Annex B

Initial Environmental Evaluation of the North Warning System Project Eleven Long Range Radar Sites and the Short Range Radar Development Site, Volume One, BAF-3. Monenco-Eyretechnics Group, October 1987.

INITIAL ENVIRONMENTAL EVALUATION
OF THE
NORTH WARNING SYSTEM PROJECT
ELEVEN LONG RANGE RADAR SITES
AND THE
SHORT RANGE RADAR DEVELOPMENT SITE
VOLUME ONE

MONENCO-EYRETECHNICS GROUP

OCTOBER 1987

ANNEX I

BAF-3

BREVOORT ISLAND, N.W.T.

ANNEX I

TABLE OF CONTENTS

PART 1

INTRODUCTION

1.1 A new LRR is being built at Brevoort Island, N.W.T., off the east coast of Baffin Island. The Brevoort LRR (BAF-3) is on the same site as an abandoned USAF relay station. The LRR will consist of the main site at the summit with a radome and communications module, an accommodations complex, a technical service module, and fuel and water storage facilities. An airfield and a beach landing area, which were built for the original relay station, will be upgraded to present standards and used again.

1.2 As part of the NWS, BAF-3 is one of three attended LRRs being constructed on the east coast of Canada. The other two are at Saglek and Cartwright, in Labrador.

1.3 The potential sources of environmental disturbance will originate from construction activities during the summers of 1986 and 1987. During seasonal construction, about 120 persons will be on site. There will be little potential for environmental disturbance during normal station operation. The permanent O&M staff will be about 10 persons.

1.4 The environmental impact as a result of construction and O&M activities is moderated by the fact that this has long been an active site. In addition to the original site of the abandoned relay station the airport and beach area have seen many users over the past 30 years. Accommodation facilities and large fuel storage tanks still exist at the airstrip and beach from previous oil industry supply base activities in support of offshore exploration drilling in Davis Strait.

1.5 Environmental concerns center on the marine resources of the area. Terrestrial wildlife is not abundant because of the limited food resources on this small and rugged island.

1.6 This text is an abridged version of the site-specific Environmental Screening Report, Brevoort, NWT, 86-06-03 completed by New North Consultants, St. John's Newfoundland. The reader is referred to the original report for more detailed text.

PART 2

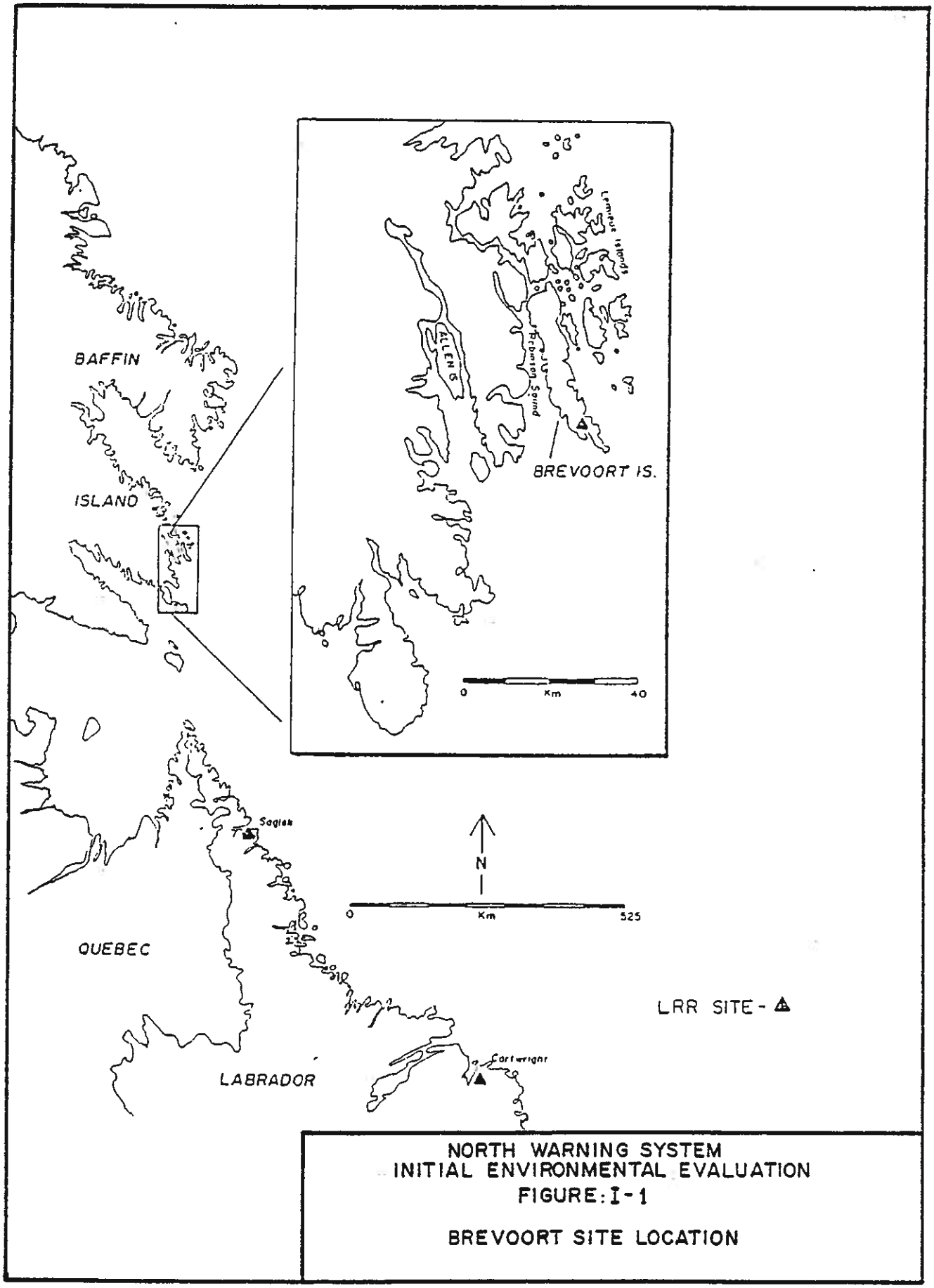
PROJECT DESCRIPTION

2.1 Brevoort Island is a 40-km long, 10-km wide island off the east coast of Baffin Island, approximately 230 km east of Iqaluit (Frobisher Bay). The LRR site is located at 63°20'23" N, 66°08'45" W on the southern end of the island overlooking Brevoort Harbour.

2.2 Brevoort Island is remote: access is only by sea and by air and Inuit communities are very distant along a rugged coast line. Figure I-1 shows the project location.

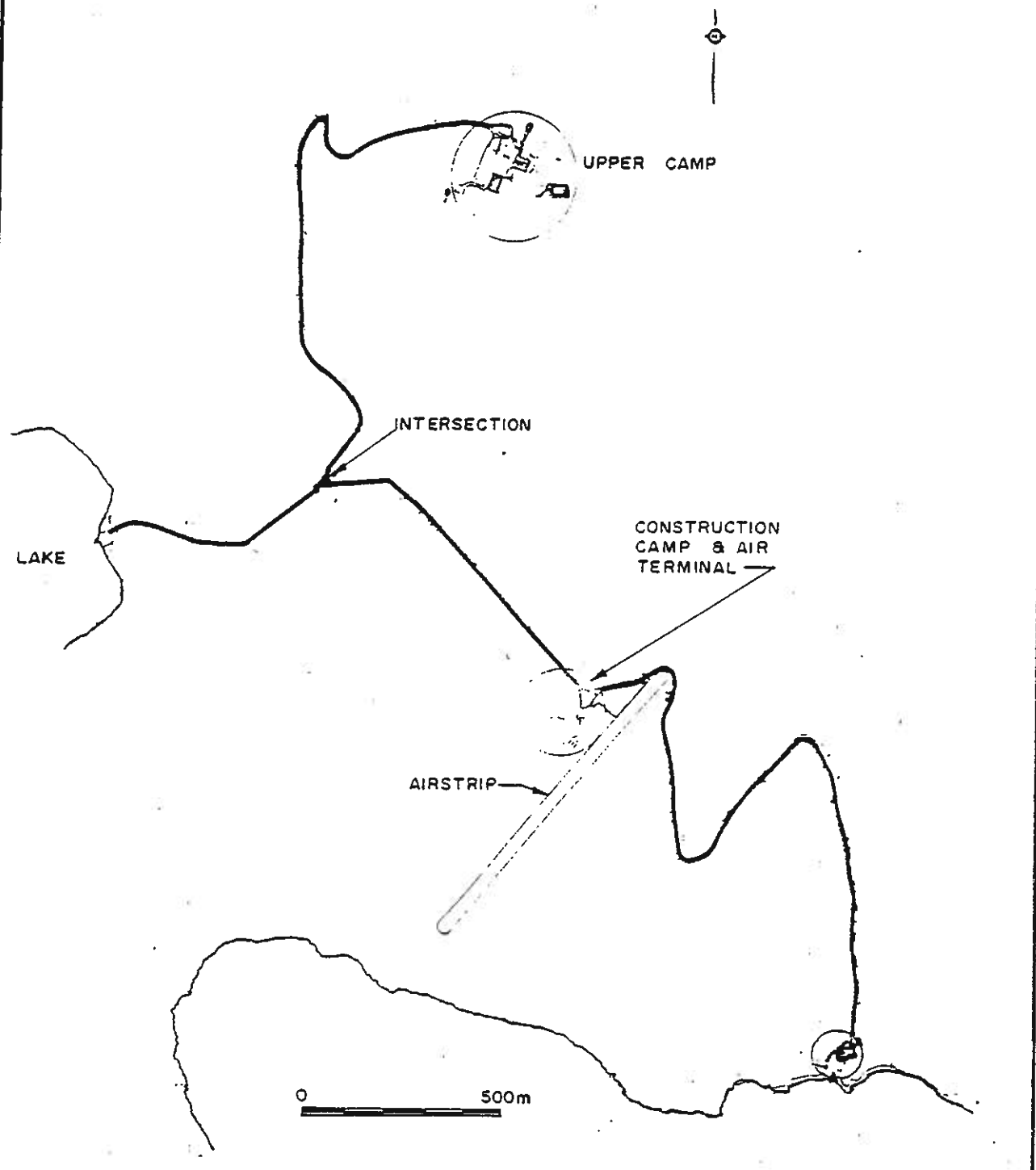
2.3 The Brevoort Island relay station was abandoned by the military in 1963. The beach and airstrip have been used as logistics support for offshore oil exploration but these were abandoned most recently in July, 1985. For the purposes of the NWS, it was necessary to completely demolish the original summit facilities to build the new LRR facilities on the same site. The new construction will utilize current design and construction standards but will not enlarge the area previously disturbed. Debris removed from the site during construction has been buried in an adjacent landfill site.

2.4 Figure I-2 illustrates the specific site layout and major features of the BAF-3 LRR installation.



NORTH WARNING SYSTEM
INITIAL ENVIRONMENTAL EVALUATION
FIGURE: I-1

BREVOORT SITE LOCATION



NORTH WARNING SYSTEM
INITIAL ENVIRONMENTAL EVALUATION
FIGURE: I-2

BREVOORT SITE PLAN

2.5 The existing and proposed site facilities are described as follows:

a. Main Site

The Main Site is located on an island summit at an elevation of approximately 375 m above sea level. The operations portion of the abandoned site comprises two pairs of tropospheric scatter communications antennae and an operations/communications building. Support facilities included an accommodations/service module, warehouse, vehicle garage, diesel tank, and helipad. Except for the warehouse, which was previously dismantled, all the structures left standing will be demolished, removed from site and landfilled. The new LRR will be constructed on the same location as the existing abandoned station. The LRR site layout is illustrated in Figure I-2 and has the following facilities:

(1) The radar will be free standing, independently supported with a height of approximately 15.2 metres above grade to the radar platform. The radome enclosure will be a 16.3 m diameter geodesic structure.

(2) The radar/communications module is an independently supported, two-storey structure, situated within the

radar tower support columns. This module contains a radar equipment room, communication facilities, operations consoles, workshop/maintenance space and associated building mechanical/electrical services.

(3) The accommodations complex is a two-storey structure, measuring 36.8 m long by 16.45 m wide, containing a total floor area of 1141 m^2. The building will house base personnel and all necessary amenities. It will have a capacity to house a maximum of 20 persons.

(4) The technical services module measures approximately 42.8 m long by 19.2 m wide, with an overall height of 9 m. The total developed floor area is about 1229 m^2 including the second floor mezzanine. This building houses all industrial needs to support summit facilities such as the power and heating plant, water pumping/treatment systems, vehicle storage and repair bays, incineration facilities, base stores and industrial maintenance support.

(5) The modules are linked via an enclosed heated access corridor, which also serves as a utilidor for mechanical/ electrical distribution services, such as power, heating, sprinkler piping, water and waste drainage piping.

(6) The main site emergency shelter is a separate structure, measuring approximately 15.8 m long by 7.5 m wide, providing an overall floor area of 119 m^2. The sleeping emergency shelter contains space for up to 20 personnel and is equipped with food, potable water, lighting and heat to survive a major disaster for up to one week.

(7) Two water storage tanks, each with a capacity of 783,000 L have been provided at the main site. These storage tanks will be inside an enclosed heated structure measuring 30.8 m long by 16.6 m wide by 9 m high.

(8) Two arctic diesel bulk fuel storage tanks will be required, having a storage capacity of about 1,200,000 L. A pumping station, measuring 4.2 m long by 3.6 m wide is provided at the bulk fuel storage site for delivery of fuel from storage to the technical services module.

(9) A 6000 L insulated septic tank will be installed underground, sited remote from the main site structures.

(10) Solid waste will be incinerated in a controlled-air, grateless-type, multiple-chamber thermal destruction

unit, capable of disposing of a normal day's solid waste production in one 5-hour cycle. The incinerator will be designed to operate free of smoke, fly ash, soot or odour. Start up and shut down of the unit will be completely automatic.

(11) A helicopter landing pad, measuring 20 m long by 20 m wide will be built in the main site area. The gravel helipad will be equipped with perimeter lighting.

(12) Two SGTs are required for communications. The antennae will each be in the order of 7.3 m in diameter, will have 13 m radome enclosures, and will be mounted on a raised platform.

b. Airstrip

The airstrip is located on a wide ledge between the main site and Brevoort Harbour at an elevation of about 198 m above sea level. An 830 m long by 33 m wide gravel runway covers most of the airfield site. A level filled area 240 m by 80 m is located along the northwest side of the airstrip. Temporary trailers and other semi-permanent structures and facilities formerly used to support offshore oil exploration occupy about three-quarters of this storage area. The airstrip will be upgraded as follows:

(1) An airfield services building will be constructed, measuring 24.8 m long by 9 m wide, containing a floor area of 223 m^2. The building height will be 6.7 m. The building will house airfield electrical equipment, runway maintenance equipment, and a standby power plant. A small passenger waiting area and cargo room will also be included.

(2) The airstrip gravelled surface will be upgraded to 300 mm thick. Medium intensity runway and taxiway lighting, rotating beacon, illuminated wind cone, and precision approach path indicator will also be installed.

(3) An emergency fuel supply for the power plant will consist of an above ground 7500 L skid-mounted dyked storage tank.

(4) The primary electrical power supply to the airfield services building will be from the summit by a power cable, laid on the ground and protected in areas of vehicular traffic.

(5) The existing access road from airfield to summit will be upgraded with gravel surfacing and improved ditches.

(6) A dyked area will be developed for storage of aviation fuel in drums (maximum 100 drums total storage) adjacent to the airstrip taxiway.

c. **Beach Site**

This area consists of the cleared beach site itself, an empty 946,000 L diesel tank, and two groups of seven aircraft fuel tanks with a total capacity of 127,300 L.

The following facilities will be constructed at the Brevoort beach site.

(1) Civil construction improvements are to be undertaken at the beach site to accommodate marine landing craft. A prepared landing craft area, at least 30 m wide, is to be developed.

(2) A storage area, approximately 14,000 m^2, is to be prepared by site grading at, or adjacent, to the beachhead.

(3) The existing diesel fuel tank is to be recommissioned, and a second new tank of 630,000 L capacity is to be erected.

(4) Containment dykes with impermeable liners are to be constructed for both installations.

(5) An arctic diesel pumping station, measuring 6.0 m by 3.6 m, is to be built, including a tanker loading pipeline to the beachhead.

(6) An existing arctic diesel transfer pipeline to the summit, comprised of 50 mm diameter steel pipe suitably supported above the ground, will be upgraded as required and recommissioned.

(7) The gravel access road from the beach site to the airstrip is to be upgraded, including drainage channel improvements.

d. Lake Site

The following water supply facilities will be constructed at the lake site located southwest of the main site.

(1) A 3.6 m by 3.8 m pump station will be constructed at the end of the jetty to deliver water to the main site.

(2) The water transmission line to the main site will be a 50 mm diameter galvanized steel pipe, laid over the natural terrain, suitably supported. It will be used only during the summer months.

(3) The water supply pump station will be accessible by vehicles during the summer months over a gravel surface road. A road link to the water supply source exists and only requires nominal upgrading.

2.6 The following Table is a summary list of the expected site changes which will occur as a result of demolition of the existing summit facilities and construction of the LRR.

Site: BREVOORT ISLAND		BAF-3
EXISTING SITE COMPONENTS	EXPECTED ALTERATIONS	NET CHANGES
1. TERRAIN		
General Features Prominent Features	. Reshape site . New quarry and landfill required	. Fill and level gravel areas and install new foundations
Roads/Culverts Surface Drainage	. Upgrade road and culverts to new construction standards	. Upgrade existing road to provide slope protection, increase shoulders and provide better surface water run-off
2. AIRPORT/RUNWAY		
Buildings Landing Strip Cut & Fill Refuelling Facility	. Construct a new aircraft services building on existing level area . Provide fuel drum storage area	. New building, improve some ditch water drainage, install landing lights
3. CAMP SYSTEMS		
General Site Buildings	. New building foundations required . All new modules installed	. Install concrete foundation piles . Major module and radome installation

Site: BREVOORT ISLAND		BAF-3
EXISTING SITE COMPONENTS	EXPECTED ALTERATIONS	NET CHANGES
Construction Buildings	. Use existing temporary buildings by airstrip	. Buildings to be removed after construction period
Water Supply/Source Water Treatment	. Source adequate . New water storage tanks and pipeline required	. Upgrade services and supply pipeline
Sewage Disposal Sewage Treatment	. Install new system	. Install and utilize package sewage treatment system
Garbage/Waste Disposal	. Incineration and landfill required	. Install new incinerator and develop suitable landfill site
Heating System Power Systems	. New modular units required	. Install within technical services module
4. STORAGE Fuel Tanks/Berms Drums/Pipelines Other Liquids	. New bulk fuel storage required at beach and summit . New pumping station . Repair existing tanks and pipeline to current safety standards	. Install new bulk fuel storage and pumping facilities, utilize some existing tanks at beach . Recommission pipeline . Install dyked bulk fuel tanks, grade site and provide adequate surface water drainage and slope protection
5. SCRAP Materials/Vehicles	. Removal of hazardous wastes and usable equipment from site then landfill of demolished structures	. Landfill all demolished structures consisting of wood, steel, cables, glass and concrete, etc. . 1 m of ground cover; sloped and drained to prevent erosion . All PCB equipment removed from site

Site: BREVOORT ISLAND		BAF-3
EXISTING SITE COMPONENTS	EXPECTED ALTERATIONS	NET CHANGES
6. HARBOUR/BEACH Shoreline Dock/Landing Area Staging Area Boats, Other Vessels	. Site clean-up, new bulk fuel tank and enlarged staging area	. Install dyked bulk fuel tanks, grade site and provide adequate surface water drainage and slope protection
7. QUARRIES/GRAVEL SOURCE Land Use Stock Pile	. Fill required for site leveling . Concrete aggregate and road modifications	. Establish a rock quarry with crushing equipment near beach site . Blasting required
8. NOISE SOURCES Machinery/Buildings Vehicles/Aircraft Activities	. Construction activity . Aircraft noise . Vehicle traffic . Blasting	. Increase in type, level, and duration of noise during construction period
9. WILDLIFE Animals/Habitat Birds/Habitat Marine Animals	. No habitat loss expected	. Noise and activity disturbance possible but few marine mammals use the fiord at Brevoort and very few terrestrial mammals have been seen near the BAF-3 site
10. VEGETATION General Features Plants etc.	. No change	. No change
11. ASTHETIC/VISUAL Towers Lights	. Extensive site clean-up and modernization	. Improved site appearance with fewer buildings well maintained

Site: BREVOORT ISLAND		BAF-3
EXISTING SITE COMPONENTS	EXPECTED ALTERATIONS	NET CHANGES
12. COMMUNITY ·Village Resource Use Activities Other	. Iqaluit (Frobisher Bay) residents make occasional site visits for hunting purposes, no change	.disruption of native resource use during construction period or O&M extremely unlikely
13. PEOPLE NWS Others	. Regular < 10 persons . Construction peak < 120 persons	. Site will be permanently occupied for the next 25 years
14. HISTORICAL RESOURCES Archaeological Sites Artifacts	. Archaeological survey found no areas of concern	. No change
15. PROTECTED AREAS Parks etc.	. No designated lands nearby	. No change
16. ENVIR./SOCIO-ECONOMIC ISSUES Type	. Few if any jobs for Baffin Island residents during either construction or O&M	. No change
17. OTHER		

2.7 Site Activities

2.7.1 Before construction of the BAF-3 facilities could begin, demolition and clean-up of existing structures was required. This was partially completed in 1986 and further work will be done during 1987 and 1988. Hazardous materials and usable

equipment were first removed, the buildings then demolished, and wood, steel, wire, cables, glass, concrete etc. placed in a borrow pit. A one metre thick layer of granular soil material was used to landscape and cover the borrow pit. Hazardous materials found on site were electrical equipment containing PCBs and a radar electronics tube containing toxic berrylium oxide. These were stored: the PCB's will be transported to Goose Bay in approved containers during 1987 and the radar tube will be returned to the U.S. manufacturer for disposal, as is the standard practice.

2.7.2 All existing dump sites will be covered with a one metre thick layer of granular material and contoured to blend with the surrounding terrain.

2.7.3 The Brevoort LRR installation will be complete and ready for occupancy by October of 1988. The main buildings should be in place by September 1987 from a construction start in early 1986.

2.7.4 Brevoort Island is remote from any community and all labour, communication, medical and other support systems are provided at site as part of the construction effort.

2.7.5 Transportation of personnel to site is by aircraft via Iqaluit (Frobisher Bay). All equipment and vehicles will arrive on site by sealift during the ice-free season which is from August through mid-October.

2.7.6 A construction camp from earlier site users exists at the airport. This camp was purchased by DND and upgraded to accommodate about 100 persons. It will be dismantled and removed after construction is complete. As many as 120 persons could be on site during peak construction periods each summer (June to September).

2.7.7 Nominal operating staff over the 20 year projected facility operating life is expected to be about 10 persons who will be employed by a civilian contractor on behalf of DND.

PART 3

EXISTING ENVIRONMENT

3.1 Biophysical Resources

3.1.1 Steep cliffs rising abruptly from the sea ring most of Brevoort Island. The LRR site is located at an elevation of 375 m above mean sea level on the southern end of the island.

3.1.2 Short, cool summers and long, often very cold winters typify Brevoort Island. The average yearly temperature is -9°C. Only two months, July and August, have mean temperatures greater than 0°C. Yearly maximum and minimum temperatures are 19°C for July and -37°C for March. Precipitation, largely in the form of snow, averages 48.6 mm per month. On average, frost is encountered 322 days per year. Fog is prevalent during the period of open water.

3.1.3 Waters around Brevoort Island are ice-infested for much of the year. Ice coverage varies from 10% with a loose arctic ice to 100% with land-fast ice. A small polynya commonly forms off the southeast end of the island each year.

3.1.4 Sheer sea cliffs surround most of the Brevoort Island coastline but lowlands are present in the north and northwest sections of the island. Exposed igneous or metamorphic bedrock is often overlain by stony, sandy, glacial till

intermixed with fluvial and marine deposits. Water and wind erosion move the poorly-developed, thin mineral soil into valleys and hollows, leaving slopes and hilltops bare.

3.1.5 The island is in the zone of continuous permafrost. On the main site, active permafrost layers range from 1.0 to 2.0 m and surficial sediments vary from 0 to 2.7 m in thickness.

3.1.6 Little site-specific information on the vegetation of Brevoort Island is available. The area is in the arctic desert which is dominated by lichens and mosses with willows and bilberry being the most common woody plants. Much of the ground is barren or covered by only a thin veneer of crustose or foliose lichens.

3.1.7 Waterbodies in the study area for the most part consist of scattered small ponds and intermittent streams.

3.1.8 A 43.5-ha glacial meltwater lake, southwest of the summit site is the designated water source for the development.

3.1.9 Freshwater fish populations on the island have not been reported in the literature but may occur in the water supply lake.

3.1.10 Coastal marine resources appear limited, based on the small amount of information available. Fishing efforts by Den Beste and McCart (1978) revealed no significant

concentrations of commercially exploitable fish species in the Brevoort area. They do report that small streams emptying into the fiords of southeast Baffin Island contain arctic char (Salvelinus alpinus). Ice scour and severe climate have prevented the development of an intertidal biological community. The beach is essentially devoid of microscopic marine life.

3.1.11 Land mammals are not abundant on Brevoort Island. Lemmings (species not reported) and arctic hare (Lepus arcticus) were reported by MacLaren Marex (1979a), but no abundance estimates were made. Polar bears (Thalarctos maritimus) use coastal portions of the island extensively in winter (Stirling et al. 1980) and there is evidence of denning and the presence of young on the southwest side of the island (Stirling et al. 1980, Stemp, 1982). These reports along with sightings by MacLaren Marex (1979b) suggest that polar bears are present year round.

3.1.12 A few caribou (Rangifer tarandus), arctic wolf (Canis lupus) and arctic fox (Alopex lagopus) may come and go across the frozen Robinson Sound, but they are not thought to be resident on the island (Theriault, pers. comm.).

3.1.13 Marine mammals are more numerous than land mammals at Brevoort Island. Walrus (Obodensus rosmarus) make use of the straits between Brevoort Island and Lemieux Island east of Brevoort and 18 km north of the BAF-3 site. Walrus are

present in the area all summer and a large-scale movement into the Lemieux Island area occurs in mid-September.

3.1.14 Other marine mammals occurring in waters around Brevoort Island include harp seal (Pagophilus groenlandicus), ringed seal (Pusa hispida), and bearded seal (Erignathus barbatus) (Smith et al., 1979, Smith and Hammill 1980a, MacLaren and Davis, 1982). Scattered whale sightings, including records of bowhead (Balaena mysticetus), minke (Balaenoptera acutorostrata), and beluga (Delphinapterus leucas), have been reported by a variety of observers (MacLaren and Davis, 1982; MacLaren Marex, 1979b). The significance of Brevoort Island for these mammals appears to be relatively minor. Cumberland Sound, Hudson Strait, and Frobisher Bay are known to be important to marine mammals.

3.1.15 Bird life on and around Brevoort Island is limited. Nesting colonies of glaucous gulls (Larus hyperboreus) have been reported by Nettleship (pers. comm.) and Smith and Hammill (1980) for southern Brevoort Island. A colony of 90 pairs was reported from Brevoort Harbour by MacLaren Marex (1979c). Stemp (1982) reported 71 glaucous gulls from Brevoort Harbour of which 21 were immatures. Nesting by black guillemot (Cepphus grylle) is suspected on the southeastern end of Brevoort Island (Smith and Hammill, 1980). Only a few passerines have been observed on a casual basis by a variety of observers (MacLaren Marex, 1979a; Stemp, 1982). Shorebird

records have been similarly sparse, and no raptor records could be found in the literature.

3.1.16 In the general vicinity of Brevoort Island, many bird species have been recorded, some in large numbers. Most significant are northern fulmar (Fulmarus glacialis) and black-legged kittiwake (Rissa tridactyla) which can occur in the thousands each summer, west of the island, in Robinson Sound (Smith and Hammill, 1980b). Common eider (Somateria mollisima) also occur there in large numbers during the summer.

3.2 Socio-Economic Setting

3.2.1 Apart from its use as an occasional subsistence hunting area, Brevoort Island's only socio-economic role is as an airport and harbour used by military, scientific, and petroleum industry personnel.

3.3 Land Use

3.3.1 Apart from the existing airport and harbour facilities on Brevoort Island, there are no significant human uses of the land. Occasionally, far-ranging hunting parties from Allen Island, Pangnirtung, and Iqaluit (Frobisher Bay) visit to hunt polar bear, walrus, and seals (Theriault, pers. comm.) but no hunting statistics are available. Given the arctic desert environment and arctic climate, other uses are unlikely.

3.4 Heritage Resources

3.4.1 The heritage resources in the vicinity of BAF-3 were documented by field investigations on the island in the summer of 1986. An environmental assessment of the effect of the project on heritage resources undertaken at this time suggests that although there are potential archeological sites along the coastline of the Brevoort Island region that the NWS site will not disturb any known sites. The location of the site at an elevation above the coastline also tends to preclude there being any archaeological remains. No sites were identified within the boundaries of BAF-3.

PART 4

PROJECT IMPACTS AND MITIGATIVE MEASURES

4.1 Potential Impacts

4.1.1 The identification of potential environmental or social impacts as a result of constructing and operating BAF-3 as a LRR are itemized in the following table. These potential concerns were identified by federal and Newfoundland environmental personnel who reviewed the environmental screening document prepared for this project (New North Consultants 1986).

TABLE 4.1 BREVOORT ISLAND

Valued Components		Related Issues
Mammals	Caribou Arctic hares Arctic fox Wolves	- death of nuisance animals particularly bears. - harassment near camps
Birds	Gulls Black Guillemot Fulmar Kittiwake Common Eider Other	- nesting disturbance - impact on colonies
Marine Species	Whales Walrus Seal	- disturbance during sea-lift - pollution from fuel spills
Water	Water source Groundwater Ocean Disposal/sewage	- contamination by fuel spills into surface waters - surface water contamination

Land	Slope stability Erosion protection	- erosion - permafrost degradation
Vegetation	Tundra	- impact on plant communities
Heritage Resources	Archaeological sites	- disturbance or loss. - impact on unidentified archaeological sites
Social & Economic	Employment Opportunity	- impact on native hunting activities

4.1.2 The environmental concerns identified and the extent of the mitigative measures presented must be placed in the context of the project. The Brevoort site is already disturbed and virtually all of the development for the new facilities will be restricted to already-disturbed areas.

4.1.3 However, restrictions and operating conditions have also been placed on the construction contractor and his activities in order to ensure environmental protection. All permits were obtained prior to the start of construction.

4.1.4 These constraints on activities include:

a. terms and conditions with respect to environmental protection attached to permits and licenses required by the contractor;

b. guidelines requiring specific conduct by the contractor on matters of environmental significance;

c. the preparation of an environmental protection plan and implementation by all on-site personnel; and

d. contingency plans in the event of an environmental emergency were prepared.

4.1.1 Biophysical Resources

4.1.1.1 Marine mammals including walrus and a variety of whales and seals are present at Brevoort Island nearshore waters at various times of the year. These animals are hunted by people from Baffin Island on occasion. Interaction by ships or aircraft with these marine mammals will be infrequent as will the opportunity for disturbance by site personnel, therefore, the potential opportunities for disturbance will be minimal.

4.1.1.2 Walrus use parts of Brevoort Island for hauling-out areas. Walrus are extremely sensitive to human contact and aircraft overflight, and at the same time are very site - tenacious (Smith et al. 1979; Brown, pers comm.). Human presence, either on foot or in vehicles, or aircraft have the potential to disturb these endangered sea mammals. In addition to the potential implications of disturbing walrus, a socio-economic impact is also possible, since hunters from Iqaluit exploit the Brevoort Island walrus herds from time to time.

4.1.1.3 Aircraft movements will avoid all areas known to be frequented by wildlife (polar bear den sites, walrus haul-out sites). Aircraft which must pass over wildlife-frequented sites will do so at a minimum altitude of 500 m (approx. 1500 ft). Vehicles cannot leave the site, nor will persons on foot under normal circumstances so the potential for any disturbance to wildlife off the BAF-3 site is extremely remote.

4.1.1.4 No attempts to chase, catch, divert, follow, or otherwise harass wildlife by aircraft, vehicle, or on foot shall be made by personnel directly or indirectly associated with BAF-3.

4.1.1.5 Interaction with polar bears is usually due to their curiosity and indifference to humans. Polar bears will scavenge the garbage dump and occasions will arise where they may become a nuisance. Proper incineration and burial of garbage will minimize this type of problem during both construction and O&M.

4.1.1.6 No specific concerns relating to other mammals have been identified.

4.1.1.7 In the event of unanticipated or unavoidable contact with mammals, particularly polar bears and walrus, individuals working at Brevoort Island will react in accordance with a

wildlife encounter contingency plan which attempts to prevent injury to either party.

4.1.1.8 Impact on seabirds is seen as the most likely effect of increased human activity on Brevoort Island. Colonial sea birds are sensitive to fly-overs and close approaches by boats or pedestrians. They will fly off their nests, leaving eggs bare or nestlings unattended. This behaviour, if repeated often, will increase chick mortality and nest failure.

4.1.1.9 The potential impact of the project on solitary nesters and pelagic seabirds visiting the waters around Brevoort Island will be insignificant because these species are cliff nesters and do not frequent the development sites. Other than the sealift vessels, there will be few watercraft of any size using the waters of Brevoort Harbour.

4.1.1.10 As with marine mammals, vehicle and aircraft movements will attempt to avoid bird colonies and refuse dumps will be made as unattractive to animals as possible.

4.1.1.11 Arctic vegetation is fragile, slow-growing, and easily disturbed. It is a food source for terrestrial birds and mammals and serves to protect the surface from wind and water erosion. Pedestrian and vehicle traffic have the potential to disrupt vegetation at the LRR site, resulting in reduced productivity and increased erosion. However, because

virtually all of the project area has already been disturbed and activities will be restricted to the site proper, the impacts are expected to be negligible.

4.1.1.12 The need for vehicle movement at the site has been anticipated in the project design, providing for the upgrading of appropriate roadways. Vehicular movement will be restricted to approved roadways and tracks.

4.1.1.13 No new roads will be constructed. Road upgrading will be to current construction standards for drainage control and consequently surface erosion at the site is unlikely. Erosion was not a serious problem during previous use of the site primarily due to the coarse texture of the surficial materials. Further, the large amount of fill, already in place is expected to prevent degradation of permafrost. Specific measures to prevent terrain degradation include:

a. vehicular movement will be restricted to approved roadways; offroad vehicle travel will be for emergency reasons only;

b. Appropriate drainage and erosion control structures will be installed along access roads;

c. beach landing sites will be upgraded prior to sea-lift by adding granular material; and

d. environmental aspects of construction-camp establishment and operation are covered in the contract technical specifications.

4.1.1.14 Since no source of granular material is available on Brevoort Island, a rock quarry was established and crushing equipment used to produce the required materials. The main environmental concerns associated with quarry development include terrain degradation caused by thawing of permafrost, erosion, alteration of existing drainage patterns and disturbance to wildlife due to noise.

4.1.1.15 The quarry size will be restricted to that necessary to meet material volume requirements. Berm construction and other erosion control measures will be used where appropriate.

4.1.1.16 Generation of wastes and refuse is an unavoidable consequence of site occupation. Depending on the disposal method adopted, waste materials can pollute surface water, groundwater, and soils, degrade permafrost, and attract wildlife, notably polar bears and foxes.

4.1.1.17 A sanitary landfill site has been selected to receive all non-combustible refuse. This site is in an existing borrow pit and has a disposal capacity of 10,000 m^3. This capacity can be increased. A daily output of less than 1 m^3 of non-combustible solids is anticipated and this volume will be

further reduced by compaction. A projected volume of about 75 m^3 per year will be land-filled. Solids from the septic tank and ash from the incinerator will also be disposed of in the landfill pit. Layers of refuse not exceeding 1.0 m in depth will be covered by 0.5 m of granular material. The capacity of the waste disposal site suggests a functional life of at least 50 years.

4.1.1.18 Combustible solids will be burned in a high efficiency incinerator. Liquid wastes (toilet and sink discharge) will be treated in a 6000 L septic tank then discharged at a safe distance from the camp.

4.1.1.19 The majority of the existing facilities at Brevoort will be demolished prior and during to construction of the new facilities. All hazardous materials have been stored and will be removed from site per existing health, safety and transport regulations.

4.1.1.20 Non-hazardous materials will be cut into managable pieces, buried in a landfill, and covered with 1.0 m of granular material. To limit excavation activities, an existing borrow pit will be used as the landfill site.

4.1.2 Socio-economics

4.1.2.1 Hunters from Iqaluit and other parts of eastern Baffin Island occasionally visit Brevoort Island and the nearshore

waters to hunt. Apart from this infrequent nomadic use, no other use of the area by Inuit has been reported. However, native people desire to continue this occasional use outside the boundaries of the LRR site. The construction of the site is not expected to interfere with this land use.

4.1.2.2 Through public consultation meetings and interviews with native and public officials in Iqaluit, areas of importance on Brevoort Island for hunting by native people have been identified. Every effort will be made by site personnel to not interfere with traditional native hunting or fishing pursuits. The presence of the base may have a positive effect for Inuit using this region by providing emergency support to hunters.

4.1.2.3 Brevoort Island, and in particular, the airstrip have been used by various types of industry using the eastern Baffin Island coast. This includes military, and civilian aircraft and ships. It is probable that these use activities will continue and will be unaffected by the construction and operation of BAF-3.

4.1.3 Heritage Resources

4.1.3.1 Very little is known about the archaeology of Brevoort Island. Current use of nearby areas by native people suggests that Brevoort may be a region of traditional camp sites used by hunters. The value of archaeological resources

is greatly diminished if they are disturbed or moved before proper mapping can be done. Consequently, there is the potential for disturbance to archaeological sites within the work area.

4.1.3.2 An on-site archaeological survey was conducted prior to the commencement of site construction in 1986 and did not identify any archaeological sites within the construction area. However, should heritage sites be identified, they will be designated as protected areas and to prevent disturbance, all on-site personnel will be discouraged from visiting them.

4.2 Residual Effects

4.2.1 It is not anticipated that there will be any residual impacts from the station construction or operation because the general site will be upgraded in design, utilize less space, operate more efficiently and have fewer persons on site during the normal operating period. Environmental awareness and impact mitigation measures are now part of the ongoing operating regime and there should be less disturbance to the environment. Fuel spill contingency plans, wildlife encounter procedures and overall environmental awareness will ensure an environmentally safe site.

4.3 Monitoring Programs

4.3.1 Site monitoring will concentrate on construction procedures to limit wildlife disturbances, prevent fuel spills and prevent erosion or damage to permafrost. On- going site operations will continue these procedures.

4.4 Trade-offs and Alternatives

4.4.1 The BAF-3 site was chosen on the basis of technical radar requirements, accessibility and economics. Construction was begun in 1986 and has been undertaken in an environmentally responsible manner. At this time it is believed that there are no trade-offs or alternatives which warrant discussion.