
APPENDIX 10:

BEAR ISLAND ARCHAEOLOGICAL IMPACT ASSESSMENT

Golder Associates Ltd.

1000, 940 6th Avenue S.W.
Calgary, Alberta, Canada T2P 3T1
Telephone (403) 299-5600
Fax (403) 299-5606



FINAL REPORT

**ARCHAEOLOGICAL IMPACT ASSESSMENT
(AIA) OF THE FORMER MID-CANADA LINE
RADAR SITE, BEAR ISLAND, NUNAVUT
(SUPPLY ARRANGEMENT
EO211-054107/006/NCS)**

Submitted to:

**PUBLIC WORKS AND GOVERNMENT
SERVICES CANADA
Nunavut Permit No. 2007-035A**

DISTRIBUTION:

9 Copies	Public Works and Government Services Canada
1 Copy	Department of Culture, Language, Elders and Youth Nunavut
1 Copy	Inuit Heritage Trust Nunavut
1 Copy	Museum of Civilization Ottawa
1 Copy	Golder Associates Ltd. Yellowknife, NWT
3 Copies	Golder Associates Ltd. Calgary, Alberta

March 2008

07-1328-0011



CREDITS

Project Director Grant Clarke, M.A.

Project Manager David Blower, Ph.D.

Permit Holder David Blower, Ph.D.

Report Author David Blower, Ph.D.

Field Investigators David Blower, Ph.D.
Brad Novecosky, MA.
William Atsynia (Wemindji)

Site File Searches Jason Harris

Senior Review D'Arcy Green, M.A.

Client Contacts Lisa Dyer
Project Support Officer
Public Works and Government Services
Canada
5th Floor, Telus Plaza North
10025 Jasper Avenue
Edmonton, AB. T5J 1S6

EXECUTIVE SUMMARY

During August of 2007, Golder Associates Ltd. (Golder) conducted an Archaeological Impact Assessment (AIA) on behalf of Public Works and Government Services Canada (PWGSC/INAC) for the Former Mid-Canada Line Radar Site Project on Bear Island, Nunavut. All required fieldwork was completed under an Archaeological Permit (2007-035A) issued by the Department of Culture, Language, Elders and Youth (CLEY), Nunavut, to David Blower of Golder.

The former Mid-Canada Line Radar Station is located on Bear Island at the mouth of James Bay. The remote location is of interest as it may have served as a strategic stop-off point during prehistoric times as well as a critical radar station during more recent times. Low-level aerial reconnaissance of the island was conducted in order to assess the locations of all structures and debris requiring further investigation and to identify areas of archaeological potential.

Lack of vegetation and sedimentation on the island enabled surface examination of the facility areas to adequately assess for the presence of cultural materials. As requested, areas which will not be impacted during remediation were not fully examined, but several areas had been previously identified by the project team for confirmation of their status as heritage resources. Upon closer examination, each of the aforementioned locations proved to be of insufficient age to be deemed archaeological in nature. However, a single heritage resource site was identified during the program, and is documented as per the Nunavut Archaeological and Palaeontological Sites Regulations.

By conducting this AIA, it is recommended that PWGSC/INAC has fulfilled the requirements of the current program in their attempts to identify the potential for impact to heritage resources through the remedial reclamation of the former Mid-Canada Line Radar Station at Bear Island. The AIA of Bear Island included the participation of William Atsynia from the local community of Wemindji, who acted as bear monitor and participated in the identification and recordation of the heritage resource site.

As the investigations of the AIA identified a heritage resource, GbHg 1, it is recommended that avoidance of that resource be required during the remediation process. All other suspected heritage resources have been refuted as described in this report. However, while not meeting the technical requirements to be classified as heritage resources, they are cultural markers of a recent occupation as described in this report, which do not affect the remediation process and as such, it is also recommended that efforts to avoid interfering with them be considered if possible.

Additionally, a community meeting was held in Chisasibi, Quebec, on February 20, 2008 which resulted in very little discussion on the heritage resources of Bear Island. Community members were informed that a buffer of 20 m had been placed around one new site identified on the island.

It is recommended that PWGSC/INAC have met their obligations to assess the potential for impact to heritage resources on Bear Island due to the remediation of the former Mid-Canada Line Radar Site. It is also recommended that, with the avoidance of the newly identified site, GbHg 1, no impacts will occur to the heritage resources of Bear Island through implementation of this program.

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1. INTRODUCTION	1
2. LOCATION, POTENTIAL IMPACTS, AND OBJECTIVES.....	5
2.1 Location.....	5
2.2 Potential Impacts	5
2.3 Project Objectives.....	7
3. PHYSICAL AND CULTURAL SETTING	8
3.1 Environmental Context.....	8
3.2 Regional Environment.....	9
3.3 Heritage Resources.....	9
3.3.1 Cultural Chronology	11
3.3.2 Historic Inhabitants.....	15
3.3.3 Heritage Studies	16
4. METHODOLOGY	17
4.1 Field Inventory and Assessment.....	17
4.2 Heritage Feature / Structure Evaluation	18
4.3 Detailed Archaeological Site Investigations / Mitigation.....	18
4.4 Reporting.....	19
4.5 Community Consultation	21
5. RESULTS	22
5.1 Former Mid-Canada Line Radar Site Areas of Investigation.....	23
5.1.1 Roadways and Airstrip.....	23
5.1.2 Infrastructure Areas	24
5.2 Potential Heritage Resource Sites	26
5.2.1 “House Foundation”.....	26
5.2.2 Marooned Boat.....	27
5.2.3 “Inukshuk”	28
5.2.4 “Semi-Subterranean House”	30
5.3 Newly Identified Heritage Resource Site	31
5.3.1 GbHg 1.....	31
6. SUMMARY AND RECOMMENDATIONS.....	34
7. CLOSURE	36
8. REFERENCES	37

LIST OF TABLES

Table 1	Heritage Site Recommendations	34
---------	-------------------------------------	----

LIST OF FIGURES

Figure 1	Location of Bear Island in James Bay	2
Figure 2	Bear Island Site Map Including Former Facility Areas	3

LIST OF APPENDICES

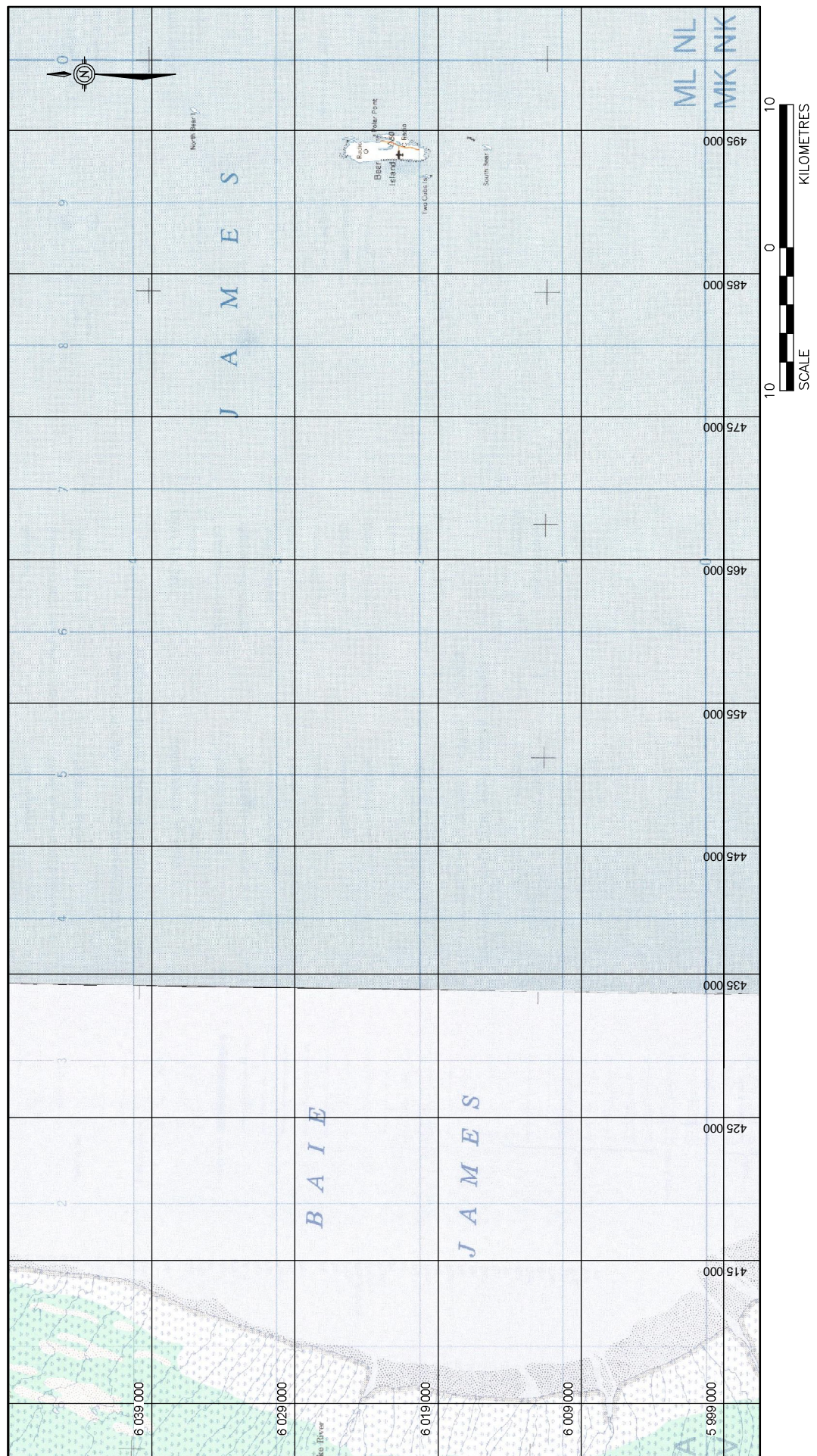
Appendix I	Photograph Log	
------------	----------------	--

1. INTRODUCTION

In August of 2007, Golder Associates Ltd. (Golder) conducted an Archaeological Impact Assessment (AIA) on behalf of Public Works and Government Services Canada and Indian and Northern Affairs Canada (PWGSC/INAC), for the Former Mid-Canada Line Radar Site Project on Bear Island, Nunavut (Figures 1 and 2). All required fieldwork was completed under Archaeological Permit 2007-035A issued by the Department of Culture, Language, Elders and Youth (CLEY), Nunavut to David Blower.

Low-level aerial reconnaissance of the island was initially flown in order to assess the locations of all structures and debris requiring further investigation and to identify areas of archaeological potential. Additional information on potential heritage features was provided by Lisa Dyer and the PWGSC/INAC team that had been working on the island for several days prior to the arrival of the archaeologists.

The AIA was intended to identify any artifacts or heritage resource areas that might be impacted by a remediation program and, as such, only those areas of previous and potential disturbance were assessed. The intent of this program was not to conduct a full AIA of Bear Island. However, during traverse of the island to reach potential areas, other landscapes were noted, and any suspected features considered. The northern area of the island, beyond the northernmost facility, was not assessed as no further structures exist in that location and avoidance of the area prevented unwarranted exposure to the polar bears residing in that vicinity. In addition, the eastern side of the island contains a rocky ridge that was not assessed as no part of the Mid-Canada Line Radar Site was located there and no remediation is scheduled to be conducted in that locale. The remaining areas of Bear Island were investigated and considered for the presence of heritage resources.



PROJECT

BEAR ISLAND MID - CANADA RADAR SITE PROJECT

TITLE

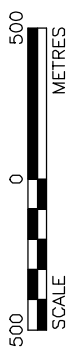
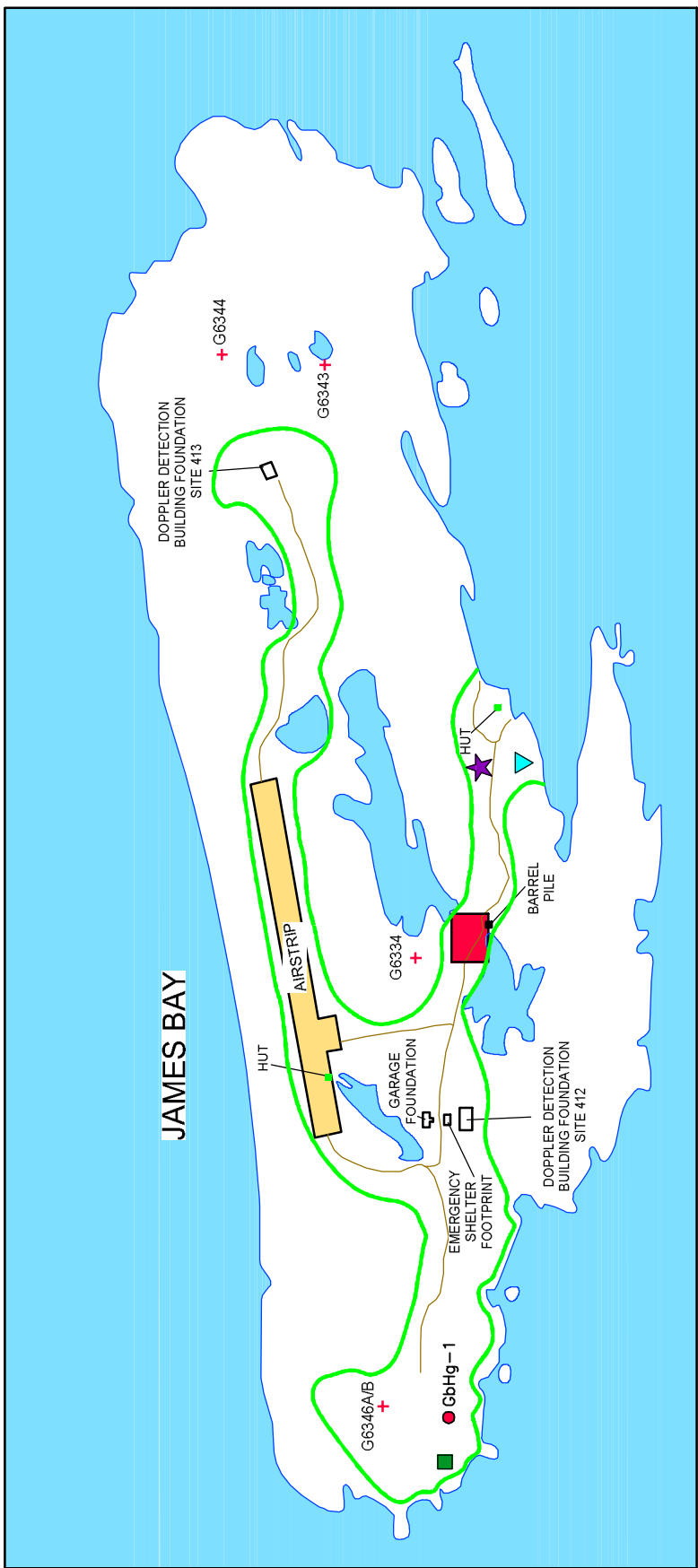
BEAR ISLAND LOCATION

REFERENCE


TOPOGRAPHIC MAP 43/1 AND 43/2 SCANNED BY SOFTMAP ©1983 HER
MAJESTY THE QUEEN IN RIGHT OF CANADA DEPARTMENT OF ENERGY,
MINES AND RESOURCES PROJECTION : TRANSVERSE MERCATOR
DATUM : NAD83 COORDINATE SYSTEM : UTM ZONE 17



PROJECT		07.1328.0011.4000		FILE No. Bear Island Location	
DESIGN	DB	10/09/07		SCALE	AS SHOWN
CADD	MM	04/10/07		REV.	0
CHECK	DB	10/03/08		FIGURE: 1	
REVIEW	DB	10/03/08			



- LEGEND**
- + BACKGROUND SAMPLE LOCATIONS
 - STACKED BARRELS
 - WORKED AREA
 - HERITAGE RESOURCE SITE
 - BOAT
 - ▲ AIA STUDY AREA
 - ★ MARKER
 - SIGN
- REFERENCE**
- DIGITIZED FROM DRAWING MAP 1-2 GENERAL SITE LAYOUT OBTAINED FROM THE CLIENT (SEP. 07, 2007)

PROJECT	BEAR ISLAND MID - CANADA RADAR SITE PROJECT					
	TITLE					
 Golder Associates Calgary, Alberta		BEAR ISLAND				
		PROJECT 07.1328.0011.4000				
		DESIGN	DB	10/09/07	FILE No.	Bear Island
		CADD	FN	23/10/09	SCALE	AS SHOWN
CHECK	DB	10/03/08	REV.	0		
REVIEW	DB	10/03/08				
		FIGURE: 2				

The predominance of low-lying basalt rock contributed to a lack of vegetation which facilitated assessment of the facility areas and increased visual assessment for the presence and/or absence of cultural materials. As requested, areas which will not be impacted during remediation were not fully examined. Several features were identified by the project team, prior to the arrival of the archaeologist, which required confirmation as to their status as heritage resources. One previously unrecorded heritage resource site was identified by the archaeologist during the program, which was documented as per the *Nunavut Archaeological and Palaeontological Sites Regulations*.

2. LOCATION, POTENTIAL IMPACTS, AND OBJECTIVES

2.1 Location

The former Mid-Canada Line Radar Station is located on Bear Island at the north end of James Bay and operated from the late 1950's until late 1965 or early 1966. The remote location is of heritage interest as it may have served as a strategic stop-off point during prehistoric times as well as a critical radar station during more recent times. Its position on the southern boundary of Hudson Bay places it in an area of overlapping use by the Inuit to the north, West Cree of Ontario, and the East Cree of Quebec. Currently no 1:50,000 NTS topographic maps exist for this location, but a 1:250,000 map showing Bear Island is available (Figure 1).

Bear Island is a low-lying black basalt outcrop, covered with small lakes, ponds, gravel beaches and exposed rock. In 1995, it was noted that none of the radar station buildings were left standing, their locations only recognized by foundations, but that a large amount of debris had been scattered over the island (INAC 1996).

2.2 Potential Impacts

The potential impacts to heritage resources at Bear Island are dependent upon the proximity of those resources to the remediation activities that will be conducted to remove the remnants of the former Mid-Canada Line Radar Station. Heritage resource sites are non-renewable resources that may be located at or near ground level or may be deeply buried. Prehistoric or precontact archaeological sites are those sites which contain features, artifacts or ecofacts reflecting the use of a given land base by people prior to European influences and technologies. Features are non-portable articles that indicate a human modification of the local environment such as hearths, pits, tent rings, stone cairns and Inuksuit. Artifacts are portable items that have been modified by people at some time in the past. These include such items as projectile points, stone flaking debris, and cut and modified bone. Ecofacts are naturally occurring items such as preserved plant

remains or pollen that can aid in the interpretation of archaeological sites. Historic archaeological sites include the features, artifacts and ecofacts relating to the past few hundred years of human occupation. These sites are typically identified by the presence of buildings or structural remains, but may include any site that has evidence of historic use of the landscape.

Alteration of the landscape can result in the damage or complete destruction of all or portions of historic resource sites. These alterations often involve the displacement of artifacts resulting in the loss of valuable contextual information or may involve the destruction of the artifacts and features themselves resulting in complete information loss. These losses are permanent and irreversible. Primary, secondary and tertiary impacts are possible with any new development. Remediation can be considered a new development in this context if it impacts previously undisturbed areas during operation.

Primary impacts include those disturbances resulting immediately from project. The primary impact zone is the area within the remediation footprint including access roads and temporary work zones. Individual sites are likely to be affected to varying degrees if they are located within the development area. Artifact context is fundamental to interpretation of archaeological sites. By disturbing the context in which artifacts and features are recovered, interpretations of heritage resources sites and, ultimately, past lifeways are affected negatively.

Secondary impacts can occur when the support services or additional access required by development adversely affects heritage resources outside the primary target areas. The remediation project should have no secondary effect on heritage resources.

Tertiary impacts are the results of project induced changes in demography and land use patterns. Increased rates of intentional and unintentional impacts can be expected as a result of increased visitation to an area if the project were large enough to affect regional population bases. Tertiary impacts are anticipated to be very low for this project,

especially because changes to the island through remediation will not affect the visitation rates for use of the island due to its isolated location and lack of a desirable resource base.

The study detailed in this report is intended to identify areas of possible impact and to determine whether the current proposed project will disturb those heritage resources located in proximity to the development.

2.3 Project Objectives

The objective of the 2007 study at the former Mid-Canada Line Radar Station located on Bear Island is to ensure that heritage resources are not inadvertently impacted by the proposed clean-up and remediation project. The purpose of this AIA is to:

- conduct a pre-impact assessment of the proposed remediation areas;
- identify any archaeological sites within those areas (if present);
- make recommendations to CLEY and PWGSC/INAC to mitigate or avoid those sites;
- make recommendations on surveillance and monitoring;
- provide a cost estimate on implementing the recommendations during the construction phase; and
- prepare a draft Final Report to be reviewed by PWGSC/INAC, followed by a Final Report for distribution as required and submission to CLEY.

3. PHYSICAL AND CULTURAL SETTING

3.1 Environmental Context

An understanding of past environmental conditions and the environmental factors that shape human approaches to subsistence and settlement patterns enable archaeologists to not only locate sites, but also to provide more accurate interpretations of individual sites. The physical aspects of the environs (topography, drainage, climate and soils) as well as resource availability (flora, fauna, lithic materials and water) are prime criteria for the identification of site location and function. Assessments of the universal cultural activities of site location, travel within and through the area, and resource exploitation are key components of any archaeological site analysis.

The anthropological theory of environmental determinism suggests that, to a great extent, environmental factors condition human behavioural and cultural adaptations, or patterns of behaviour. The environment has likely influenced many of the activities that contribute to the character of the regional prehistoric record. All available environmental variables must be considered as indicators of prehistoric use of the landscape.

The regional environment influences where specific activities and occupation are located in a pattern of seasonal movements according to the availability of resources: a seasonal round. The variables of archaeological site distribution can be identified and combined into useful criteria for suggesting the potential of an environment to hold heritage resources that includes a wide variety of landforms frequently associated with coastlines and lake shores, river banks, eskers and kames, and bedrock knolls in Arctic environs. Distribution patterns partially reflect environmental opportunities presented to human groups as well as cultural preferences demonstrated by site location. Topography influences much human activity including travel, communication, resource catchments, dwelling locations and eventually constrains human activity areas to defined localities. Based on existing heritage resources, the environment is a key factor in human settlement patterns.

3.2 Regional Environment

Prior to European contact, the people of North America developed economies that were intimately linked with the landscapes in which they lived. Changes in the vegetation communities have occurred throughout the region over time and the productivity of the landscape and how it was culturally manipulated in the past has changed.

Bear Island is predominantly flat with very little topography on its western side. There are rocky outcrops on the eastern edge of the island with a high ridge running along the northeast coastal area. A small change in elevation in the centre of the island and on the northern half of the island provides some relief. There is a sheltered cove on the eastern central side of the island where beach landings were conducted during the operation of the radar station. Overlooking the sheltered cove are rocky outcrops and hills on the east and west.

3.3 Heritage Resources

Archaeology is the study of human history through the material remains of culture, now known as heritage resources. The ultimate goal in archaeology is to describe the cultures and events responsible for the creation and deposition of the remains at a given archaeological site. As such, archaeologists use material remains to determine the nature and age of cultural occupations at a site. Artifacts, ecofacts and features deposited into the natural environment, along with their inter-relationships, are the integral parts that make up an archaeological site. The Nunavut Archaeological and Palaeontological Sites Regulations (2003) define heritage resources as: “but not limited to, archaeological and historical sites, burial grounds, palaeontological sites, historical buildings and cairns.”

Predating the arrival of Europeans, precontact archaeological sites are comprised of artifacts, features and residues of native origin typically characterized by modified bone and stone, and stone structures. Historic sites are those structures, features, and objects of European influence that date back to contact with the Europeans but can also represent

more recent activity of more than 50 years. Depending on the context, sites less than 50 years old may be considered to represent traditional land use and are identified to document continued use and occupation of an area to the present time. A key component of the historic period record are the sites, artifacts and affiliated resources relating to post-contact Aboriginal people's use of the landscape. These include both archaeological sites and objects such as standing and collapsed cabins, campsites, graves, and traditional sites and resources, such as special places, hunting and plant collecting areas, traplines and their associated remains, oral traditions and various documents. These latter resources are usually identified through consultation procedures such as Traditional Use Studies (TUS) or community consultations.

Additionally, heritage resources include, as well as the sites where events took place in the past, all of the objects that they contain and any of the contextual information that may be associated with them and will aid in their interpretation, including natural specimens and documents or verbal accounts.

Heritage resources are non-renewable and are susceptible to alteration, damage, and destruction by construction and development activities. The value of heritage resources cannot be measured in terms of individual artifacts or biological specimens, rather the value of these resources lies in the integrated information which is derived from the relationship of the individual artifacts and fossil specimens, associated features, spatial relationships (distribution), and contextual situations. Interpretation of heritage resource materials, and the ability to interpret the significance of particular sites in a landscape, is based on an understanding of the nature of the relationship between individual archaeological and palaeontological materials as well as the sediments and strata within which they are contained. As such, removal or mixing of cultural or fossil bearing sediments results in the permanent loss of information basic to the understanding of these resources. As a result, heritage resources are increasingly susceptible to destruction and depletion through disturbance.

Similarly, tundra areas north of the tree line are characterized by extremely slow rates of soil development and sediment accumulation. Accordingly, at repeatedly occupied sites, there is little chance of distinguishing occupations relating to different periods within the 10,000-year record of human occupation in the region without recovering a diagnostic indicator. Some areas of high sediment deposition rates are present along the length of the study area, but these are not the typical scenario.

The lack of temporally diagnostic artifacts, the absence of materials suitable for radiocarbon dating, and the natural mixing of shallow archaeological deposits serve to limit the definition of the recognized prehistory for the region. In contrast, extant documents, records, and oral testimony provide a firmer basis for understanding the historic period of the region.

3.3.1 Cultural Chronology

The culture history of the northern James Bay area is complex as it straddles two ecological zones demarcated by the tree line. To the south, people adopted a boreal subsistence pattern, while to the north, a pattern based on existence on the harsh tundra of the interior and a coastal existence down either side of Hudson's Bay. Just as climatic changes through time resulted in movement of the tree line either to the north or to the south, so too did these changes influence settlement patterns among the inhabitants of either zone. Although there is a lack of physical evidence, it is quite probable that inhabitants from either ecological zone settled in the James Bay area at one time or another. An abbreviated outline of cultural development for the north and the study area is included below.

3.3.1.1 Shield Culture (8,000 to 1,500 BP)

The early cultural development most applicable to the study area is the Shield Culture. Shield Culture encompassed the boreal forest of the northern Canadian Shield including the southeastern Northwest Territories, southern Nunavut, most of Manitoba, northern

Ontario, northern Quebec and Labrador from approximately 8,000 years ago to 1,500 years ago (Wright 1995). Due to the relatively recent recession of the Laurentide ice sheet, it does not appear that the Hudson Bay Lowlands were occupied prior to 4,000 years ago (Wright 1995).

Shield Culture materials can typically be distinguished from earlier cultures by the introduction of the atlatl dart, signalled by the presence of notched projectile point styles. This was not, however, a replacement for the previously utilised lanceolate points, as both side-notched and lanceolate points appear together in Shield Culture sites (Wright 1995). Other tools associated with Shield Culture include large bifacially flaked knives, scrapers, chipped adzes and unmodified flakes, but few ground stone tools.

Shield Culture is based on technology, subsistence and settlement patterns that show very little change over an extended temporal period and is considered to have led to the northern Algonquian-speaking people who still occupy the territory today, including the Cree of the James Bay area (Wright 1995).

Originally the Shield Archaic populations occupied the Thelon River drainage in Keewatin District, but sometime between 1500 and 1000 BC, abandoned the region due to a deteriorating climate that may have forced the tree line too far south to permit the Shield Archaic hunters to commute from the forest to their old lands in the Thelon drainage. In its place the Arctic Small Tool tradition (ASTt) appears.

3.3.1.2 Arctic Small Tool Tradition (4,200 to 2,800 BP)

There is presently little evidence to link earlier Palaeo-Arctic tradition occupations to the Arctic Small Tool tradition (ASTt) occupations that succeed them. The ASTt represents a widespread cultural manifestation that covers all of the Canadian Arctic as well as parts of Alaska and Greenland and is typically thought to date between approximately 4,200 and 2,800 BP (McGhee 1990). It includes the Denbigh Flint complex in northern Alaska, the Independence I culture of the Canadian High Arctic, the Inuvik Phase and the

Pre-Dorset culture in Arctic Canada, and the Sarqaq culture in Greenland (Dumond 1987). It is possible that the ASTt relates to a separate migration of peoples from Siberia and does not appear to be related to the preceding Palaeo-Arctic tradition. As the name implies, the toolkit of the ASTt is comprised of lithic artifacts that are finely made and smaller than tools of similar function and age from elsewhere in North America. These include microblades and microcores, burins, gravers, small side and end scrapers, side and end blades, and bipointed (arrow) and triangular (harpoon) projectile points (Wright 1995). In Alaska, it appears to have developed into the cultures of the Norton tradition, while in Canada, it developed into the Dorset culture.

Around 3,500 BP, the High Arctic appears to have depopulated as Pre-Dorset groups shifted their range into the Barren Grounds of the Northwest Territories and adjacent portions of the boreal forest. Although a more complex model has been assumed (McGhee 1996), a correlation with general climatic trends becomes apparent.

The Canadian Tundra Tradition (3,300 to 2,600 BP) has been described as a local variant of the ASTt which focused on caribou exploitation (Noble 1981). Sites of this cultural tradition are widespread, being represented in sites on Great Slave and Great Bear Lakes eastward to North Henik Lake near Hudson Bay. Characterized by large lenticular and oval bifaces, small triangular and side notched points, side blades, burin and microblade technology, these assemblages are most commonly associated with orange/pink and white quartzites. Native copper appears in some sites toward the end of this period.

3.3.1.3 Taltheilei Shale Tradition (2,500 to 100 BP)

Following the ASTt, is the Taltheilei Shale Tradition (2,500 to 100 BP), seen as ancestral to development of the Athapaskan people (Noble 1981). Artifacts of siliceous shale originating on the eastern arm of Great Slave Lake are characteristic; although Taltheilei artifacts have also been identified in the Barrens south of Kugluktuk at Itchen Lake (Blower 2003) and range as far south as Christina Lake in Alberta where late phase variants have been recovered (Blower 2007). Lanceolate projectile points continue to be

important in the tool assemblage but small corner and side notched points occur in the latter half of the tradition. The prominent biface and burin and microblade technologies of the preceding phase are notably absent.

3.3.1.4 Dorset Culture (2,500 to 1,000 BP)

The Dorset culture occupied the Canadian Arctic from 2,500 BP until at least 1,000 BP. (McGhee 1990). Best known for miniature carvings, Dorset appears to have been a more successful adaptation to the conditions of the north than the preceding ASTt cultures from which it developed. This is demonstrated by the huge area occupied by Dorset groups and by evidence that they had perfected winter hunting on the sea ice. Cooler conditions in the northern hemisphere around 3,000 years ago resulted in expansion of the sea ice and a shift away from terrestrial hunting of caribou and hunting of sea mammals from boats in open water to a procurement of sea mammals from coastal edges and sea ice. This is evidenced in the archaeological record with a shift away from bow hunting to harpoon and spear hunting (McGhee 1996). Artifacts recovered from sites representing this period are more diverse and “reflect a richer and more secure way of life than that of earlier Palaeo-Eskimos.” including the establishment of permanent winter villages (McGhee 1996).

However, when the people of the Thule culture arrived in the Canadian Arctic approximately 1,000 years ago, the Dorset culture had largely or entirely disappeared for reasons that are not well understood (McGhee 2001; Wright 1999).

3.3.1.5 Thule (1,000 to 400 BP)

The Thule tradition dates from approximately 1,000 to 400 BP and is derived from the Norton tradition in northern Alaska. More specifically, Thule grows out of the Old Bering Sea and Punuk traditions, which have numerous similarities to Thule cultural assemblages. These assemblages suggest subsistence based on maritime resources such as seals and whales that were hunted from kayaks or umiaks as identified by harpoon

floats. Thule represented a new kind of adaptation to the Arctic environment, based on the hunting of large sea mammals in open water through the use of drag floats attached to the harpoon line. Large skin boats and the use of dogs to pull large sleds were other Thule innovations. Winters were spent in sometimes large communities of semi-subterranean houses, subsisting on a stored surplus obtained most typically by hunting bowhead whales. The introduction of Thule into the Canadian Arctic is noted by a distinct change in a number of cultural markers from the Dorset culture. The earliest Thule occupations currently recognized are on islands in the Bering Strait and exhibit an almost complete reliance on maritime resources; however, later sites demonstrate that both maritime and terrestrial resources were utilized (McGhee 1990). Climatic changes following the thirteenth century likely caused the Thule to modify their way of life into that of the various historic Inuit groups.

3.3.2 Historic Inhabitants

Historical use of the project area is identified with the James Bay Cree in Quebec, the Moose Cree in Ontario and Inuit groups, some of whom eventually moved into the Chisasibi (Fort George) area on the Quebec side of James Bay (Lovisek 2002; Nutall 2005). Bear Island falls into an overlap area between all three groups, positioned as it is, near the centre of the mouth of James Bay and Hudson Bay. Many of the Cree moved into former trading post areas and represent two regional groups: the coasters, who were dependant on maritime sea mammals and later worked with fur traders; and the inland Cree, who were more caribou-oriented until the establishment of fur trade posts in the nineteenth century (Preston 1981; Honigmann 1981). The Inuit of Northern Quebec spent summers inland hunting caribou, returning to the coast in winter when ice and snow facilitated the use of dog sleds. It is during the sixteenth century that sustained European contact began with hostilities recorded until the early eighteenth century (Lovisek 2002). Magee (2005) notes that Henry Hudson and his crew spent several weeks navigating James Bay in 1610, before hauling their ship, the *Discovery*, ashore to spend the winter. Interestingly, only a single encounter with a native was recorded for the entire stay. The crew of the *Discovery* mutinied the following year and Hudson, his son and several loyal

crew members were set adrift in James Bay in 1611 and never heard from again (McGhee 2005). Afterwards, the dominance of the Hudson's Bay Company on the fur trade created a reliance on the company by Inuit groups. Many of these groups remained semi-nomadic into the early twentieth century.

Beyond the knowledge that Bear Island existed on maps as far back as the seventeenth century, there is little information on any habitation of the site in historic times. On a map produced in 1762, Bear Island is noted along with its outlying smaller rocky islands known then as the "Cubs". In all later maps, it is known continuously as Bear Island or a variation of it. This designation is certainly supported today as a large number of polar bears and cubs have been identified on the northern sections of the island and adjoining isles, and were present during this AIA.

It was not until the 1950's, when the Mid-Canada Early Warning Line was built, that habitation of the island was recorded; albeit temporarily. The station on Bear Island had two Doppler antennae at the top of guyed towers, an equipment building, a survival hut and fuel tanks which were closed sometime between late 1964 and the spring of 1965 when jet aircraft rendered the Mid-Canada Early Warning Line defence system redundant.

3.3.3 Heritage Studies

Prior to the current study of the former Mid-Canada Line Radar Site on Bear Island, no heritage resources sites were recorded in the Nunavut or Canadian Museum of Civilization database for this location.

4. METHODOLOGY

4.1 Field Inventory and Assessment

All field work was conducted under a valid Class II Archaeological Permit issued by CLEY. The field program focused on assessment of all areas of high and moderate archaeological potential, and considered other areas of low potential as the survey was conducted and opportunities arose. During the course of the field investigations, all heritage resource sites that were identified were to be evaluated with respect to: site significance; potential effects to the sites that may occur during remediation; the significance of these potential effects; and then, recommendations were to be made regarding any mitigation warranted to offset effects caused by the remediation program. Field results were to be communicated to the client while in the field to take advantage of time and cost savings to the project. Inventory and assessment techniques followed established practices and consisted of the following:

- visual examination of the identified areas to determine the presence of such surficial features such as standing or collapsed buildings, dumps, cache pits, cabin foundations, etc. and exposed precontact cultural materials such as stone tool making debris and tools;
- visual examination of the identified areas to determine the presence of items of historical military interest;
- excavation of shovel tests (ca. 40 x 40 cm) to varying depths to determine the potential for subsurface precontact cultural remains if deposition is present;
- visual examination of bedrock exposures (if any) or gravels for Quaternary palaeontological fossils as well as precontact quarrying activity;
- excavation of either additional shovel tests or 1 x 1 m units for the purpose of identifying the distribution, density, and nature of cultural remains associated with sites identified through inventory procedures;

- documentation of the location (GPS coordinates), nature, size, and complexity of each identified site; and
- documentation of individual site features to record content, context, potential identity, and to provide information required to develop a mitigation program.

These results, along with updates and recommendations will be included in written submissions to CLEY as required by the Permit to conduct the AIA, and discussed with the Chief Archaeologist of Nunavut.

4.2 Heritage Feature / Structure Evaluation

Evaluations of heritage features and standing structures were to be completed for features/structures that are observed during the investigations. These evaluations would consider perceived heritage resource value and community cultural value as well as the predicted impact from the proposed program. In general, disturbed sites with limited cultural remains would be assigned lower archaeological resource values than undisturbed sites, large sites with large amounts of cultural material, complex sites, and multicomponent sites. Undisturbed multicomponent sites would generally be assigned the highest heritage resource value.

Community input will play a role in the evaluation of site value, and the inclusion of a member of the local community on the field crew aided in the in-field discussions regarding site significance.

4.3 Detailed Archaeological Site Investigations / Mitigation

If required, mitigation of significant heritage resources sites may include a number of different options. Prior to evaluation of these mitigative options, the perceived value of the identified archaeological sites will be discussed with the PWGSC/INAC Project team to determine the feasibility of avoiding important sites. Only if site avoidance is not possible, will other mitigative measures such as collection and documentation, and

controlled mapping/excavation be considered. In areas of no sediment deposition surface collection and mapping of artifacts and features may satisfy regulatory requirements for mitigation. Recommendations for excavation may include a controlled excavation mitigative plan and will specify the number of square metres and suggest locations for excavation units/blocks.

Overall mitigative options may be summarized by:

- collection and documentation undertaken at the time of the field assessment at all sites with low archaeological resource value;
- avoidance if feasible at all sites assigned high archaeological resource value;
- mitigative excavations which will be recommended at those sites assigned high archaeological resource value that could not be avoided by borrow source relocation; and
- a management plan for required mitigation relative to the proposed construction schedule will be discussed with the site project team.

4.4 Reporting

Analysis of collected artifacts includes cleaning, cataloguing, identification, inventory, and description of each individual piece for inclusion in the final report. Both stone material and technological identification and descriptions of all artifacts will be undertaken. GPS site information would be provided for mapping relative to the former site structures at the site and to CLEY, but not included in the final versions of the report. Archaeological site maps, photographs, and artifact scans will be prepared as digital files. Based on the cultural material collected, a recommendation regarding final site disposition relative to future projects is to be made.

Upon completion of the field components and the required artifact curation, a draft report will be prepared. A final permit report on the archaeological studies will be prepared for

CLEY on behalf of PWGSC/INAC, for review by CLEY. This report will include a project description, the environmental setting, the historical and archaeological context for the project area, field methodology, and the results of the field reconnaissance. The report will include both descriptive, as well as mapped data on the sites, artifacts, and features identified, as well as detailed information on the nature, content, and significance of the artifacts and features identified. Cultural material recovered will be inventoried, described, and discussed within the report text to aid in evaluation of scientific and interpretive value. All identified sites will be documented on appropriate site inventory forms.

If required, a summary of the findings will be prepared for inclusion in a screening document.

In general, the following workplan is followed:

- Avoidance will be recommended if feasible at all sites assigned high archaeological resource value (this to include all constructed features: burials, tent rings, caches, hunting blinds, hearths).
- Collection and documentation will be undertaken as a mitigative option of sites with low archaeological resource value, or isolated artifacts, as a method of protecting the heritage resource from future undocumented impacts due to increased personnel activity in the vicinity.
- Mitigative excavations, including mapping, collection and test excavations, will be recommended at those sites assigned high archaeological resource value that could not be avoided by facility relocation, and discussed with CLEY and the Chief Archaeologist as to the acceptable methods of mitigation.

A management plan for required mitigation, monitoring or surveillance relative to the proposed remediation will be developed as part of the contracted services deliverable to PWGSC/INAC. This could include site mitigation, additional survey of any project re-

locates required due to site avoidance, and verification of those heritage sites located outside the proposed development activity area that should remain outside re-located areas.

4.5 Community Consultation

Consultation regarding the remedial options for Bear Island between PWGSC/INAC and the community of Chisasibi, Quebec, took place on February 20, 2008. Community review and input on heritage resources is normally sought for incorporation into site interpretation, archaeological resource value, and appropriate mitigation options prior to submission of the Final Report. Heritage resources were not an issue during this consultation and the community members were informed that a 20 m buffer has been created around the single newly identified heritage site GbHg 1 (see Results Section 5.3.1).

5. RESULTS

A search of the Canadian Museum of Civilization database yielded no information on previously recorded heritage resources sites on Bear Island prior to conducting the AIA. As such, no revisits or information updates to existing sites was required.

On arrival at the former Mid-Canada Line Radar Site it was noted that previous work removing the structures and support facilities had already been conducted. Where buildings and support structures had been located, only refuse remained. Crumbling concrete foundations, guy wire support blocks, decayed wooden floors, fallen metal radio towers, bottle dumps, vehicle parts, damaged electronic equipment and other remains of the stations occupation and operation are all that it is left. No standing structures of significance or heritage concern remain for study. Roadways, facility remains, and areas of PWCGS concern were investigated for heritage resources that may not be apparent to the untrained observer.

Four areas of concern were identified by the PWCGS team already on Bear Island as possible heritage resources. This brings a total of six areas of assessment that included:

- roadways linking the former facilities with the southern and northern end of the island and the beach landing area;
- station foundations and telecommunications refuse and building remains;
- a “prehistoric house foundation”;
- a beached boat near the beach landing area;
- an Inukshuk; and
- a possible semi-subterranean house.

These were all investigated and are reported on below.

5.1 Former Mid-Canada Line Radar Site Areas of Investigation

5.1.1 Roadways and Airstrip

All connecting roadways, airstrip and adjoining areas were assessed for heritage resources with negative results. In most cases, the road beds had been made with gravel fill from another location, most likely a source at the southeast end of the island where gravel extraction is evident from a large area (Plate 1). This borrow source is located in the south eastern side of the island and is the highest point of land in this location.



Plate 1 View south of gravel pit at southeast end of island overlooking GbHg 1.

Additional materials located near to the roads include the remains of old Bombardier snowmobiles that will be cleared away (Plate 2).



Plate 2 View east of snowmobile remains.

5.1.2 Infrastructure Areas

As mentioned above, the structures on Bear Island have been removed, scavenged, or deteriorated into a state of disrepair with only debris and refuse still present (Plate 3). In all such areas, assessment ground inspection was conducted to identify possible heritage resources but with negative results. This includes the hut at the beach landing area (Plate 4), the barrel storage area, and water storage areas (Plate 5). The condition of the station facilities can be seen from these photographs. No areas of prehistoric use could be identified, and no historic remains of significance recorded.



Plate 3 View north of Doppler detection building foundation (Site 412) remains.



Plate 4 View north of beach landing area.



Plate 5 View northwest of water storage pond.

5.2 Potential Heritage Resource Sites

5.2.1 “House Foundation”

Several team members had identified this site variously as a house foundation, or a cross (Plate 6). Upon examination it was identified that the base rocks were possibly used to hold down lumber and boards which appear to be remnants of a sign post structure. Planks of wood with wire nails in them are still present and the structure direction faces out into the bay at the southern tip of the island as if it were a sign for approaching water craft. The stones used to hold down the cross piece do not have matching lichen growth on them and it is apparent that they were placed there from a mixed context with black, orange and grey lichen present. Their juxtaposition appears recent enough that no new lichen growth has occurred between the points of contact between rocks and the lichen colours do not match up. It is thought that this was possibly the support structure for a Station Identification sign.



Plate 6 View southeast of sign structure and rocks.

5.2.2 Marooned Boat

On the east side of the island on a sheltered beach a boat has been beached (Plate 7). The boat has been there for an unknown period of time. It is in poor condition and based on its present location was beached during a very considerable storm, or hauled out of the water for storage. The cabin still contains evidence of electrical wiring and canvass/vinyl style wood covering on the outer shell. While the boat is interesting, it is not a heritage site.



Plate 7 View northeast of marooned boat showing rocky terrain.

5.2.3 “Inukshuk”

An Inukshuk was reported on the rocky outcrop overlooking the beach landing area and marooned boat (Plate 8). The feature appeared to be an Inukshuk from a distance, but upon closer inspection it appeared to be a marker, possibly for navigation, due to its position above the cove. Assessment of the feature resulted in the identification of a wrench or iron bar inside the structure which is placed in sight of the beach and harbour entrance. The feature is approximately 2 m in height with a base of 95 by 130 cm.

Prior to the AIA, one of the pilots for the 2007 Bear island assessment team recovered a rifle stock from the “Inukshuk” area with syllabic writing etched on one side of the butt (Plate 9). The rifle stock was not old, although the wood was weathered and the finish stripped away. The stock was presented for inspection and photography as an item of interest only. The rifle stock is not considered a heritage resource and its origin and the circumstances to its presence on the island is not currently known.



Plate 8 View northeast of Inukshuk/marker overlooking cove.



Plate 9 Rifle stock with syllabic writing.

While on an unrelated visit to Baker Lake several days later, an Inuit Elder translated the syllabics into the following:

Lucassie Atutukai

Seeme Uninnalaatujaq

Charlie Ilujaatsiaq

James Uitaluk

Tommy Ittujaatsiapik

Utaaluktuq Qasalluaq

Noah Akuliaq

People of Inukjuaq (Port Harrison)

Sept. 2002

Inukjuaq is 493 km (straight line) north east of Bear Island on the Quebec (Nunavik) shoreline. It is not known whether this group of people was on Bear Island, or what the circumstances of the rifle stock were.

5.2.4 “Semi-Subterranean House”

The possible semi-subterranean house was brought to our attention by the project Geotechnical Engineer (Plate 10). The possible feature was located in the north/central part of the island at the end of a small esker where evidence of bulldozer activity was still visible. A cut through the esker was made by the bulldozer at a 90° angle, and then it tracked across the spine of the esker. At the south end of the esker gravel had been pushed up to form a ridge behind a scooped out area that had disturbed the surrounding rock plates. There were no cultural materials located at the “site” and it is believed that it was in the process of being used as a gravel source at the north end of the island.



Plate 10 View northwest of “semi-subterranean house.”

5.3 Newly Identified Heritage Resource Site

5.3.1 GbHg 1

During the investigation of the southern section of the island and the area surrounding the previously used gravel pit, a tent ring was identified (Plates 11 and 12) approximately one metre away from the edge of the gravel pit. Borden Number GbHg 1 was received from the Canadian Museum of Civilization designating the site location, and in this case identifying it as the first site identified in this Borden Block. The ring is constructed of raised rocks and is incomplete, with several rocks missing from the east end, and an apparent entrance opening on the southeast side. The ring appears quite old and settled in place, on a surface of numerous other rocks. It was revisited later in the day for observation under an increased oblique angle of sunlight which supported the identification.



Plate 11 View south of GbHg 1, tent ring.



Plate 12 View north of GbHg 1, with doorway in foreground.

The ring has approximately 35 to 50 rocks and is on the highest point of land in the southern sector which is now the gravel pit. It measures approximately 3.5 by 3 m. There is no evidence of cultural materials in the vicinity of the ring. While the ring is identifiable it does not hold enough information to assign it to a particular architectural Type (*cf.* Ryan 2003). It could be suggested that it is a Late structure based on Ryan's typology, but there is no substantial information present to support that conjecture. There are no cultural materials present around the rocks. Because of this, and the incomplete nature of the ring, with little potential for the presence of further information, its significance is rated as low.

Should the gravel pit be used during the remediation activity it is possible that this site would be impacted. A 20 m buffer zone around the site will ensure that its integrity is not compromised.

6. SUMMARY AND RECOMMENDATIONS

The AIA of the Bear Island radar station conducted under Nunavut Permit 2007-035A produced the results as discussed in Section 5 and outlined in Table 1. The predominance of bedrock and nearly complete lack of vegetation and sedimentation on the island enabled a high visibility surface examination of the facility areas to adequately assess for the presence of cultural materials. As requested, areas which will not be impacted during remediation were not fully examined. In addition, four areas were identified prior to the AIA by the project team for confirmation of their status as heritage resources. Each of these was determined to be of recent origin and do not meet the requirements of a heritage resource. Nonetheless, a single heritage resource site, GbHg 1, was identified during the program, and is documented as per the *Guidelines for Applicants and Holders of Nunavut Territory Archaeology and Palaeontology Permits* (Government of Nunavut 2003). This site is considered to be of low significance due to a lack of cultural materials, or evidence of additional cultural activity, and its less than complete state.

Table 1 Heritage Site Recommendations

Site	Type	Significance	Recommendations
GbHg 1	tent ring	low	20 m buffer zone; continued avoidance

On arrival at the former Mid-Canada Line Radar Site it was observed that all areas of the main facility had been removed although foundations remain in a state of disrepair and decay. Because of this, the assessment of individual structures became redundant. An assessment of small areas of possibly undisturbed land throughout this area was conducted but with negative results. Site GbHg 1 will not be impacted by remediation and a 20 m buffer zone has been placed around the site should any remediation activity take place in its vicinity.

It is recommended that remediation of the former Mid-Canada Line Radar Site should be allowed to continue with no impact to heritage resources if continued avoidance of GbHg 1 is practiced.

By conducting this AIA and taking part in a community consultation at Chisasibi on February 20, 2008, it is recommended that PWGSC/INAC has fulfilled the requirements of the current program to identify the potential for impact to heritage resources through the remedial reclamation of the former Mid-Canada Line Radar Station at Bear Island. The AIA of Bear Island included the participation of a member of the local community at Wemindji, William Atsynia, who acted as bear monitor and participated in the identification and recordation of sites.

As the investigations of the AIA identified heritage resource site, GbHg 1, it is recommended that avoidance of that resource be required during the remediation process. While a buffer zone of 20 m would protect this site, it is currently only one metre from the edge of the gravel pit on its northwest side. Care will need to be taken to ensure that site integrity is maintained should the gravel pit be used during remediation.

All other suspected heritage resources have been refuted as described in this report. However, while not meeting the technical requirements to be classified as heritage resources, they are cultural markers of a recent occupation and cultural activity as described in this report, but which do not affect the remediation process. As such, avoidance is recommended to prevent interfering with the “prehistoric house foundation” on the southern tip of the island, and, the beached boat and Inukshuk at the beach landing area, through the designation of a 20 m buffer zone.

7. CLOSURE

We trust the above meets your present requirements. If you have any questions or require additional details, please contact the undersigned.

GOLDER ASSOCIATES LTD.

Report prepared by:

Report reviewed by:



David Blower, Ph.D., RPA
Senior Archaeologist, Project Manager



D'Arcy Green, M.A.
Associate, Senior Archaeologist

8. REFERENCES

Blower, David

- 2003 Heritage Resources Studies Mitigation and Assessment 2002, Bathurst Inlet Port and Road Project, Nunavut Permit 02-035A. Department of Culture, Language, Elders and Youth, Iqaluit.
- 2007 Historical Resources Impact Assessment, EnCana Christina Lake Thermal Expansion Project. Permit 07-186. On file with Alberta Tourism, Parks, Recreation and Culture, Edmonton.

Nutall, Mark

- 2005 Encyclopaedia of the Arctic, Volume 2 G-N Index. Ed. by, Mark Nutall, pp 990-997. Routledge, New York.

Dumond, Don E.

- 1987 The Eskimos and Aleuts, Revised Edition. Thames and Hudson, London.

Government of Nunavut

- 2003 Guidelines for Applicants and Holders of Nunavut Territory Archaeology and Palaeontology Permits. Department of Culture, Language, Elders and Youth, Iqaluit.

Honigmann, John J.

- 1981 West Main Cree. In, Handbook of North American Indians, Volume 6, Subarctic Pp 217-243. Smithsonian Institution, Washington.

Indian and Northern Affairs Canada

- 1996 An Environmental Assessment of Two Mid-Canada Line Sites at Bear Island, NWT. Environmental Sciences Group, Royal Military College, Kingston, Ontario.

Lovesek, Joan A.

- 2002 Algonquians / Subarctic. In, *Aboriginal Peoples of Canada*, ed. By Paul R. Magocsi, pp 98-128. University of Toronto Press Incorporated 1999, Toronto.

McGhee, Robert

- 1984 Thule Prehistory of Canada. In, *Handbook of North American Indians*, pp 369 – 376. Smithsonian Institution, Washington.
- 1990 Canadian Arctic Prehistory. Canadian Museum of Civilization, Hull.
- 2001 Ancient People of the Arctic. Paperback Edition, UBC Press, Vancouver.
- 2005 The Last Imaginary Place: A Human History of the Arctic World. Oxford University Press, New York.

Noble, William. C.

- 1981 Prehistory of the Great Slave Lake and Great Bear Lake Region. In, *Handbook of North American Indians Volume 6, Subarctic*. Pp. 97-129. Smithsonian Institution. Washington.

Preston, Richard J.

- 1981 East Main Cree. In, *Handbook of North American Indians, Volume 6, Subarctic*. Pp 196–216. Smithsonian Institution, Washington

Ryan, Karen

- 2003 An Overview of Palaeoeskimo architectural remains in the Central Canadian Low Arctic. *Etudes/Inuit/Studies*, 27(1-2): 29-65.

Wright, J. V.

- 1995 A History of the Native People of Canada, Volume I (10,000 – 1,000 B.C.) Mercury Series, Archaeological Survey of Canada, Paper 152. Canadian Museum of Civilization, Hull.

- 1999 A History of the Native People of Canada, Volume II (1,000 B.C. – A.D. 500.) Mercury Series, Archaeological Survey of Canada, Paper 152. Canadian Museum of Civilization, Hull.

APPENDIX I

PHOTOGRAPH LOG

Former Mid-Canada Line Radar Site Photo Log

No.	Direction	Site	Comment
1-62	all	n/a	aerial photographs of Bear Island
63-66		n/a	airstrip landing area
67-72	all	WP 003	signpost (house foundation/cross)
73-82	all	n/a	misc. photos of south east side of island
83-88	W	GbHg 1	tent ring
89-90	NW	n/a	recent faunal
91-94	all	n/a	misc. photos west side of island
95-107	all	n/a	marooned boat on the beach, east side of island
108-116	all	n/a	beach landing area and cove
117-123	all	n/a	crew on overlook above cove
124-125	S	n/a	rock upland overlooking cove
126-138	NE	n/a	“Inukshuk” above cove
139-144	NE	n/a	rusted out snowmobiles
145-146	NW	n/a	one water storage area
147	S	n/a	pipeline
148-152	all	n/a	Doppler detection foundation Site 412
153-159	NW	n/a	south end of esker in north half of island
160-168	all	n/a	Doppler detection foundation Site 413
169-175	all	n/a	misc. photos near Doppler detection foundation Site 413
176-187	N	n/a	photos of north end of island (white specs are polar bears)
188-192	S / SW	n/a	central west side of island
193-201	SE	n/a	south central, east side of island
202-204	SW	GbHg 1	tent ring
205-207	SW	n/a	signpost stand
208-211	SW	n/a	southern tip of island
212-214	NE	GbHg 1	gravel pit with GbHg 1 on right edge
215-218	NW	n/a	storm clouds
219-223	n/a	n/a	rifle stock with syllabic writing
224-230	all	n/a	staging area