Canadrill-CBCL Joint Venture
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January 28, 2021

PROJECT PROPOSAL

Project Name

Clyde River Small Craft Harbour Geotechnical and Environmental Assessment Sampling Program

Introduction

Canadrill-CBCL Joint Venture (Canadrill-CBCL) has been retained by Public Services and Procurement Canada (PSPC) to design a Fisheries and Oceans Canada (DFO) small craft harbour (SCH) in Clyde River, Nunavut. To support the design, on behalf of DFO-SCH, Canadrill-CBCL proposes to carry out a geotechnical investigation and environmental assessment field program in March 2021 to assess harbour areas of interest in Clyde River.

Project Type

The geotechnical and environmental assessment field program fits the categories of scientific research and ice drilling.

Proponent and Representative Details

Proponent	Fisheries and Oceans Canada – Small Craft Harbours (DFO-SCH)
Proponent Contact	Eleanor McEwan, P.Eng. 501 University Crescent Winnipeg, Manitoba R3T 2N6 Phone: 204-984-1102 Email: eleanor.mcewan@dfo-mpo.gc.ca
Consultant Representative	Canadrill-CBCL
Consultant Contact	Loretta Hardwick, M.Sc. Suite 509, 1565 Carling Avenue Ottawa, Ontario K1Z 8R1 Phone: 343-552-2235 Email: lhardwick@cbcl.ca

Project Location

The sampling program will be carried out in Clyde River, on the shore and ice of Patricia Bay, in the Qikiqtaaluk Region, North Baffin Island. Figure 1 (Attachment 1) provides a map of the proposed geotechnical and environmental assessment drilling locations.

Land Use and Ownership

The field program will be carried out in the Qikiqtaaluk Region, in the North Baffin Planning Region. The land in the location where the field program will be carried out is on the shore and seabed of Patricia Bay. The seabed is federal Crown land under the administration and control of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC). The shore is territorial Crown land under the administration and control of the Nunavut Department of Community and Government Services.

Background

In 2019, DFO-SCH carried out a feasibility study for DFO-SCH in four communities in Nunavut, including Clyde River. To inform the feasibility study, a field program was conducted in 2019 by Advisian on behalf of DFO-SCH and was reviewed by the Nunavut Planning Commission (NPC) for conformity with the North Baffin Regional Land Use Plan (NBRLUP). The 2019 project proposal was determined by the NPC to conform with the NBRLUP (NPC File # 149159).

The field program for the feasibility study was referred to the Nunavut Impact Review Board (NIRB) for screening and a NIRB Screening Decision Report was issued (File No. 19YN031). A permit for the 2019 field program was received from the Nunavut Research Institute and was extended to 2020 (Scientific Research License 02 061 20R-M).

Project Description

The geotechnical investigation and environmental assessment sampling will be carried out using a diamond rotary drill mobilized specifically for this project. Drilling will be conducted onshore and nearshore, working atop the established ice-sheet, as outlined below. Diamond rotary drilling will occur from within a heated shack setup onsite over each borehole location and be capable of performing standard penetration tests and bedrock coring.

The drill and drill shack will be mounted on a skid and dragged to the drill location using a front-end loader, which will also be used to move the drill set-up to and from each borehole location.

It is anticipated that that the program will include nine days of 24-hour diamond drilling nearshore (estimated at 18 boreholes) and onshore (5 boreholes). The purpose of the nearshore boreholes is to properly evaluate the thickness of the ocean bottom sediments, compactness/consistency of overburden, presence of problematic boulders, obtain sediment samples for physical and chemical analysis, and obtain bedrock core (if encountered) within the depth of interest near-shore. Each nearshore borehole will be advanced to 12 to 20 m below the ground surface or 3 m into sound bedrock. The onshore boreholes will be advanced to a depth of 2 m to characterize soil in the active layer (above permafrost) and install monitoring wells in two of the boreholes.

Our ice specialist will be consulted as required to assess ice thicknesses and confirm working procedures are in accordance with best practices and carried out safely at all times while drilling the near-shore borehole locations.

Project Schedule
The geotechnical field program is scheduled to be carried out over approximately 15 days in March/April 2021. The field program is dependent on weather conditions with sufficient ice thickness to support personnel and equipment to drill through the ice in the nearshore area. The field program will comprise 24-hour drilling operations and will be supervised by an engineer on a full-time basis (two shifts for efficiency).

Personnel
The field team for the geotechnical and environmental assessment program will consist of approximately 11 people. The team will consist of personnel from Canadrill and CBCL with local support.

Authorizations
Table 1, below, presents a list of permits and approvals relevant to the proposed field program.

Permit/Licence/Authorization	Regulatory Authority	Status
Scientific Research License 02 061 20R-M	Nunavut Research Institute	Expired December 31, 2020 Request to extend to be submitted
Land Use Review & Conformity Determination 149159	Nunavut Planning Commission	Conformity Determination Received January 22, 2021
Screening Decision (File No. 19YN031)	NIRB	Submitted
Class A Land Use Permit	CIRNAC	Submitted
Land Use Permit	Government of Nunavut	Submitted

Equipment and Materials
The following equipment and materials will be used:

- Coring/Sampling CME 55 Drill Rig on skids
- Drill shack
- Front-end loader
- Diesel generators
- Herman nelson heaters
- Oil-fired coil heaters for waterline
- 200 gallons of diesel fuel
- 250 gallons of gasoline fuel

- Propane
- NewZan Drilling Mud

Water Use

Marine water from Patricia Bay will be used for the drilling. Approximately 6,000 to 10,000 gal/day will be extracted from Patricia Bay at or near the borehole location and will be recycled back to the bay.

Waste Management

No waste is expected to be generated from the drilling. Waste is limited to packaging material, which will be bagged and disposed of at the Clyde River municipal waste disposal facility.

Environmental Impacts, Mitigation and Management

The environmental effects will be the same as those described by Advisian (2019) and screened by the NIRB for the feasibility study. Table 2, below, presents a summary of potential environmental effects and mitigations measures relevant to the 2021 geotechnical field program. Additional detail on the existing environment, potential environmental effects, and environmental mitigation and protection measures are provided in a Regulatory Compliance and Environmental Management Plan developed for this Project. The project-specific terms and conditions outlined in the NIRB's 2019 Screening Decision Report (File No. 19YN031) will be followed for the 2021 geotechnical and environmental assessment field program in Clyde River. In addition, any other terms and conditions of other permits and approvals will also be followed. All on-site personnel will be advised of the regulatory requirements and conditions and will be supervised by the field program lead.

Potential Environmental Effect	**Mitigation Measures**
Terrestrial and marine wildlife may be disturbed and move away from or be attracted to drilling activities. Underwater noise generated by the drilling is not expected to reach levels that are likely to disturb marine mammals and is being carried out when the bay is ice-covered and marine mammals are not expected to be present.	Local field assistants will accompany the geotechnical field program personnel to monitor for disturbance to marine and terrestrial wildlife and their habitat. If marine mammals are observed within 500 m of the drilling location, drilling activities will cease until the marine mammal has left the area. Drilling activities will be carried out in compliance with the *Fisheries Act*.

Potential Environmental Effect	Mitigation Measures
Disruption of fish habitat through direct alteration of the seabed, increased turbidity, or accidental spills. The alteration of the seabed is temporary and limited to the small area occupied by each borehole. A low magnitude increase in suspended sediment will be temporary and limited to the area surrounding each in-water borehole.	The alteration of the seabed is limited to the small area occupied by each borehole. The borehole diameter will be limited to approximately 10 cm. The amount of fuel and drilling additive will be limited to that required to complete the drilling for each day. A non-toxic, biodegradable drilling additive will be used, if required. Secondary containment will be in place under the drill rig motor. A spill response plan and spill response kit adequate to contain the potential volume of fuel in the equipment will be maintained on-site and implemented in the event of a spill.
Fish could be drawn into water intake while pumping water from Patricia Bay.	Although the geotechnical program is in marine waters, DFO's *Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater* will be followed.
Shellfish mortality may occur where sedentary species are in the direct path of the drill head. This is limited to the small area occupied by each borehole.	The drill head will be advanced slowly to allow mobile species to escape.
Disruption of traditional use.	The community will be advised of the field program prior to arrival of the field team. The geotechnical field program will not interfere with traditional use by local people.

Consultation

During the feasibility study, consultation was carried out with the community of Clyde River in November 2018, May 2019, and November 2019. The planned field programs were presented to the community and discussed at each meeting. The specific requirement for the geotechnical program using a drill rig from the ice was first discussed with the community during the November 2019 consultation held by Advisian.

In February 2020, the Department of Fisheries and Oceans - Small Craft Harbours Branch, held a consultation with the community to discuss the development of the Clyde River Small Craft Harbour, including the 'next steps' and tentative schedule. The geotechnical program was discussed with the community as a key requirement to designing the harbour; work was identified

as having to be completed from the ice using a drill rig. Members of the Hamlet Council, Nangmautaq HTA, community QIA representatives, QIA representative, and Guardian program members attended the February 2020 consultation.

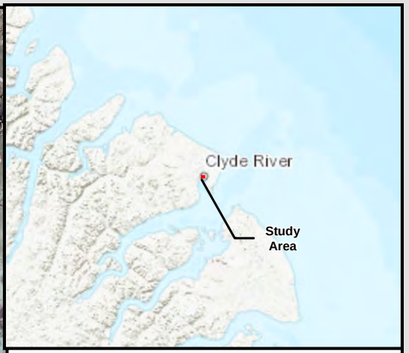
In 2020, members of the Canadrill-CBCL Team travelled to Clyde River, Nunavut, from September 28 to October 2 to participate in meetings and engagement activities with the community of Clyde River for this phase of the project. The objectives of the initial engagement trip to Clyde River were as follows:

- Introduce the Canadrill-CBCL Team to the Hamlet and Nangmautaq Hunters and Trappers Organization (HTO) of Clyde River
- Identify key players and establish a relationship between the Canadrill-CBCL Team and the community
- Present the proposed harbour layout and field programs to the community stakeholders and provide answers to questions
- Better understand the context of the small craft harbour in the community of Clyde River
- Begin the collection of field data and Inuit Qaujimajatuqangit (IQ)

The engagement approaches used during the initial engagement trip to Clyde River included:

- A structured presentation and discussion with the Hamlet, HTO, Qikiqtani Inuit Association members
- A meeting with knowledge holders to gather information on IQ
- Ad hoc conversations with people from Clyde River

The next community consultation is planned for February 2021 and will provide details of the March/April 2021 geotechnical and environmental assessment field program to the community of Clyde River.



LEGEND

- Proposed Phase III Upland Borehole Locations (Tentative)
- Geotechnical Boreholes
- Preferred Layout

CBCL

CLYDE RIVER SMALL CRAFT HARBOUR DEVELOPMENT

Figure 1: Proposed Geotechnical & Phase III Environmental Site Assessment Borehole Locations

Drawn: SF	**Date: 2021-01-27**
Checked: LH	**CBCL Project Number: 200235.00**
Approved:	**Scale @ 11"x17"** 1:1,300

NOTES:

0 12.5 25 50 m

Coordinate System: NAD 1983 UTM Zone 20N
Units: Meter

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