Our file: NTY71050

June 24, 2003

Mr. Phillip di Pizzo
Executive Director
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

Re: Draining of Pond, Hamlet of Arviat,

Dear Sir,

Jacques Whitford Environment Limited (Jacques Whitford) was requested to assist the Hamlet of Arviat (Figure 1) in acquiring approval from the Nunavut Water Board (NWB) to drain a pond within the municipal boundaries. The pond would be drained to facilitate residential land development. Our task involved determining if the pond currently supports overwintering fish (and, therefore, fish habitat) and identifying a method to drain the pond that would not result in any negative effects to receiving waters. This letter is to inform you of the results of our investigation and to make recommendations regarding pond drainage.

Methodology

Nick Lawson of Jacques Whitford, with the assistance of Ron Suluk of the Hamlet of Arviat conducted the on-site investigation during May 29-30, 2003. The investigation focussed on determining if fish habitat was present in the subject pond and to confirm a viable and environmentally acceptable method for draining the pond. The following activities were undertaken to achieve these objectives.

On May 29, three minnow traps (two of which contained bait) were set in the subject pond (Pond A- Figure 2). The traps were checked at least 24 hours later on May 30, 2003. Additionally, approximately 40 depth measurements were taken throughout the pond. Observations of substrate material, shoreline condition and the extent of ice were also made during the depth survey. Following the depth survey, area maps (i.e., NTS 1:50,000 scale maps and community maps) were reviewed and further inspection was undertaken to identify inflows and outflows to the subject pond and receiving waters. The local Sustainable Development Officer was consulted about the potential for fish habitat in the subject pond and receiving water bodies.

Finally, a review of the drainage location proposed by the Hamlet was undertaken involving an inspection of proposed routing, receiving water bodies and surface elevations.

Results

The minnow traps were pulled on May 30 after approximately 24 hours in the water and found to be empty.

The depth survey indicated an average pond depth of approximately 0.27m with the maximum depth recorded at 0.5m. Ice was observed frozen to the bottom of the pond in several locations, demonstrating that the water in the pond freezes to the bottom during winter. Joe Saviktaaq Sr., Sustainable Development Officer in Arviat, confirmed that lakes in the area typically freeze to depths of 2m during winter and that the subject pond and receiving waters have not been known to ever contain fish. In addition, there is no evidence that the pond is used seasonally by fish that may migrate from streams or other connected water bodies.

Water enters the pond through a combination of municipal drainage and snowmelt. The Hamlet dumps snow collected during the winter on the pond. Four culverts drain into the north and northwest sections of the pond. Three of the four culverts were dry at the time of the site visit.

Local topography in Arviat is generally very flat with drainage routes not always evident. It appears that, at certain water levels, the subject pond would drain to the south through a drainage ditch and overland to another pond (Pond C- Figure 2) to the south. Water exits this pond through two culverts under the newly constructed “Tank Farm” road. The receiving waters are approximately 3 m lower than the exit of the culvert. Water then flows east through culverts under the “Dump road” where it enters another pond. Distinct drainage from this pond to any other water bodies could not be identified during the site visit. Review of an air photograph of the community taken in late July 1992 illustrated that this final receiving water body had largely dried and that the water level in the subject pond decreased below the level observed during the site visit.

A second possible drainage route was also investigated. A small pond (Pond D) to the southwest and across the road from the subject pond drains through a series of channels to several other small ponds to the east. Distinct drainage from these ponds to any other water bodies could not be identified during the site visit.

The lack of fish captured in the minnow traps, shallow depth, presence of direct evidence of the pond freezing to the bottom and the lack of any connection to fish bearing water suggests that the pond in question does not sustain a permanent fish population. There is no evidence that the pond is used seasonally by migrating fish. While the investigation of downstream receiving waters was not as substantial, evidence collected during the site visit also suggests that these waters are not fish bearing.

Pond Drainage

The Hamlet of Arviat proposes to drain the subject pond during the summer of 2003. By this time water levels in the pond, source and receiving waters will likely have receded below levels observed during the site visit. While fish bearing waters were not identified in either the subject pond or receiving waters, drainage should be undertaken to minimize any potential negative effects on receiving waters. As such the suspension and transport of sediment during the pond drainage should be minimized. It is expected that pond drainage will be achieved through mechanical pumping. Several options are available to the Hamlet to drain the subject pond. For all options it is assumed that the pump intake would be located in the southernmost extremity of the subject pond (Pond B) where water depths are the greatest.

Option A

This option would involve pumping the pond water to the two culverts under "Tank Farm" road (Option A- Figure 2). A temporary berm would be constructed at the outlet of Pond C to prevent it from draining or backing up during the pumping operation. A settling pond would be excavated upstream of the culverts and water would be pumped from the Pond B to this settling pond. Sediment would settle in the settling pond and water would proceed through the culverts and drain into the downstream receiving water bodies. For additional sediment control it is recommended that a silt fence be installed across the intake of the culverts to capture any remaining sediment in the water. This option would require water to be pumped a distance of approximately 400 metres.

Option B

This option (Option B- Figure 2) would involve pumping the water across the road (or under through a culvert) to the southeast to a small pond (Pond D) where sediment could settle before the water flows down-gradient through several channels before dissipating over a wet marshy area. For further sediment control, silt fences could be installed at the outlet of Pond D. This option would require water to be pumped a distance of approximately 200 metres.

Option C

Under this option (Option C- Figure 1) water would be pumped across the road (or under through a culvert)and released in the wet marshy area east of the road. Vegetation would trap sediment and water would flow overland to lower elevations. The discharge point would have to be moved regularly and a "dissipater" should be attached at the end of the discharge line to prevent erosion. This option would result in the shortest distance to pump water.

Closure

This letter is intended to provide the information required by the NWB to support the Hamlet of Arviat's request for approval to drain the pond and to provide direction to the Hamlet to minimize the potential environmental effects of pond drainage. While beyond the scope of the current project, the Hamlet will need to ensure future subdivision design accommodates the ouflows of the four culverts currently draining into the subject pond. Accordingly, we believe it

would be beneficial for the Hamlet to prepare a surface water drainage plan for this area and any other areas of the community negatively impacted by poor drainage.

Please do not hesitate to contact the undersigned should you have any questions about the above report or wish to discuss this matter further.

Yours truly,

JACQUES WHITFORD ENVIRONMENT LIMITED

Nick Lawson, B.Sc.
Manager, NWT and Nunavut Operations

Attachment

c. Grant Scott, A/SAO, Hamlet of Arviat
Brian Purdy, Municipal Planning Engineer, CG&T, Government of Nunavut, Rankin Inlet