrades to Existing Utilidor System	√		Work will include replacing valves, elbows and utilidor sections, installing water laterals, testing existing curb box check valves and replacing as required, installing a heat tape system in all hydrants, installing insulation as required, installing a new bypass valve and testing all lines.	Boundary of the construction corridor and adjacent areas for the duration of the construction period.

Backfilling / Compaction	√		The utilidor easement will require backfilling / compaction upon approval of installations by Project Engineer.	Boundary of the construction corridor and adjacent areas for the duration of the construction period.
Demobilization	√		The disassembly and removal from site of all temporary facilities, equipment and workers, and general site clean-up.	Boundary of the construction corridor and adjacent areas during the demobilization period.
Project Component: Construction of Utilidor Extension				
Activity	**Included**		**Rationale**	**Boundary**
	Yes	**No**		
Mobilization (transportation of materials to the sites via northern sea lift)		√	Large quantities of materials are routinely transported to Nunavut communities via the northern sealift. There is no critical incremental increase in material transportation associated with this project.	
Site preparation	√		The construction site for the utilidor will have to be cleared of fences and other anthropogenic obstructions, as well as ice and snow, any vegetation that may be present along the construction corridor.	Boundary of the construction corridor and adjacent areas for the duration of the construction period.
Excavation	√		The utilidor easement will be excavated to lines, grades, elevations and dimensions as approved by the Project Engineer. Excavation will be carried out using standard methods and equipment.	Boundary of the construction corridor and adjacent areas for the duration of the construction period.
Install Water and Sewer Mains and Fittings	√		Water and sewer mains and fittings will be installed according to design specifications. Installation	Boundary of the construction corridor and adjacent areas for

			activities will use standard materials, methods and equipment.	the duration of the construction period.
Install Thermal Insulation for Underground Piping	√		An insulation system is required for water and sewer mains, including fittings and appurtenances. The intent is to have a fully insulated water and sewer system.	Boundary of the construction corridor and adjacent areas for the duration of the construction period.
Install Hydrants, Access Vaults, Valves, Tees, and Curb boxes with Sewer Check Valves	√		Hydrants, Access Vaults, Valves, Tees, and Curb boxes with Sewer Check Valves will be installed and tested according to standard methods.	Boundary of the construction corridor and adjacent areas for the duration of the construction period.
Backfilling / Compaction	√		The utilidor easement will require backfilling / compaction upon approval of installations by Project Engineer.	Boundary of the construction corridor and adjacent areas for the duration of the construction period.
Demobilization	√		The disassembly and removal from site of all temporary facilities, equipment and workers, and general site clean-up.	Boundary of the construction corridor and adjacent areas during the demobilization period.
Project Component: Operation of Utilidor				
Activity	**Included**		**Rationale**	**Boundary**
	Yes	**No**		
Maintenance	√		Ongoing maintenance of the utilidor may be required.	Boundary includes the utilidor easement over the lifespan of the community of Resolute Bay.

Malfunctions	√		Ongoing operation of sanitary line may result malfunctions and/or accidents.	Boundary includes the utilidor easement over the lifespan of the community of Resolute Bay.
Decommissioning	√		Removal and replacement of utilidor components will be completed on an as required basis to ensure that services are provided to Resolute Bay.	Boundary includes the utilidor easement over the lifespan of the community of Resolute Bay.

2.1.1 Activities or Physical Works Not Included Within Scope of Project

As previously indicated, the project is limited to all physical works or activities related to the construction and operation of the utilidor extension, as well as the installation of the required utilidor upgrades in the community of Resolute Bay, as defined in Table 2.1 above. This EA screening does not consider potential effects due to gross human error in the normal design and implementation of the project, or effects from unusual events such as *force majeur*. Such events are considered beyond the scope of reasonable predictability for the purpose of an EA for this project.

2.2 Time Frames

The project involves the construction of the utilidor over an approximate 5 month period. Construction is expected to begin in July 2006 and end in October 2006. Construction will not be carried out during the period November to May. Operations associated with the project are expected to carry on for a period of 20+ years.

2.3 Proposed Project Description

The following provides a description of the proposed project. The project description has been subdivided into discrete phases to provide a more focused description of project components and the potential for environmental effects.

Further details on the project are provided in the design drawings presented in Appendix 1.

Table 2.2 – Project Description

Project Components	Physical Works and Activities	Description
Installation of Utilidor Upgrades	Material staging/storage	• Staging/storage of materials for construction during the period when utilidor upgrades are being installed and the utilidor extension is being built will be conducted in an environmentally responsible manner, in accordance with directions from the Project Engineer throughout the construction period. Materials that require staging/storage will include: tools, equipment, inert construction materials; fuels; and, lubricants.
	Site preparation	• Equipment movement will be necessary. • Any existing topsoil (which is expected to be minimal given the northern location of the project) will be stripped and spoil piles / stockpiles will be created for re-spreading after backfilling. • If required, fill will be trucked in from existing quarries. Permits will be obtained as necessary and all permit terms and conditions will be adhered to.

Project Components	Physical Works and Activities	Description
	Excavation	• Easement will be excavated to expose existing pipes. • Excavated easement will be shored, braced and underpinned as required. • The trench will be dewatered to achieve a level earth bottom free from loose or organic matter. Pumped water being directed to existing drainage ditches (using screens to filter out silt held in suspension). • No more then 30m of the easement will be excavated in advance of installation operations and no more than 15m will be left open at the end of the day's operation. • Surplus and unsuitable excavated material will be disposed of in an approved location off site.
	Conduct Required Upgrades to Existing Utilidor System	• Replace approximately 84 m of the utilidor water lines. • Replace five 90 degree elbows. • Install 12 new water laterals • Test existing curb check box check valves and sewer check valves and curb boxes and replace as required. • Install / insulate heat tape on fire hydrant systems as required. • Install a new by-pass valve as required. • Test all existing lines and valves for functionality as directed by the Project Engineer.

Project Components	Physical Works and Activities	Description
	Backfilling	• Trench will require backfilling / compaction upon approval of installations by Project Engineer. • Areas to be backfilled will be free from debris, snow, and ice. Backfill material will not be frozen or contain ice, snow or debris. • Compact fill material will be placed in continuous horizontal layers, not exceeding 200 mm loose depth or 150 mm compacted depth. • All excavated materials from the proposed project will be cleaned up, removed and disposed of in an approved manner and location. • Any settlement of backfill will be promptly repaired though the addition and compaction of additional clean fill material.
	Demobilization	• All temporary facilities, equipment, and workers will be removed from the site, and the site will be cleaned-up.
Construction of Utilidor Extension	Material staging/storage	• Staging/storage of materials for construction during the period when utilidor upgrades are being installed and the utilidor extension is being built will be conducted in an environmentally responsible manner, in accordance with directions from the Project Engineer throughout the construction period. Materials that require staging/storage will include: tools, equipment, inert construction materials; fuels; and, lubricants.

Project Components	Physical Works and Activities	Description
	Site preparation	• Equipment movement will be necessary. • Any existing topsoil (which is expected to be minimal given the northern location of the project) will be stripped and spoil piles / stockpiles will be created for re-spreading after backfilling. • If required, fill will be trucked in from existing quarries. Permits will be obtained as necessary and all permit terms and conditions will be adhered to.
		• For the installation of the utilidor extension, the easement will be excavated to a depth no greater than 1.6 m and a width no wider than 400 mm greater from the outside pipe. • Fill materials will be stockpiled in designated areas and protected from contamination. • Excavated easement will be shored, braced and underpinned as required. • Earth bottoms will be dry, undisturbed soil, level, and free from loose or organic matter. • The trench will be dewatered as required with pumped water being directed to existing drainage ditches (using screens to filter out silt held in suspension). • No more then 30m of the easement will be excavated in advance of installation operations and no more than 15m will be left open at the end of the day's operation. • Surplus and unsuitable excavated material will be disposed of in an approved location off site.

Project Components	Physical Works and Activities	Description
	Install Water & Sewer Mains and Fittings	• Excavation will be inspected and approved prior to commencement of installation operations. • Mains will be installed at locations and to grades designated by project design. • Trench will be excavated to allow for 400mm of free space between pipes. • Trench bed will be shaped true to grade to provide a continuous uniform bearing service for pipe exterior. • Pipe will be constructed one section at a time. • Pressure testing will be conducted on each pipe section using water, prior to installation in the trench. Water used in pressure testing will be disposed of by dewatering into drainage ditches (using screens to filter out silt held in suspension). • Each pipe section will be installed upon completion of testing. • Access vaults will be constructed (see "Install Hydrants, Access Vaults, Valves, Tees, and Curb boxes with Sewer Check Valves" activity). • Pipe will be connected to prefabricated access vaults (see "Install Hydrants, Access Vaults, Valves, Tees, and Curb boxes with Sewer Check Valves" activity). • Pipe will be connected to existing mains. • Hydrostatic and leakage testing will be conducted. Water from testing will be disposed of by dewatering into drainage ditches (using screens to filter out silt held in suspension). • The water pipe will be flushed and disinfected. Water from flushing will be disposed of by dewatering into drainage

Project Components	Physical Works and Activities	Description
		ditches (using screens to filter out silt held in suspension). • The sewer pipe will be flushed. Water from flushing will be disposed of by dewatering into drainage ditches (using screens to filter out silt held in suspension).
	Install Thermal Insulation for Underground Piping	• All surfaces will be cleaned prior to applying adhesives, polyurethane, half shells, mastic, shrink sleeve or tape. • Jointing will be completed as required. • All exposed surfaces will be coated with mastic. All surfaces of half-shells will be coated prior to installation. • Half shell insulation composed of polyurethylene will be installed. • 2 layers of heat shrink sleeves will be applied.
	Install Hydrants, Access Vaults, Valves, Tees, and Curb boxes with Sewer Check Valves	• Hydrants, Access Vaults, Valves, Tees, and Curb boxes with Sewer Check Valves will be installed and tested according to standard methods.

Project Components	Physical Works and Activities	Description
	Backfilling / Compaction	• Trench will require backfilling / compaction upon approval of installations by Project Engineer. • Areas to be backfilled will be free from debris, snow, and ice. Backfill material will not be frozen or contain ice, snow or debris. • Compact fill material will be placed in continuous horizontal layers, not exceeding 200 mm loose depth or 150 mm compacted depth. • All excavated materials resulting from the proposed project will be cleaned up, removed and disposed of in an approved manner and location. • Any settlement of backfill will be promptly repaired though the addition and compaction of additional clean fill material.
	Demobilization	• All temporary facilities, and equipment will be removed from the site, and the site will be cleaned-up.
Operations	Maintenance	• The Government of Nunavut will be responsible for maintenance of the utilidor which may include: cleaning; repairs; replacement of degraded components; etc.
	Malfunctions	• Pipe ruptures, blockages, etc. will be responded to in accordance with an approved contingency plan. Responsibility for first order response rests with the Department of Community and Government Services of the Government of Nunavut, with follow-up responsibility resting with the Community of Resolute Bay.
	Decommissioning	• Removal and replacement of utilidor components will be implemented on an as required basis to ensure that services are provided to Resolute Bay.

3.0 ENVIRONMENTAL ASSESSMENT METHODOLOGY

3.1 Overview Assessment

The methodology used in this report has evolved from methods proposed by Beanlands and Duinker (1983) who stressed the importance of focusing the assessment on the environmental components of greatest concern to potentially affected parties. Accordingly, this assessment focuses on Valued Environmental Components (VECs) relevant to the project location. VECs are components of the biophysical and related socioeconomic environments that are valued by society and upon which the EA is focused, due to potential interactions with the project. The EA methodology for this project includes an evaluation of the potential effects of each project component, as well as accidental events and cumulative effects, with regard to the identified VECs. Project related effects are assessed within temporal, spatial, technical and administrative boundaries established for the assessment.

3.2 Issue Scoping and Selection of Valued Environmental Components

Issues scoping is an important part of the VEC identification process for this assessment. Issues scoping has included the following activities:

- Consultation with Infrastructure Canada;
- Literature review; and,
- Review of regulatory issues and guidelines.

Relevant government regulations and guidelines reviewed during the issues scoping process included:

- *Canadian Environmental Assessment Act* and related Regulations; and,
- Nunavut Land Claim Agreement.

VECs were selected for this assessment based on the scoping activities described above and the professional judgment of the study team. Table 3.1 presents the list of VECs and the rationale for their inclusion/exclusion as VECs for assessment in Section 6.0.

Table 3.1 – Preliminary List of Potential Valued Environmental Components (VECs) and Boundaries

VEC			Rationale	Assessment Boundaries
Description	Included			
	Yes	No		
Soils	√		Soil quality could be affected by malfunctions or accidents (e.g., fuel spills) that could lead to soil contamination.	Construction corridor and adjacent areas that could be affected by malfunctions and accidents during the life-span of the project (20+ years).
Permafrost	√		Permafrost may exist in the project area and may be affected by the proposed project (i.e. melting due to exposure during construction and/or heating by the utilidor during operations).	Construction corridor and adjacent areas that could be affected by exposure of permafrost and/or increased heat from the utilidor (20+ years).
Vegetation	√		There may be a limited requirement for vegetation removal in the footprint of the proposed utilidor.	Footprint of the construction corridor and adjacent areas to be disturbed.
Wildlife	√		Disturbance of wildlife and loss of habitat in the immediate vicinity is possible due to construction activities, although very limited.	Construction corridor and adjacent areas where wildlife could be affected throughout the duration of the construction period.
Water Quality	√		Water quality in watercourses / drainage ditches may be affected by surface run-off created by project activities during construction (e.g., hydrostatic testing, leak testing, trench de-watering). In the event of a spill or other malfunction or accident, the potential for contamination of nearby watercourses exists.	Water adjacent to the project areas and areas downstream that could be affected by surface run-off or malfunctions and accidents during the life-span of the project (20+ years). Note: Project does not involve changes to treatment of municipal effluent. Accordingly, receiving waters for

VEC			Rationale	Assessment Boundaries
Description	Included			
	Yes	No		
				municipal effluent discharged from the municipal wastewater system and associated treatment are not included within the scope of this EA.
Fish and Fish Habitat	√		While no fish bearing waterbodies / streams are located within the immediate vicinity of the project, the potential exists for discharge water and spills to enter into waters containing fish.	Fish bearing waters in the vicinity that may be affected by discharge of wastewater from hydrostatic testing, trench de-watering, accidents/malfunctions of the utilidor itself. Fish and fish habitat associated with receiving waters for municipal effluent discharged from the municipal wastewater system and associated treatment are not included within the scope of this EA.
Air Quality	√		Air quality is important to community residents and may be affected by the generation of dust during construction activities.	Air quality on the construction corridor and within a 200 m radius around this area for the duration of the construction period (5 months).
Health and Safety	√		Health and safety of contractors, and the public could possibly be at risk as a result of malfunctions and accidents during construction and operations.	Construction corridor and adjacent areas that could be affected by malfunctions and accidents during the life-span of the project (20+

VEC			Rationale	Assessment Boundaries
Description	Included			
	Yes	No		
				years).
Noise	√		Utilidor construction activities have the potential to generate noise above normal levels. Noise can be a nuisance for residents.	The construction corridor and within a 200 m radius around this area throughout the duration of the construction period (5 months).
Aesthetics	√		While the utilidor will be located underground upon completion of the project, active construction sites have the potential to be aesthetically unpleasing.	Construction corridor and adjacent areas for the duration of the construction period.
Archaeology	√		The utilidor is located within the municipal boundaries of Resolute Bay and no archaeological features are known to be present on the easement. In the event they are discovered during excavation; however, the potential for interaction exists.	Construction corridor and adjacent areas that could be affected by malfunctions and accidents during the construction period.
Land Use		√	The proposed project has been slated for construction on municipal easements that have been designated by the Community of Resolute Bay for this purpose.	

4.0 DESCRIPTION OF VALUED ENVIRONMENTAL COMPONENTS (VEC)

The following description of VECs is based on a review of relevant documents and the potential for the project to interact with the environment. No site visits were undertaken by the study team due to the environmentally-benign nature of the planned project.

Soils

The nature of the existing soils on the proposed utilidor corridor is typical of an Arctic community setting consisting predominantly glacial till composed of silt, sand, and gravel. Little overburden exists on the construction corridor due to the fact that the project area is located predominantly beneath existing roadway (see Figure 1). In undisturbed areas the overburden is expected to be extremely thin due to the high arctic setting of the project.

The utilidor is located in areas where soil contamination is not suspected.

Permafrost

Given the high arctic location of the project, permafrost is continuous. Based on consultation with the Regional Municipal Planning Engineer for the Government of Nunavut Department of Community and Government Services, the active layer above the permafrost is estimated to be approximately one to two inches in depth.

Vegetation

There is little vegetation present in the vicinity of the proposed utilidor corridor which is located primarily on existing roads consisting of compacted silt, sand, and gravel. In areas where vegetation is present, typical Arctic vegetation communities (e.g., grasses, cotton grasses, sedges, lichens, mosses) are found.

Wildlife

Typical wildlife that frequent the community of Resolute Bay is comprised of mammals and birds including wolf, arctic fox, arctic ground squirrel, rodents, ptarmigan, Jaegars, Snow Buntings, Arctic Terns, Ivory Gulls, Red-throated loons, Northern Fulmars, Black-legged Kittwakes and Black Guillemots. Mammals normally hunted by Nunavummiut (including polar bear, muskox, and caribou) are not expected to normally frequent the proposed project area give its community setting. In addition, marine mammals that frequent the area, including narwhals, beluga whales, ringed seal, bearded seal, and harp seal, are not expected to be affected by the project due to the the fact that it is located within the community of Resolute Bay. Thus, potential for interaction on the utilidor corridor is limited primarily to small mammals and birds.

Water Quality

The closest waterbody to the construction corridor is Resolute Bay, Barrow Strait, which is located approximately 390 m south of the project area. Char Lake, a fresh water lake, is located approximately 500 m northeast of the project area. Project interactions with waterbodies (marine or freshwater) are not anticipated due to the community based setting of the project.

Fish and Fish Habitat

No fish or fish habitat with the potential to interact with the proposed project has been identified in or within the vicinity of the project area, based on reviewed Drawings (see Appendix 1). The closest waterbody to the construction corridor is Resolute Bay, Barrow Strait which is located approximately 390 m south of the project area. Project interaction with Resolute Bay, Barrow Strait is not anticipated.

Air Quality

Air quality in the vicinity of the proposed utilidor is typical of a northern community and of good quality. Indications are that during the summer, the area can become dusty from vehicular traffic on roads and wind, when there is a lack of precipitation.

Health and Safety

The utilidor is not located in an area with obvious health and safety issues. Health and safety issues can arise with any municipal utilidor construction project.

Noise

Ambient noise in the vicinity of the study area can be expected to be typical of a northern community setting. Motorized vehicles (e.g., trucks, snowmobiles, ATVs, cars) are the major sources of ambient noise, although aircraft landing and taking off also create intermittent noise.

Aesthetics

Resolute Bay is a typical Nunavut community. Aesthetic values are related to the northern and Inuit lifestyles of community members and include: views of Resolute Bay; streets that are uncluttered and easily used; being able to easily walk about town; etc.

Archaeology

The utilidor is located within the municipal boundaries of Resolute Bay and no archaeological features are known to be present on the easement; however, the possibility exists that archaeological artifacts could be encountered during excavation.

5.0 ENVIRONMENTAL ASSESSSMENT SCREENING METHODOLOGY

This screening level EA has been completed to determine the environmental effects, and related effects on socio-economic and cultural resources, including cumulative effects, associated with the proposed project.

This EA screening identifies:

- The environment components that will or could be directly or indirectly affected by the project;
- Effects that can be negative (significant or non-significant) or positive;
- The characteristics (nature, extent, duration, frequency, magnitude, timing, etc.) of the effects that the project is predicted to have on these environmental components;
- The actions necessary to avoid, prevent, change, mitigate or remedy the effects; and,
- The advantages and disadvantages to the environment associated with undertaking the project.

The screening process then includes identification of mitigation measures, summary of residual effects after mitigation, proposed conclusions on the significance of predicted environmental effects, and recommendations on environmental monitoring and/or follow-up that should be undertaken.

The Nunavut Water Board will give notice of the application to appropriate federal and territorial government departments and agencies, hamlet councils, hunters and trappers' organizations, Regional Inuit Organizations, Regional Wildlife Organizations, etc., and shall publish the notice in a newspaper of general circulation in the area affected or, if there is no such newspaper, in such other manner as the Board considers appropriate. Any comments will be considered in project approvals.
NOTE: THIS HAS NOT HAPPENED YET.

This EA screening is prepared on the basis of available existing information provided by Infrastructure Canada, the Government of Nunavut Department of Community and Government Services, a literature review, and professional expertise.

A list of references is provided at the end of the report.

5.1 Significance of Environmental Effects

The significance of environmental effects was established based upon the predicted characteristics of the effect in terms of its nature, extent, duration, frequency, magnitude, and timing, as well as the sensitivity of each VEC to the effects and the ability of the VEC to recover from the potential effect. For the purposes of this assessment, a determination is made on whether effects are considered to be significant for both ecological and human components.

Whether a negative effect is considered significant or not depends on the variables set out below.

A significant environmental effect is considered to be one that refers to a permanent change of sufficient magnitude in the nature of a given environmental component, a loss of a component that will modify environmental integrity at the site, or any other effect of importance, that is frequent, durable and of sufficient magnitude on a natural or human element of the environment.

An environmental effect that is not a significant effect is one where the environmental component of sufficient magnitude is not permanently modified, the integrity of the environment at the site is maintained; or, the effect of the project concerns a component that is not highly valued by the local population or the site users.

6.0 IDENTIFYING AND MITIGATING EFFECTS

As indicated, the identified VECs for this EA include: soils; permafrost; vegetation; wildlife; water quality; fish and fish habitat; air quality; health and safety; noise; archaeology; and, aesthetics. In those cases where an interaction between a project component and a VEC was identified, the effects were then evaluated to determine the characteristics of the effect. Depending upon the predicted nature and significance of an identified effect, one or more mitigation and/or monitoring measure(s) was identified to ensure that the severity of the predicted adverse effects would be reduced.

It should be noted that, while project / environment interactions are focused on potential negative environmental effects, the proposed project is a required part of infrastructure that has a an overall positive effect in terms of ensuring a safe, dependable supply of potable water to residents and facilities in Resolute Bay, ensuring that sewage is collected for effective treatment and disposal, and maintaining and enhancing the general standard of living in the community.

6.1 Potential Effects on Environmental Components

6.1.1 Soils

Effect

The potential exists for hydrocarbon contaminated soils to be encountered during the excavation phase of construction. Indiscriminant excavation and material handling has the potential to mobilize and more widely distribute the hydrocarbon contaminated soils.

There is the potential for hydrocarbon spills to occur during the construction phase of the project. Diesel and hydraulic oil spills could originate from fueling, operation and maintenance of equipment during the construction phase. These spills would be infrequent, localized and of small volume. Hydrocarbon spills and related effects on soil quality are not expected to occur during operation of the utilidor, except potentially during utilidor repair and maintenance operations. A rupture in a sewage line has the potential to release sewage onto and into soils.

Mitigation

- Construction will be completed by contractors, and contracts will be written to ensure that:
  - During construction activities, should soil contamination be suspected, work will be halted in the area, and the appropriate expertise will be brought in to assess the nature and extent of contamination, and the appropriate remedial actions to be followed.
  - During construction activities, best practices will be employed such as: vehicles and equipment are to be in good working order; and, appropriate spill containment and spill response materials will be present on site.
  - An updated spill contingency plan will be in place. The plan will provide a clear path of response in the event of a spill. All spills are to be documented and reported to the 24-hour Spill Line at (867) 920-8130.
  - In the event of a malfunction or accident, the affected areas will be immediately remediated to acceptable standards as determined by the Government of Nunavut and the Government of Canada.
- Secondary containment, such as self-supporting insta-berms, will be used when storing barreled fuel on location.
- Drip pans, or other similar preventive measures, will be employed when refueling equipment on site.

Residual Effect and Significance Determination

The risk of a spill or other accidental event will be greatly reduced through the implementation of construction best practices by the contractor. It is expected that, should a spill occur, it will be contained to a local area, the volume will be small, and it will be cleaned up quickly. In the unlikely event that a malfunction or accident should occur, the affected areas will be remediated to appropriate standards. Therefore, the effects of the project on soil quality are predicted to be not significant.

Follow-up

- None required.

6.1.2 Permafrost

Effect

Permafrost integrity could be adversely affected by the proposed project. Based on discussions with the Regional Municipal Planning Engineer from the Nunavut Department of Community and Government Services, it was determined that permafrost is continuous and estimated to be at a depth of one to two inches below grade.

During trenching for utilidor installation, permafrost degradation could occur if the exposure area and time period are not minimized. In addition, heat emanating from the utilidor has the potential to degrade permafrost over the operational lifespan of the utilidor, which could result in soil instability and failure of utilidor structural integrity.

Mitigation

- Every effort will be made to minimize thermal degradation due to the trenching operation.
- Construction will be completed by contractors, and contracts will be written to ensure that:
  - The trench will be backfilled to the bottom of road base elevation within 48 hours of initial excavation or as approved by the Engineer.
  - The trench will be backfilled to a minimum of 0.5m, or as directed by the Engineer, above the top elevation of permafrost at the end of the working day.
- Potential permafrost degradation as a result of utilidor operation will be mitigated by insulating the water and sewer pipes to avoid heat transfer.

Residual Effect and Significance Determination

The integrity of any existing permafrost encountered will be maintained through the application of accepted northern engineering design and mitigation measures, and therefore, the effects of the project on permafrost are predicted to be not significant.

Follow-up

- The structural integrity of the utilidor pipes, in relation to permafrost will be monitored on an ongoing basis over the lifespan of utilidor operations.

6.1.3 Vegetation

Effect

Some permanent loss of vegetation may occur on the construction corridor in any areas where vegetation currently exists, but where growth may not be possible in the future due to changes in land use. The vegetation that may be lost is expected to be typical of the area. No unique vegetation communities or known vegetation species of concern will be affected by the project.

Mitigation

- Construction will be completed by contractors and contracts will be written to ensure that:
  - The area of vegetation to be lost or disturbed will be minimized through proper delineation of the workspace by installing fencing or another temporary barrier.
  - Re-vegetation will be implemented in those areas where vegetation is lost and where future land use will allow for vegetation survival and growth.

Residual Effect

The residual effect is expected to consist of the potential permanent loss of a small amount of vegetation that is expected to be plentiful in the area. Therefore, the effects of the project on vegetation are predicted to be not significant.

Follow-up

In areas where re-vegetation is implemented, follow-up to confirm success will be undertaken.

6.1.4 Wildlife

Effect

During construction, there is the potential for minor disturbance of the existing wildlife (i.e., birds and mammals) in the area as a result of noise and increased human activity. This may result in the temporary displacement of some species from the area. It is anticipated that this disturbance will be localized to areas immediately adjacent to the project area, affect a small number of animals (i.e., those that have home ranges that are in the immediate vicinity of the project area), and will be completely reversible once construction is completed.

As well, some permanent loss of vegetation may occur in the footprint of the construction corridor, which could represent habitat for birds and mammals. Similar habitat is considered to be plentiful in the surrounding area.

Mitigation

- Construction will be completed by contractors and contracts will be written to ensure that:
  - The area of vegetation to be lost and disturbed will be minimized through proper delineation of the workspace by installing fencing or another temporary barrier.
  - Environment Canada recommends that all activities with the potential to affect migratory birds be conducted outside the migratory bird breeding season, which extends from approximately June 1-July 15. These dates are approximate, and if active nests (i.e., nests containing eggs or young) are encountered outside of these dates, the area will be avoided until nesting is complete (i.e., the young have left the nest). Paragraph 6(a) of the *Migratory Birds Regulations* state that no one shall disturb or destroy the nests or eggs of migratory birds.

Residual Effect

The residual effect is expected to consist of infrequent temporary disturbance of some species of birds and mammals that will be fully reversible. In addition, there will be the permanent loss of small amount of habitat that is considered to be plentiful in the area and is not expected to be critical to the survival of any affected bird and mammal populations. Therefore, the effects of the project on wildlife are predicted to be not significant.

Follow-up

None recommended

6.1.5 Water Quality

Effect

Effects on water quality in areas down gradient from the construction corridor could potentially originate from malfunctions and accidents (i.e., potential spills of fuel, lubricants, etc.) during construction. As well, the possibility exists that surface run-off from construction activities could impair water quality (i.e., elevated suspended solids) in downstream areas. Construction run-off is expected to occur for a short duration and natural drainage flow patterns will not be altered as a result of this project.

An accident or malfunction during utilidor operations, over its lifespan, has the potential to result in a spill of potable water or sewage that could affect down gradient water quality.

Mitigation

- Construction will be completed by contractors and contracts will be written to ensure that:
  - Contractors will not deposit, nor permit the deposit of any fuel, chemicals, wastes or sediment into any water body during all stages of project construction.
  - Contractors will be required to develop and implement contingency plans during construction, to ensure that water quality is maintained. Contingency plans will include, but not be limited to: training; provision of spill response materials; spill response procedures (i.e., documentation of spills, reporting to the 24 hour Spill Response Line, etc.); and, the prevention of construction run-off. Prevention of construction run-off will be achieved through sediment and erosion controls and best management practices.
  - Refueling of equipment will be done in a designated area away from drainage ditches and watercourses.
  - Fuels, other hazardous products and wastes will be stored, handled and disposed in accordance with approved methods.
  - An updated spill contingency plan will be in place. The plan will provide a clear path of response in the event of a spill. All spills are to be documented and reported to the 24-hour Spill Line at (867) 920-8130.
  - In the event of a malfunction or accident, affected areas will be remediated to acceptable standards of the Government of Nunavut and the Government of Canada.
  - The flow of surface drainage or natural watercourses will not be obstructed.
  - Water being discharged in drainage ditches during dewatering will not contain silt held in suspension as screens will filter silt out of discharged water.
  - Measures should be prevent erosion at dewatering points.

- In the event of a spill of potable water, any associated discharge of sediment laden water into a down gradient water body will be contained as quickly as possible and remediated as required.
- In the event of a spill of sewage, the spill will be contained as quickly as possible and cleaned up by municipal staff.

Residual Effect and Significance Determination

The risk of a spill or other accidental event will be greatly reduced through development and implementation of contingency planning mentioned above. It is anticipated that should a spill occur, it will be contained to a local area, be relatively small and be cleaned up quickly. In the unlikely event that a malfunction or accident should occur, the affected aquatic areas will be remediated to appropriate standards. Surface run-off from project activities will be minimized through the implementation of standard preventive measures for construction, if needed, as part of overall contingency planning. In light of the foregoing, it is concluded that the effects of the project on water quality are predicted to be not significant.

Follow-up

- None recommended.

6.1.6 Fish and Fish Habitat

Effect

This project will not interact directly with fish and fish habitat. Subsection 36(3) of the federal *Fisheries Act* (administered by Environment Canada); however, prohibits the deposit of a deleterious substance into waters frequented by fish. Construction run-off, and fuel and lubricant spills, can be considered deleterious substances. The likelihood that run-off or spills would extend into to a fish bearing waterbody (the closest fish bearing waterbody to the construction corridor is Resolute Bay located 390m from the edge of construction corridor), is a function of the nature and extent of the run-off/spill and the time of year. The effects on fish and fish habitat in the marine environment as a result of spills/run-off are highly unlikely.

Mitigation

- A contingency plan will be developed and implemented for the construction phase, including but not limited to: training; spill response materials; spill response procedures; and, prevention of construction run-off. All spills are to be documented and reported to the 24-hour Spill Line at (867) 920-8130.
- In the event of a malfunction or accident, the affected areas will be remediated in a timely manner to acceptable standards of Nunavut and the Government of Canada.
- All fuel caches are to be located above the high water mark of any water body and in such a manner as to prevent the contents from entering any water body frequented by fish.

Residual Effect

The risk of a spill or other accidental event will be greatly reduced through development and implementation of contingency plans as mentioned above. It is anticipated that, should a spill occur, it will be contained to a limited area, be relatively small and be cleaned up quickly, with the spill not extending into waters frequented by fish. Surface

run-off from project activities will be minimized through application of standard construction preventive measures, if needed, as part of contingency planning. In light of the foregoing, it is concluded that the effects of the project on fish and fish habitat are predicted to be not significant.

Follow-up

As required in the event of a spill.

6.1.7 Air Quality

Effect

Construction activities such as excavation, backfilling and vehicle movements may produce emissions and dust that could potentially be bothersome to people in the vicinity of the construction site. Construction activities that have the potential to generate dust are expected to extend over a short period of approximately four months.

Mitigation

- The contractor will be required to implement dust control measures (i.e., watering) should dust levels become problematic.
- Vehicles should be in good working order

Residual Effect

Activities with the potential to raise dust will be limited to a period of approximately four months. The contractor will be required to ensure that, should excessive dust be created by construction activities, standard dust suppression measures will be applied. Therefore, the effects of the project on air quality are predicted to be not significant.

Follow-up

- None recommended

6.1.8 Health and Safety

Effect

It is possible that the health and safety of the contractors and the general public could potentially be at risk as a result of accidents during all activities associated with the proposed project. Risks will be minimized by ensuring that contract documents reflect the requirement that legally required health and safety procedures must be specified and followed.

Mitigation

- Construction will be completed by contractors, and contracts will be written to ensure that:

- Equipment refueling will be done in a designated area away from drainage ditches and watercourses.
- Fuels, other hazardous products and wastes will be stored, handled and disposed of according to approved methods.
- Contingency plans will be developed and implemented for the construction phase, including but not limited to training, spill response materials and spill response procedures (i.e., documentation of spills, reporting to the 24 hour Spill Response Line, etc.).

Residual Effect and Significance Determination

The potential for a malfunction or accident that could lead to health and safety effects will be greatly reduced through the implementation of appropriate legally required safety standards, rules and procedures. Other health and safety effects will be minimized through: effective application of best management practices and bringing in the appropriate expertise if any contamination is encountered or suspected. Therefore, it is concluded that the effects of the project on health and safety are predicted to be not significant.

Follow-up

- None recommended.

6.1.9 Noise

Effect

During utilidor construction, the potential exists for elevated noise levels (e.g., from equipment operation, especially excavation / backfilling) in areas close to the equipment, affecting people in close proximity. Elevated noise levels are expected to occur during equipment operations for the four month duration of the construction period.

Mitigation

- Construction will be completed by contractors, and contracts will be written to ensure that:
  - During construction activities, in accordance with labour law, hearing protection will be provided to workers and worn in areas designated as having elevated noise levels.
  - Construction activities will be limited to regular working hours.
  - Excavation / backfilling will be completed as quickly as possible.

Residual Effect and Significance Determination

Elevated noise levels will be created in close proximity to heavy equipment, at various times during the four month construction period, although not continuously. Noise will only be generated during normal working hours in accordance with by-laws. Standard measures will be implemented to protect the hearing of workers in close proximity to

areas with elevated noise levels. Therefore, it is predicted that the noise effects of the project will be not significant.

Follow-up

- None recommended

6.1.10 Aesthetics

Effect

The construction activity, open trench, piles of excavated materials, presence of pipes and other materials, etc. could be aesthetically unpleasing for the public. These effects will extend continuously over the four month duration of the project, although not always in the same specific location.

Mitigation

- Contract terms and conditions will ensure that the contractors maintain a tidy construction site.

Residual Effect and Significance

Ensuring a tidy construction site and proper disposal of fill materials will minimize aesthetic effects during the length of the construction. Aesthetic effects will last during the four month construction period and then be fully reversible. Therefore, the effects of the project on aesthetics are predicted to be not significant.

Follow-up

- None recommended

6.1.11 Archaeology

Effect

The potential exists for excavation / construction activity to unearth previously unknown archaeological artifiacts, that could compromise valuable information about the past.

Mitigation

- Contract terms and conditions will ensure that, if an archaeological site is discovered:
  - Operations will be immediately suspended on the site and the Project Manager will be notified; and,
  - The Project Manager will notify any affected First Nation representative and the appropriate department of the Government of Nunavut responsible for the location of the site and consult them regarding the nature of the materials, structures or artifacts and any further actions to be taken.

Residual Effect and Significance

No residual effect of significance is anticipated.

Follow-up

- None recommended

6.2 Cumulative Effects

CEAA requires analysis of the project environmental effects in combination with other projects or activities that have been, or are reasonably expected to be, carried out. The scope of the cumulative effects analysis is focused upon the following:

- Combined effects of past and present activities that have resulted in many of the project activity/environment interactions noted during the environmental effects analysis of the project; and,
- Combined effects arising from the anticipated effects of other future projects that will take place in the foreseeable future.

No other outside actions were identified, in consultation with the Government of Nunavut Department of Community and Government Services, that could interact cumulatively with the proposed project. The proposed project will result in a common suite of standard mitigated effects typical of construction projects that will be confined to the immediate area around the project site and not result in incremental effects on identified VECs. The project will have the positive effect of ensuring a new, fully up to date potable water distribution system and wastewater collection system for the Hamlet of Resolute Bay.

6.3 Malfunctions and Accidents

Malfunctions and accidents resulting in potential adverse environmental effects may occur during project implementation. These events, should they occur, would likely be limited to spills of potable water and sewage, and possibly fuels and other hydrocarbons. It is difficult to accurately predict the precise nature, probability and severity of these events on the environment. Emergency response, training and contingency planning are accepted as effective means to limit and mitigate the severity of effects. Malfunctions and accidents have been identified as having the potential to interact with a number of VECs. Detailed discussions regarding the nature of these effects, mitigation, residual effects and significance predictions for identified VECs are found in Section 6.1.

7.0 CONCLUSIONS / RECOMMENDATIONS

In accordance with Subsection 20(1)(a) of the *Canadian Environmental Assessment Act*, taking into account the effective implementation of mitigation measures identified in this EA Screening Report, it is predicted that construction and operation of a 225 m extension, as well as the installation of required upgrades to the existing utilidor system in the community of Resolute Bay, Nunavut, is not likely to cause significant adverse environmental effects. Infrastructure Canada may proceed to exercise any power, duty or function that would permit the project to be carried out and will ensure all mitigation measures are effectively implemented.

8.0 CLOSURE

The findings of this report are in accordance with our understanding of the project at the present time. This report was undertaken as a Screening Report as defined by the *Canadian Environmental Assessment Act*. The report provides a level of detail that will allow the Responsible Authority to make a decision to proceed with the project.

Prepared by:

Ms. Dana Lampi, Consultant
G.A. Packman & Associates

Date: January 19, 2006

Mr. Glen Packman, President
G.A. Packman & Associates

Date: January 19, 2006

9.0 APPROVAL

This screening level environmental assessment pursuant to the *Canadian Environmental Assessment Act* has been approved on behalf of Infrastructure Canada as follows:

Approved by:

Name: Mr. Keith Grady

Position: Senior Environmental Coordinator, Infrastructure Canada

Signature: _____

Date: _____

10.0 REFERENCES

Beanlands, G. E. and N. P. Duinker, 1983. An Ecological Framework for Environmental Impact Assessment in Canada. Institute for Resource and Environmental Studies. Dalhousie University, Halifax, NS and Federal Environmental Assessment Review Office.

A.D. Williams Engineering Inc. August 2005. Utilidor Upgrade and Related Work. Resolute Bay, Nunavut. Prepared for the Department of Community and Government Services, Government of Nunavut.

11.0 PERSONAL COMMUNICATIONS

Livingston, Tom. 2005. Regional Municipal Planning Engineer. Department of Community and Government Services. Government of Nunavut. Cambridge Bay, NU.

Mandeville, Lloyd. 2005. Civil Engineer. A.D. Williams Engineering Inc. Yellowknife, NT.

APPENDIX 1
PROJECT SCHEMATICS