SCREENING DECISION REPORT
NIRB FILE No.: 07YN019

NPC File No. 148555
NRI License # 02 030 17R-M

June 15, 2017

Following the Nunavut Impact Review Board's (NIRB or Board) assessment of all materials provided, the NIRB is recommending that a review of McGill University's "Permafrost-active layer dynamics and feedbacks with climate forcing in ice-rich sediments" project is not required pursuant to paragraph 92(1)(a) of the *Nunavut Planning and Project Assessment Act* (NuPPAA).

Subject to the Proponent's compliance with the terms and conditions as set out in below, the NIRB is of the view that the project proposal is not likely to cause significant public concerns, and it is unlikely to result in significant adverse environmental and social impacts. The NIRB therefore recommends that the responsible Minister accepts this Screening Decision Report.

OUTLINE OF SCREENING DECISION REPORT

REGULATORY FRAMEWORK

The primary objectives of the NIRB are set out in Section 12.2.5 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (Nunavut Agreement) as follows:

> *"In carrying out its functions, the primary objectives of NIRB shall be at all times to protect and promote the existing and future well-being of the residents and communities of the Nunavut Settlement Area, and to protect the ecosystemic integrity of the Nunavut Settlement Area. NIRB shall take into account the well-being of the residents of Canada outside the Nunavut Settlement Area."*

These objectives are confirmed under section 23 of the NuPPAA.

The purpose of screening is provided for under section 88 of the NuPPAA:

> "*The purpose of screening a project is to determine whether the project has the potential to result in significant ecosystemic or socio-economic impacts and, accordingly, whether it requires a review by the Board…*"

To determine whether a review of a project is required, the NIRB is guided by the considerations as set out under subsection 89(1) of NuPPAA:

> *"89. (1) The Board must be guided by the following considerations when it is called on to determine, on the completion of a screening, whether a review of the project is required:*
>
> *(a) a review is required if, in the Board's opinion,*
> *i. the project may have significant adverse ecosystemic or socio-economic impacts or significant adverse impacts on wildlife habitat or Inuit harvest activities,*
> *ii. the project will cause significant public concern, or*
> *iii. the project involves technological innovations, the effects of which are unknown; and*
>
> *(b) a review is not required if, in the Board's opinion,*
> *i. the project is unlikely to cause significant public concern, and*
> *ii. its adverse ecosystemic and socioeconomic impacts are unlikely to be significant, or are highly predictable and can be adequately mitigated by known technologies."*

It is noted that subsection 89(2) provides that the considerations set out in paragraph 89(1)(a) prevail over those set out in paragraph 89(1)(b).

Where the NIRB determines that a project may be carried out without a review, the NIRB has the discretion to recommend specific terms and conditions to be attached to any approval of the project proposal. Specifically, paragraph 92(2)(a) of NuPPAA provides:

> "*92. (2) In its report, the Board may also*
> *(a) recommend specific terms and conditions to apply in respect of a project that it determines may be carried out without a review.*"

PROJECT REFERRAL

On April 24, 2017 the Nunavut Impact Review Board (NIRB or Board) received a referral to screen McGill University's "Permafrost-active layer dynamics and feedbacks with climate forcing in ice-rich sediments" project proposal from the Nunavut Planning Commission (NPC or Commission), with an accompanying positive conformity determination with the North Baffin Regional Land Use Plan.

Pursuant to Article 12, Sections 12.4.1 and 12.4.4 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (Nunavut Agreement) and section 87 of the *Nunavut Planning and Project Assessment Act* (NuPPAA), the NIRB commenced screening this project proposal. Due to the proposal containing activities that were sufficiently related to previously assessed activities under NIRB file number **07YN019**, the NIRB viewed this project proposal as an amendment to the previously screened project and assigned this proposal with this previous file number. A summary of the previously screened project activities can be found in **Appendix A**.

PROJECT OVERVIEW & THE NIRB ASSESSMENT PROCESS

1. Project Scope

The proposed "Permafrost-active layer dynamics and feedbacks with climate forcing in ice-rich sediments" project is located within the Qikiqtani Region, within 25 kilometres (km) of Eureka on Ellesmere Island. The Proponent intends to continue collecting measurements to quantify permafrost and landscape dynamics within the context of climate change. The program is proposed to take place over two (2) summer field seasons from July 2017 to July 2018.

As required under subsection 86(1) of the NuPPAA, the Board accepts the scope of the "Permafrost-active layer dynamics and feedbacks with climate forcing in ice-rich sediments" project as set out by McGill University in the proposal. The scope of the project proposal includes the following undertakings, works, or activities:

- Two (2) temporary Campbell Scientific weather stations to be erected in July 2017 with removal in July 2018. Weather stations to have sensors above and below ground to measure temperature, moisture, conductivity, and soil heat;
- Shallow (active layer) soil and ground ice samples collected at a series of sites;
- Aerial surveys of sites to be conducted via helicopter;
- Transportation of personnel to research sites via helicopter, all-terrain vehicle (ATV) or travel on foot;
- Continue with field work activities including the mapping of ground ice exposures by global positioning system; and
- Use of accommodations at the Eureka weather station.

2. Inclusion or Exclusion to Scoping List

The NIRB has identified no additional works or activities in relation to the project proposal. As a result, the NIRB proceeded with screening the project based on the scope as described above.

3. Key Stages of the Screening Process

The following key stages were completed:

Date	Stage
April 24, 2017	Receipt of project proposal and positive conformity determination (North Baffin Land Use Plan) from the NPC
April 24, 2017 May 2, 2017	Information requests

May 5, 2017	Proponent responded to information requests
May 5, 2017	Scoping pursuant to subsection 86(1) of the NuPPAA
May 12, 2017	Public engagement and comment request
May 23, 2017	Receipt of public comments

4. Public Comments and Concerns

Notice regarding the NIRB's screening of this project proposal was distributed on May 12, 2017 to relevant federal and territorial government agencies, Inuit organizations and other parties. The NIRB requested that interested parties review the proposal and provide the Board with any comments or concerns by May 23, 2017 regarding:

- Whether the project proposal is likely to arouse significant public concern; and if so, why;
- Whether the project proposal is likely to cause significant adverse eco-systemic or socio-economic effects; and if so, why;
- Whether the project proposal is likely to cause significant adverse impacts on wildlife habitat or Inuit harvest activities; if so, why;
- Whether the project proposal is of a type where the potential adverse effects are highly predictable and mitigable with known technology, (please provide any recommended mitigation measures); and
- Any matter of importance to the Party related to the project proposal.

The following is a summary of the comments and concerns received by the NIRB:

Environment and Climate Change Canada (ECCC)

- No comments or additional terms and conditions to offer at this time.

Indigenous and Northern Affairs Canada (INAC)

- Unable to offer comments on whether the project is likely to arouse significant public concern since the application does not contain any detailed records of community engagement/consultation activities undertaken.
- Recommended the Proponent conduct community consultations prior to submitting the project proposal and at the start of the new activities.

5. Comments and Concerns with respect to Inuit Qaujimaningit, Traditional, and Community Knowledge

No concerns or comments were received with respect to Inuit Qaujimaningit or traditional and community knowledge in relation to the proposed project.

FACTORS FOR DETERMINING SIGNIFICANCE OF IMPACTS

In determining whether a review of the project is required, the Board considered whether the project proposal had potential to result in significant ecosystemic or socio-economic impacts.

Accordingly, the assessment of impact significance was based on the analysis of those factors that are set out under section 90 of the NuPPAA. The Board took particular care to take into account Inuit Qaujimaningit, traditional and community knowledge in carrying out its assessment and determination of the significance of impacts.

The following is a summary of the Board's assessment of the factors that are relevant to the determination of significant impacts with respect of this project proposal:

1. *The size of the geographic area, including the size of wildlife habitats, likely to be affected by the impacts.*

   The proposed project is located within the North Baffin region, within 25 km of Eureka on Ellesmere Island. The Proponent would be based at the existing Eureka weather station facilities and the project footprint consists of two (2) temporary Campbell Scientific weather stations, as well as ATV- and helicopter-assisted travel routes to sample sites. The proposed activities may take place within habitats and seasonal ranges for many far-ranging and local wildlife species such as Peary caribou, muskox, wolves, Wolverines, and migratory and non-migratory birds as identified by the Proponent, Government of Nunavut and NPC mapping sources. In addition, Species at Risk such as Polar Bears have been identified as using the area and the project may potentially affect animal migratory patterns.

2. *The ecosystemic sensitivity of that area.*

   The proposed project would occur in an area with no particular identified ecosystemic sensitivity; however, as noted by the Commission's land use planning database, the community of Grise Fiord identified the Fosheim peninsula area as having value and priority for the Peary caribou and potential commercial muskox harvesting.

3. *The historical, cultural and archaeological significance of that area.*

   Neither the Proponent nor any parties that submitted comments for this project identified any known areas of historical, cultural and archaeological significance associated with the project area. Should the project be approved to proceed, the Proponent would be required to contact the Government of Nunavut-Department of Culture and Heritage if any sites of historical, cultural or archaeological significance are encountered.

4. *The size of the human and the animal populations likely to be affected by the impacts.*

   The proposed project would occur at a location within 25 km of Eureka on Ellesmere Island; as such, no human populations are likely to be affected by project impacts. However, it was noted during the commenting period that no public consultation has been conducted and a term and condition has been recommended to direct engagement with communities in the region (e.g., Grise Fiord), hunters and trappers organization and interested parties, as well as the posting of public notices to ensure residents are aware of the research activities being or to be conducted. No specific animal populations have been identified as likely to be affected by potential project impacts.

5. *The nature, magnitude and complexity of the impacts; the probability of the impacts occurring; the frequency and duration of the impacts; and the reversibility or irreversibility of the impacts.*

   As the "Permafrost-active layer dynamics and feedbacks with climate forcing in ice-rich sediments" project is a proposed research project, the nature of potential impacts is considered to be well-known, with potential for infrequent, localized impacts to the biophysical environment that are temporary in nature, and mitigable with due care.

6. *The cumulative impacts that could result from the impacts of the project combined with those of any other project that has been carried out, is being carried out or is likely to be carried out.*

   The proposed project would take place within a 100 km radius to a number of other projects that are currently active, in addition to other projects proposed and currently undergoing assessment by the Board as listed in Table 1 below. However, it is noted that this project is not likely to result in residual or cumulative impacts. The potential for cumulative impacts to human populations, local wildlife, vegetation, soil, and water resulting from the research activities and other projects occurring in the region has been identified and considered in the development of the NIRB's recommendations. Terms and conditions recommended for each of these projects are expected to reduce any residual impacts, and as such would limit or eliminate the potential for cumulative effects to occur.

Table 1: Project List

NIRB Project Number	**Project Title**	**Project Type**
Proposed Developments – undergoing assessment		
17UN035	Bathurst/High Arctic Remediation and Risk Management Project	Remediation Project
17YN039	Multidisciplinary Investigation of Salt Diapirs	Research
17CN051	Arctic Kingdom - Redbull	Filming and Camp
Active Projects		
08YN010	Ice Dynamics and Cryospheric Changes in Northern Canada	Research
Past Projects		
16DN017	Operation Nevus 2016	Defense
16DN061	NOREX 17	Defense

7. *Any other factor that the Board considers relevant to the assessment of the significance of impacts.*

   No other specific factors have been identified as relevant to the assessment of this project proposal.

VIEWS OF THE BOARD

In considering the factors as set out above in the screening of the project proposal, the NIRB has identified a number of issues below and respectfully provide the following views regarding whether or not the proposed project has the potential to result in significant impacts. In addition, the NIRB has proposed terms and conditions that would mitigate the potential adverse impacts identified.

Administrative Conditions:

To encourage compliance with applicable regulatory requirements and assist the Board and responsible authorities with compliance and effects monitoring for project activities, the Board has previously recommended terms and conditions 1 through 3, and 20 and 21 which continue to apply to the current project proposal. The Board is also recommending term and condition 31 to ensure complete reference to applicable regulatory requirements.

The Board would also note that, as justified in its previous decision (NIRB File No. 07YN019 dated October 11, 2016), terms and conditions 5 through 10, 13, 22 and 29 remain applicable to the original research project activities (land, vegetation, and permafrost studies and training activities), while the additional impacts identified for the new components of the current research activities warrant mitigation measures as justified below.

Ecosystem, wildlife habitat and Inuit harvesting activities:

Issue 1: Potential adverse impacts to terrestrial wildlife, including caribou and muskox, migratory and non-migratory birds and their respective habitats from the installation of two temporary scientific weather stations, aerial surveys by helicopter, and from the transportation of personnel and equipment between the Eureka weather station and local sampling locations via helicopter and/or ATV.

Board views: As discussed above in the assessment of factors relevant to this project proposal, potential adverse impacts are limited to a small geographic area, the research being generally unobtrusive and carried out on foot and the potential use of a helicopter to support the research activities, and conducted over a short period of time (less than two (2) months per year for two (2) years). However, there is potential for impacts to several terrestrial wildlife species including caribou herds, muskox, wolves, and migratory birds, non-migratory birds and Species at Risk including Polar Bears. However, any resulting impacts from the activities and project-related noise would be expected to be temporary only and low magnitude.

The Proponent would be required to follow the *Migratory Birds Convention Act*, *Migratory Birds* Regulations, the *Species at Risk Act*, the *Wildlife Act (Nunavut),* and the *Aeronautics Act* (see Regulatory Requirements section). Restrictions on helicopter flight altitudes are expected to further mitigate potential adverse impacts to terrestrial wildlife.

Recommended Mitigation Measures: It is recommended that the potential adverse impacts may be mitigated by measures such as requiring the Proponent to maintain minimum flight

altitudes and minimizing activities when birds are particularly sensitive to disturbance especially during migration, nesting and moulting. The Board has previously recommended terms and conditions to mitigate the potential adverse impacts to migratory and non-migratory birds, caribou, and all other wildlife, specifically: 11, 12, 14 through 18, and 23 through 25, which continue to apply to the current project proposal.

Issue 2: Potential adverse impacts to surface water quality, soil and vegetation, and fish and fish habitat, from research activities and transportation of equipment and personnel to and from the Eureka weather station via ATV.

Board Views: There is potential for adverse impacts to surface water quality, soil and vegetation, and fish and fish habitat from the use of ATVs, the collection of soil samples, and the installation of temporary weather stations. However, it is noted that the specific area identified by the Proponent for installation of the temporary weather stations is an area that is already disturbed (the old airstrip at the Eureka weather station). Further, the Proponent has committed to collecting soil samples at locations selected to minimize vegetation disturbance and to reuse consistent travel routes when accessing sample sites. The potential adverse impacts to surface water quality, soil and vegetation, and fish and fish habitat, are considered to be of low probability, with potential adverse effects anticipated to be low in magnitude, infrequent in occurrence, and reversible in nature.

Recommended Mitigation Measures: It is recommended that the potential for adverse impacts to water quality, vegetation, soils, and terrain be mitigated by requiring the Proponent clean up and restore areas utilized to preserve the integrity of the environment. The Board previously recommended the following terms and conditions to mitigate potential impacts to surface water quality and fish and fish habitat: 4, 26 and 27, which continue to apply to the current project proposal.

Issue 3: Potential adverse impacts to public and traditional land use activities in the area due to research and transportation activities.

Board Views: There is potential for the proposed project to disrupt traditional and recreational land use activities such as transportation of personnel and equipment to the noise generated from research activities each site, which may result in disruption of wildlife in the area resulting in a reduction in hunting success or harvesting activities. However, it is noted that the proposed project activities are located approximately 400 km north from Grise Fiord, the closest community; therefore the potential adverse impacts are considered to be of low probability, low magnitude, and reversible. A term and condition has been recommended to ensure minimal impacts to traditional land use activities by ensuring consultation with the community and community organizations.

Recommended Mitigation Measures: The Board previously recommended term and condition 28 to ensure that the affected communities and organizations are informed about the project proposal and term and condition 30 has been previously recommended to ensure that project activities do not interfere with Inuit wildlife harvesting or traditional land use

activities in the area. Further, the Board previously recommended terms and conditions to 11, 12, 14 through 16, 17, 18, and 23 through 25, to minimize potential interference with the movement of birds and wildlife. These terms and conditions continue to apply to the current project proposal.

Socio-economic effects on northerners:

Issue 4: Potential adverse impacts to historical, cultural and archaeological sites from research and transportation activities.

Board Views: No known areas of historical, cultural and archaeological significance have been identified within the project area proposed. Should such areas be discovered or encountered, the Proponent would be required to contact the Culture and Heritage Department and is required to follow the *Nunavut Act* (as recommended in Regulatory Requirements section). The probability for adverse impacts to historical, cultural and archaeological sites from research and transportation activities is considered to be low in magnitude.

Recommended Mitigation Measures: Term and condition 28 was previously recommended by the Board to ensure that available Inuit Qaujimaningit can inform project activities, and reduce the potential for negative impacts occurring to any historical sites, which continues to apply to the current project proposal. Term and condition 19 was previously recommended by the Board to minimize disturbance to any archaeological sites discovered, which continues to apply to the current project proposal.

Significant public concern:

Issue 5: No significant public concern was expressed during the public commenting period for this file.

Board Views: Follow up consultation and involvement of local community members is expected to mitigate any potential for public concern resulting from project activities.

Recommended Mitigation Measures: The Board previously recommended term and condition 28 to ensure that the affected community and organizations are informed about the project proposal, and to provide the Proponent with an opportunity to proactively address or mitigate any concerns that may arise from the project activities findings.

Technological innovations for which the effects are unknown:

No specific issues have been identified associated with this project proposal.

In considering the above factors and subject to the Proponent's compliance with the terms and conditions necessary to mitigate against the potential adverse environmental and social effects, the Board is of the view that the proposed project is unlikely to cause significant public concern

and its adverse ecosystemic and socioeconomic impacts are unlikely to be significant, or are highly predictable and can be adequately mitigated by known technologies.

RECOMMENDED PROJECT-SPECIFIC TERMS AND CONDITIONS

The following terms and conditions were previously issued by the NIRB in the March 20, 2007 and October 11, 2016 Screening Decision Reports for File No. 07YN019***, and continue to apply to the*** **"Permafrost-active layer dynamics and feedbacks with climate forcing in ice-rich sediments, Fosheim Peninsula, Ellesmere Island, Nunavut*"*** ***project*****:**

General

1. The Permittee shall maintain a copy of the Project Terms and Conditions at the site of operation at all times.
2. The Permittee shall forward copies of all permits to the NIRB obtained and required for this project prior to the commencement of the project.
3. The NIRB shall be notified of any changes in operating plans or conditions associated with this project prior to any such change.

Fuel and Wastes Storage

4. The Permittee shall not deposit, nor permit the deposit of any fuel, chemicals, wastes or sediment into any water body.
5. The Permittee shall locate, if applicable, all sumps, pits, spill basins and fuel caches and other hazardous materials a minimum of thirty (30) metres away from the high water mark of any water body and in such a manner as to prevent the contents from entering any water body frequented by fish.
6. The Permittee shall not store materials on the surface ice of lakes or streams, except that which is for immediate use.
7. The Permittee shall ensure that any non-combustible and hazardous waste, including waste oil, is disposed appropriately off site at an approved facility.
8. The Permittee is required to use secondary containment with impervious linens for storage of all barreled fuel rather than relying on natural depressions to contain spills.
9. All spills of harmful substances should be documented and reported to the 24-hour spill line at (867) 920-8130, regardless the quantity of release.
10. The Permittee shall ensure that any temporary camps are restored to their natural state after the completion of project activities.

Wildlife

11. The Permittee is required to ensure that there is minimal disturbance to any nesting birds and wildlife in the area.
12. The Permittee shall not disturb or destroy the nests or eggs of migratory birds. If active nests are encountered during project activities, the nesting area should be avoided to prevent disturbance (i.e. the young have left the vicinity of the nest).

13. The Permittee is required ensure that camp waste be made inaccessible to wildlife at all times.
14. The Permittee shall follow procedures outlined in the "Territorial Safety in Bear Country Manual", and should contact the Regional Biologist or the Wildlife manager for information and advice on measures which should be taken to minimize the possibility of conflicts/interactions with bears. Consideration should be given to setting up an electric fence around the camp.
15. (*updated*) In the event of a defense kill of a Polar Bear, the Permittee shall be aware of section 5.6.52 and 5.6.55 of Nunavut Land Claims Agreement and shall contract nearest government of Nunavut wildlife office immediately for further direction.
16. Any observations of Ivory Gulls should be reported to the Canadian Wildlife Service at ec.enviroinfo.ec@canada.ca.

Aircraft Operations

17. The Permittee shall ensure that aircraft do not, unless for emergency, touch-down in areas where concentrations of wildlife are present. And raptor nesting sites and concentrations of nesting or molting waterfowl should be avoided by aircraft.
18. If the disturbance cannot be avoided, it is recommends that aircraft used in conducting project activities maintain a flight altitude of at least 610 m and a horizontal distance of 2 km during horizontal (point to point) flight from any known colonies of Ivory Gulls and any other observed groups (colonies) of Ivory Gulls during the nesting season.

Archaeological

19. (updated) The Permittee should be aware of the law regarding disturbance of archaeological and palaeontological sites and the removal of artifacts found. If a site is found it should remain undisturbed and its location should be reported to the Government of Nunavut Department of Culture and Heritage.

General

20. The Proponent shall operate in accordance with all commitments stated in correspondence provided to the Nunavut Planning Commission (Application to Determine Conformity, July 7, 2016), and the NIRB (Online Application Form, July 11 and August 17, 2016); Project Map and Translated NIRB Part 1 Form, August 17, 2016).
21. The Proponent shall operate the site in accordance with all applicable Acts, Regulations and Guidelines.

Fuel and Chemical Storage

22. The Proponent shall ensure that appropriate spill response equipment and clean-up materials (e.g., shovels, pumps, barrels, drip pans, and absorbents) are readily available during any transfer of fuel or hazardous substances. Further, the Proponent shall ensure that all personnel are properly trained in fuel and hazardous waste handling procedures, as well as spill response procedures.

Wildlife - General

23. The Proponent shall not harass wildlife. This includes persistently worrying or chasing animals, or disturbing large groups of animals. The Proponent shall not hunt or fish, unless proper Nunavut authorizations have been acquired.

24. The Proponent shall ensure that all project personnel are made aware of the measures to protect wildlife and are provided with training and/or advice on how to implement these measures.

Caribou and Muskoxen Disturbance

25. The Proponent shall cease activities that may interfere with the migration or calving of caribou or muskox, until the caribou or muskox have passed or left the area.

Ground Disturbance

26. The Proponent shall not move any equipment or vehicles unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting or gouging. Overland travel of equipment or vehicles must be suspended if rutting occurs.

27. The Proponent should, where possible, use existing roads or trails while travelling overland.

Other

28. The Proponent should engage with local residents regarding planned activities in the area and should solicit available Inuit Qaujimaningit and information regarding current recreational and traditional usage of the project area which may inform project activities. Posting of translated public notices and direct engagement with potentially interested groups and individuals prior to undertaking project activities is strongly encouraged.

29. The Proponent should, to the extent possible, hire local people.

30. The Proponent shall ensure that project activities do not interfere with Inuit wildlife harvesting or traditional land use activities.

In addition to the previously issued terms and conditions, the Board recommends the following additional project-specific terms and condition:

General

31. The Proponent shall operate in accordance with all commitments stated in correspondence provided to the Nunavut Planning Commission (Application to Determine Conformity, April 24, 2017), and the NIRB (Online Application Form, May 5, 2017).

OTHER NIRB CONCERNS AND RECOMMENDATIONS

In addition to the project-specific terms and conditions, the Board has previously recommended the following on October 11, 2016:

Change in Project Scope

1. Responsible authorities or Proponent shall notify the Nunavut Planning Commission (NPC) and the NIRB of any changes in operating plans or conditions, including phase advancement, associated with this project prior to any such change.

Bear and Carnivore Safety

2. The Proponent should review the Government of Nunavut's booklet on Bear Safety, which can be downloaded from this link: http://gov.nu.ca/sites/default/files/bear_safety_-_reducing_bear-people_conflicts_in_nunavut.pdf. Further information on bear/carnivore detection and deterrent techniques can be found in the "*Safety in Grizzly and Black Bear Country*" pamphlet, which can be downloaded from this link: http://www.enr.gov.nt.ca/sites/default/files/web_pdf_wd_bear_safety_brochure_1_may_2015.pdf.

3. There are polar bear and grizzly bear safety resources available from the Bear Smart Society with videos on polar bear safety available in English, French and Inuktitut at http://www.bearsmart.com/play/safety-in-polar-bear-country/. Information can also be obtained from Parks Canada's website on bear safety at the following link: http://www.pc.gc.ca/eng/pn-np/nu/quttinirpaaq/visit/visit6/d.aspx or in reviewing the "*Safety in Polar Bear Country*" pamphlet, which can be downloaded from the following link: *http://www.pc.gc.ca/eng/pn-np/nu/quttinirpaaq/visit/visit6/~/media/pn-np/nu/auyuittuq/pdf/shared/PolarBearSafety_English.ashx*.

4. Any problem wildlife or any interaction with carnivores should be reported immediately to the local Government of Nunavut, Department of Environment Conservation Office (Conservation Officer of Resolute Bay, phone: (867) 252-3879.

Species at Risk

5. The Proponent review Environment and Climate Change Canada's "Environment Assessment Best Practice Guide for Wildlife at Risk in Canada", available at the following link: http://www.sararegistry.gc.ca/virtual_sara/files/policies/EA%20Best%20Practices%202004.pdf. The guide provides information to the Proponent on what is required when Wildlife at Risk, including *Species at Risk*, are encountered or affected by the project.

Migratory Birds

6. The Proponent review Canadian Wildlife Services' "Key migratory bird terrestrial habitat sites in the Northwest Territories and Nunavut", available at the following link: http://publications.gc.ca/site/eng/317630/publication.html and "Key marine habitat sites for migratory birds in Nunavut and the Northwest Territories", available at the following link: http://publications.gc.ca/site/eng/392824/publication.html. The guide provides information to the Proponent on key terrestrial and marine habitat areas that are essential to the welfare of various migratory bird species in Canada.

7. For further information on how to protect migratory birds, their nests and eggs when planning or carrying out project activities, consult Environment and Climate Change Canada's Incidental Take web page and the fact sheet "Planning Ahead to Reduce the Risk of Detrimental Effects to Migratory Birds, and their Nests and Eggs" available at http://www.ec.gc.ca/paom-itmb/.

Caribou Management

8. Territorial and federal government agencies in Nunavut should work together with Regional Inuit Associations, co-management boards and industry to develop an action plan to identify

and mitigate potential cumulative effects of human land use activities, including mineral exploration, on barren-ground caribou. This assessment of cumulative effects should occur at a regional scale (i.e., larger than individual project areas).

9. The NPC should be aware of the public concerns regarding a perceived lack of protection for caribou and caribou habitat within the Qikiqtani region of Nunavut. In developing a Nunavut-wide land use plan, the NPC may wish to consider formalized protection of important caribou habitat, and seasonal restrictions on potentially disruptive activities in these areas to minimize disturbance to caribou lifecycles and Inuit harvesting activities.

REGULATORY REQUIREMENTS

The Board previously recommended in the October 11, 2016 Screening Decision Report(s) for NIRB File No. 07YN019 the following legislation, which continues to apply to the current proposal:

Acts and Regulations

1. The *Fisheries Act* (http://laws-lois.justice.gc.ca/eng/acts/F-14/index.html).
2. The *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (http://laws-lois.justice.gc.ca/eng/acts/n-28.8/).
3. The *Migratory Birds Convention Act* and *Migratory Birds Regulations* (http://laws-lois.justice.gc.ca/eng/acts/M-7.01/).
4. The *Species at Risk Act* (http://laws-lois.justice.gc.ca/eng/acts/S-15.3/index.html). Attached in **Appendix B** is a list of Species at Risk in Nunavut.
5. The *Wildlife Act (Nunavut)* and its corresponding regulations (http://www.canlii.org/en/nu/laws/stat/snu-2003-c-26/latest/snu-2003-c-26.html) contains provisions to protect and conserve wildlife and wildlife habitat, including specific protection measures for wildlife habitat and species at risk.
6. The *Nunavut Act* (http://laws-lois.justice.gc.ca/eng/acts/N-28.6/). The Proponent must comply with the proposed terms and conditions listed in the attached **Appendix C**.

In addition, the Proponent is also advised that the following legislation may apply to the project:

7. The *Aeronautics Act* (http://laws-lois.justice.gc.ca/eng/acts/A-2/).

CONCLUSION

The foregoing constitutes the Board's screening decision with respect to McGill University's "Permafrost-active layer dynamics and feedbacks with climate forcing in ice-rich sediments" project proposal. The NIRB remains available for consultation with the Minister regarding this report as necessary.

Dated ___June 15, 2017___ at Cambridge Bay, NU

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Elizabeth Copland, Chairperson

Attachments: Appendix A: Previously-Screened Project Proposals
Appendix B: Species at Risk in Nunavut
Appendix C: Archaeological and Palaeontological Resources Terms and Conditions for Land Use Permit Holders

APPENDIX A: PREVIOUSLY-SCREENED PROJECT PROPOSALS

The original project proposal NIRB (File No. 07YN019) was received by the NIRB from the Nunavut Research Institute (NRI) on January 25, 2007 and from the Nunavut Planning Commission (NPC) on February 28, 2007. The proposal was screened by the Board in accordance with Part 4, Article 12 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (Nunavut Agreement). On March 20, 2007 the NIRB issued a Nunavut Agreement 12.4.4(a) screening decision to the Minister Responsible for Nunavut Arctic College which indicated that the proposed project could proceed subject to the NIRB's recommended project-specific terms and conditions.

McGill University's (the Proponent) original "High Arctic research project" (consisting of two (2) separate research studies entitled the "Investigation of the Sensitivity of High Arctic Permafrost to Climate Change" project and the "Nature and Significance of Perennial Springs in the Canadian High Arctic" project) was located in the North Baffin Region on the Fosheim Peninsula, Ellesmere Island and on Axel Heiberg Island approximately 300 to 400 kilometres (km) northwest of Grise Fiord. The Proponent indicated that it intended to complete various research field work activities to examine components of climate change and permafrost. The program was proposed to take place from March 2007 to March 2012.

According to the previously screened project proposal, the scope of the project included the following undertakings, works or activities:

- Field work activities including the mapping of permafrost, groundwater and group ice;
- The establishment of small (2-3 person), temporary camps (4-5 days) on Axel Heiberg Island; and
- Other research activities located at the Environment Canada station at Eureka.

Additional authorization and extension requests associated with "The Nature and Significance of Perennial Springs in the Canadian High Arctic" project have also been reviewed by the NIRB following screening of the original project proposal (File No. 07YN019). In each instance where the NIRB received applications up to and including July 19, 2011, the NIRB confirmed that the applications were exempt from the requirement for further screening pursuant to Section 12.4.3 of the Nunavut Agreement and the activities therein remained subject to the terms and conditions recommended in the original March 20, 2007 Screening Decision Report. On October 11, 2016, after receiving an application for additional activities on July 7, 2016, the NIRB issued additional terms and conditions associated with the "An Investigation of the Sensitivity of High Arctic Permafrost to Climate Change" project as per paragraph 92(2)(a) of the NuPPAA. The following is a summary of the previously screened project activities as received by the NIRB:

The June 16, 2008 extension requests for Indian and Northern Affairs Canada's (INAC, now Indigenous and Northern Affairs Canada) Land Use Permit N2006N0028 involved activities in support of continued research activities for an additional one (1) year to allow for scientific research to continue.

The May 18, 2010 amendment request for INAC's Land Use Permit N2006N0028 involved activities to allow the establishment of a temporary camp (for 28-36 person days) on the Fosheim Peninsula to support continued research activities. The activities and components associated with this 2010 amendment included:

- Initially based out of the Eureka weather station and then will set up temporary camp on Fosheim Peninsula south Slidre Fjord;
- Conduct a survey using ground penetrating radar to detect and map massive ground ice;
- Transportation by helicopter;
- Four (4) persons at the site for seven (7) to nine (9) days;
- Four (4) small expedition tents and one (1) Mt. Logan tent;
- Withdrawing water for domestic usage;
- Running a small generator to charge batteries;
- All wastes and garbage to be flown out; and
- Five (5) gallons of gas and a 20 pound cylinder of propane stored at the camp.

The July 19, 2011 extension requests for Aboriginal Affairs and Northern Development's (now Indigenous and Northern Affairs Canada) Land Use Permit N2006N0028 involved activities in support of continued research activities for an additional one (1) year to allow for scientific research to be based out of the existing camp.

The scope associated with the previous July 7, 2016 amendment included:

- Conduct land, vegetation, and permafrost studies and training activities adjacent to Resolute Bay in addition to previously approved research activities on Axel Heiberg Island and Ellesmere Island;
- Activities to take place seasonally from 2016 to 2019 during the months of August and September;
- Use of accommodations and facilities for up to seven (7) personnel at the Polar Continental Shelf Project (PCSP) in Resolute Bay;
- Use of research equipment including surveying levels, ground probes, global positioning systems, and ground-penetrating radars to conduct land, vegetation, and permafrost research studies and training activities;
- Access to local research and training sites on foot or by all-terrain vehicles;
- Transportation and use of fuel to facilitate transportation activities; and
- Collection of wastes during field studies with appropriate disposal at the PCSP facility.

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Appendix B
Species at Risk in Nunavut

Due to the requirements of Section 79(2) of the Species At Risk Act (SARA), and the potential for project-specific adverse effects on listed wildlife species and its critical habitat, measures should be taken as appropriate to avoid or lessen those effects, and the effects need to be monitored. Project effects could include species disturbance, attraction to operations and destruction of habitat. This section applies to all species listed on Schedule 1 of SARA, as listed in the table below, or have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which may be encountered in the project area. This list may not include all species identified as at risk by the Territorial Government. The following points provide clarification on the applicability of the species outlined in the table.

- Schedule 1 is the official legal list of Species at Risk for SARA. SARA applies to all species on Schedule 1. The term "listed" species refers to species on Schedule 1.
- Schedule 2 and 3 of SARA identify species that were designated at risk by the COSEWIC prior to October 1999 and must be reassessed using revised criteria before they can be considered for addition to Schedule 1.
- Some species identified at risk by COSEWIC are "pending" addition to Schedule 1 of SARA. These species are under consideration for addition to Schedule 1, subject to further consultation or assessment.

If species at risk are encountered or affected, the primary mitigation measure should be avoidance. The Proponent should avoid contact with or disturbance to each species, its habitat and/or its residence. All direct, indirect, and cumulative effects should be considered. Refer to species status reports and other information on the species at risk Registry at http://www.sararegistry.gc.ca for information on specific species.

Monitoring should be undertaken by the Proponent to determine the effectiveness of mitigation and/or identify where further mitigation is required. As a minimum, this monitoring should include recording the locations and dates of any observations of species at risk, behaviour or actions taken by the animals when project activities were encountered, and any actions taken by the proponent to avoid contact or disturbance to the species, its habitat, and/or its residence. This information should be submitted to the appropriate regulators and organizations with management responsibility for that species, as requested.

For species primarily managed by the Territorial Government, the Territorial Government should be consulted to identify other appropriate mitigation and/or monitoring measures to minimize effects to these species from the project.

Mitigation and monitoring measures must be undertaken in a way that is consistent with applicable recovery strategies and action/management plans.

Schedules of SARA are amended on a regular basis so it is important to check the SARA registry (www.sararegistry.gc.ca) to get the current status of a species.

Updated: October 2016

Terrestrial Species at Risk [1]	COSEWIC Designation	Schedule of SARA	Government Organization with Primary Management Responsibility [2]
Migratory Birds			
Eskimo Curlew	Endangered	Schedule 1	EC
Buff-breasted Sandpiper	Special concern	Pending	EC
Ivory Gull	Endangered	Schedule 1	EC
Ross's Gull	Threatened	Schedule 1	EC
Harlequin Duck (Eastern population)	Special Concern	Schedule 1	EC
Rusty Blackbird	Special Concern	Schedule 1	Government of Nunavut
Peregrine Falcon	Special Concern (*anatum-tundrius* complex[3])	Schedule 1 - Threatened (*anatum*) Schedule 3 – Special Concern (*tundrius)*	Government of Nunavut
Short-eared Owl	Special Concern	Schedule 1	Government of Nunavut
Red Knot (*rufa* subspecies)	Endangered	Schedule 1	EC
Red Knot (*islandica* subspecies)	Special Concern	Schedule 1	EC
Horned Grebe (Western population)	Special Concern	Pending	EC
Red-necked Phalarope	Special concern	Pending	EC
Vegetation			
Felt-leaf Willow	Special Concern	Schedule 1	Government of Nunavut
Blanket-leaved Willow	Special Concern	Schedule 1	Government of Nunavut
Porsild's Bryum (Moss)	Threatened	Schedule 1	Government of Nunavut
Terrestrial Wildlife			
Peary Caribou	Endangered	Schedule 1	Government of Nunavut
Peary Caribou (High Arctic Population)	Endangered	Schedule 2	Government of Nunavut
Peary Caribou (Low Arctic Population)	Threatened	Schedule 2	Government of Nunavut
Dolphin and Union Caribou	Special Concern	Schedule 1	Government of Nunavut
Grizzly Bear (Western Population)	Special Concern	Pending	Government of Nunavut
Wolverine	Special Concern	Pending	Government of Nunavut
Marine Wildlife			
Polar Bear	Special Concern	Schedule 1	Government of Nunavut/DFO
Atlantic Walrus	Special Concern	Pending	DFO
Beluga Whale (Cumberland Sound population)	Threatened	Pending	DFO
Beluga Whale (Eastern Hudson Bay population)	Endangered	Pending	DFO
Beluga Whale (Western Hudson Bay population)	Special Concern	Pending	DFO
Beluga Whale (Eastern High Arctic – Baffin Bay population)	Special Concern	Pending	DFO
Bowhead Whale (Eastern Canada – West	Special Concern	Pending	DFO

Greenland population)			
Bowhead Whale (Eastern Arctic population	Endangered	Schedule 2	DFO
Killer Whale (Northwest Atlantic / Eastern Arctic populations)	Special Concern	Pending	DFO
Grey Whale (Eastern North Pacific population)	Special Concern	Schedule 1	DFO
Humpback Whale (Western North Atlantic population)	Special Concern	Schedule 3	DFO
Narwhal	Special Concern	Pending	DFO
Fish			
Northern Wolffish	Threatened	Schedule 1	DFO
Atlantic Wolffish	Special Concern	Schedule 1	DFO
Bering Wolffish	Special Concern	Schedule 3	DFO
Fourhorn Sculpin	Special Concern	Schedule 3	DFO
Roundnose Grenadier	Endangered	Pending	DFO
Spotted Wolffish	Threatened	Schedule 1	DFO
Thorny Skate	Special Concern	Pending	DFO
Atlantic Cod, Arctic Lakes	Special Concern	Pending	DFO
Blackline Prickleback	Special Concern	Schedule 3	DFO

Notes: DFO: Fisheries and Oceans Canada; ECCC: Environment and Climate Change Canada; GN: Government of Nunavut

[1] The Department of Fisheries and Oceans has responsibility for aquatic species.

[2] Environment and Climate Change Canada has a national role to play in the conservation and recovery of Species at Risk in Canada, as well as responsibility for management of birds described in the Migratory Birds Convention Act (MBCA). Day-to-day management of terrestrial species not covered in the MBCA is the responsibility of the Territorial Government. Populations that exist in National Parks are also managed under the authority of the Parks Canada Agency.

[3] The *anatum* subspecies of Peregrine Falcon is listed on Schedule 1 of SARA as threatened. The *anatum* and *tundrius* subspecies of Peregrine Falcon were reassessed by COSEWIC in 2007 and combined into one subpopulation complex. This subpopulation complex was assessed by COSEWIC as Special Concern.

Appendix C
Archaeological and Palaeontological Resources Terms and Conditions for Land Use Permit Holders

INTRODUCTION

The Department of Culture and Heritage (CH) routinely reviews land use applications sent to the Nunavut Water Board, Nunavut Impact Review Board and the Indigenous and Northern Affairs Canada. These terms and conditions provide general direction to the permittee/proponent regarding the appropriate actions to be taken to ensure the permittee/proponent carries out its role in the protection of Nunavut's archaeological and palaeontological resources.

TERMS AND CONDITIONS

1) The permittee/proponent shall have a professional archaeologist and/or palaeontologist perform the following **Functions** associated with the **Types of Development** listed below or similar development activities:

	Types of Development (See Guidelines below)	**Function** (See Guidelines below)
a)	Large scale prospecting	Archaeological/Palaeontological Overview Assessment
b)	Diamond drilling for exploration or geotechnical purpose or planning of linear disturbances	Archaeological/ Palaeontological Inventory
c)	Construction of linear disturbances, Extractive disturbances, Impounding disturbances and other land disturbance activities	Archaeological/ Palaeontological Inventory or Assessment or Mitigation

Note that the above-mentioned functions require either a Nunavut Archaeologist Permit or a Nunavut Palaeontologist Permit. CH is authorized by way of the *Nunavut and Archaeological and Palaeontological Site Regulations*[1] to issue such permits.

2) The permittee/proponent shall not operate any vehicle over a known or suspected archaeological or palaeontological site.

[1] P.C. 2001-1111 14 June, 2001

3) The permittee/proponent shall not remove, disturb, or displace any archaeological artifact or site, or any fossil or palaeontological site.

4) The permittee/proponent shall immediately contact CH at (867) 934-2046 or (867) 975-5500 should an archaeological site or specimen, or a palaeontological site or fossil, be encountered or disturbed by any land use activity.

5) The permittee/proponent shall immediately cease any activity that disturbs an archaeological or palaeontological site encountered during the course of a land use operation until permitted to proceed with the authorization of CH.

6) The permittee/proponent shall follow the direction of CH in restoring disturbed archaeological or palaeontological sites to an acceptable condition. If these conditions are attached to either a Class A or B Permit under the Territorial Lands Act Indigenous and Northern Affairs Canada directions will also be followed.

7) The permittee/proponent shall provide all information requested by CH concerning all archaeological sites or artifacts and all palaeontological sites and fossils encountered in the course of any land use activity.

8) The permittee/proponent shall make best efforts to ensure that all persons working under its authority are aware of these conditions concerning archaeological sites and artifacts and palaeontological sites and fossils.

9) If a list of recorded archaeological and/or palaeontological sites is provided to the permittee/proponent by CH as part of the review of the land use application the permittee/proponent shall avoid the archaeological and/or palaeontological sites listed.

10) Should a list of recorded sites be provided to the permittee/proponent, the information is provided solely for the purpose of the proponent's land use activities as described in the land use application, and must otherwise be treated confidentially by the proponent.

Legal Framework

As stated in Article 33 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (Nunavut Agreement):

Where an application is made for a land use permit in the Nunavut Settlement Area, and there are reasonable grounds to believe that there could be sites of archaeological importance on the lands affected, no land use permit shall be issued without written consent of the Designated Agency. Such consent shall not be unreasonably withheld. [33.5.12]

Each land use permit referred to in Section 33.5.12 shall specify the plans and methods of archeological site protection and restoration to be followed by the permit holder, and any other conditions the Designated Agency may deem fit. [33.5.13]

Palaeontology and Archaeology

Under the *Nunavut Act*[2], the federal government can make regulations for the protection, care and preservation of palaeontological and archaeological sites and specimens in Nunavut. Under

[2] s. 51(1)

the *Nunavut Archaeological and Palaeontological Sites Regulations*[3], it is illegal to alter or disturb any palaeontological or archaeological site in Nunavut unless permission is first granted through the permitting process.

Definitions
As defined in the *Nunavut Archaeological and Palaeontological Sites Regulations*, the following definitions apply:

> *"archaeological site" means a place where an archaeological artifact is found.*
>
> *"archaeological artifact" means any tangible evidence of human activity that is more than 50 years old and in respect of which an unbroken chain of possession or regular pattern of usage cannot be demonstrated, and includes a Denesuline archaeological specimen referred to in section 40.4.9 of the Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada (Nunavut Agreement).*
>
> *"palaeontological site" means a site where a fossil is found.*
>
> *"fossil" includes:*
> *Fossil means the hardened or preserved remains or impression of previously living organisms or vegetation and includes:*
> *(a) natural casts;*
> *(b) preserved tracks, coprolites and plant remains; and*
> *(c) the preserved shells and exoskeletons of invertebrates and the preserved eggs, teeth and bones of vertebrates.*

Guidelines for Developers for the Protection of Archaeological Resources in the Nunavut Territory

(**Note:** Partial document only, complete document at: www.ch.gov.nu.ca/en/Archaeology.aspx)

Introduction
The following guidelines have been formulated to ensure that the impacts of proposed developments upon heritage resources are assessed and mitigated before ground surface altering activities occur. Heritage resources are defined as, but not limited to, archaeological and historical sites, burial grounds, palaeontological sites, historic buildings and cairns Effective collaboration between the developer, the Department of Culture and Heritage (CH), and the contract archaeologist(s) will ensure proper preservation of heritage resources in the Nunavut Territory. The roles of each are briefly described.

CH is the Nunavut Government agency which oversees the protection and management of heritage resources in Nunavut, in partnership with land claim authorities, regulatory agencies, and the federal government. Its role in mitigating impacts of developments on heritage resources is as follows: to identify the need for an impact assessment and make recommendations to the appropriate regulatory agency; set the terms of reference for the study depending upon the scope of the development; suggest the names of qualified individuals

[3] P.C. 2001-1111 14 June, 2001

prepared to undertake the study to the developer; issue an archaeologist or palaeontologist permit authorizing field work; assess the completeness of the study and its recommendations; and ensure that the developer complies with the recommendations.

The primary regulatory agencies that CH provides information and assistance to are the Nunavut Impact Review Board, for development activities proposed for Inuit Owned Lands (as defined in Section 1.1.1 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (Nunavut Agreement)), and the Indigenous and Northern Affairs Canada, for development activities proposed for federal Crown Lands.

A developer is the initiator of a land use activity. It is the obligation of the developer to ensure that a qualified archaeologist or palaeontologist is hired to perform the required study and that provisions of the contract with the archaeologist or palaeontologist allow permit requirements to be met; i.e. fieldwork, collections management, artifact and specimen conservation, and report preparation. On the recommendation of the contract archaeologist or palaeontologist in the field and the Government of Nunavut, the developer shall implement avoidance or mitigative measures to protect heritage resources or to salvage the information they contain through excavation, analysis, and report writing. The developer assumes all costs associated with the study in its entirety.

Through his or her active participation and supervision of the study, the contract archaeologist or palaeontologist is accountable for the quality of work undertaken and the quality of the report produced. Facilities to conduct fieldwork, analysis, and report preparation should be available to this individual through institutional, agency, or company affiliations. Responsibility for the curation of objects recovered during field work while under study and for documents generated in the course of the study as well as remittance of artifacts, specimens and documents to the repository specified on the permit accrue to the contract archaeologist or palaeontologist. This individual is also bound by the legal requirements of the *Nunavut Archaeological and Palaeontological Sites Regulations*.

Types of Development

In general, those developments that cause concern for the safety of heritage resources will include one or more of the following kinds of surface disturbances. These categories, in combination, are comprehensive of the major kinds of developments commonly proposed in Nunavut. For any single development proposal, several kinds of these disturbances may be involved

- *Linear disturbances: including the construction of highways, roads, winter roads, transmission lines, and pipelines;*
- *Extractive disturbances: including mining, gravel removal, quarrying, and land filling;*
- *Impoundment disturbances: including dams, reservoirs, and tailings ponds;*
- *Intensive land use disturbances: including industrial, residential, commercial, recreational, and land reclamation work, and use of heritage resources as tourist developments.*

- *Mineral, oil and gas exploration: establishment of camps, temporary airstrips, access routes, well sites, or quarries all have potential for impacting heritage resources*.

Types of Studies Undertaken to Preserve Heritage Resources

Overview: An overview study of heritage resources should be conducted at the same time as the development project is being designed or its feasibility addressed. They usually lack specificity with regard to the exact location(s) and form(s) of impact and involve limited, if any, field surveys. Their main aim is to accumulate, evaluate, and synthesize the existing knowledge of the heritage of the known area of impact. The overview study provides managers with baseline data from which recommendations for future research and forecasts of potential impacts can be made. A Class I Permit is required for this type of study if field surveys are undertaken.

Reconnaissance: This is done to provide a judgmental appraisal of a region sufficient to provide the developer, the consultant, and government managers with recommendations for further development planning. This study may be implemented as a preliminary step to inventory and assessment investigations except in cases where a reconnaissance may indicate a very low or negligible heritage resource potential. Alternately, in the case of small-scale or linear developments, an inventory study may be recommended and obviate the need for a reconnaissance.

The main goal of a reconnaissance study is to provide baseline data for the verification of the presence of potential heritage resources, the determination of impacts to these resources, the generation of terms of reference for further studies and, if required, the advancement of preliminary mitigative and compensatory plans. The results of reconnaissance studies are primarily useful for the selection of alternatives and secondarily as a means of identifying impacts that must be mitigated after the final siting and design of the development project. Depending on the scope of the study, a Class 1 or Class 2 Permit is required for this type of investigation.

Inventory: A resource inventory is generally conducted at that stage in a project's development at which the geographical area(s) likely to sustain direct, indirect, and perceived impacts can be well defined. This requires systematic and intensive fieldwork to ascertain the effects of all possible and alternate construction components on heritage resources. All heritage sites must be recorded on Government of Nunavut Site Survey forms. Sufficient information must be amassed from field, library and archival components of the study to generate a predictive model of the heritage resource base that will:

- allow the identification of research and conservation opportunities;
- enable the developer to make planning decisions and recognize their likely effects on the known or predicted resources; and
- make the developer aware of the expenditures, which may be required for subsequent studies and mitigation. A Class 1 or 2 permit is required.

Assessment: At this stage, sufficient information concerning the numbers and locations of heritage resources will be available, as well as data to predict the forms and magnitude of impacts. Assessments provide information on the size, volume, complexity and content of a

heritage resource, which is used to rank the values of different sites or site types given current archaeological knowledge. As this information will shape subsequent mitigation program(s), great care is necessary during this phase.

Mitigation: This refers to the amelioration of adverse impacts to heritage resources and involves the avoidance of impact through the redesign or relocation of a development or its components; the protection of the resource by constructing physical facilities; or, the scientific investigation and recovery of information from the resource by excavation or other method. The type(s) of appropriate mitigative measures are dictated by their viability in the context of the development project. Mitigation strategies must be developed in consultation with, and approved by, the Department of Culture and Heritage. It is important to note that mitigation activities should be initiated as far in advance of the construction of the development as possible.

Surveillance and monitoring: These may be required as part of the mitigation program.

Surveillance may be conducted during the construction phase of a project to ensure that the developer has complied with the recommendations.

Monitoring involves identification and inspection of residual and long-term impacts of a development (i.e. shoreline stability of a reservoir); or the use of impacts to disclose the presence of heritage resources, for example, the uncovering of buried sites during the construction of a pipeline.