Aboriginal Affairs and Northern Development Canada | Affaires autochtones et Développement du Nord Canada

November 4, 2014

Baffinland Iron Mines Corporation
2275 Upper Middle Road East
Oakville, ON
Canada L6H 0C3

Re: Surface Water Drainage to Camp Lake
Mary River Project – Water Licence No. 2AM-MRY1325

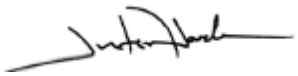
Dear Mr Millard:

This letter is to address Baffinland Iron Mines Corporation's (BIMC) *Preliminary Plan*, submitted September 8, 2014, regarding the sediment loading of surface drainage into Camp Lake near MS-MRY-1a. This plan was developed due to concerns on-site which were documented in the Aboriginal Affairs and Northern Development Canada's (AANDC) Water Licence Inspection June 17-19, 2014. The *Preliminary Plan* outlined that a final design plan would be submitted to the Water Resources Inspector on or before October 31st 2014 to provide further details related to drainage diversions, the use of flocculants, and the construction of settling ponds.

AANDC recognizes that BIMC has submitted the required plan entitled, *Surface Water Drainage to Camp Lake Near Freshwater Intake – Sedimentation Control Plan* (see Appendix A) on October 30, 2014. Implementation of the new plan will be monitored by AANDC Water Resource Officers.

Sincerely,

Justin Hack



Justin Hack
Water Resource Officer
Aboriginal Affairs and Northern Development Canada

cc. Erik Allain, Manager, Field Operations, AANDC Iqaluit
Robert Savard, Water Resource Officer, AANDC Iqaluit
James Neary, Environmental Assessment, AANDC Iqaluit
Phyllis Beaulieu, NWB
Stephen Bathory, QIA

APPENDIX A

- Preliminary Plan - September 8, 2014
- Final Design Plan, *Surface Water Drainage to Camp Lake Near Freshwater Intake – Sedimentation Control Plan* - October 30, 2014

Baffinland

September 8, 2014

Resource Management Officer
Nunavut Field Operations
Aboriginal Affairs and Northern Development Canada
PO Box 219
Box 100
Iqaluit, NU X0A 0H0
Robert.Savard@aandc-aancd.cg.ca

Re: Surface Water Drainage to Camp Lake – Prelimanary Plan
Mary River Project – Water License No. 2AM-MRY1325

During the compliance inspection which was conducted on June 17-19, 2014 by Aboriginal Affairs and Northern Development Canada (AANDC) Water Resource officers, some concerns were identified pertaining to the sediment loading of surface drainage into Camp Lake near MS-MRY-1a. In the response letter from Baffinland dated July 4th, 2014, Baffinland commited to providing a technical memo to the inspector which outlined conceptual options for improvements to the drainage by September 1st, 2014. This date was subsequently extended to September 8, 2014 by the inspector on August 29th, 2014 as certain details of the of the conceptual plan were still not availible due to present conditions on site. The following outlines the the progess made thus far pertaining to options being examined as well as the proposed milestones moving forward.

1.) Construction of Settling Ponds

At present, one of the options being looked at is the creation of successive settiling ponds within the drainage in order to decrease the flow velocity and in turn allow for the suspended sedimients to settle out in the ponds. One of the constraints to this approach is that the gradiant of the drainage is quite steep and in turn create concerns pertaining to the staiblitly of the embankment. Also, at present we are not able to conduct any preliminary geotechnical ground testing due to flows in the channel and the risk of sedimentation into the lake as a result of the testing. A potential location for the ponds has been identified at the toe of the slope adjacent to the shore of the lake as the graident would likely be suitable to ensure pond and embankment stability (Figure 1). Once frozen conditions are present, preliminary ground testing will be conducted to acertain soil type as well as permafrost/ground ice conditions and a final design will be developed and submitted to the inspector on or before October 31st, 2014 with constuction being completed on or before May 15th, 2015 should this option prove viable.

2.) Use of Flocculants

Another option being examined is the use of flocculants to aid in increasing the rate of sediment precipitation from the water once it reaches the settiling ponds. This will likely be achevied through the placement of flocculant blocks into the channel upstream from the settling ponds, however the exact details are not currently availible as there is some investigation required into the sediment loading of the runoff in order to acertain an effective approach to this type of treatment. Further details on the use of flocculants will be provided in the final design plan to be submitted to the inspector on or before October 31st, 2014.

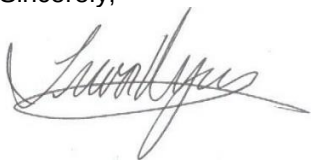
Baffinland

3.) Upstream Drainage Diversions

As was noted in the in the inspector's report from the June 17-19 inspection, the increased water drainage to the area was postulated to be caused from infrastructure work done adjacent to and on the runway. As a result of the runway upgrades, ponding of water has now been identified proximal to the toe of the runway alignment to support this theory. There is already a plan in place and a design produced to redirect the drainage southward and around the Weatherhaven camp to prevent the aforementioned ponding. This will in turn reduce the amount of melt runoff that will flow through the yard of the camp and down the drainage near Camp Lake. Furthermore, the increased silt load in the runoff is a result of the increased traffic passing through the yard and which must drive through the swale through which the runoff flows. Plans are in place to look at the various options for moving the location of the swale to an area that will not be driven through and to recontour the present location of the swale such that vehicle traffic is not required to drive through the runoff and in turn reduce the sediment loading of the runoff. Further details on the drainge diversions will be provided in the final design plan to be submitted to the inspector on or before October 31st, 2014.

Should you require further information on the above, please feel free to contact the undersigned at (647) 253-0596 Ext. 6010 or Jim Millard at (902) 403-1337.

Sincerely,



Trevor Myers, B.A.(Hon.), M.Sc.
Environmental Superintendent

cc. Jim Millard, Allan Knight, Oliver Curran, Erik Madsen, Baffinland.
Justin Hack, AANDC

Figure 1 – Potential Loaction of Settiling Ponds

Baffinland

October 30, 2014

Resource Management Officer
Nunavut Field Operations
Aboriginal Affairs and Northern Development Canada
PO Box 219
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Iqaluit, NU X0A 0H0
Robert.Savard@aandc-aancd.cg.ca

Re: Surface Water Drainage to Camp Lake Near Freshwater Intake – Sedimentation Control Plan
Mary River Project – Water License No. 2AM-MRY1325

Background

During the compliance inspection which was conducted on June 17-19, 2014 by Aboriginal Affairs and Northern Development Canada (AANDC) Water Resource officers, some concerns were identified pertaining to the sediment loading of surface drainage into Camp Lake near MS-MRY-1a. Flows through the drainage originate from, and flow through, the Weatherhaven Camp and surrounding area. The following outlines Baffinland's plan for the implimentation of sediment controls measures for the aforementioned drainage and surface runoff.

Local Environment and Design Considerations

The drainage area in question has an approximate size of roughly 8 hectares and is comprised mainly of hard packed and often frozen sand and gravels with scant vegetation. The area is relatively flat, with an approximate gradient differential of only 1.5 m over the majority of the area. Flows draining from this area occur via a single channel at the north end of the camp. The channel is roughly 200 meters long with an approximate 13% grade. The ground adjacent to the drainage channel has been determined to be ice rich, with visible ice wedge features throughout. In consideration of the sensitivity of the ice rich soils, it was determined that the construction activities would avoid these areas. Therefore, sediment control structures were located at the toe of the embankment, adjacent to Camp Lake, where the ground conditions are stable and where there would be minimal disturbance of the channel itself (Figure 1). The main design consideration for sediment control structures was to minimize the discharge of sediments in general to Camp Lake. It is acknowledged that the sediment control structures as designed will reduce but not eliminate the discharge of sediments to Camp Lake, especially during extremely high flow events.

Methodologies

The design basis for the drainage discharge modeling was undertaken using both the Rational Equation Method (REM) as well as the Technical Realease 55 (TR-55) model. The REM is the simplest method to determine peak discharge for drainage basin runoff. It is not as sophisticated as the TR-55 method and the REM runoff coefficient is a function of soil type and gradiant. The TR-55 model is more complex and presents a methodical and reliable approach to predicting peak discharge due to a 24-hr storm event. Peak flow rates and the associated resulting residency times (based on planned pond sizes) from a range of precipitation intensities are presented below in Table 1. The combined pond volumes for the purpose of this desgn is 30 m^3.

Table 1 – Flow Rates and Residency Times

Model	Assumed 24 Hour Rainfall Events (mm/day)	Peak Flow Rate (L/sec)	Residency Time (minutes)
REM	30	22	23
REM	50	37	14
REM	80	59	8
TR-55	30	10	50
TR-55	50	30	16
TR-55	80	70	7

Construction of Settling Ponds

Sediment control of the surface water drainage to Camp Lake will be controlled by means of the of two successive settiling ponds at the base of the drainage that will be constructed by means of a mechanical excavator. The ponds will decrease the flow velocity and in turn provide additional time to allow for the settling out of suspended sedimients prior to the runoff entering Camp Lake (refer to Figure 2). The upstream and downstream settling ponds will have an approximate capacity of 18 cubic metres and 12 cubic metres, respectively. The pond banks and the spillway which connects the two ponds, as well as the outflow location of the ponds will be constructed using course rock material and will be lined with geotextile to reduce the posibility of erosion during high intensity flows. The ponds will be periodically monitored and deposited sediment excavated as required to maintain pond capacity and run-off retention times.

Constuction of the settling ponds is scheduled to be completed prior to freshet 2015 or when subsurface conditions allow. A silt curtain will be installed at the outlet to the new drainage discharge and will be maintained during the 2015 open water season to control any residual sediments from construction or from very high flow rainfall/snowmelt events.

Monitoring

Once contruction of the ponds is completed, folllow-up monitoring will be condcuted to assess the effectivelness of sediment control structures on water quality discharge as well as to assess the condition of the structures themselves for possible problems. The monitoring will be undertaken throughout the 2015 freshet and open water season. Monitoring will include periodic flow measurments as well as periodic turbidity measurments in order to ascertain actual flow volumes and sedmient loading caused by the runoff throughout the season. As previously mentioned, at the onset of the open water season, a silt curtain will be placed in the lake at the outflow location from the ponds as a precautionary measure until such a time that the monitoring has deemed the ponds to be effective in reducing the sediment loading to acceptable levels under a wide range of runoff events and flow conditions.

Use of Flocculants

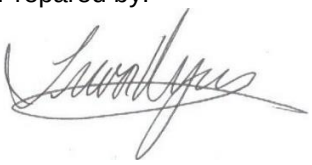
Another option for sediment control which was examined is the use of flocculants to aid in increasing the rate of sediment deposition in the settiling ponds. This process can typically require up to 24 hours to be effective depending on the type flocculant used, the dosage, the pH , the quality of the mixing, and the ability to minimize disturbance within the settling pond. At this time, flocculants are not being considered, however, their potential use will be re-examined should the planned sediment control structures prove inadequate.

Upstream Drainage Diversion

The increased sediment loading of the runoff is in part a result of the high volume of vehicle traffic passing through the yard area of the Weatherhaven Camp. Various options for moving the location of the swale were examined to reduce vehicle interaction with the swale water and impacting its quality. At this time, no fesible solution was identified. It was determined that the main source of the increased traffic flows was a result of the maintenance and site services faciliies being located in area. Prior to the 2015 Freshet, the Maintenance and Site Services facilities are scheduled to be transitioned to the new camp area at the MSC. Once this transition has occurred, it will greatly reduce the amount of vehicle traffic through the yard at the Weatherhaven Camp and hence, through the the swale. This in turn will reduce the sediment loading for future runoff events.

Should you require further information on the above, please feel free to contact the undersigned at (647) 253-0596 Ext. 6010 or Jim Millard at (902) 403-1337.

Prepared by:



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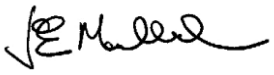
Environmental Superintendent

Reviewed by:



James Millard, M.Sc, P.Geol.
Environmental Manager

cc. Jim Millard, Allan Knight, Oliver Curran, Erik Madsen, Baffinland.
Justin Hack, AANDC

Figure 1 – Location of Settiling Ponds

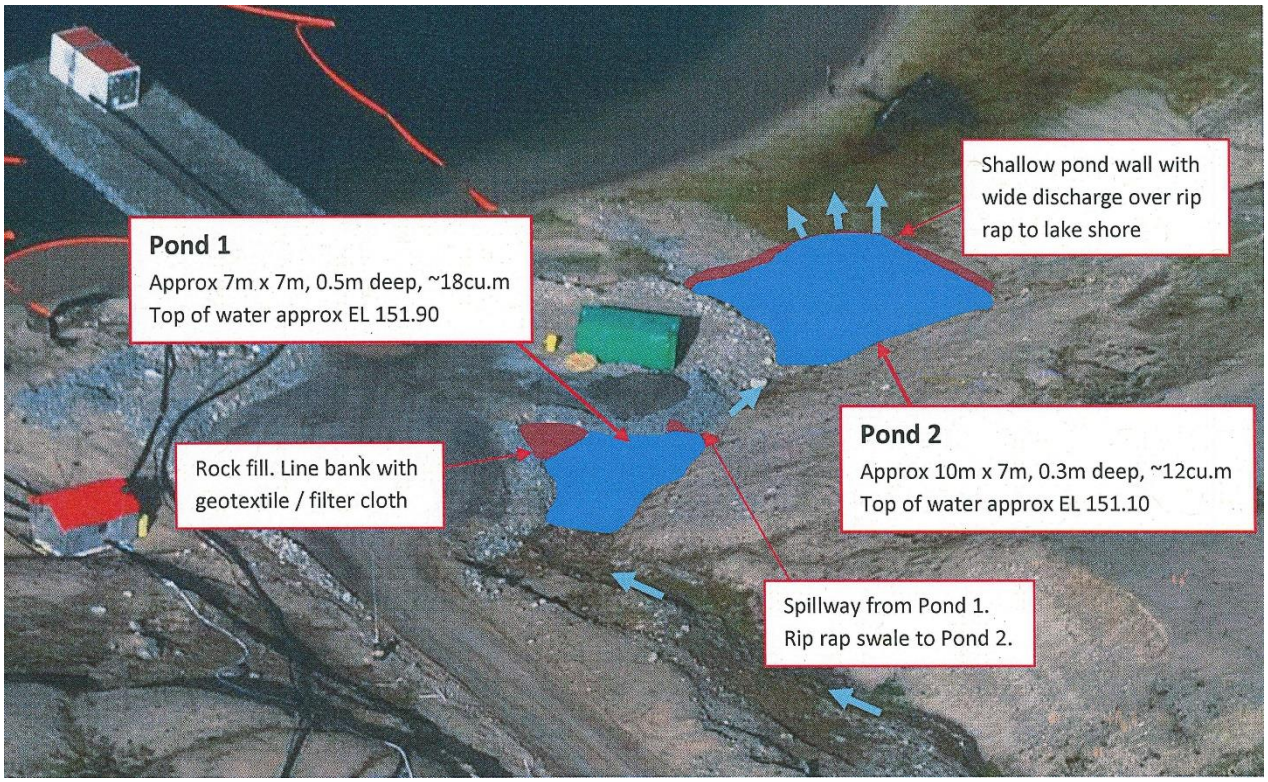


Figure 2 –Settiling Pond Design