



## SCREENING PART 2 FORM PROJECT SPECIFIC INFORMATION REQUIREMENTS (PSIR)

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### 1. SUBMISSIONS

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The Proponent must submit all information pertaining to the Project as a whole. The information requirements below are designed for the purpose of environmental assessment and are not limited to the scope of a single permit or license application.

**IMPORTANT:** Please be advised of the following:

1. NIRB does not accept references to an ftp or web sites as a submission.
2. The Proponent must provide NIRB with 1 (one) electronic copy and 1 (one) hardcopy of the required information in English.
3. All maps should be shapefiles, be legible, and should include grids, be of appropriate scale, indicate the scale, include latitude and longitude references, NTS Maps numbers, title, legend and a north arrow. To the extent possible, avoid hand-drawn demarcations and faxed maps; and,
4. Please complete all required information in each section below. If the required information is not applicable to the project proposal, please indicate this in the response with "n/a". If the request has been provided in a different section or report, please note the section or report where the response can be found.

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### 2. GENERAL PROJECT INFORMATION REQUIREMENTS

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#### Project Coordinates and Maps

1. The preferred method for submitting project coordinates information is through the use of a Geographic Information System (GIS) compatible digital file. Although an ESRI ArcView 3.x shape file (in decimal degrees) is the preferred interchange format, the NIRB has the capacity to receive over 100 GIS and CAD related formats, including MapInfo and AutoCAD, provided proper format and projection metadata is also submitted. The NIRB requires coordinates for the project proposal which reflect the entire project area as defined by:
  - Area/sites of investigation;
  - Boundaries of the foreseen land use permit/right-of-way area(s) to be applied for;
  - Location of any proposed infrastructure or activity(s); and,

- Boundaries of the mineral claim block(s) where proposed activities will be undertaken.
2. Map of the project site within a regional context indicating the distance to the closest communities.
  3. Map of any camp site including locations of camp facilities.
  4. Map of the project site indicating existing and/or proposed infrastructure, proximity to water bodies and proximity to wildlife and wildlife habitat.

The coordinates of the project area are roughly:

378003.08 m E, 7339215.45 m N  
378106.33 m E, 7339119.62 m N  
377982.60 m E, 7339048.55 m N  
377793.01 m E, 7339109.30 m N



Figure 1.0 Image from Google Earth dated July 14, 2006

## Project General Information

5. Discuss the need and purpose of the proposed project.

The Small Craft Harbours Branch of Fisheries and Oceans Canada (DFO/SCH) has been mandated to develop a small craft harbor facility in Pangnirtung, Nunavut. The project was reviewed by the Nunavut Impact Review Board (NIRB) in 2009 to enable upgrading of an existing docking facility in Pangnirtung into a small craft harbour and again in 2010 to enable the reinstatement of a crossing on the Duval River. In both cases, the proposals were processed without a review under Part 5 or 6 of the Nunavut Land Claims Agreement (NCLA). Work to date includes: dredging, installation of a breakwater, extension of existing breakwater, installation of a culvert on the Duval River, construction of a marshaling area, and installation of fish habitat compensation measures (i.e., tidal pool and boulder grid).

Further dredging is required since it has not been completed to the planned depth (-1.5 m). In order to determine why dredging could not be completed to depth, DFO/SCH may be required to conduct a geotechnical investigation which would potentially involve the drilling of up to 20 boreholes to determine the location and depth of bedrock. The proposed drilling activity would occur in the sea bed in the western half of the inner basin, either from the sea ice, from a barge or from a causeway constructed to support the dredging work. The boreholes will have a maximum depth of two meters below chart datum. The disturbed bedrock would then be removed as part of the dredging project. Should blasting be necessary DFO/SCH will contact NIRB to obtain the required approvals.

DFO/SCH is requesting to extend the project timeline to December 2013 to address components of the project that have not been completed. Remaining activities include: possible geotechnical investigation, completion of dredging, continued use of the Duval River crossing, and installation of fixed and floating wharfs.

All work will be in compliance with the Recommended Project-Specific Terms and Conditions that have been set out by NIRB.

6. Discuss alternatives to the project and alternative methods of carrying out the project, including the no-go alternative. Provide justification for the chosen option(s).

Drilling may be required in order to determine the best way to complete the dredging work.

7. Provide a schedule for all project activities.

Tentative Schedule:

Potential Geotechnical Investigation	April-June 2012
Continued dredging of basin and associated harbour improvement activities	May 2012 – December 2013

8. List the acts, regulations and guidelines that apply to project activities.
9. List the approvals, permits and licenses required to conduct the project.

**Nunavut Water Board (NWB)** – The project requires renewal of Licence #1BW-DUV0911 in order to continue using a temporary crossing on the Duval River required for access to quarry. A licence renewal package was submitted to NWB by DFO/SCH on February 3, 2012. NWB has made the documents available for comment until April 14, 2012 when the 30 day review period is closed.

**Fisheries and Oceans Canada (DFO)** – the project has two expired authorizations under the *Fisheries Act* (09-HCAA-CA7-00003 and 10-HCAA-CA7-00033). A submission was recently prepared for DFO (Fish Habitat Management) review requesting that the authorizations be extended to December 2013 and notifying DFO/FHM of the potential requirement for a geotechnical investigation. DFO/SCH will comply with all applicable DFO operational statements.

**Transport Canada (TC)** – The project currently has two approvals under the *Navigable Waters Protection Act* (NWP). Transport Canada has been notified of the continued works and planned geotechnical investigation. No additional approvals are required for the work (as originally proposed) to proceed into 2012-2013, the exception being causeway construction to support the geotechnical investigation. If a causeway is required, an application will be submitted to TC for approval under the Act.

**Nunavut Impact Review Board** – NIRB approval is necessary to extend the timeline of the project. Drilling is not currently listed in the list of planned activities for the project. NIRB has requested that DFO-SCH submit Forms 1 and 2 in order to determine if the potential drilling works require screening.

## DFO Operational Statement (OS) Conformity

10. Indicate whether any of the following Department of Fisheries and Oceans (DFO) Operational Statement (OS) activities apply to the project proposal:
- Bridge Maintenance
  - Clear Span Bridge
  - Culvert Maintenance
  - Ice Bridge
  - Routine Maintenance Dredging
  - Installation of Moorings

The following OS apply to the project:

- Culvert Maintenance
- Routine Maintenance Dredging
- Installation of Moorings
- Minerals Exploration Activities (for drilling on ice)

Please see DFO's OS for specific definitions of these activities available from DFO's web-site at <http://www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/index-eng.htm>

11. If any of the DFO's OS apply to the project proposal, does the Proponent agree to meet the conditions and incorporate the measures to protect fish and fish habitat as outlined in the applicable OS? If yes, provide a signed statement of confirmation.

## Transportation

12. Describe how the project site will be accessed and how supplies will be brought to site. Provide a map showing access route(s).
13. If a previous airstrip is being used, provide a description of the type of airstrip (ice-strip/all-weather), including its location. Describe dust management procedures (if applicable) and provide a map showing location of airstrip.
14. If an airstrip is being constructed, provide the following information:
- a. Discuss design considerations for permafrost
  - b. Discuss construction techniques
  - c. Describe the construction materials, type and sources, and the acid rock drainage (ARD) and metal leaching (ML) characteristics (if rock material is required for airstrip bed).
  - d. Describe dust management procedures.
  - e. Provide a map showing location of proposed airstrip.
15. Describe expected flight altitudes, frequency of flights and anticipated flight routes.

Existing airport at Pangnirtung and sea lift access and scheduling will be utilized.

## Camp Site

16. Describe all existing and proposed camp structures and infrastructure
17. Describe the type of camp:
- a. Mobile
  - b. Temporary
  - c. Seasonal
  - d. Permanent
  - e. Other

18. Describe the maximum number of personnel expected on site, including the timing for those personnel involved with the project.

Not applicable

## Equipment

19. Provide a list of equipment required for the project and discuss the uses for the equipment.
20. If possible, provide digital photos of equipment.

It is expected that a dry (no drilling lubricant) hammer drill rig will be used for the potential geotechnical investigation. All other equipment has not changed from previous submissions.

## 21. Water

22. Describe the location of water source(s), the water intake methods, and all methods employed to prevent fish entrapment. Provide a map showing the water intake locations.
23. Describe the estimated rate of water consumption (m<sup>3</sup>/day).
24. Describe how waste water will be managed. If relevant, provide detail regarding location of sumps, including capacity of sumps and monitoring.
25. If applicable, discuss how surface water and underground water will be managed and monitored.

Not applicable

## Waste Water (Grey water, Sewage, Other)

26. Describe the quantities, treatment, storage, transportation, and disposal methods for the following (where relevant):
  - Sewage
  - Camp grey water
  - Combustible solid waste
  - Non-combustible solid waste, including bulky items/scrap metal
  - Hazardous waste or oil
  - Contaminated soils/snow
  - Empty barrels/ fuel drums
  - Any other waste produced
27. If the project proposal includes a landfill or landfarm, indicate the locations on a map, provide the conceptual design parameters, and discuss waste management and contact-water management procedures.

Not applicable

## Fuel

28. Describe the types of fuel, quantities (number of containers, type of containers and capacity of containers), method of storage and containment. Indicate the location on a map where fuel is to be stored, and method of transportation of fuel to project site.

29. Describe any secondary containment measures to be employed, including the type of material or system used. If no secondary containment is to be employed, please provide justification.
30. Describe the method of fuel transfer and the method of refuelling.
31. Describe spill control measures in place.

Please refer to Environment Canada's fuel storage tank system regulations (*Storage Tank System for Petroleum and Allied Petroleum Products*) website at <http://www.ec.gc.ca/st-rs/> for details on fuel storage requirements.

The project will utilize existing fuel infrastructure associated with the Hamlet of Pangnirtung.

### **Chemicals and Hazardous Materials\***

*\*included but not limited to oils, greases, drill mud, antifreeze, calcium or sodium chloride salt, lead acid batteries and cleaners*

32. Describe the types, quantities (number of containers, the type of container and capacity of containers), method of storage and containment. Indicate the location on a map where material is to be stored, and method of transportation of materials to project site.
33. Describe any secondary containment measures to be employed, including the type of material or system used.
34. Describe the method of chemical transfer.
35. Describe spill control measures in place.

Not applicable

### **Workforce and Human Resources/Socio-Economic Impacts**

36. Discuss opportunities for training and employment of local Inuit beneficiaries.
37. Discuss workforce mobilization and schedule, including the duration of work and rotation length, and the transportation of workers to site.
38. Discuss, where relevant, any specific hiring policies for Inuit beneficiaries.

Final plans are currently under development. All opportunities, as mandated by federal and territorial legislation (ex. Contracting for construction), will be pursued.

### **Public Involvement/ Traditional Knowledge**

39. Indicate which communities, groups, or organizations would be affected by this project proposal.
40. Describe any consultation with interested Parties which has occurred regarding the development of the project proposal.
41. Provide a summary of public involvement measures, a summary of concerns expressed, and strategies employed to address any concerns.
42. Describe how traditional knowledge was obtained, and how it has been integrated into the project.
43. Discuss future consultation plans.

Discussions are ongoing with the Hamlet, local hunter and trapper organization, and the fish plant.

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### 3. PROJECT SPECIFIC INFORMATION

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The following table identifies the project types identified in Section 3 of the NIRB, Part 1 Form. Please complete all relevant sections.

It is the proponent's responsibility to review all sections in addition to the required sections to ensure a complete application form.

**Table 1: Project Type and Information Required**

Project Type	Type of Project Proposal	Information Request
1	All-Weather Road/Access Trail	Section A-1 and Section A-2
2	Winter Road/Winter Trail	Section A-1 and Section A-3
<b>3</b>	<b>Mineral Exploration *</b>	<b>Section B-1 through Section B-4</b>
4	Advanced Mineral Exploration	Section B-1 through Section B-8
5	Mine Development/Bulk Sampling	Section B-1 through Section B-12
6	Pits and Quarries	Section C
<b>7</b>	<b>Offshore Infrastructure</b> (port, break water, dock)	<b>Section D</b>
8	Seismic Survey	Section E
9	Site Cleanup/Remediation	Section F
10	Oil and Natural Gas Exploration/Activities	Section B-3 and Section G
11	Marine Based Activities	Section H
12	Municipal and Industrial Development	Section I

Bolded activities are applicable to the proposed works

\* The potential drilling activity is related most closely to Mineral Exploration; therefore the information required under Sections B1-4 has been included.

#### Roads/Trails

##### A-1. Project Information

1. Describe any field investigations and the results of field investigations used in selecting the proposed route (e.g. geotechnical, snow pack)
2. Provide a conceptual plan of the road, including example road cross-sections and water crossings.
3. Discuss the type and volume of traffic using the road/trail (i.e. type of vehicles and cargo and number of trips annually).
4. Discuss public access to the road.
5. Describe maintenance procedures.

6. Describe whether any portion of the road will be located outside of the Nunavut Settlement Area and whether any other regulatory requirements must be met (e.g. CEAA).

### **A-2. All-Weather Road/Access Trail**

7. Discuss road design considerations for permafrost.
8. Describe the construction materials (type and sources for materials), and the acid rock drainage (ARD) and metal leaching characteristics of the construction materials.
9. Discuss construction techniques, including timing for construction activities.
10. Indicate on a map the locations of designated refuelling areas, water crossings, culverts, and quarries/borrow sources.
11. Identify the proposed traffic speed and measures employed to ensure public safety.
12. Describe dust management procedures.

### **A-3. Winter Road/Trail**

13. Describe the surface preparation, including the use of snow berms or compaction, and any flooding. If flooding is to be used, provide the location of the water source on a map.
14. Describe the operating time period.
15. Identify the proposed traffic speed and measures employed to ensure public safety.
16. Discuss whether the selected route traverses any fish-bearing water bodies.

## **SECTION B: Mineral Exploration /Advanced Exploration /Development**

### **B-1. Project Information**

1. Describe the type of mineral resource under exploration.

No minerals are being explored; purpose of drilling is to determine amount and depth of bedrock

### **B-2. Exploration Activity**

2. Indicate the type of exploration activity:
  - Bulk Sampling (underground or other)
  - Stripping (mining shallow bedded mineral deposits in which the overlying material is stripped off, the mineral removed and the overburden replaced)
  - Trenching
  - Pitting
  - Delineation drilling
  - Preliminary Delineation drilling
  - Exploration drilling
  - Geophysical work (indicate ground and/or air)
  - Other

Hammer drilling is proposed for the potential geotechnical investigation. If required, drilling will occur in the sea bed in the western half of the inner basin, either from the sea ice or from a barge once the sea ice goes out. An estimated maximum of twenty exploratory bore holes to a maximum depth of two meters below chart datum may be drilled.

3. Describe the exploration activities associated with this project:

- Satellite remote sensing
- Aircraft remote sensing
- Soil sampling
- Sediment sampling
- On land drilling (indicate drill type)
- On ice drilling (hammer drill)
- Water based drilling (hammer drill)
- Overburden removal
- Explosives transportation and storage
- Work within navigable waters
- On site sample processing
- Off site sample processing
- Waste rock storage
- Ore storage
- Tailings disposal
- Portal and underground ramp construction
- Landfilling
- Landfarming
- Other

**B-3. Geosciences**

4. Indicate the geophysical operation type:

- a. Seismic (please complete Section E)
- b. Magnetic
- c. Gravimetric
- d. Electromagnetic
- e. Other (specify)

Not applicable

5. Indicate the geological operation type:

- a. Geological Mapping
- b. Aerial Photography
- c. Geotechnical Survey
- d. Ground Penetrating Survey
- e. Other (specify)

Not applicable

6. Indicate on a map the boundary subject to air and/or ground geophysical work.

See Figure 1.0

7. Provide flight altitudes and locations where flight altitudes will be below 610m.

Not applicable

#### **B-4. Drilling**

8. Provide the number of drill holes and depths (provide estimates and maximums where possible).

An estimated maximum of twenty exploratory boreholes to a maximum depth of two meters below chart datum may be drilled.

9. Discuss any drill additives to be used.

Not applicable

10. Describe method for dealing with drill cuttings.

Minimal amounts of sediment and rock powder will be released into the water at the location of each borehole. This material will be excavated as part of the dredging work.

11. Describe method for dealing with drill water.

Not applicable

12. Describe how drill equipment will be mobilized.

If drilling on ice, an ice road will be pushed with a bulldozer or other appropriate equipment and the drill site will be cleared. The drill will be towed or driven (depending on type) to the site(s). Alternatively, the drilling will be performed from a floating barge or from temporary elevated rock fill platforms.

13. Describe how drill holes will be abandoned.

All holes and resulting materials will be removed as part of the dredging works.

14. If project proposal involves uranium exploration drilling, discuss the potential for radiation exposure and radiation protection measures. Please refer to the *Canadian Guidelines for Naturally Occurring Radioactive Materials* for more information.

Not applicable

#### **B-5. Stripping/ Trenching/ Pit Excavation**

15. Discuss methods employed. (i.e. mechanical, manual, hydraulic, blasting, other)
16. Describe expected dimensions of excavation(s) including depth(s).
17. Indicate the locations on a map.
18. Discuss the expected volume material to be removed.
19. Discuss methods used to determine acid rock drainage (ARD) and metal leaching potential and results.

## **B-6. Underground Activities**

20. Describe underground access.
21. Describe underground workings and provide a conceptual plan.
22. Show location of underground workings on a map.
23. Describe ventilation system.
24. Describe the method for dealing with ground ice, groundwater and mine water when encountered.
25. Provide a Mine Rescue Plan.

## **B-7. Waste Rock Storage and Tailings Disposal**

26. Indicate on a map the location and conceptual design of waste rock storage piles and tailings disposal facility.
27. Discuss the anticipated volumes of waste rock and tailings.
28. Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.

## **B-8. Stockpiles**

29. Indicate on a map the location and conceptual design of all stockpiles.
30. Describe the types of material to be stockpiled. (i.e. ore, overburden)
31. Describe the anticipated volumes of each type of material to be stockpiled.
32. Describe any containment measures for stockpiled materials as well as treatment measures for runoff from the stockpile.
33. Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.

## **B-9. Mine Development Activities**

34. Indicate the type(s) of mine development activity(s):
  - Underground
  - Open Pit
  - Strip Mining
  - Other
35. Describe mine activities.
  - Mining development plan and methods
  - Site access
  - Site infrastructure (e.g. airstrip, accommodations, offshore infrastructures, mill facilities, fuel storage facilities, site service roads)
  - Milling process
  - Water source(s) for domestic and industrial uses, required volumes, distribution and management.
  - Solid waste, wastewater and sewage management
  - Water treatment systems
  - Hazardous waste management
  - Ore stockpile management
  - Tailings containment and management
  - Waste rock management

- Site surface water management
  - Mine water management
  - Pitting and quarrying activities (please complete Section C)
  - Explosive use, supply and storage (including on site manufacturing if required)
  - Power generation, fuel requirements and storage
  - Continuing exploration
  - Other
36. Describe the explosive type(s), hazard class, volumes, uses, location of storage (show on map), and method of storage.

### **B-10. Geology and Mineralogy**

37. Describe the physical nature of the ore body, including known dimensions and approximate shape.
38. Describe the geology/ mineralogy of the ore deposit
39. Describe the host rock in the general vicinity of the ore body.
40. Discuss the predicted rate of production.
41. Describe mine rock geochemical test programs which have been or will be performed on the ore, host rock, waste rock and tailings to determine acid generation and contaminant leaching potential. Outline methods and provide results if possible.

### **B-11. Mine**

42. Discuss the expected life of the mine.
43. Describe mine equipment to be used.
44. Does the project proposal involve lake and/or pit dewatering? If so, describe the activity as well as the construction of water retention facilities if necessary.
45. Discuss the possibility of operational changes occurring during the mine life with consideration for timing. (e.g. open pit to underground)
46. If project proposal involves uranium mining, consider the potential for radiation exposure and radiation protection measures. Particular attention should be paid to *The Nuclear Safety and Control Act*.

### **B-12. Mill**

47. If a mill will be operating on the property in conjunction with mining, indicate whether mine-water may be directed to the mill for reuse.
48. Describe the proposed capacity of the mill.
49. Describe the physical and chemical characteristics of mill waste as best as possible.
50. Will or does the mill handle custom lots of ore from other properties or mine sites?

## **SECTION C: Pits and Quarries**

1. Describe all activities included in this project.
- Pitting
  - Quarrying
  - Overburden removal
  - Road use and/or construction (please complete Section A)
  - Explosives transportation and storage
  - Work within navigable waters

- Blasting
  - Stockpiling
  - Crushing
  - Washing
  - Other
2. Describe any field investigations and the results of field investigations used in determining new extraction sites.
  3. Identify any carving stone deposits.
  4. Provide a conceptual design including footprint.
  5. Describe the type and volume of material to be extracted.
  6. Describe the depth of overburden.
  7. Describe any existing and potential for thermokarst development and any thermokarst prevention measures.
  8. Describe any existing or potential for flooding and any flood control measures.
  9. Describe any existing or potential for erosion and any erosion control measures.
  10. Describe any existing or potential for sedimentation and any sedimentation control measures.
  11. Describe any existing or potential for slumping and any slump control measures.
  12. Describe the moisture content of the ground.
  13. Describe any evidence of ice lenses.
  14. If blasting, describe methods employed.
  15. Describe the explosive type(s), hazard class, volumes, uses, location of storage (show on map), and method of storage.
  16. Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.
  17. Discuss safety measures for the workforce and the public.

## **SECTION D: Offshore Infrastructure**

### **D-1. Facility**

1. Describe any field investigations and the results of field investigations used in selecting the site (i.e. aerial surveys, bathymetric surveys, tidal processes, shoreline erosion processes, geotechnical foundation conditions)
2. Provide a conceptual plan, profile description and drawing(s) indicating shoreline, facility footprint, tidal variations, required vessel draft, keel offset, deck height freeboard
3. Discuss how anticipated loads on the seabed foundation and on the offloading platform will be incorporated into the design.
4. Describe how vessels will manoeuvre around the facility. (e.g. pull alongside or in front)
5. Discuss the anticipated life of the facility.
6. Describe whether part of the facility or project will be located outside of the Nunavut Settlement Area and whether any other regulatory requirements must be met (e.g. CEAA).

### **D-2. Facility Construction**

7. Describe the types of material used for construction (i.e. granular or rock, steel piling or sheet piling, concrete). If material is granular, consider acid rock drainage potential, metal leaching potential, percentage of fines, size.

8. Describe dredging activities.
9. Indicate source of granular or rock material used in construction.
10. List quantities of the various types of material used in construction.
11. Describe construction method(s).
12. Indicate whether a site engineer will be on-site to inspect construction.
13. If proposed construction method involves dumping of fill into water, discuss measures for mitigating the release of suspended solids.

### **D-3. Facility Operation**

14. Describe maintenance activities associated with the facility (e.g. dredging, maintenance to account for potential settlement of facility,)
15. Discuss whether the public will have access to the facility(s) and describe public safety measures.
16. Describe cargo and container handling, transfer and storage facilities.
17. Indicate whether fuel will be transferred from barges at this site and describe the method of that fuel transfer.
18. Discuss frequency of use.

### **D-4. Vessel Use in Offshore Infrastructure**

19. Please complete Section H

## **SECTION E: Seismic Survey**

### **E-1. Offshore Seismic Survey**

1. Indicate whether the survey is 2D or 3D at each site.
2. Describe the type of equipment used, including:
  - Type and number of vessels including length, beam, draft, motors, accommodation capacity, operational speeds when towing and when not towing
  - Sound source (type and number of airguns)
  - Type and number of hydrophones
  - Number, length, and spacing of cables/ streamers
3. On a map, indicate the grid, number of lines and total distance covered by each line, the distance to nearby community/communities and sensitive areas (e.g., National Parks, National Wildlife Areas, Migratory Bird Sanctuaries, recognized breeding grounds or migratory routes).
4. Indicate the discharge volume of the airguns, the depth of airgun discharge, the noise levels of acoustic signal at various distances from the source (e.g., 500 metres, 1000 metres), and the frequency and duration of airgun operation at each site.
5. Discuss the potential for dielectric oil to be released from the streamer array, and describe proposed mitigation measures.
6. Indicate whether additional seismic operations are required for start-up of operations, equipment testing, repeat coverage of areas.
7. Indicate whether air gun procedures will include a “ramping up” period and, if so, the proposed rate of ramping up.
8. Indicate whether the measures described in the *Statement of Canadian Practice for Mitigation of Noise in the Marine Environment* will be adhered to for this project.

9. Describe whether any part of the project will be located outside of the Nunavut Settlement Area and whether any other regulatory requirements must be met (e.g. CEEA).

### **E-2. Nearshore/Onshore Seismic Survey**

10. For each site, indicate whether nearshore and onshore surveys will be conducted during the ice season or once the ice has melted
11. Describe how nearshore and onshore areas will be accessed.
12. Describe the survey methods to be used (e.g. explosive charge, vibration, air or water gun, other)
13. Describe equipment to be used
14. If applicable, indicate number, depth and spacing of shot holes
15. Describe explosive wastes including characteristics, quantities, treatment, storage, handling, transportation and disposal methods.

### **E-3. Vessel Use in Seismic Survey**

16. Please complete Section H.

## **SECTION F: Site Cleanup/Remediation**

1. Describe the location, content, and condition of any existing landfills and dumps (indicate locations on a map).
2. Identify salvageable equipment, infrastructure and/or supplies.
3. Provide a list of all contaminants to be cleaned up, anticipated volumes and a map delineating contaminated areas. This includes buildings, equipment, scrap metal and debris, and barrels as well as soil, water (surface and groundwater) and sediment.
4. Describe the degree of pollution/contamination, and list the contaminants and toxicity.
5. Describe technologies used for clean-up and/or disposal of contaminated materials. Include a list of all the physical, chemical and biological cleanup/ remediation methods, operational procedures, and the dosage/frequency of reagents and bacterial medium.
6. Identify and describe all materials to be disposed of off site, including the proposed off site facilities, method of transport and containment measures.
7. Discuss the viability of landfarming, given site specific climate and geographic conditions.
8. Describe the explosive types, hazard classes, volumes, uses, location of storage (indicate on a map), and method of storage (if applicable).
9. If blasting, describe the methods employed.
10. Describe all methods of erosion control, dust suppression, and contouring and re-vegetation of lands.
11. Describe **all** activities included in this project.
  - Excavation (please complete Section B-5)
  - Road use and/or construction (please complete Section A)
  - Airstrip use and/or construction
  - Camp use and/or construction
  - Stockpiling of contaminated material
  - Pit and/or quarry (please complete Section C)
  - Work within navigable waters (please complete Section H)
  - Barrel crushing
  - Building Demolition

- Other

**SECTION G: Oil and Natural Gas Exploration/Activities**

**G-1. Well Authorization**

1. Identify the location(s) of the well centre(s) by latitude and longitude. Attach a map drawn to scale showing locations of existing and proposed wells.
2. Indicate if the site contains any known former well sites.
3. Include the following information for each well:
  - a. Well name
  - b. Surface location
  - c. Proposed bottomhole location
  - d. Ground elevation (in metres)
  - e. Spacing area (in units)
  - f. Identify the well type:
    - i. Production
    - ii. Injection
    - iii. Disposal
    - iv. Observation
    - v. Storage
    - vi. Experimental
    - vii. Other (specify)
  - g. Identify the well classification:
    - i. Exploratory wildcat
    - ii. Exploratory outpost
    - iii. Development
  - h. Drilling operation (deviation):
    - i. Vertical
    - ii. Directional
    - iii. Horizontal
    - iv. Slant
  - i. Objective Zones (copy chart style below)

Objective Formation	Fluid (oil/gas/water)	Depth (mTVD)	Core (Y/N)

- j. Proposed Total Depth in mTDV and mMD.
- k. Formation of Total Depth
- l. Sour well? (yes or no)
  - i. If Yes: Maximum H<sub>2</sub>S concentration in mol/kmol  
Emergency planning zone radius in km
- m. Blowout Prevention (Well Class I – VI)
- n. Deviation Surveys
  - i. Will be run at intervals less than 150m? (yes or no)
- o. Wireline logs
  - i. Will run logs in hole for surface casing? (yes or no)
  - ii. Will run a minimum of 2 porosity measuring logs? (yes or no)

## G-2. On-Land Exploration

4. Indicate if the site contains any known:
  - a. Waste Dumps
  - b. Fuel and Chemical Storage Areas
  - c. Sump Areas
  - d. Waste Water Discharge Locations
5. Attach maps drawn to scale showing locations of existing and proposed items identified in (2) above, as well as all proposed:
  - a. Sumps
  - b. Water sources
  - c. Fuel and chemical storage facilities
  - d. Drilling mud storage areas
  - e. Transportation routes
6. If utilizing *fresh water*, estimate maximum drawdown and recharge capability of the river or lake from which water will be drawn.
7. Indicate if permafrost is expected to be encountered under:
  - a. Camp Facilities
  - b. Well Site
  - c. Access Routes
  - d. Sumps
  - e. Other: \_\_\_\_\_
8. Indicate any potential for encountering artesian aquifers or lost circulation within the surface hole (to casing depth).
9. Will drilling wastes contain detrimental substances (including, but not limited to, oil-based or invert mud and high salinity fluids)? If yes, indicate the substances and estimated volumes.
10. Indicate methods for disposal of drilling wastes:
  - a. Sump
  - b. Down Hole (requires NEB approval)
  - c. On-Site Treatment (provide plan)
  - d. Off-Site (give location and method of disposal)
11. If a sump is being used, attach the following information:
  - a. scale drawings and design of sumps
  - b. capacity in cubic metres
  - c. berm erosion protection
  - d. soil permeability and type
  - e. recycling/reclaiming waters
  - f. surface drainage controls
  - g. abandonment procedures
12. Attach the proposed or existing contingency plan which describes the course of action, mitigative measures and equipment available for use in the event of system failures and spills of hazardous materials.
13. Attach an outline of planned abandonment and restoration procedures.

## G-3. Off-Shore Exploration

14. Will drilling wastes contain detrimental substances (including, but not limited to, oil-based or invert mud and high salinity fluids)? If yes, indicate the substances and estimated volumes.

15. Attach the proposed or existing contingency plan which describes the course of action, mitigative measures and equipment available for use in the event of system failures and spills of hazardous materials.
16. Attach an outline of planned abandonment and restoration procedures.
17. Please complete Section H.

#### **G-4. Rig**

18. Type of Rig. Draw works, make and model
19. Derrick/Mast make and model
20. H.P. available to draw-works

### **SECTION H: Marine Based Activities**

In previous submissions, Section H was completed as disposal at sea was planned. No disposal at sea has taken place for Phase I of the Pangnirtung Harbour Development Project and it is not expected to be necessary for the project's duration.

#### **H-1. Vessel Use**

1. Describe the purpose of vessel operations.
2. List classes and sizes of vessels to be used.
3. Indicate crew size.
4. Indicate operating schedule.
5. Provide a description of route to be traveled (include map).
6. Indicate whether the vessel will call at any ports. If so, where and why?
7. Describe wastes produced or carried onboard including the quantities, storage, treatment, handling and disposal methods for the following:
  - a. Ballast water
  - b. Bilge water
  - c. Deck drainage
  - d. Grey and black water
  - e. Solid waste
  - f. Waste oil
  - g. Hazardous or toxic waste
8. List all applicable regulations concerning management of wastes and discharges of materials into the marine environment
9. Provide detailed Waste Management, Emergency Response and Spill Contingency Plans
10. Does the vessel(s) possess an Arctic Pollution Prevention Certificate? If yes, indicate the date of issue and the name of the classification society.
11. Describe the source of fresh water and potable water
12. Indicate whether ice-breaking will be required, and if so, approximately where and when? Discuss any possible impacts to caribou migration, Inuit harvesting or travel routes, and outline proposed mitigation measures.
13. Indicate whether the operation will be conducted within the Outer Land Fast Ice Zone of the East Baffin Coast. For more information on the Outer Land Fast Ice Zone, please see the Nunavut Land Claims Agreement (NLCA), Articles 1 and 16.

14. Indicate whether Fisheries or Environmental Observers or any other *Qualified Marine Observer* will be onboard during the proposed project activities. If yes, describe their function and responsibilities.
15. Describe all proposed measures for reducing impacts to marine habitat and marine wildlife (including mammals, birds, reptiles, fish, and invertebrates).
16. Describe whether any part of the project will be located outside of the Nunavut Settlement Area and whether any other regulatory requirements must be met (e.g. CEAA).

## **H-2. Disposal at Sea**

17. Provide confirmation you have applied for a *Disposal at Sea* permit with Environment Canada.
18. Provide a justification for the disposal at sea.
19. Describe the substance to be disposed of, including chemical and physical properties.
20. Indicate the location where the disposal is to take place.
21. Describe the frequency of disposals (disposals per day/week or month).
22. Describe the route to be followed during disposal and indicate on a map.
23. Indicate any previous disposal methods and locations.
24. Provide an assessment of the potential effects of the disposal substance on living marine resources.
25. Provide an assessment of the potential of the disposal substance, once disposed of at sea, to cause long-term physical effects.
26. Describe all mitigation measures to be employed to minimize the environmental, health, navigational and aesthetic impacts during loading, transport and disposal.

## **SECTION I: Municipal and Industrial Development**

1. Describe the business type, including public, private, limited, unlimited or other.
2. Describe the activity (e.g. development of quarry, development of hydroelectric facility, bulk fuel storage, power generation with nuclear fuels or hydro, tannery operations, meat processing and packing, etc.).
3. Describe the production process or service provision procedures.
4. Describe the raw materials used in this activity, the storage and transportation methods. If hazardous materials are included in raw materials, products or by-products; include safety regulations methodology.
5. Provide detailed information about the structure and/or building in which the activity will be conducted.
6. List the PPE (personal protective equipment) and tools to be used to protect personal health and safety.
7. Describe the firefighting equipment that are or will be installed.
8. Describe the noise sources, noise level in work area, technical measurements that will be adopted to abate the noise levels and regulatory requirements for noise abatement and noise levels.
9. Describe the type of gaseous emission that will be produced during this activity. Include the allowable thresholds and mitigation measures.
10. Describe odours that the activity might release and include corresponding allowable threshold. Describe mitigation measures if thresholds are exceeded.
11. Describe radiation sources that might be emitted during the activity. Include type and source and include mitigation measures. Also describe preventative measures for human exposure (i.e. PPE).

12. Discuss the employee safety and environment protection training program.
13. If the activity involves a bulk fuel storage facility, include drawings showing the bulk fuel storage facility location in proximity to natural water courses, high water marks, etc.
14. If the activity involves the development of a new quarry or expansion of an existing quarry, complete Section C.

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## 4. DESCRIPTION OF THE EXISTING ENVIRONMENT

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Describe the existing environment, including physical, biological and socioeconomic aspects. Where appropriate, identify local study areas (LSA) and regional study areas (RSA).

Please note that the detail provided in the description of the existing environment should be appropriate for the type of project proposal and its scope.

The following is intended as a guide only.

### Physical Environment

*Please note that a description of the physical environment is intended to cover all components of a project, including roads/trails, marine routes, etc. that are in existence at present time.*

- Proximity to protected areas, including:
  - i. designated environmental areas, including parks;
  - ii. heritage sites;
  - iii. sensitive areas, including all sensitive marine habitat areas;
  - iv. recreational areas;
  - v. sport and commercial fishing areas;
  - vi. breeding, spawning and nursery areas;
  - vii. known migration routes of terrestrial and marine species;
  - viii. marine resources;
  - ix. areas of natural beauty, cultural or historical history;
  - x. protected wildlife areas; and
  - xi. other protected areas.
- Eskers and other unique landscapes (e.g. sand hills, marshes, wetlands, floodplains).
- Evidence of ground, slope or rock instability, seismicity.
- Evidence of thermokarsts.
- Evidence of ice lenses.
- Surface and bedrock geology.
- Topography.
- Permafrost (e.g. stability, depth, thickness, continuity, taliks).
- Sediment and soil quality.
- Hydrology/ limnology (e.g. watershed boundaries, lakes, streams, sediment geochemistry, surface water flow, groundwater flow, flood zones).
- Tidal processes and bathymetry in the project area (if applicable).
- Water quality and quantity.
- Air quality.
- Climate conditions and predicted future climate trends.
- Noise levels.

- Other physical Valued Ecosystem Components (VEC) as determined through community consultation and/or literature review.

### **Biological Environment**

- Vegetation (terrestrial as well as freshwater and marine where applicable).
- Wildlife, including habitat and migration patterns.
- Birds, including habitat and migration patterns.
- Species of concern as identified by federal or territorial agencies, including any wildlife species listed under the *Species at Risk Act (SARA)*, its critical habitat or the residences of individuals of the species.
- Aquatic (freshwater and marine) species, including habitat and migration/spawning patterns.
- Other biological Valued Ecosystem Components (VEC) as determined through community consultation and/or literature review.

### **Socioeconomic Environment**

- Proximity to communities.
- Archaeological and culturally significant sites (e.g. pingos, soap stone quarries) in the project (Local Study Area) and adjacent area (Regional Study Area).
- Palaeontological component of surface and bedrock geology.
- Land and resource use in the area, including subsistence harvesting, tourism, trapping and guiding operations.
- Local and regional traffic patterns.
- Human Health, broadly defined as a complete state of wellbeing (including physical, social, psychological, and spiritual aspects).
- Other Valued Socioeconomic Components (VSEC) as determined through community consultation and/or literature review.

The existing harbour is located in an area of the Pangnirtung Fjord tidal flats adjacent to the Hamlet of Pangnirtung. Prior to 2009 the harbour included a partially excavated entrance channel and basin, a 365 m long rubblemound (“east”) breakwater, a vertical wharf structure and a marshaling area. The existing breakwater is a rubblemound structure, including a central core, armour rock protection on the side slopes and a granular surface on the crest. The core consists of materials excavated from the tidal flats (silty sand and gravel) to create the basin and entrance channel, and granular materials extracted from a local quarry. The armour protection includes quarried rock, as well as large boulders removed from the tidal flats. The granular surface on the crest of the structure allows vehicular access along the completed structure.

In 2009, Small Craft Harbours initiated a project to improve the harbour. Work to date includes: dredging, installation of a breakwater, extension of existing breakwater, installation of a culvert on the Duvall River, construction of a marshaling area, and installation of fish habitat compensation measures (i.e., tidal pool and boulder grid). Work yet to be completed includes: possible geotechnical investigation, dredging, and installation of fixed and floating wharfs.

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## **5. IDENTIFICATION OF IMPACTS AND PROPOSED MITIGATION MEASURES**

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1. Please complete the attached Table 1 – Identification of Environmental Impacts, taking into consideration the components/activities and project phase(s) identified in Section 4 of this

document. Identify impacts in Table 1 as either positive (P), negative and mitigable (M), negative and non-mitigable (N), or unknown (U).

2. Discuss the impacts identified in the above table.
3. Discuss potential socioeconomic impacts, including human health.
4. Discuss potential for transboundary effects related to the project.
5. Identify any potentially adverse effects of the project proposal on species listed under the *Species at Risk Act (SARA)* and their critical habitats or residences, what measures will be taken to avoid or lessen those effects and how the effects will be monitored.
6. Discuss proposed measures to mitigate all identified negative impacts.

Best management practices or mitigation measures related to marine infrastructure will be incorporated in the project to ensure that any adverse effects on the environment are minimized or avoided.

Mitigation measures for the project include fish habitat compensation, which was completed in 2011. Small Craft Harbours will evaluate the effectiveness of the compensation this year.

General Mitigation Measures include:

- All in-water works shall take place outside of timing windows designated to protect local fish populations from impacts of the works or undertakings during spawning migrations, nursery/rearing periods and other critical life history stages.
- All materials and equipment used for the purpose of site preparation and project completion shall be operated and stored in a manner that prevents any deleterious substance (i.e., petroleum products, silt, etc.) from entering the water.
  - Any stockpiled materials shall be stored and stabilized away from the water and shall not be left on the ice.
  - Vehicle and equipment re-fueling and maintenance shall be conducted away from the water.
  - Any part of equipment entering the water shall be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water.
  - Only clean material free of fine particulate matter shall be placed in the water
- Sediment and erosion control measures shall be implemented prior to work and maintained during the work phase, to prevent entry of sediment into the water.
  - All sediment and erosion control measures shall be inspected daily to ensure that they are functioning properly and are maintained and/or upgraded as required.
  - If the sediment and erosion control measures are not functioning properly, no further work shall occur until the sediment and/or erosion problem is addressed.
  - All disturbed areas on the work area shall be stabilized as soon as possible after project completion.
  - Sediment and erosion control measures shall be left in place until all disturbed areas on the work area have been stabilized.
  - All disturbed areas shall be stabilized and re-vegetation as required upon completion of work and restored to a pre-disturbed state or better.

Dewatering Mitigation measures include:

Temporary isolation of areas of the tidal flats may be used to allow dredging work “in the dry” by installing containment structures around the dredging sites to address the rise and fall of the tides.

Generic dewatering mitigation measures:

- Use dams made of non-earthen material, such as water inflated portable dams, pea gravel bags, concrete blocks, steel or wood wall, clean rock, sheet pile or other appropriate designs, to separate the dewatered work site.
- If granular material is used to build dams, use clean or washed material that is adequately sized (i.e., moderately sized rock and not sand or gravel) to withstand anticipated tides during the construction. If necessary, line the outside face of dams with heavy poly-plastic to make them impermeable to water.
- Design dams to accommodate any expected high tides or extreme wind or weather during the construction period.
- Before dewatering, rescue any fish from within the isolated area and return them safely immediately outside of the work site.
- Pump sediment laden dewatering discharge into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering any water body.
- Remove accumulated sediment and excess spoil from the isolated area before removing containment structures.

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## 6. CUMULATIVE EFFECTS

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A cumulative impact (or effect) can be defined as the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. Cumulative impacts can also result from individually minor but collectively significant actions taking place over a period of time.

Discuss how the effects of this project interact with the effects of relevant past, present and reasonably foreseeable projects in a regional context.

The expansion of the harbour is taking place in the area of the tidal flats that are highly disturbed from the previous construction of 1993-1996 and the ongoing activity of the commercial fishing and sea lift access. Cumulative effects are not anticipated.

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## 7. SUPPORTING DOCUMENTS

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Where relevant, provide the following supporting documents:

- Abandonment and Decommissioning Plan
- Existing site photos with descriptions
- Emergency Response Plan
- Comprehensive Spill Prevention/Plan (must consider hazardous waste and fuel handling, storage, disposal, spill prevention measures, staff training and emergency contacts)
- Waste Management Plan/Program
- Monitoring and Management Plans (e.g. water quality, air pollution, noise control and wildlife protection etc.)

- If project activities are located within Caribou Protection Areas or Schedule 1 Species at Risk known locations, please provide a Wildlife Mitigation and Monitoring Plan

In addition, for Project Type 9 (Site Cleanup/Remediation), please provide the following additional supporting documents:

- Remediation Plan including cleanup criteria and how the criteria were derived.
- Human Health Risk Assessment of the contaminants at the site.

The relevant documents were previously prepared and submitted for the project. No changes to these documents are anticipated.

