



## SCREENING DECISION REPORT NIRB FILE No.: 18YN025

NPC File No.: 148831

**June 20, 2018**

Following the Nunavut Impact Review Board's (NIRB or Board) assessment of all materials provided, the NIRB is recommending that a review of Trent University's "Back for the future: Long-term observations of vegetation and snowcover in the High Arctic" is not required pursuant to paragraph 92(1)(a) of the *Nunavut Planning and Project Assessment Act*, S.C. 2013, c. 14, s. 2 (*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 Ministers accept this Screening Decision Report.

### OUTLINE OF SCREENING DECISION REPORT

- 1) REGULATORY FRAMEWORK
- 2) PROJECT REFERRAL
- 3) PROJECT OVERVIEW & THE NIRB ASSESSMENT PROCESS
- 4) ASSESSMENT OF THE PROJECT PROPOSAL IN ACCORDANCE WITH PART 3 OF *NuPPAA*
- 5) VIEWS OF THE BOARD
- 6) RECOMMENDED PROJECT-SPECIFIC TERMS AND CONDITIONS
- 7) OTHER NIRB CONCERNS AND RECOMMENDATIONS
- 8) REGULATORY REQUIREMENTS
- 9) CONCLUSION

### 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)* and are confirmed by section 23 of the *NuPPAA*:

*Nunavut Agreement*, Article 12, Section 12.2.5: 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.

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

*NuPPAA*, s. 88: 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*:

*NuPPAA*, s. 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) of the *NuPPAA* provides that the considerations set out in paragraph 89(1)(a) prevail over those set out in paragraph 89(1)(b) of the *NuPPAA*.

As set out under subsection 92(1) of the *NuPPAA*, upon conclusion of the screening process, the Board must provide its written report the Minister:

*NuPPAA*, s. 92(1): The Board must submit a written report to the responsible Minister containing a description of the project that specifies its scope and indicating that:

- (a) a review of the project is not required;
- (b) a review of the project is required; or
- (c) the project should be modified or abandoned.

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 pursuant to paragraph 92(2)(a) of *NuPPAA* as follows:

*NuPPAA*, s. 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 13, 2018 the Nunavut Impact Review Board (NIRB or Board) received a referral to screen Trent University's "Back for the future: Long-term observations of vegetation and snowcover in the High Arctic" project proposal from the Nunavut Planning Commission (NPC or Commission) which noted that the project proposal is outside the area of an applicable 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*, S.C. 2013, c. 14, s. 2 (*NuPPAA*), the NIRB commenced screening this project proposal and assigned it file number 18YN025.

## PROJECT OVERVIEW & THE NIRB ASSESSMENT PROCESS

### 1. Project Scope

The proposed "Back for the future: Long-term observations of vegetation and snowcover in the High Arctic" project is located within the Kitikmeot region, approximately 60 kilometres (km) northwest from Cambridge Bay. The Proponent intends to conduct baseline studies of vegetation and snow conditions and evaluate the long-term changes based on previous studies conducted between 1991-1993. The program is proposed to take place in August 2018 and April 2019.

As required under subsection 86(1) of the *NuPPAA*, the Board accepts the scope of the Back for the future: Long-term observations of vegetation and snowcover in the High Arctic project as set out by Trent University in the proposal. The scope of the project proposal includes the following undertakings, works, or activities:

- Establishment of a temporary camp for two (2) people;
- Use of a Twin Otter for transportation to and from study area;
- Use of a canoe and travel on foot to access research sites;
- Conduct estimates of abundance and composition of plants previously quantified by creating vegetation composition plots and taking photographs;
- Measuring snow hardness and thickness;
- Fuel use (2 gallons of Naphtha for cooking);
- Use of water for domestic purposes;
- Combustible and non-consumable wastes to be properly disposed of in Cambridge Bay; and
- Demonstrate research techniques to local residents.

### 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:

<b>Date</b>	<b>Stage</b>
April 13, 2018	Receipt of project referral from the NPC
April 13, 2018	Information request
May 18, 2018	Proponent responded to information request
May 18, 2018	Scoping pursuant to subsection 86(1) of the <i>NuPPAA</i>
May 30, 2018	Public engagement and comment request
June 11, 2018	Receipt of public comments

#### **4. Public Comments and Concerns**

Notice regarding the NIRB's screening of this project proposal was distributed on May 30, 2018 to community organizations in Cambridge Bay, as well as to relevant federal and territorial government agencies, Inuit organizations and other parties. The NIRB requested that interested parties review the proposal and the NIRB's *proposed* project-specific terms and conditions, and provide the Board with any comments or concerns by June 11, 2018 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; and if so, why;
- Whether the project proposal is of a type where the potential adverse effects are highly predictable and mitigable with known technology, (and providing 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:

##### **Government of Nunavut, Department of Culture and Heritage (GN-CH)**

- Caution must be exercised to ensure that vegetation observation plots are not located within archaeological features.
- Camp location must be visually inspected to ensure that no archaeological features are located in the vicinity.
- Avoid conducting activities in the vicinity (50 m buffer zone) of archaeological/historical sites. If archaeological sites or features are encountered, activities should immediately be interrupted and moved away from this location. Each site encountered needs to be recorded and reported to the Government of Nunavut Territorial Archaeology Office.
- Noted that no person shall search, excavate, alter, or otherwise disturb an archaeological site, or remove any artifact from an archaeological site without a Class 2 permit.
- Building of inuksuit is not recommended.

##### **Indigenous and Northern Affairs Canada (INAC)**

- No comments or additional terms and conditions.

### **Kugluktuk Angoniatit Association**

- No concerns with the project.
- Requested that the proponent send a final report.

### **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.

#### **ASSESSMENT OF THE PROJECT PROPOSAL IN ACCORDANCE WITH PART 3 OF *NuPPAA***

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 research activities would occur within a small geographic area approximately 60 kilometres (km) northwest of Cambridge Bay. The project activities include setup of a temporary camp with daily accessing research sites by foot in August to take photographs of vegetation and setup vegetation composition plots and in April 2019 to conduct snow measurements. The proposed activities may take place within habitat and seasonal ranges for caribou and muskox and habitats for many far-ranging and local wildlife species including migratory and non-migratory birds, wolves, bear, arctic fox, and arctic hare, and may potentially impact animal migratory patterns.

2. *The ecosystemic sensitivity of that area.*

The proposed project would occur in an area with no particular identified ecosystemic sensitivity. The area has been identified from NPC's online mapping data and expert knowledge as having value and priority to the local community for:

- i. Caribou (Dolphin-Union Herd) and associated migration routes;
- ii. Muskox;
- iii. Migratory birds including Canada geese and eider ducks;
- iv. Grizzly bears;
- v. Fish (Arctic char and cod);
- vi. Camping, hunting and fishing; and
- vii. Tourism (Kayaking).

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

During the commenting period, the Government of Nunavut (GN) indicated that there are thirty-four recorded archaeological sites within the boundaries of the study area and noted there may be additional unidentified sites as no systematic archaeological reconnaissance has been conducted in the area. The GN noted that if any sites of historical, cultural, or archaeological significance are encountered, the Proponent would be required to contact the GN-Department of Culture and Heritage.

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

Although no significant public concerns were raised during the public commenting period, the NIRB notes that the close proximity of the proposed activities to the community of Cambridge Bay and an area used by residents for recreational/traditional pursuits which could potentially contribute to public concern developing. A term and condition has been recommended to direct engagement with the community, 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.

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 “Back for the future: Long-term observations of vegetation and snowcover in the High Arctic” 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 physical environment that are temporary in nature, reversible and mitigable with due care. Due to the project being conducted over a short period of time, the and the minimal noise created with the conduct of the research activities, the project is expected to not likely disturb wildlife or traditional land use in the area.

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 kilometre 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 terrestrial wildlife 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**

<b>NIRB Number</b>	<b>Project</b>	<b>Project Title</b>	<b>Project Type</b>
<b><i>Active Projects</i></b>			
10YN014		CAT-TRAIN-ICE Canadian Arctic Tidal Transect Research and Information network	Research ( <i>ongoing</i> )
12AN025		One Ocean Expeditions – Canadian Arctic Cruiseship Tourism	Tourism ( <i>ongoing</i> )
15YN032		Deployment pf Environmental Instrumentation in Grenier Lake Watershed, Cambridge Bay	Research ( <i>ongoing</i> )
17QN048		Land Use Permit for Quarry #3 and #6 @ Cambridge Bay (Located in Nunavut Airport Land)	Quarry
17UN042		CAT-TRAIN: Canadian Arctic Tidal Transect Research and Infrastructure Network	Infrastructure and Research ( <i>ongoing</i> )
17YN002		Towards Sustainable Fishery for Nunavummiut	Research ( <i>ongoing</i> )
18YN003		Climate – terrestrial biodiversity investigation in tundra vegetation along an Arctic longitudinal gradient	Research
18YN011		Spatial mapping of water chemistry using the ChemYak	Research
18YN020		Permafrost Dynamics in Response to Climate Change on Victoria Island, Nunavut	Research
18YN021		Migratory and breeding ecology of birds facing global environmental change	Research
18YN024		Landfast Ice Deterioration and Break-up Data Collection and Modelling for Northern Communities and Low-Impact Shipping in Ice	Research
<b><i>Past Projects</i></b>			
16AN072		Northwest Passage Project	Tourism
16DN063		Operation NUNALIVUT 2018	Defence
16TN039		MS Crystal Serenity – Crystal Cruises LLC Northwest Passage 2017	Tourism
16YN054		Baseline Monitoring of Marine Productivity and Oceanography Spanning the Northwest Passage Using Ships of Opportunity	Research
17YN004		Northern Contaminants Air Monitoring: Passive Air Sampling for Organic Pollutants and Mercury	Research
17YN024		LiDAR (light detection and ranging) and Radar surveys of land and sea ice of the Cambridge Bay Region	Research
17YN026		Geoscience Tools for Supporting Environmental Risk Assessment of Metal	Research

NIRB Number	Project	Project Title	Project Type
		Mining	
17YN027		Arctic-Boreal Vulnerability Experiment (ABoVE) Airborne Campaign	Research
17AN031		Canada C3 led by Students on Ice	Tourism / Research
17YN041		A Coastal, Pan-Canadian Collection of plants, microalgae and marine invertebrates for the Canadian Museum of Nature, as part of Canada C3	Research
17YN072		Functional, Structural and Biodiversity Studies of Arctic Freshwaters	Research
17YN074		Connecting Snow Melt to River Discharge in the Kitikmeot Region and Northwest Territories	Research

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 following project-specific terms and conditions have been recommended: 1-4.

#### **Ecosystem, wildlife habitat and Inuit harvesting activities:**

**Issue 1:** Potential adverse impacts to terrestrial wildlife, including caribou and caribou habitat (Dolphin-Union herd) and muskox, migratory and non-migratory birds and their respective habitats from the establishment of a temporary camp, the research activities and noise disturbance associated with the transport to the research site via twin otter.

**Board views:** As discussed above in the assessment of factors relevant to this project proposal, the potential for impact(s) is applicable to a small geographic area and is limited due to short duration of the activities outside of Cambridge Bay. The proposed activities may take place within areas that overlap many far-ranging terrestrial wildlife species, as well



as, migratory and non-migratory birds. Wildlife that frequent the area may be temporarily disturbed due to increased noise from the transport of personnel and equipment to the research sites by twin otter; however, transport is expected to occur only at the beginning and end of the research activities for pick-up and drop-off undertakings. Further, the project activities are short term (21 days) in nature and the impacts are expected to be temporary in nature, reversible and mitigable with due care.

The Proponent would be required to follow the *Migratory Birds Convention Act*, the *Migratory Birds Regulations*, the *Species at Risk Act* and the *Wildlife Act (Nunavut)* (see Regulatory Requirements section).

**Recommended Mitigation Measures:** It is recommended that the potential adverse impacts may be mitigated by measures such as requiring the Proponent to avoid nesting areas of migratory birds, avoid wildlife, reduce wildlife attractants and ensure not to harass wildlife. It is also recommended that project personnel are properly briefed on wildlife protocols, sensitivities, and management procedures prior to undertaking research activities. The NIRB recommends the following terms and conditions to mitigate the potential adverse impacts to terrestrial wildlife, migratory birds and their associated habitat: 6 through 19.

**Issue 2:** Potential adverse impacts to vegetation health, soil quality and water quality from the establishment of a temporary camp and the associated research activities.

**Board Views:** There is potential for adverse impacts to vegetation health, soil quality and water quality from the establishment of a temporary camp, travelling and conducting research activities within the study area. However, the potential adverse impacts to vegetation health, soil quality and water quality are considered to be of low magnitude and reversible in nature.

The Proponent would be required to follow the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Wildlife Act (Nunavut)* (see Regulatory Requirements section).

**Recommended Mitigation Measures:** It is recommended that the potential adverse impacts to the terrestrial environment, and surface water quality would be mitigated by measures requiring the Proponent to establish their camp on durable ground and ensure wastes are properly stored and disposed in the community of Cambridge Bay. The Board recommends terms and conditions 5, 6, and 20 through 24 to mitigate potential adverse impacts.

**Issue 3:** Potential adverse impacts to public and traditional land use activities in the area due to research activities, transportation of personnel using a Twin Otter and the establishment of a temporary camp.

**Board Views:** There is potential for the proposed project activities to disrupt traditional and recreational land use activities as the activities would occur within approximately 60

kilometres of Cambridge Bay. The noise from the transportation of personnel by twin otter may temporarily change the distribution of wildlife and may affect personal enjoyment out on the land; however, the project activities are short term (21 days) in nature and the impacts are expected to be temporary in nature, reversible and mitigable with due care. A term and condition has been recommended to minimize impacts to traditional land use activities.

Recommended Mitigation Measures: Term and condition 25 is recommended to ensure that the affected communities and organizations are informed about the project proposal and term and condition 26 has been recommended to ensure that project activities do not interfere with Inuit wildlife harvesting or traditional land use activities in the area.

### **Socio-economic effects on northerners:**

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

Board Views: The Proponent is proposing to work in area with some known historical, cultural, or archaeological sites as identified in the comments submitted by the Government of Nunavut – Department of Culture and Heritage (GN-CH), with a minimum of thirty-four recorded archaeological sites noted within the boundaries of the study area. The GN-CH has recommended that caution must be exercised to ensure that vegetation observation plots are not located within archaeological features as due to the accumulation of organic matter, archaeological sites generally provide rich substrates facilitating plant growth.

The Proponent would be required to follow the *Nunavut Act* (as recommended in Regulatory Requirements section) if any sites of historical, cultural, and archaeological importance are encountered during their research activities and to contact the GN-CH.

Recommended Mitigation Measures: The Board recommends term and condition 25 to ensure that the potential adverse impacts to historical sites may be mitigated by measures such as soliciting available Inuit Qaujimaningit from local residents.

**Issue 5:** Potential benefit to the local community from the sharing of knowledge with the community, training of local residents and purchasing of local goods and services.

Board Views: The Proponent has committed to training local residents after the project and will report back to the community of Cambridge Bay about their scientific findings and will store the photographs and data taken during the project so that people can use the information in the future. The Proponent also indicated that they would be using accommodations at the Canadian High Arctic Research Station and purchasing local goods and services within the community of Cambridge Bay.

Recommended Mitigation Measures: Terms and conditions 25 and 27 have been recommended to ensure the Proponent informs the community of the research activities and findings as

well as provide community members with information to ensure a successful local hiring opportunity.

**Significant public concern:**

**Issue 6:** No significant public concern was expressed during the public commenting period for this file.

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

**Recommended Mitigation Measures:** Term and condition 25 is recommended 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 Board is recommending the following specific terms and conditions to apply in respect of the project:

**General**

1. Trent University (the Proponent) shall maintain a copy of the Project Terms and Conditions at the site of operation at all times.
2. The Proponent shall forward copies of all permits obtained and required for this project to the Nunavut Impact Review Board (NIRB) prior to the commencement of the project.
3. The Proponent shall operate in accordance with all commitments stated in correspondence provided to the Nunavut Planning Commission (NPC File No.: 148831), and the NIRB (Online Application Form, May 18, 2018).
4. The Proponent shall operate the site in accordance with all applicable Acts, Regulations and Guidelines.

**Water Use**

5. The Proponent shall not use water, including constructing or disturbing any stream, lakebed or the banks of any definable water course unless approved by the Nunavut Water Board.

## **Waste Disposal**

6. The Proponent shall keep all garbage and debris in bags placed in a covered metal container or equivalent until disposed of at an approved facility. All such wastes shall be kept inaccessible to wildlife at all times.

## **Wildlife - General**

7. The Proponent shall ensure that there is no damage to wildlife habitat in conducting this operation.
8. The Proponent shall not harass wildlife. This includes persistently circling, chasing, hovering over pursuing or in any other way harass wildlife, or disturbing large groups of animals.
9. The Proponent shall not hunt or fish, unless proper Nunavut authorizations have been acquired.
10. 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.

## **Migratory Birds and Raptors Disturbance**

11. The Proponent shall not disturb or destroy the nests or eggs of any birds. If nests are encountered and/or identified, the Proponent shall take precaution to avoid further interaction and or disturbance (e.g., a 100 metres buffer around the nests). If active nests of any birds are discovered (i.e., with eggs or young), the Proponent shall avoid these areas until nesting is complete and the young have left the nest.
12. The Proponent shall minimize activities during periods when birds are particularly sensitive to disturbance such as migration, nesting and moulting.
13. The Proponent shall ensure its aircraft avoid excessive hovering or circling over areas where bird presence is likely.

## **Aircraft Flight Restrictions**

14. The Proponent shall not alter flight paths to approach wildlife, and avoid flying directly over animals.
15. The Proponent shall restrict aircraft/helicopter activity related to the project to a minimum flight altitude of 610 metres above ground level unless except during landing, take-off or if there is a specific requirement for low-level flying, which does not disturb wildlife or migratory birds.
16. The Proponent shall ensure that aircraft maintain a vertical distance of 1000 metres and a horizontal distance of 1500 metres from any observed groups (colonies) of migratory birds. Aircraft should avoid critical and sensitive wildlife areas at all times by choosing alternate flight corridors.
17. The Proponent shall ensure that aircraft/helicopter do not, unless for emergency, touch-down in areas where wildlife are present.

### **Caribou and Muskoxen Disturbance**

18. 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.
19. The Proponent shall not block or cause any diversion to caribou migration, and shall cease activities likely to interfere with migration such as movement of equipment or personnel until such time as the caribou have passed.

### **Temporary Camps and Land Use**

20. The Proponent shall ensure that all camps are located on gravel, sand or other durable land.
21. The Proponent shall not erect camps or store material on the surface ice of lakes or streams.
22. The Proponent shall ensure that the land use area is kept clean and tidy at all times.

### **Restoration of Disturbed Areas**

23. The Proponent shall remove all garbage, fuel and equipment upon abandonment.
24. The Proponent shall ensure that all disturbed areas are restored to a stable or pre-disturbed state as practical as possible upon completion of field work.

### **Other**

25. 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.
26. The Proponent shall ensure that project activities do not interfere with Inuit wildlife harvesting or traditional land use activities.
27. The Proponent should, to the extent possible, hire local people and access local services where possible.

### **OTHER NIRB CONCERNS AND RECOMMENDATIONS**

In addition to the project-specific terms and conditions, the Board is recommending the following:

#### **Change in Project Scope**

1. Responsible authorities or Proponent shall notify the Nunavut Planning Commission, 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](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](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](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 Cambridge Bay, phone: (867) 983-4614).

### **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](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/>.

## **REGULATORY REQUIREMENTS**

The Proponent is also advised that the following legislation may apply to the project:

### **Acts and Regulations**

1. The *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (<http://laws-lois.justice.gc.ca/eng/acts/n-28.8/>).

2. The *Migratory Birds Convention Act* and *Migratory Birds Regulations* (<http://laws-lois.justice.gc.ca/eng/acts/M-7.01/>).
3. The *Species at Risk Act* (<http://laws-lois.justice.gc.ca/eng/acts/S-15.3/index.html>). Attached in **Appendix A** is a list of Species at Risk in Nunavut.
4. 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>).
5. 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 B**.

## CONCLUSION

The foregoing constitutes the Board's screening decision with respect to the Trent University's "Back for the future: Long-term observations of vegetation and snowcover in the High Arctic". The NIRB remains available for consultation with the Minister regarding this report as necessary.

Dated June 20, 2018 at Whale Cove, NU.



Elizabeth Copland, Chairperson

Attachments: Appendix A: Species at Risk in Nunavut  
Appendix B: Archaeological and Palaeontological Resources Terms and Conditions for Land Use Permit Holders

## Appendix A

### 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](http://www.sararegistry.gc.ca)) to get the current status of a species.



Updated: September 2017

Terrestrial Species at Risk <sup>1</sup>	COSEWIC Designation	Schedule of SARA	Government Organization with Primary Management Responsibility <sup>2</sup>
<b>Migratory Birds</b>			
Buff-breasted Sandpiper	Special concern	Schedule 1	ECCC
Eskimo Curlew	Endangered	Schedule 1	ECCC
Harlequin Duck (Eastern population)	Special Concern	Schedule 1	ECCC
Harris's Sparrow	Special Concern	Pending	ECCC
Horned Grebe (Western population)	Special Concern	Schedule 1	ECCC
Ivory Gull	Endangered	Schedule 1	ECCC
Peregrine Falcon	Special Concern ( <i>anatum-tundrius</i> complex <sup>3</sup> )	Schedule 1 - Schedule 3	ECCC
Red Knot ( <i>islandica</i> subspecies)	Special Concern	Schedule 1	ECCC
Red Knot ( <i>rufa</i> subspecies)	Endangered	Schedule 1	ECCC
Red-necked Phalarope	Special concern	Pending	ECCC
Ross's Gull	Threatened	Schedule 1	ECCC
Rusty Blackbird	Special Concern	Schedule 1	ECCC
Short-eared Owl	Special Concern	Schedule 1	ECCC
<b>Vegetation</b>			
Blanket-leaved Willow	Special Concern	Schedule 1	Government of Nunavut
Felt-leaf Willow	Special Concern	Schedule 1	Government of Nunavut
Porsild's Bryum (Moss)	Threatened	Schedule 1	Government of Nunavut
<b>Arthropods</b>			
Traverse Lady Beetle	Special Concern	Pending	Government of Nunavut
<b>Terrestrial Wildlife</b>			
Caribou (Barren-Ground population)	Threatened	Pending	Government of Nunavut
Dolphin and Union Caribou	Special Concern	Schedule 1	Government of Nunavut
Grizzly Bear (Western Population)	Special Concern	Pending	Government of Nunavut
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
Wolverine	Special Concern	Pending	Government of Nunavut
Wolverine (Western population)	Non-active	Pending	Government of Nunavut
<b>Marine Wildlife</b>			
Atlantic Walrus	Special Concern	Pending	DFO
Beluga Whale (Cumberland Sound population)	Endangered	Schedule 2	DFO
Beluga Whale (Eastern High Arctic – Baffin Bay population)	Special Concern	Pending	DFO
Beluga Whale (Eastern Hudson Bay population)	Endangered	Pending	DFO

Beluga Whale (Southeast Baffin Island – Cumberland Sound population)	Endangered	Schedule 2	DFO
Beluga Whale (Western Hudson Bay population)	Special Concern	Pending	DFO
Bowhead Whale (Eastern Arctic population)	Endangered	Schedule 2	DFO
Bowhead Whale (Eastern Canada – West Greenland population)	Special Concern	Pending	DFO
Killer Whale (Northwest Atlantic / Eastern Arctic populations)	Special Concern	Pending	DFO
Narwhal	Special Concern	Pending	DFO
Polar Bear	Special Concern	Schedule 1	Government of Nunavut/DFO
Fish			
Atlantic Cod, Arctic Lakes	Special Concern	Pending	DFO
Atlantic Wolffish	Special Concern	Schedule 1	DFO
Bering Wolffish	Special Concern	Schedule 3	DFO
Blackline Prickleback	Special Concern	Schedule 3	DFO
Fourhorn Sculpin	Special Concern	Schedule 3	DFO
Fourhorn Sculpin (Freshwater form)	Data Deficient	Schedule 3	DFO
Northern Wolffish	Threatened	Schedule 1	DFO
Roundnose Grenadier	Endangered	Pending	DFO
Spotted Whitefish	Threatened	Schedule 1	DFO
Thorny Skate	Special Concern	Pending	DFO

<sup>1</sup> The Department of Fisheries and Oceans has responsibility for aquatic species.

<sup>2</sup> Environment Canada (EC) 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.

## Appendix B 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:

	<b>Types of Development</b> (See Guidelines below)	<b>Function</b> (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*<sup>1</sup> to issue such permits.

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

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<sup>1</sup> 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*<sup>2</sup>, the federal government can make regulations for the protection, care and preservation of palaeontological and archaeological sites and specimens in Nunavut. Under

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<sup>2</sup> s. 51(1)

the *Nunavut Archaeological and Palaeontological Sites Regulations*<sup>3</sup>, 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](http://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

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<sup>3</sup> 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.