

**ARCHAEOLOGICAL IMPACT
ASSESSMENT
Pioneer High Arctic Bundle Sites,
Various Locations, Nunavut**

Public Services and Procurement Canada

Permit Number: 2022-21A

Final Report



Prepared for:

Dillon-Outcome Joint Venture, on behalf of
Public Services and Procurement Canada
Western Region

Prepared by:
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Calgary, Alberta



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CONFIDENTIAL REPORT

**ARCHAEOLOGICAL IMPACT ASSESSMENT
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Executive Summary

This report contains confidential archaeological site data that cannot be made public. Archaeological sites and access to information about those sites are protected by legislation in Nunavut. The information contained in this report is provided to the Department of Culture and Heritage, Government of Nunavut, to satisfy the requirements of the Archaeological Permit, and is provided to the proponent for use in Project planning and design.

A separate summary report that does not contain detailed information on archaeological sites or their locations has been prepared for this Project. The summary report (public version) can be submitted to other regulators and made public.

At the request of Public Services and Procurement Canada (PSPC), Stantec Consulting Ltd. conducted an Archaeological Impact Assessment under Nunavut Archaeological Permit 2022-21A for the Pioneer High Arctic Bundle Sites at various contaminated site locations in Nunavut (the Project). Stantec was contracted by Dillon Consulting Limited and Outcome Inc. in Joint Venture (Dillon-Outcome). Dillon-Outcome was contracted by PSPC on behalf of their client, Crown Indigenous Relationships and Northern Affairs Canada to carry out field investigations and environmental studies on seven contaminated sites. The sites are located between 180 km and 580 km from Resolute Bay, Nunavut.

Although all seven sites were planned for assessment in 2021, access and logistical constraints for the two most northern locations (Kristoffer Bay and Cape Isachsen) resulted in these two locations being removed from the program prior to mobilization for the Project. During the 2021 field program, access could not be obtained for Cape Ahnighito as the aircraft could not safely land at this location.

Study sites at Cape Ahnighito, Cape Isachsen, and Kristoffer Bay were assessed during the 2022 field program. No archaeological sites were newly identified or revisited during the AIA completed for the study areas. Archaeological studies are considered complete at Cape Ahnighito, Cape Isachsen, and Kristoffer Bay.

Study Limitations

The conclusions in the Report are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

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1.0 INTRODUCTION

At the request of Public Services and Procurement Canada (PSPC), Stantec Consulting Ltd. (Stantec) conducted an Archaeological Impact Assessment (AIA) under Nunavut Archaeological Permits 2021-32A and 2022-21A for the Pioneer High Arctic Bundle Sites at various contaminated site locations in Nunavut (the Project). Stantec was contracted by Dillon Consulting Limited and Outcome Inc. in Joint Venture (Dillon-Outcome). Dillon-Outcome was contracted by PSPC on behalf of their client, Crown Indigenous Relationships and Northern Affairs Canada (CIRNAC) to conduct the AIA as part of environmental investigations on seven contaminated sites located between 180 km and 580 km north of Resolute Bay, Nunavut.

1.1 PROJECT BACKGROUND

The Project Terms of Reference (TOR) requested assessment at seven contaminated sites. Brief descriptions of each site are provided in Table 1-1 below (PSPC 2021). Site locations are illustrated in Figure 1-1.

Table 1-1 Pioneer High Arctic Bundle Site Descriptions

Site	Year Assessed, Permit	Identifier	Location	Brief Description from TOR
Pioneer Island	2021, 2021-32A	EK007 – Devon Island (West) and EK011 – Pioneer Island/Devon Island in the Northwest Territories/Nunavut contaminated site database	76° 57' 59.47" N latitude and 96° 58' 21.30" W longitude	Site includes an airstrip, approximately 25 drums scattered around the site (five full, four partially full, six empty, and at least 10 of unknown condition and contents), minor amounts of metal and wood debris, and a burn pit.
Playfair Point	2021, 2021-32A	NB012 – Playfair Point in the Northwest Territories/Nunavut contaminated site database, southwest coast of Bathurst Island	75° 21' N latitude and 100° 43' W longitude	Site was used by the Canadian Wildlife Service (CWS) from 1989 to 1995 to support caribou research at the CWS Walker River Camp on the east side of Bathurst Island. During the aerial reconnaissance of the area by WESA in 2006, a small drum cache was observed.
Stupart Island	2021, 2021-32A	NB070 – Stupart Island in the Northwest Territories/Nunavut contaminated site database	77° 07' 53.71" N latitude and 104° 26' 32.32" W longitude	Site consists of the remains of an historic camp, including two old tent platforms, approximately 60 drums (mostly empty) piled in caches and scattered around the site, and several debris piles with evidence of burning.

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Table 1-1 Pioneer High Arctic Bundle Site Descriptions – continued

Site	Year Assessed, Permit	Identifier	Location	Brief Description from TOR
Skybattle Bay	2021, 2021-32A	NB034 in the Northwest Territories/Nunavut contaminated site database, southwest portion of Loughheed Island	77° 14' 41.95" N latitude and 105° 07' 51.72" W longitude	Site is a former Panarctic Oils Ltd. site, where explorations for oil and gas reserves were carried out in the past. The site currently consists of two former exploration wells and an associated airstrip. There are three caches of over 100 drums (mostly empty) located at various points along the airstrip and a minimal amount of metal and wood debris scattered throughout the site. Some roadways and trails are visible and the airstrip is quite large and appeared to be in good condition. The well site associated with the airstrip currently consists of disturbed ground and some debris.
Cape Ahnighito	2022, 2022-21A	NB048 in the Northwest Territories/Nunavut contaminated site database, northern tip of Loughheed Island	77° 43' 43.53" 3 N latitude and 106° 03' 59.92" W longitude	Site is a fuel cache site; it currently consists of three historical drum caches of approximately 85 drums (mostly empty, some partially full and some full), scattered drums, debris pits and significant amounts of scattered debris.
Cape Isachsen	2022, 2022-21A	NB076 – Cape Isachsen – Ellef Ringnes Island in the Northwest Territories/Nunavut contaminated site database, northwest tip of Ellef Ringnes Island	79° 16' 40.44" N latitude and 105° 16' 37.78" W longitude	Site is a former Panarctic Oils Ltd. site where exploration for oil and gas reserves were carried out in the past. The site consists of a former exploration well, a suspected former camp area, at least two suspected sumps, at least three disturbed areas and a minor amount of partially buried metal debris.
Kristoffer Bay	2022, 2022-21A	NB043 – Kristoffer Bay/Ellef Ringnes Island in the Northwest Territories/Nunavut contaminated site database, western coast of Ellef Ringnes Island	78° 15' 04.07" N latitude and 102° 32' 35.36" W longitude	Site is a former Panarctic Oils Ltd. site, where explorations for oil and gas reserves were carried out in the past. The site currently consists of the suspended exploration well and four abandoned test holes. The site also has trails, minor debris, a suspected sump area and disturbed ground that is suspected to have been where some of the former site drilling and camp infrastructure were located.

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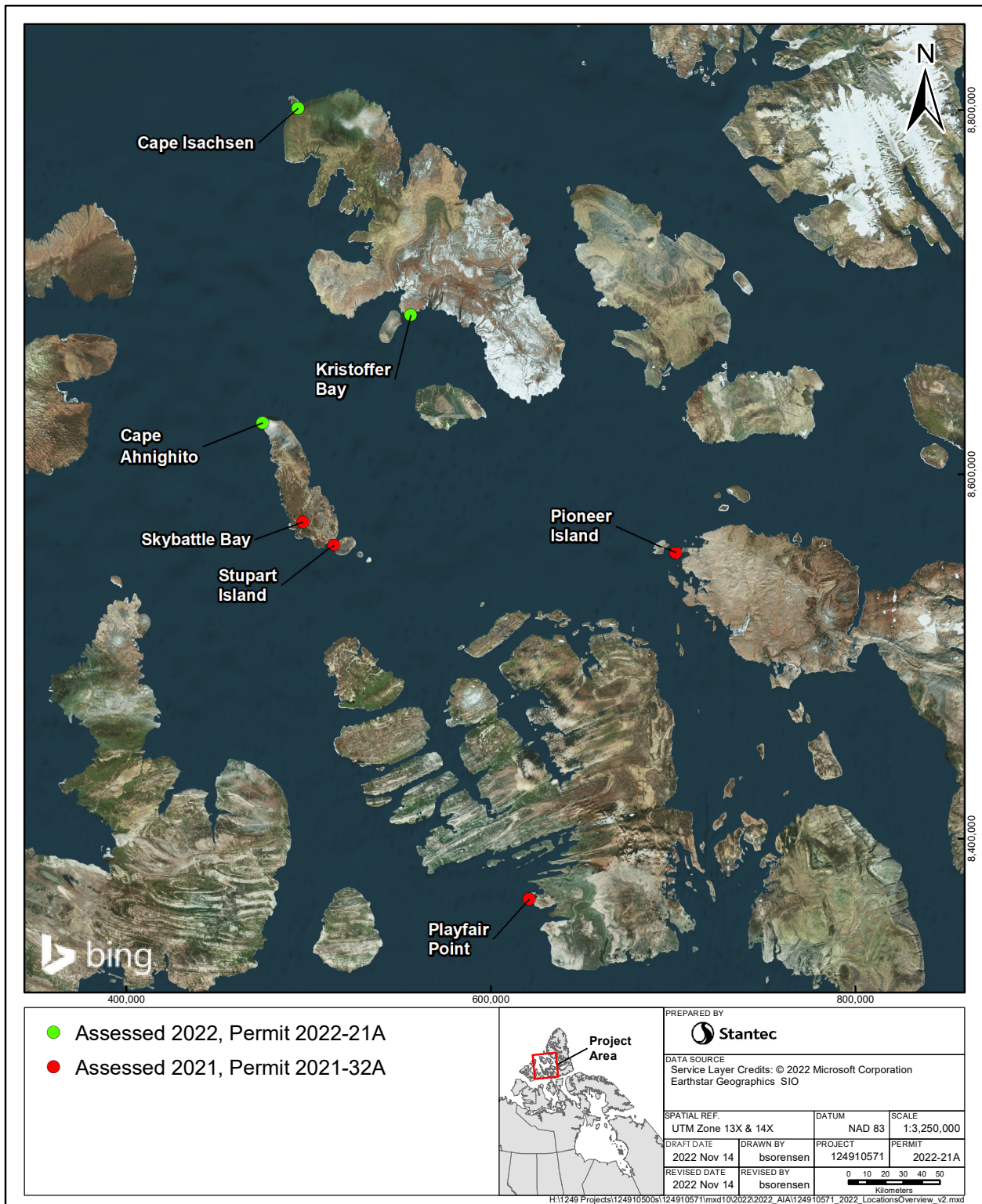


Figure 1-1 Project Location

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Although all seven sites were planned for assessment in 2021, logistical constraints prevented access to the two most northern locations (Kristoffer Bay and Cape Isachsen). These two locations were removed from the planned 2021 program prior to mobilization for the Project. During the 2021 field program, access could not be obtained for Cape Ahnighito as the aircraft could not safely land at this location. This site was also removed from the 2021 program. Four of the seven sites (Pioneer Island, Playfair Point, Stupart Island, and Skybattle Bay) were assessed during the 2021 field program under permit 2021-32A (Tischer 2022). Study sites at Cape Ahnighito, Cape Isachsen, and Kristoffer Bay were assessed during the 2022 field program (Figure 1-1). The results of the archaeological assessments completed at these three locations are presented in this report.

1.2 OBJECTIVES

The objectives of the archaeological studies were to document any previously recorded and/or newly identified archaeological sites relative to the contaminated sites and potential future remediation activities. Specifically, the field program was designed to identify archaeological sites, to assess the nature of potential project impacts on identified sites relative to site heritage value, to provide Dillon-Outcome and PSPC with information necessary to assist in project planning to avoid archaeological sites, and to formulate recommendations for further site management and mitigation.

1.3 SCOPE OF WORK

The scope of work for the Project consisted of the following components:

1. **Record Review** - to identify previously recorded sites within proximity of the study locations and to determine the nature of the database in the general area.
2. **Ground Reconnaissance** - to re-identify, in the field, any archaeological sites that were previously recorded within proximity of the study locations, as well as to identify and document any unrecorded archaeological sites.
3. **Site Evaluation** - to evaluate the nature of the existing archaeological database, the quantity and quality of observable remains (e.g., site condition, content, uniqueness, and complexity) and the potential of the archaeological site to contribute to the regional archaeological database.
4. **Impact Assessment** - to assess the potential for impacts to the identified archaeological sites, as well as the local and regional database, and to recommend site specific mitigative and avoidance measures commensurate with the assigned value of the site.

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2.0 ENVIRONMENTAL SETTING

2.1 INTRODUCTION

Environment has always provided the parameters within which human cultures may develop by providing both opportunities and limitations. As a result, elements of the regional environment are important considerations in the understanding of cultural development, as they influenced not only the types of activities that could be conducted, but the ways in which they could be accomplished. In the archaeological record, this pattern is observed in the type and location of archaeological sites found in specific environments. In Nunavut, archaeological sites are often found associated with a specific set of landforms (including beaches, coastlines, eskers, valley edges, knolls, rivers, narrows, and lakes) which would direct travel, bias routes of communication, and enhance or restrict resource procurement and occupation. Owing to close relationships among human adaptive strategies and the environment, a brief overview of regional and local environments is presented.

2.2 REGIONAL ENVIRONMENT

The three locations investigated during the 2022 field program are situated in the Northern Arctic Ecozone, which extends over most of the non-mountainous areas of the arctic islands and parts of the northeastern Kivalliq, western Baffin Island, and northern Quebec. Cape Ahnighito is on the northern tip of Loughheed Island overlooking the Prince Gustaf Adolf Sea. Both Cape Isachsen and Kristoffer Bay are located on Ellef Ringnes Island. Cape Isachsen is on the northwest coast of the Isachsen Peninsula overlooking the Perry Channel, while the Kristoffer Bay site is situated on a small peninsula off the northwest end of the Bay, facing the Danish Strait.

All three sites are in the Sverdrup Islands Lowland Ecoregion (Northern Arctic Ecozones 2021) (Figure 2-1). The region is developed on generally soft, poorly consolidated Mesozoic rocks. The landscape is a rolling, scarped lowland typically less than 150 m above sea level. Permafrost in the region is surficial to deep and continuous. The mean annual temperature is -18°C, with a summer mean of -1.5°C and a winter mean of -32°C. Mean annual precipitation ranges from 100 mm to 150 mm. Areas along the northern extreme of the region are hyper-arid polar deserts receiving less than 100 mm of annual rainfall. Owing to these conditions, static regosols and turbic orthic cryosols formed on colluvial, alluvial, morainal, and marine deposits are the dominant soil orders represented in the region. These systems support sparsely distributed vegetation communities comprised of mosses, lichens, and cold-adapted vascular plants such as sedge and cotton grass. Arctic willow and *Dryas* spp. occur infrequently. Characteristic wildlife includes polar bear, muskox, Peary caribou, arctic hare, arctic fox, collared lemmings, ringed and bearded seals, bowhead and beluga whales, ptarmigan, and king eider.

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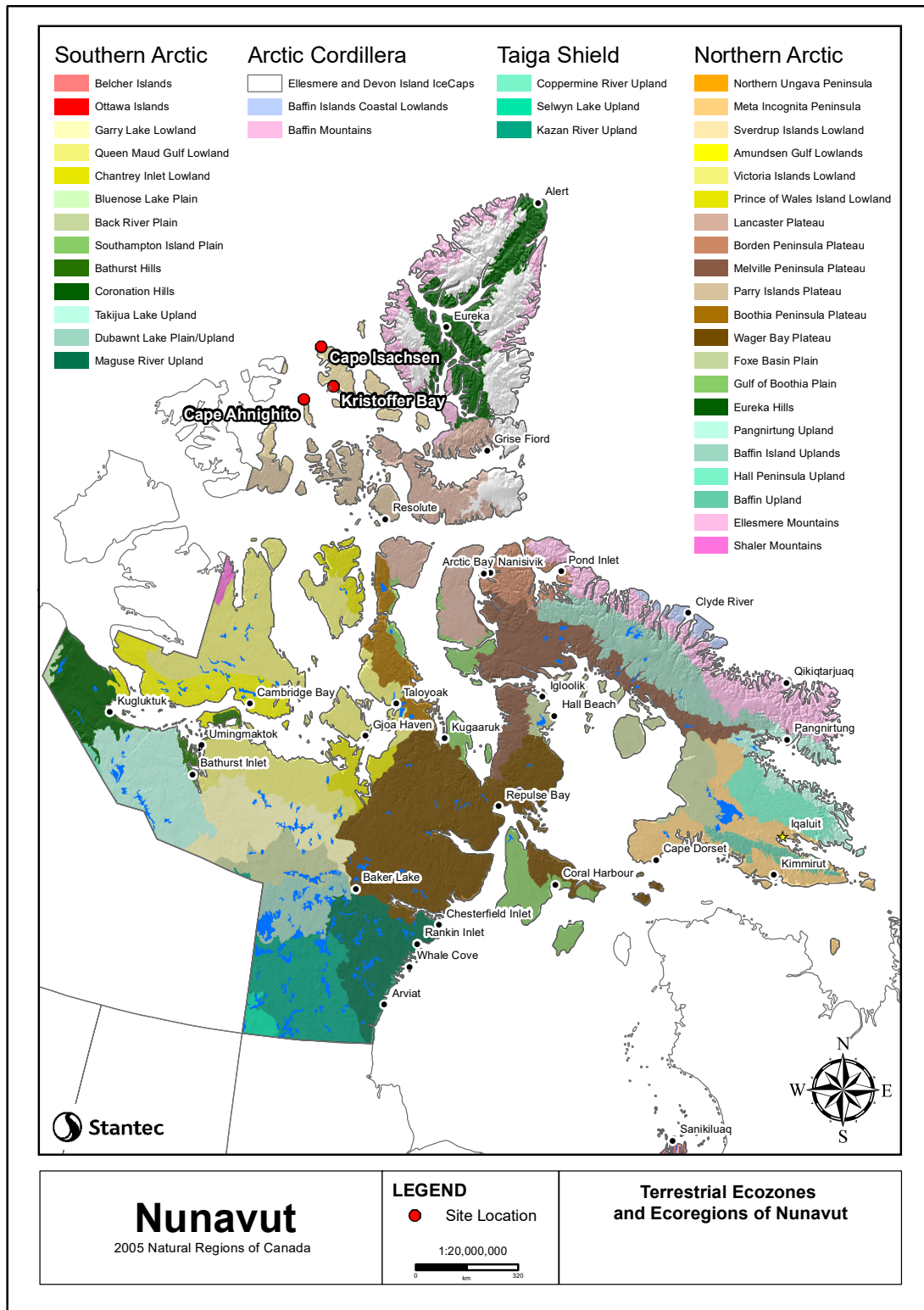


Figure 2-1 Terrestrial Ecozones and Ecoregions of Nunavut

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2.3 PROJECT ENVIRONMENT

2.3.1 Cape Ahnighito

The Cape Ahnighito site is situated on the northern tip of Lougheed Island overlooking the Prince Gustaf Adolf Sea. The evaluation area is an historical fuel cache site of unknown origin. It currently consists of caches comprised of approximately 103 drums (92 at the main site and 11 at the northeast drum cache; mostly empty, some partially full and some full), scattered drums, debris pits, and significant amounts of scattered refuse (WESA 2012a) (Plate 2-1). For the purposes of remediation, the site has been divided into two areas of concern: the main site and the northwest drum cache (WESA 2012a).

Local bedrock is carbonaceous sandstone of the Isachsen formation capped with 2 m of marine pelite (mudstone/siltstone) (Harrison et al. 2016; Hodgson 1981). The landscape above this is a low-relief coastal plain sitting 10 meters above sea-level (masl). Permafrost in the area was previously recorded at 0.2 to 0.5 m below the surface (WESA 2012a). Both the main site and the northwest drum cache are imperfectly drained owing to the large water holding capacity of pelite and the shallow permafrost barrier (Plates 2-2 to 2-4). Low-lying areas have numerous runoff gullies feeding into a larger channel situated north and northeast of the sites. Vegetation is sparse, comprised mainly of moss, lichen, and tussock. A single caribou was observed during the 2022 field program. During the program (conducted in June), the northern coast of Lougheed Island was surrounded by an approximately 500 m wide barrier of fast and multiyear pack ice (Plate 2-4). While ice levels vary annually, it is likely that the island often remains surrounded by ice throughout most of the year. This may impede access to the island. The wildlife monitor indicated that these seascapes are not viable seal or polar bear habitats. Caribou are sparse in the area and tend to inhabit the river valley slopes, upland plains, and ridges of the southern interior (Gunn et al. 1981).

Based on its low-lying and imperfectly drained topography, limited resource capacity, and potential access challenges owing to sea ice, the Cape Ahnighito area is of low potential to contain archaeological sites.

2.3.2 Cape Isachsen

Cape Isachsen is located on the northwest coast of Ellef Ringnes Island's Isachsen Peninsula overlooking the Perry Channel. The location is a former Panarctic Oils Ltd. (Panarctic) exploration site active during the 1970s. The site is comprised of an abandoned exploration well, numerous disturbed areas containing buried metal, two suspected sumps, and a suspected camp (WESA 2012b). Several mounds of disturbed sediment containing refuse were observed during the current field program (Figure 2-5).

The Cape Isachsen site is on a 5 masl coastal plain comprised of fluvial braidplane/overbank sands with minor mud and gravels capping shale/sandstone conglomerate (Harrison et al. 2016). Permafrost was previously recorded at 0.3 to 0.55 m below the surface (WESA 2012b). The area has low-relief, little to no vegetation, and is poorly drained (Plates 2-6 and 2-7). No wildlife, elevated terrain, valleys, or substantial lakes, ponds, springs, and rivers/creeks were observed during local ground reconnaissance and broader flyovers. The wildlife monitor indicated that the terrain and vegetation was unsuitable for caribou and muskox, and people from Resolute typically do not hunt or use lands this far north.

Owing to these factors, the Cape Isachsen area is of low potential to contain either archaeological sites or features related to recent land use.

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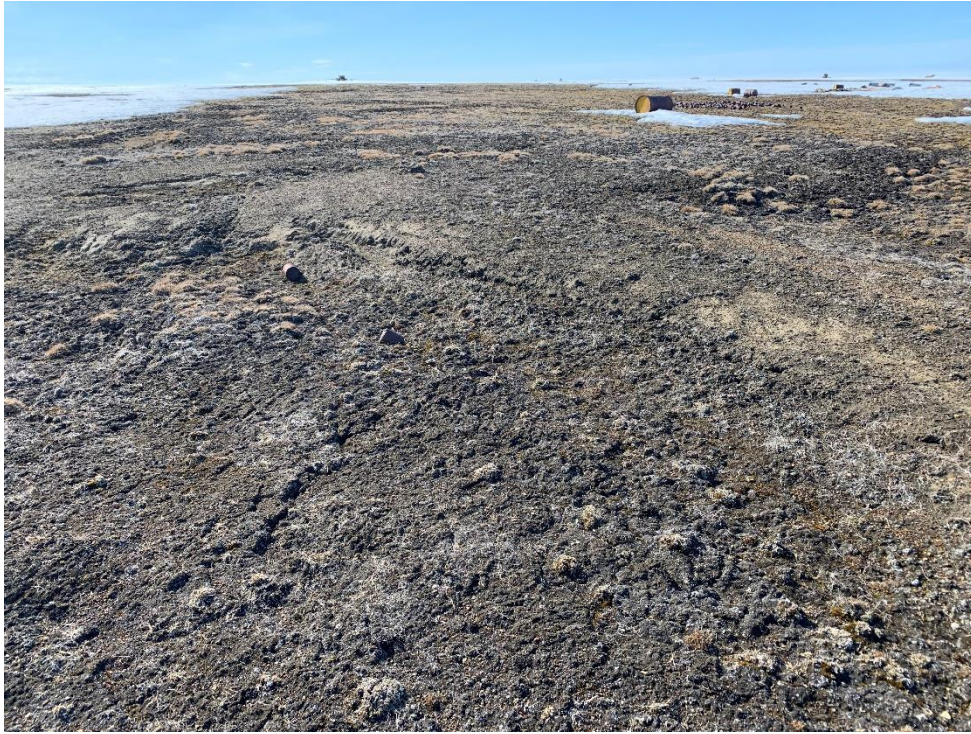


Plate 2-1 View east at the Cape Ahnighito main site showing scattered fuel drums.



Plate 2-2 Close view of the ground surface at the Cape Ahnighito main site showing muddy coastal plain terrain.

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Plate 2-3 View west at the Cape Ahnighito northwest drum cache site showing imperfectly drained coastal plain.



Plate 2-4 View west at the Cape Ahnighito northwest drum cache site showing coastal ice (background).

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Plate 2-5 View north at Cape Isachsen showing poorly drained, muddy terrain.

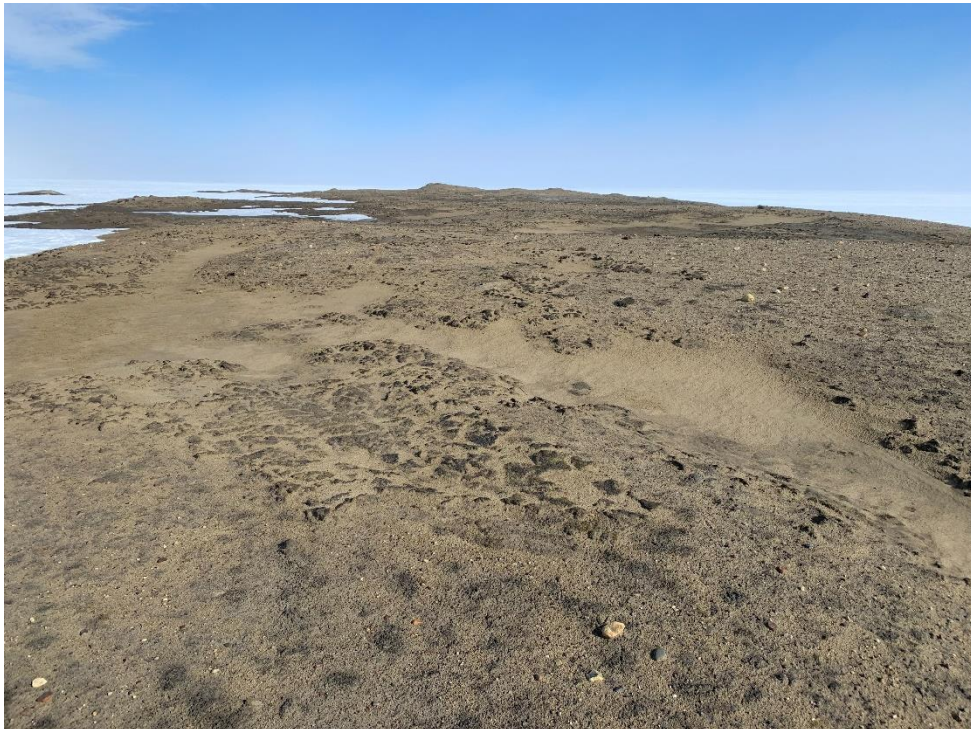


Plate 2-6 View west at Cape Isachsen showing poorly drained, muddy terrain.

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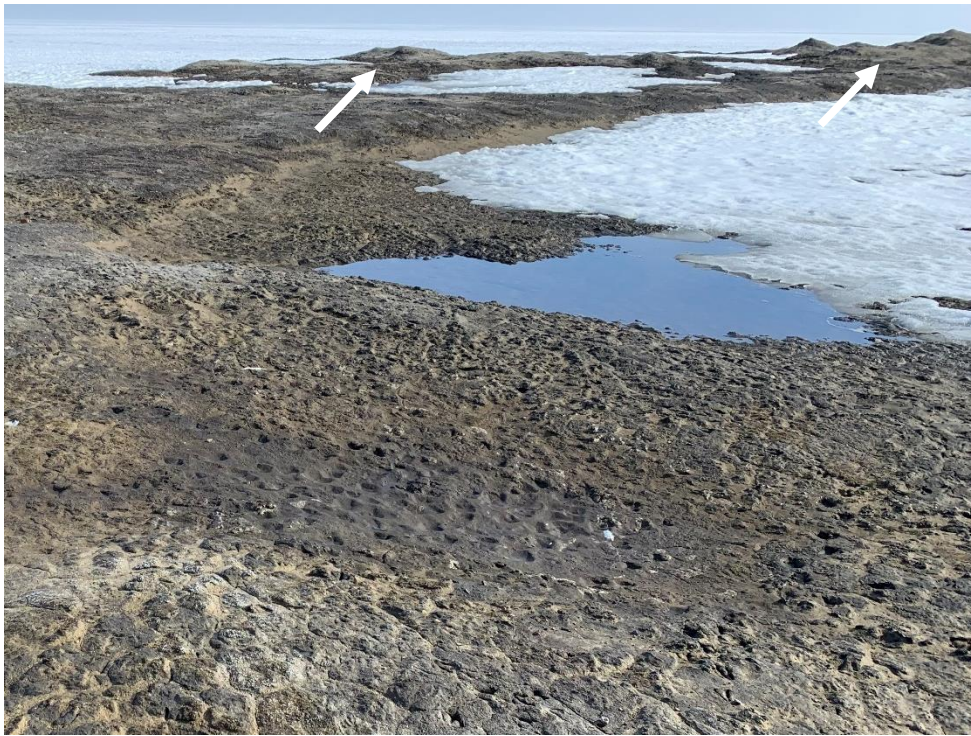


Plate 2-7 View northeast at Cape Isachsen showing poorly drained and muddy terrain. The arrows point to ground disturbances related to oil and gas activities. A suspected sump is in the foreground.

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2.3.3 Kristoffer Bay

The Kristoffer Bay site is situated on a small peninsula off the west coast of Ellef Ringnes Island overlooking the Danish Strait to the south. Panarctic carried out explorations for oil and gas reserves at this location during the 1970s and 1980s. Inspections in 1992 confirmed that well abandonment was complete. The site currently consists of the suspended exploration well, four abandoned test holes, trails, debris, and suspected sump and camp locations (WESA 2012c). The 2022 site inspection revealed that the site consists of a tagged wellhead and an untagged suspected wellhead, a suspected sump, and widely strewn metal, wood, and plastic debris.

Extensive disturbances related to Panarctic operations were observed during the 2022 field program. Fine sediments are dispersed across the surface of the entire eastern extent of the site (Plate 2-8). This likely owes to well sump deposition. Metal, wood, and plastic debris are also scattered across the entire area yet concentrated in a gully east of the well head (Plate 2-9).

Formed atop siliciclastic bedrock (primarily quartz sandstone, siltstone, and shale), the assessment area included a coastal plain and three terraces comprised of undifferentiated deltaic/overbank sands and marine beach deposits (clay, silt, sand, gravels, and cobbles) (Harrison et al. 2016). For the purposes of this study, the investigated terraces, all of which are parallel to the current coastline, are designated as lower, middle, and upper. All four landforms have no vegetation cover, with the exception of mosses colonizing some of the more poorly drained areas.

The coastal plain gently slopes southeast into the bay and is extensively gullied by seasonal runoff and the drainage of a freshwater stream situated at the eastern extent of the site (Plates 2-10 and 2-11). The lower terrace is approximately 7 masl and provides a large area of level, well drained land comprised of compact sands and gravels (Plate 2-12 and 2-13). At approximately 9 masl, the muddy middle terrace slopes to the south and is generally poorly drained and gullied owing to runoff and fine sediment deposition sourced from the upper terrace (Plates 2-13 to 2-16). This upper terrace is approximately 15 masl. It is primarily sandy and gravelly, generally sloping toward the south, and extensively gullied by the tributaries of a large drainage channel coursing to the southwest (Plate 2-17). There are several areas with accumulations of saturated fine sediments deposited by runoff. Debris associated with the drilling operations was observed on this terrace in locations upward of 350 m from the well head (Plate 2-17). The terraces have good views of elevated landforms in the north and east interior (Plate 2-13).

Considering the local relief, good drainage across the lower terrace, proximity to fresh water and the coast, and good views of interior landforms, yet also the significant extent of ground disturbance, the area investigated at Kristoffer Bay has low to moderate archaeological potential.

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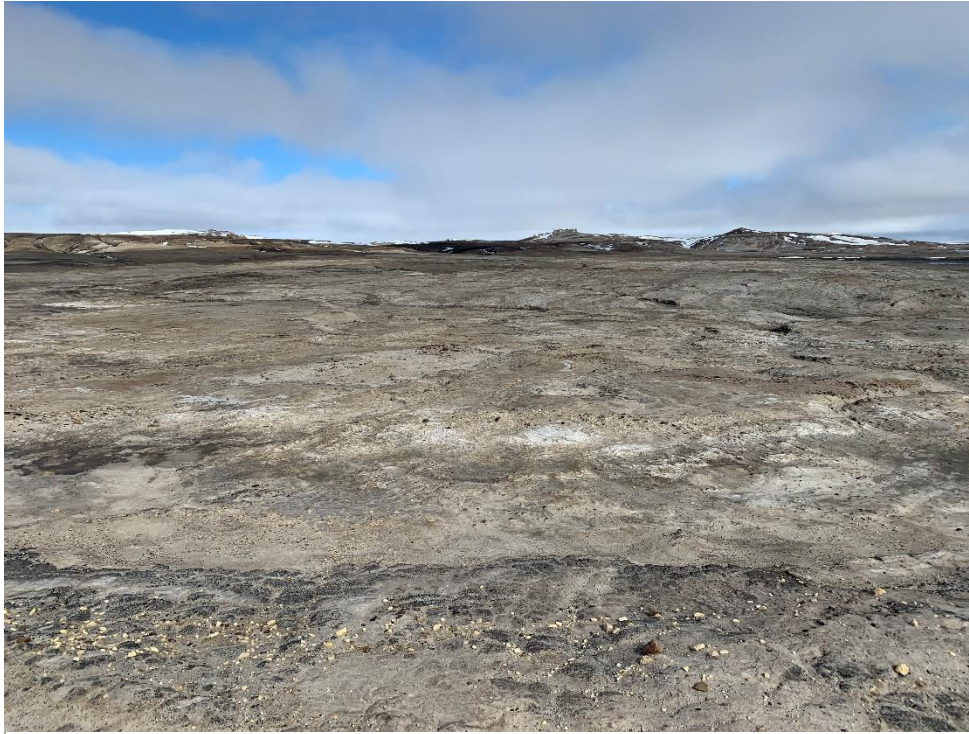


Plate 2-8 View northeast at Kristoffer Bay showing extensive disturbance associated with drilling activities and fine sediments.



Plate 2-9 View west at Kristoffer Bay showing the location of a channel filled with debris related to drilling activities.

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Plate 2-10 View south at Kristoffer Bay showing the gently sloping coastal plain at sea-level, floe ice, and a drainage outflow.

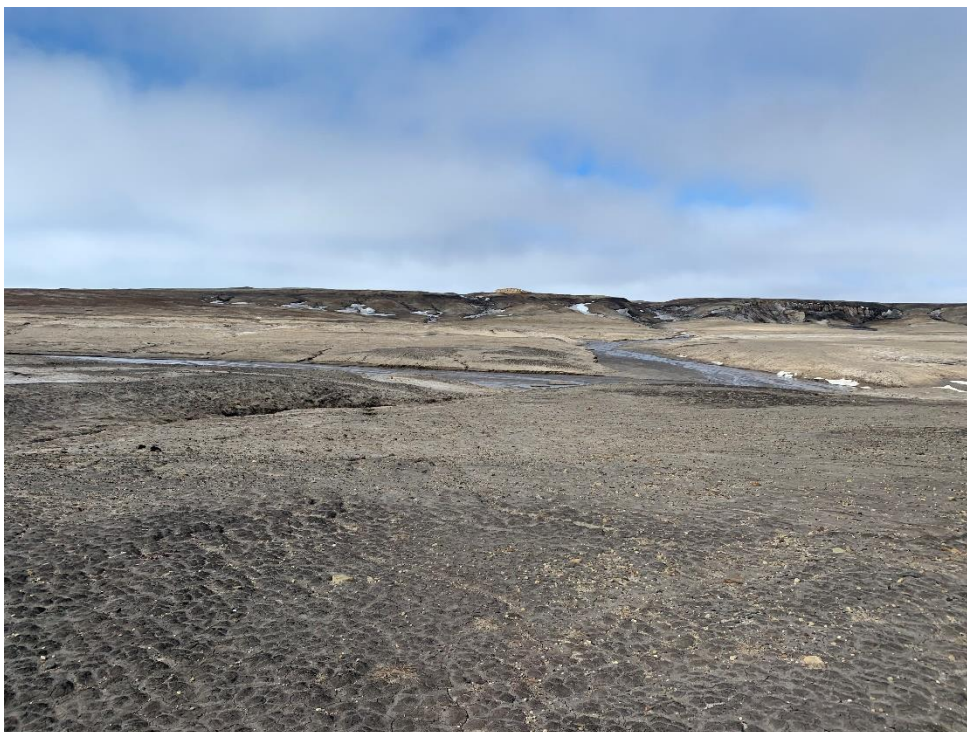


Plate 2-11 View northeast at Kristoffer Bay with a south draining freshwater stream.

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Plate 2-12 View west at Kristoffer showing the sea-level coastal plain (background left) and the lower terrace landform (background center).



Plate 2-13 View east at Kristoffer Bay showing the low-relief, well drained lower terrace (center) and the middle terrace edge (left).

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Plate 2-14 View east at Kristoffer Bay showing the middle terrace with gently sloping poorly drained gullied areas (center) and the upper terrace edge (background left).



Plate 2-15 View west at Kristoffer Bay showing the middle terrace with sloping, poorly drained terrain.

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Plate 2-16 View northwest at Kristoffer Bay showing the middle terrace with sloping, poorly drained terrain.

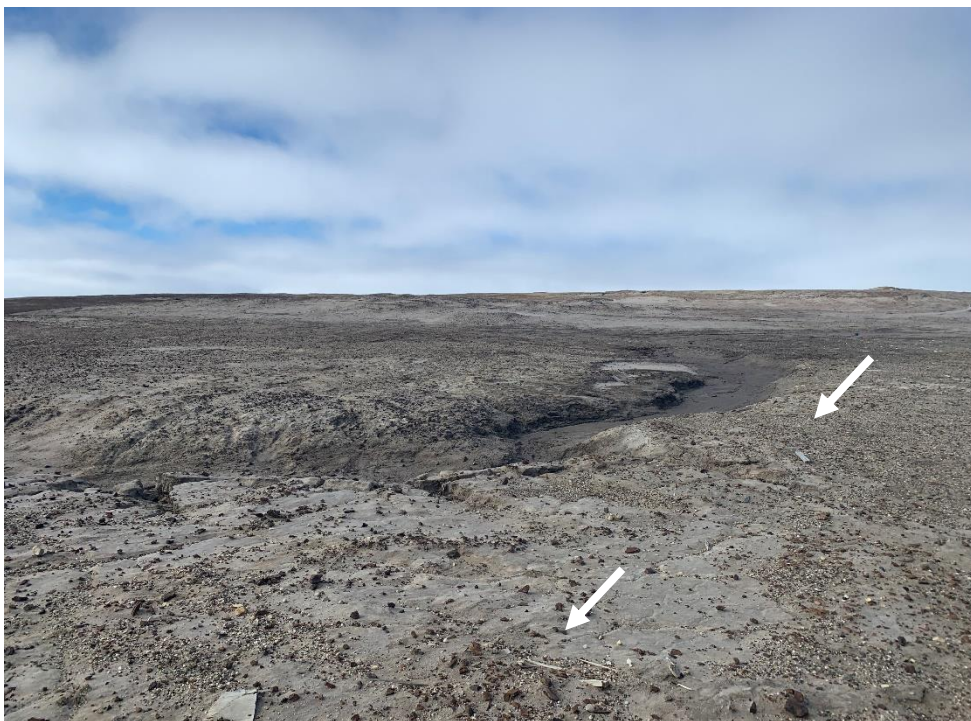


Plate 2-17 View west at Kristoffer Bay showing the gullied upper terrace and scattered debris.

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Heritage Resources
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3.0 HERITAGE RESOURCES

3.1 DEFINITION

Heritage resources are identified by the Nunavut Archaeological and Palaeontological Sites Regulations (Nunavut Government 2001) and consist of archaeological artifacts more than 50 years old and fossils including natural casts, preserved tracks, coprolites, and plant remains as well as shells, exoskeletons of invertebrates, and vertebrate remains. Prehistoric archaeological sites are composed of artifacts, features, and residues of Indigenous origin. They predate the arrival of Europeans and are typically characterized by modified bone and stone, and stone structures. Historic sites are characterized by structures, features, and objects of European influence. These sites date back to the period of European contact but also include remains of more recent activity (i.e., more than 50 years). Historic sites less than 50 years old are generally associated with contemporary land use. They document continued use and occupation of an area to the present time. Cultural landscapes consisting of either natural or human-made features important to a society's sense of place are also important heritage resources. Although palaeontological sites contain fossils of plants or animals or fossilized evidence of their existence, also of geological interest are type sites for geological formations.

3.2 POTENTIAL IMPACTS

Owing to the fact that prehistoric archaeological, historical, palaeontological, and traditional land use sites represent discrete episodes of past activities, they are non-renewable and, therefore, are susceptible to alteration or removal by development. Prehistoric and historical archaeological resources are comprised of residues of past cultures. Although the people responsible for deposition of the archaeological material are unavailable for observation, the preserved context and associations in which the remains functioned can reveal many clues about past human behaviour, adaptations and relationships to the natural world. The key to the interpretation of these resources, however, is in their pattern of cultural deposition, which is extremely fragile, ephemeral and the product of unique processes and conditions of preservation. Consequently, once they are disturbed, they cannot be replaced, recreated or restored. Owing to the nature of their origin and preservation, archaeological resources are finite in quantity. Archaeological resources are therefore increasingly susceptible to destruction and depletion through natural and cultural disturbances.

3.3 MITIGATIVE OPTIONS

Adverse primary impacts to heritage resource sites, identified prior to the construction stage of development, can be significantly reduced or eliminated by avoidance or adequate study. Site avoidance can be achieved through alteration of the Project footprint. If avoidance is not feasible, adequate study of archaeological sites generally involves scientific investigations that are designed to systematically explore and reconstruct the activities that are represented at the site. These investigations may involve the systematic collection of surface materials, detailed mapping, photographic documentation of sites, and/or the excavation of buried sites. In cases where the heritage value of an archaeological site is considered to be low, photographic documentation, recording, and collection of surface specimens may represent

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sufficient mitigative measures. In cases where the heritage value of a site is identified as high, however, more detailed investigative measures, such as controlled excavation, may be necessary.

3.4 CULTURAL CONTEXT

The Project sites are situated on Lougheed Island and Ellef Ringnes Island. The first inhabitants of this High Arctic Island region were the Palaeoeskimos, part of the Arctic Small Tool tradition. The Palaeoeskimo inhabitants represent a relatively rapid and widespread migration of people from Alaska to Greenland into previously unoccupied regions starting as early as 5000 years ago. In the High Arctic, occupation by Palaeoeskimos is suggested to be sporadic, with periods of occupation and hiatus. The first phase of this Palaeoeskimo tradition in the High Arctic Islands is part of the Independence I complex (dating to 2000 – 1700 years BC), represented by sparsely distributed sites found in the High Arctic and often characterized by small box hearths and tiny stone tools located on raised beach ridges (McGhee 1990). Sites associated with the Pre-Dorset complex (1700 – 800 years BC) are less common in the High Arctic than further south, but Pre-Dorset sites have been recorded on Devon Island (McGhee 1990). It is likely that the Pre-Dorset people relied heavily on marine mammal resources. The styles of the harpoon heads used to hunt these animals change through time and therefore provide useful chronological markers for archaeologists.

A cooling climate and subsequent reduction in the abilities to acquire marine mammals around 3000 years ago may have resulted in a decline in population, and set the stage for a new culture, the Dorset (800 BC to AD 1000), although Independence II sites (1000 – 500 BC) are known from both Bathurst and Devon Islands. Independence II culture may have derived from Independence I. It also shares some similarities with Pre-Dorset sites, or it may be a northern variant of Dorset (McGhee 1990).

The Dorset people appear to have lived more secure and rich lives than the Independence/Pre-Dorset before them, as evidenced by larger, more permanent, and more complex sites. This may relate to different methods of obtaining marine mammals which involved hunting from sea ice. Because of different adaptations, it seems that the Dorset were more suited to the colder climate that prevailed in the Arctic during this time. Dorset winter houses were large, semi-subterranean, and contained a mid-passage similar to that present at Pre-Dorset sites. Dorset longhouses are also known from the region, including at Brooman Point on Bathurst Island (McGhee 1984; Park 2003). Dorset artifact assemblages are dominated by finely made, small, specialized tools, often made from specially selected lithic materials. Most notably, the Dorset are known for their carvings of organic materials such as ivory and antler, possibly suggestive of a shamanic religious belief (McGhee 1990).

Approximately 1000 years ago, the climate in the Arctic was warming, and resource availability would have changed significantly. At this time, the Dorset culture was suddenly replaced by the Thule culture. Central arctic oral traditions include references to the 'Tunit' (Dorset) people, and it is probable that the two groups occupied the Arctic at the same time, although likely briefly (McGhee 1990). The Thule culture has origins in Alaska, and its spread across the Arctic appears to represent a very rapid movement of people (McGhee 1990). The hunting of large whales appears to be a key component of the Thule way of life, supplemented by seal, fish, caribou, and fowl. Whales were hunted from the sea using kayak and umiak and using floating harpoons. Characteristic Thule winter houses are made of stones and whale bones in a semi-subterranean construction including a cold-trap at the door.

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The Thule people were present in the High Arctic, but again, this occupation was likely sporadic in nature depending on climatic conditions. A large Early Thule site is present on the east side of Bathurst Island at Brooman Point, which also contained Pre-Dorset and Dorset occupations (McGhee 1984).

Modern day Inuit are directly related to the Thule people. Although the expanse of Thule culture across the Arctic resulted in the development of widely varying ways of life for the inhabitants based on the varied resources available in different regions, modern Inuit did not regularly inhabit the High Arctic Islands until the 1950s, when they were relocated to communities such as Resolute Bay and Grise Fiord.

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4.0 METHODS

To meet the objectives of the AIA, the archaeological studies included a record review of previously recorded archaeological sites in proximity of the study areas. Field studies were subsequently conducted using helicopter for access, and ground reconnaissance and inspection to identify archaeological sites. Analysis of findings and reporting was conducted after completion of the field studies, including site evaluation, impact assessment, and formulation of recommendations.

4.1 RECORD REVIEW

An updated site file search of the Nunavut Archaeological Sites Database was obtained from the Nunavut Department of Culture and Heritage to review the locations and nature of archaeological sites on record within proximity (50 km) of each of the Project site areas (Government of Nunavut 2022).

As part of the pre-field studies, a permit application was submitted to the Department of Culture and Heritage, Government of Nunavut, outlining the study methods and proposed assessment coverage. Archaeological permit 2022-21A was subsequently issued for the field studies.

4.2 FIELD STUDIES

During the filed program, AIA studies were completed for Cape Ahnighito, Cape Isachsen, and Kristoffer Bay. Two Inuit participants were involved in the program, including a wildlife monitor and an environmental assistant, both from Resolute Bay. Their insights on land use and local environments helped guide the AIA.

Ground reconnaissance included visual inspection to identify stone features such as tent rings, stone circles, caches, hearths, and inuksuit, as well as historic items or prehistoric lithic artifacts. No areas with significant deposition were identified that warranted shovel testing.

The Project sites are contaminated sites of varying description (see Table 1-1). At each location, a larger area encompassing the contaminated area was subject to ground truthing relative to archaeology, including buffer areas to allow for use of peripheral areas for borrow material should future remediation activities require borrow material or burial of contaminated material.

4.3 SITE EVALUATION

The nature of site assessment completed at each archaeological site identified is largely contingent on the nature of the site and its physical relationship to both previous and proposed disturbance activities. For the current assessment, ongoing avoidance was assumed to be the primary planned mitigation measure at identified sites pending determination of possible future project impacts. As such, detailed site assessment (including shovel testing) was not undertaken, but individual features were documented (UTM location taken with handheld GPS, site mapping, photography, feature description); site forms and site sketch maps were completed for each site. If identified sites are proposed for impact (i.e., if avoidance is not possible due to design constraints), further assessment and/or mitigation activities would need to be conducted during subsequent studies.

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4.4 SITE DESIGNATION

Archaeological sites are referred to by a Borden Number which consists of a four-letter symbol accompanied by a number (e.g., LdNs-11). This uniform site designation scheme for archaeological sites in Canada was developed by archaeologist Charles Borden (1954). Within this system and north of latitude 62° (Figure 4-1), the upper-case letters represent major blocks 2° by 4° in size (i.e., L = 64° to 66° latitude; N = 104° to 112° longitude) and the lower-case letters denote 10' and 20' units within the major block (i.e., d = 30' to 40' latitude; s = 0' to 20' longitude). The numbers are assigned sequentially by the Archaeological Survey of Canada, Canadian Museum of Civilization and refer to specific sites within each unit.

4.5 SITE DOCUMENTATION

Hand-held GPS units are used to record the location of sites encountered during ground reconnaissance; site locales are recorded using the Universal Transverse Mercator (UTM) Grid Reference (NAD 83). The relationship of each site to the proposed Project is denoted. The condition of each site and site characteristics are documented and include apparent site integrity, estimated site dimensions, content, setting, and complexity. Each site is photographed and documented relative to the Project in a sketch map prepared to illustrate the site setting, shovel test locations, and the relationship to the Project.

4.6 SITE CLASSIFICATION

Each site identified is classified on the basis of its primary physical attributes and/or predicted primary function. Prehistoric and historic site types include isolated finds, artifact scatters, campsites, quarries, and stone features. Stone feature sites are stone alignments or configurations resulting from past human activity. Depending on the configuration of these features, function may be ascribed to these sites, for example campsites, fishing sites, or caches. The site type ascribed to each identified site was assigned based on the nature of the features and artifacts, as well as the site setting and the perceived function or activities taking place at the site.

4.7 SITE VALUE AND INTERPRETIVE POTENTIAL

Site values are determined on the basis of the results of the field program as well as the regional archaeological context and Indigenous perspective. Generally, relative site value and interpretive potential is based on the data obtained to date. Factors considered include site type, size, and complexity, presence or absence of subsurface materials and features, and number of artifacts observed. The scientific value of a specific site is deemed to be low if substantial disturbance or exposure has occurred or if sites have single artifacts or single features of limited antiquity. Sites with large quantities of artifacts, diagnostic artifacts (or potential to contain diagnostic artifacts), cultural stratification, multiple stone features (particularly if they contain unusual features or diagnostic artifacts), or any combination thereof are classified as having high site value and interpretive potential.

In addition to these tangible variables, each site is viewed from the perspective of the regional database. Where available, Indigenous and public perspectives of site value may also provide important criteria for evaluating identified sites depending on the nature and location of the sites.

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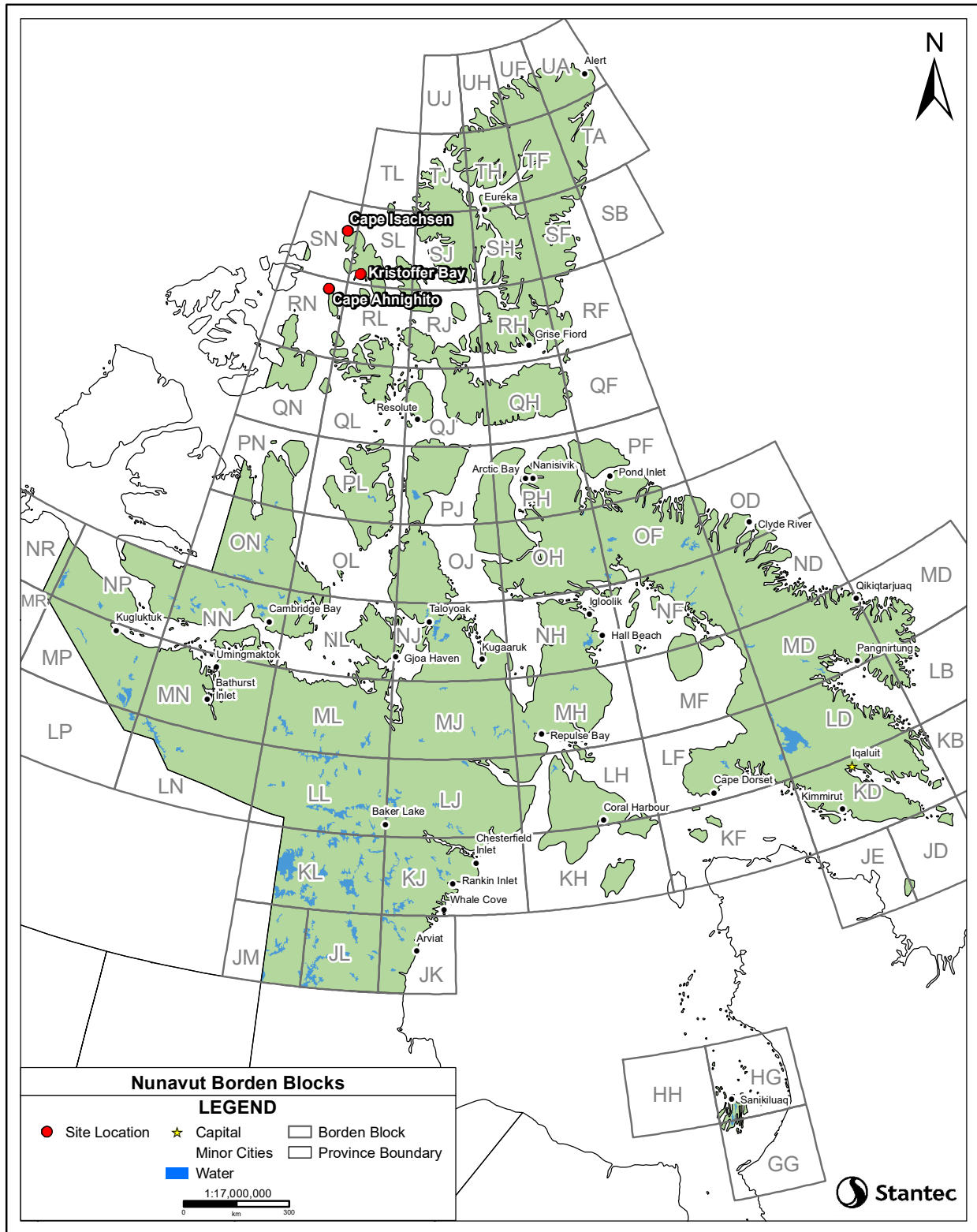


Figure 4-1 Borden Units north of 60° relevant to the Project area

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4.8 FORMULATION OF RECOMMENDATIONS

Site specific recommendations are formulated primarily on the basis of the level of available information and the perceived values within the context of the predicted impact. Because of the non-renewable nature of heritage resources, avoidance as a mitigation measure is recommended as the preferred option at sites with established heritage values. Sites of limited scientific value and of limited ethnic value (for example, isolated artifact finds or fossil fragments) are generally not recommended for further study and are not considered for avoidance mitigation as the data collected at the archaeological impact assessment stage has effectively reduced or eliminated impact from the proposed development.

In general, site-specific mitigative measures recommended reflect the nature and content of each site and the site value ascribed to each site. As such, the site-specific scope of studies recommended at each site represents a professional judgment as to an appropriate balance in compensation for scientific and community information lost through site destruction.

The site-specific recommendation made for an identified site is based primarily on its location relative to proposed disturbance activities. Should disturbance to identified sites be anticipated as a result of the Project, further assessment and/or mitigation studies may be required. Mitigation requirements are determined by the Nunavut Department of Culture and Heritage.

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5.0 RESULTS

5.1 RECORD REVIEW

Records provided by the Department of Culture and Heritage, Government of Nunavut (2022), cover large areas (50 km) around the Project sites to allow for an evaluation of the cultural context of each area. Based on the site file search, previous archaeological investigations in the general Project area are limited. There are no previously recorded archaeological sites on Lougheed Island or Ellef Ringnes Island. No sites are on record within 50 km of the Cape Ahnighito, Cape Isachsen, and Kristoffer Bay assessment locations.

Eight new sites were recorded on the northwest side of Pioneer Island during the 2021 field program conducted for the Project (Tischer 2022). Newly recorded sites include a prehistoric tent ring (RfLc-6) and several possible caches (e.g., RfLc-8 and RfLc-9).

Several sites were documented on the northern part of Devon Island and Pioneer Island between 1962 and 1982. Located on the western arm of Pioneer Island, RfLd-1 is a cairn observed from the air in 1981. The cairn is suggested to date to the 1850s, associated with the Belcher HMS Assistance search for Franklin. Two other sites are on record very close to Pioneer Island on the Grinnell Peninsula of Devon Island. RfLc-3 is a cairn again associated with the Belcher expedition but made using rocks taken from the nearby Thule Village, RfLc-4.

The remaining 13 archaeological sites on record within 50 km of the Pioneer Island site are largely found on the west coast of Devon Island, although two are on the northeast coast of Bathurst Island. Sites on record include a Dorset campsite/burial, another prehistoric campsite with tent rings, and multiple sites associated with the Belcher HMS Assistance expedition, including a winter camp. These new and previously recorded sites are approximately 250 km southeast of Cape Ahnighito (the most southerly site evaluated during the 2022 field program).

Sites on Bathurst Island at locations approximately 220 km to 280 km south of Cape Ahnighito were recorded in 1977 during a University of Calgary project, in 1982 during a Canadian Museum of Civilization project, and in 1996 during a survey conducted for the then-proposed North Bathurst Island National Park. Sites on record are generally associated with the Polar Bear Pass (Nanuit Itillinga) National Wildlife Area in the center of Bathurst Island, although several sites are situated just to the west of the Wildlife Area boundary. Sites on record include Dorset campsites, Thule campsites, and multiple other prehistoric campsites, tent rings, and caches with no noted cultural affiliation.

5.2 FIELD STUDIES

The archaeological assessments conducted at the study sites consisted of ground reconnaissance and visual surface inspection of the contaminated site areas and surrounding terrain (Figures 5-1 to 5-4).

Studies were carried out at the Cape Ahnighito main site, northwest drum cache, and the surrounding terrain in both locales, all of which are considered to be of low archaeological potential. The core concentration of drums and refuse at the main site was assessed for archaeological sites.

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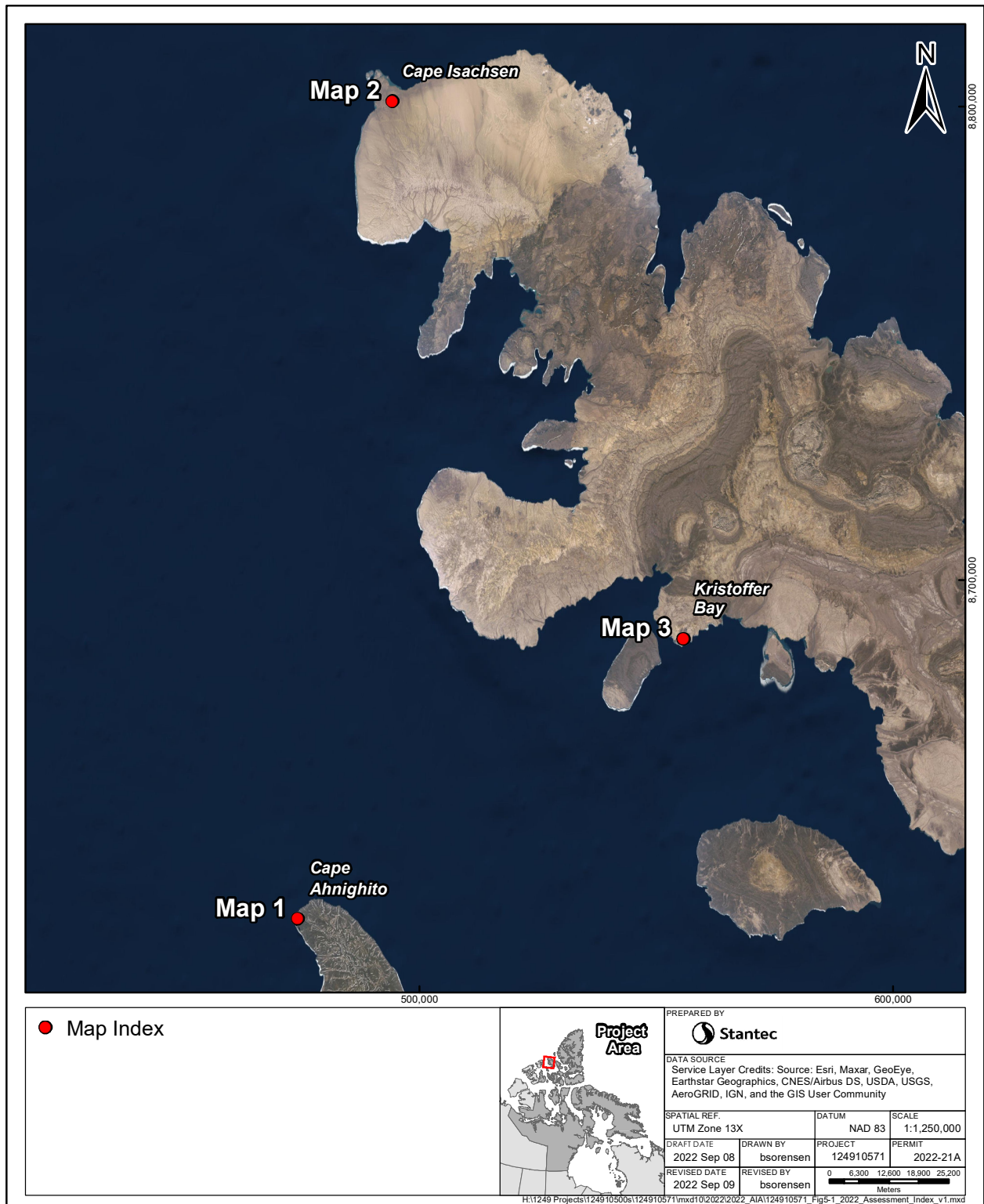


Figure 5-1 Archaeological Assessment and Site Locations – Index Map.

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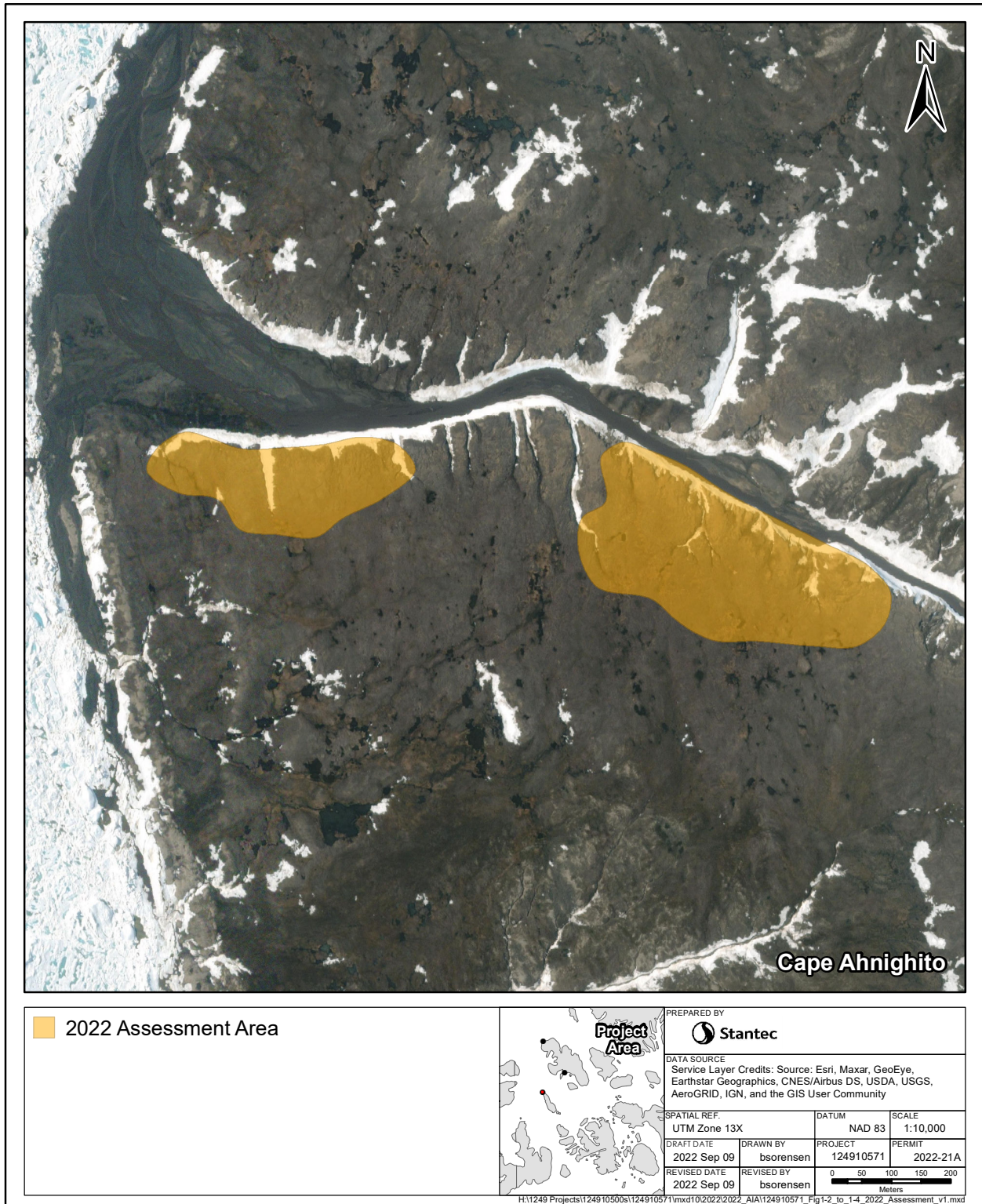


Figure 5-2 Archaeological Assessment and Site Location – Map 1 of 3 (Cape Ahnighito, Main Site and Northwest Drum Cache).

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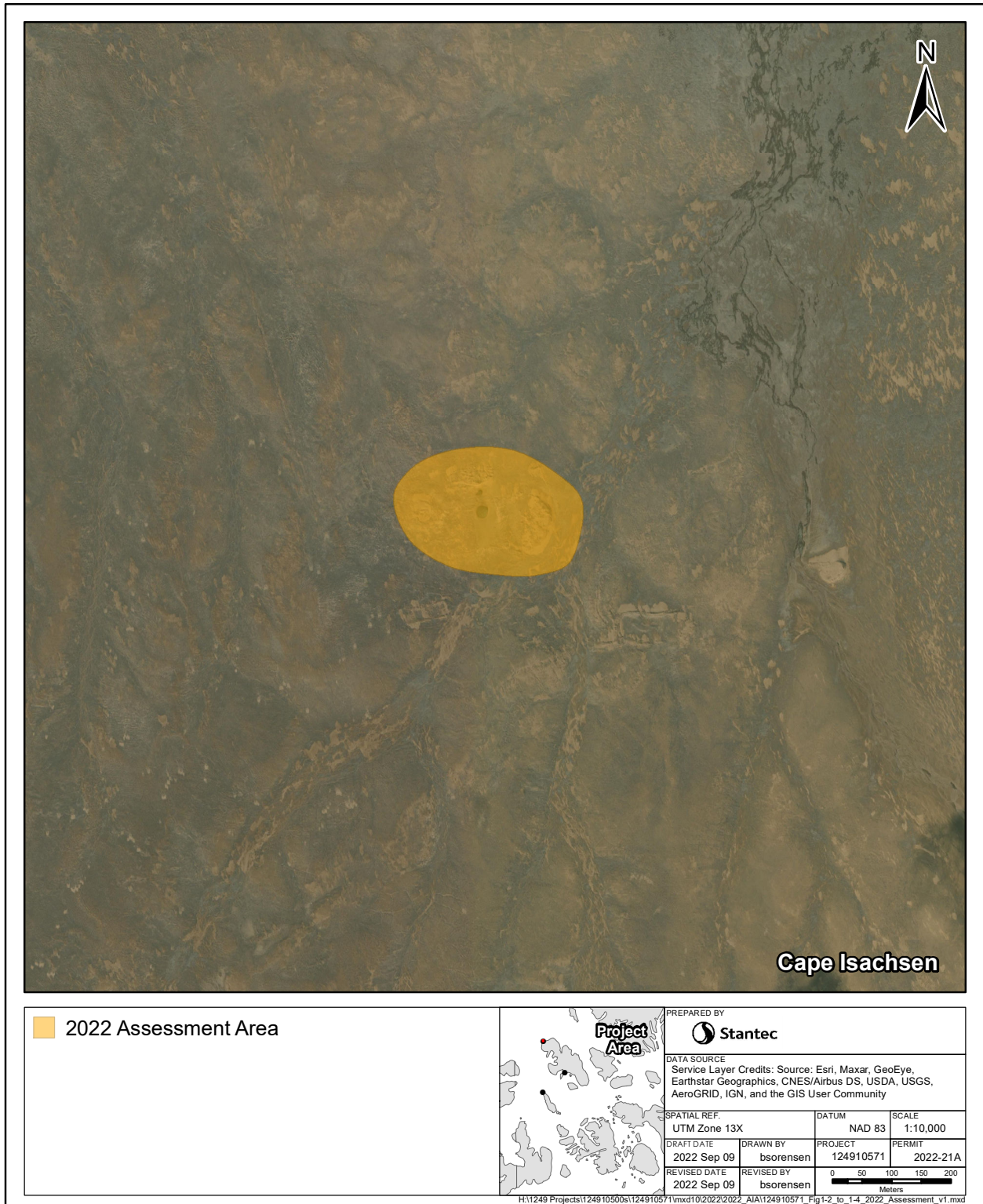


Figure 5-3 Archaeological Assessment and Site Location – Map 2 of 3 (Cape Isachsen).

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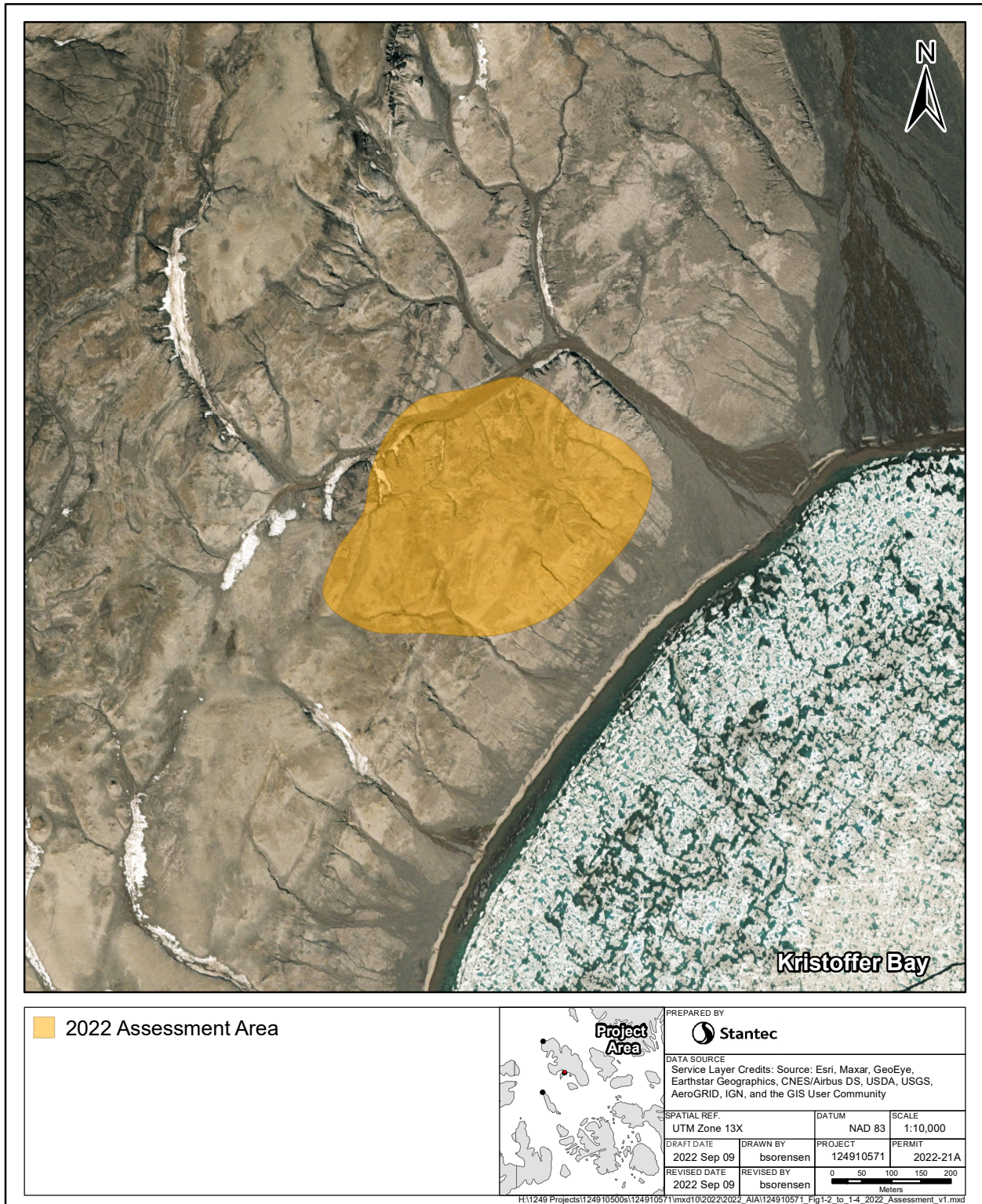


Figure 5-4 Archaeological Assessment and Site Location – Map 3 of 3 (Kristoffer Bay).

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Additional assessment was completed in the surrounding terrain over an area of approximately 500 m by 200 m (Figure 5-2). Ninety-two drums were recorded at the main site and eleven drums were observed at the northeast drum cache site during ground reconnaissance. Archaeological assessment was conducted around their locations and across the surrounding terrain over an area of approximately 400 m by 150 m (Figure 5-2).

The low archaeological potential study area at Cape Isachsen is small, consisting primarily of the drilling location and suspected sump areas. Archaeological assessment was conducted at these locations, along with a surrounding area covering 250 m by 200 m (Figure 5-3).

Kristoffer Bay was the largest area assessed, and it was considered to have low to moderate archaeological potential. Areas around tagged and untagged wellheads, suspected sump areas, and refuse disposal locations were assessed. Three terraces in the surrounding area were also investigated. The lower terrace was well drained, while only some parts of the middle and upper terraces had good drainage. A freshwater stream and the coast are also close by. As a result, the area may have been an attractive place to past people. A section of these landscapes covering approximately 500 m by 375 m was assessed for archaeological sites (Figure 5-4).

5.3 IDENTIFIED SITES

No prehistoric or historic period archaeological sites were newly recorded or revisited during the 2022 field program.

Both Cape Ahnighito and Cape Isachsen were low-relief and imperfectly to poorly drained, making them unattractive places for past and present land use. Large sections of the Cape Isachsen and Kristoffer Bay sites were also heavily disturbed by past oil and gas exploration operations. These areas have low archaeological potential. Well drained areas on the terraces at Kristoffer Bay have moderate archaeological potential based on evaluation of landforms, but as noted, it is unlikely that this area provided access to necessary resources. As such the overall evaluation of archaeological potential is low to moderate. No sites were identified in these locations.

The wildlife monitor indicated that all three of the study locations are unsuitable hunting areas, and they are not typically visited by people from Resolute Bay. No recent land use sites were identified at the assessment locations during the 2022 field program.

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6.0 SUMMARY AND RECOMMENDATIONS

At the request of PSPC and Dillon-Outcome, Stantec conducted an AIA under Nunavut Archaeological Permit 2022-21A for the Pioneer High Arctic Bundle Sites at three contaminated site locations in Nunavut. The sites proposed for assessment are located between 180 km and 580 km from Resolute Bay, Nunavut.

Although seven contaminated sites were planned for assessment in 2021, access and logistical constraints resulted in the removal of three; the outstanding studies at Cape Ahnighito, Cape Isachsen, and Kristoffer Bay were assessed in 2022 under Archaeological Permit 2022-21A.

Based on the results of the 2022 field program, archaeological assessments are considered complete at Cape Ahnighito, Cape Isachsen, and Kristoffer Bay. No precontact or historic period archaeological sites were newly recorded or revisited during the current study. No further archeological assessments are recommended for the contaminated site locations at Cape Ahnighito, Cape Isachsen, and Kristoffer Bay.

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