



## **Point Lake Dewatering Plan Version 2.1, December 2021**

### **1. Introduction**

As per Part E, Item 1 of Water Licence W2020L2-0004 (Conditions Applying to Dewatering and Drawdown), Arctic Canadian Diamond Company Ltd. (Arctic) is submitting this Dewatering Plan for Point Lake prior to the commencement of Dewatering for approval by the Wek'èezhii Land and Water Board (WLWB).

Arctic is proposing to develop the Point Lake open pit located approximately 2 km northeast of the existing Misery Pit and Camp location. The project will use the existing infrastructure at Misery Camp and kimberlite will be processed in the Process Plant located at the Main Ekati Camp. Concurrent with submission of this Plan, Arctic has submitted applications for a Water Licence Amendment and two new Land Use Permits to enable development of the Point Lake open pit (the "Project"). Dewatering of Point Lake is a critical path activity that is required to be completed during summer 2022 to make the Project viable. To reduce schedule risk, Arctic has requested that this Plan be approved as part of the Water Licence Amendment process rather than as a subsequent condition of the amended Water Licence.

In advance of the development of the Point Lake open pit, Point Lake will be fished out and Dewatered. A Point Lake Fish-Out Plan is required to be separately approved by Fisheries and Oceans Canada prior to the scheduled Dewatering and fish-out in summer 2022. Arctic's application to Fisheries and Oceans Canada will schedule the fish-out concurrent with Stage 1 Dewatering.

Arctic engaged professional advice to evaluate Dewatering configurations and to assist with Dewatering design. Since the development of Version 1.0 of this Plan in May 2021, Arctic has advanced its planning and Version 2.1 reflects Arctic's commitments up to and including the WLWB Public Hearing (November 23 to 26, 2021). The design takes into consideration water volume, pipe and pump sizes, pumping locations, flow rates, and potential erosion and mitigation measures. The amount of water to be displaced from the lake and the short period of time to complete this were the main considerations for selection of the system. The Project Water Licence Amendment application addresses potential surface water quality and hydrology effects in the natural environment, finding that this Dewatering plan can be conducted without adverse negative effects on the natural environment.

This Plan also addresses the potential need for directing a minor quantity (approximately 3%) of Dewatering outflow to Connor Lake if required through the Point Lake Project *Fisheries Act* Authorization. Connor Lake receives flow input from Point Lake as well as its own catchment area. Connor Lake outflow is dominantly to Lac du Sauvage with a minor outflow to Alexia Lake. The Dewatering outflow introduced to Connor Lake would be within natural lake levels and flow experience in the Connor Lake outflow.

This Dewatering Plan for Point Lake is based on the success of previous lake Dewatering programs at the Ekati Diamond Mine and will be conducted as approved by the WLWB.

Table 1 summarizes the changes to this version of the Dewatering Plan.



**Table 1. Changes to Version 2.1**

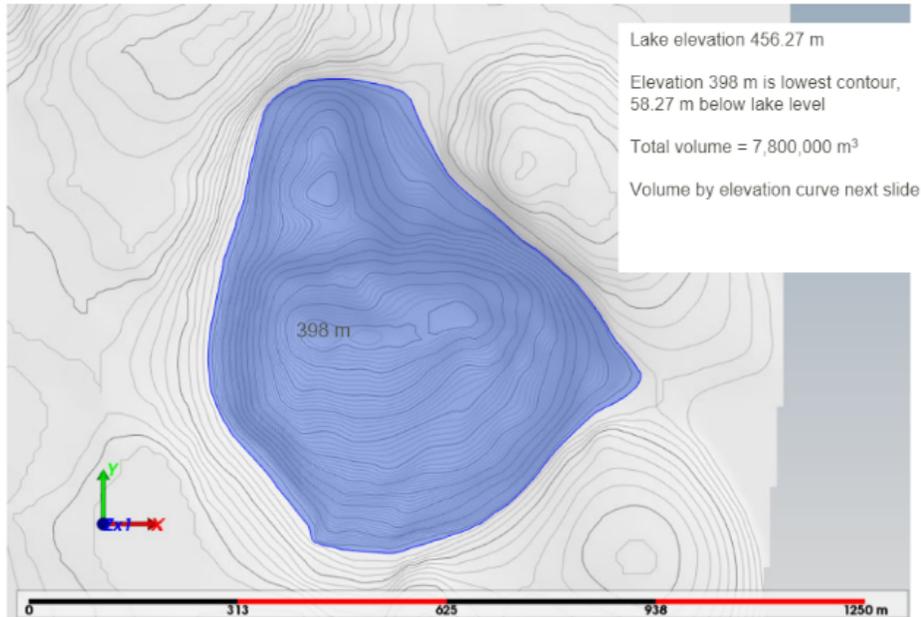
<b>Location</b>	<b>Update to Point Lake Dewatering Plan v. 2.1</b>
Section 1	Introduction updated with statement that v. 2.1 reflects Arctic commitments made during Public Hearing for Point Lake Project
Section 1	Added statement that v. 2.1 addresses potential need for Dewatering outflow to Connor Lake
Section 2(a)	Updated with estimated Stage 1 Dewatering outflow which may be directed to Connor Lake
Section 2(b)	Added short statement to reflect potential need for outflow to Connor Lake, and updated Figure 2
Section 2(b)	Removed mention of alternative pipeline routes around the Misery site to Lynx open pit
Section 2(b)	Added anticipated flow rate from Point Lake to Connor Lake of up to 100 m <sup>3</sup> /hr if pumping required
Section 2(b)	Updated timing for removal of pumps and barges following Dewatering
Section 2(c)	Added statement that Dewatering outflow will be directed to Connor Lake or Connor Lake outflow channel if and as required through <i>Fisheries Act</i> Authorization, and updated Figure 3
Section 2(d)	Added information on erosion mitigation and monitoring for Dewatering outflow to Connor Lake if pumping required
Section 2(f)	Added statement and rationale that no hydrological or water quality effects to Connor Lake, Connor Lake outflow, or Lac du Sauvage are predicted if pumping to Connor Lake is required
Section 2(g)	Updated location of SNP station for Stage 1 pumping, per Arctic commitment
Section 2(g)	Information added on water quality effects and monitoring for Stage 1 Dewatering per Arctic commitment
Section 2(i)	Added description of anticipated pipeline from Point Lake to Connor Lake if pumping required.
Section 2(i)	Updated to state that information on pipeline covering to facilitate caribou passage will be found in the Point Lake Project WEMP addendum

## 2. Water Licence Requirements for the Dewatering Plan

The specific requirements for a Dewatering Plan as listed in Schedule 4, Item 1 of Water Licence W2020L2-0004 are addressed as follows:

### a) Volume of water produced by Dewatering:

The total volume of Point Lake is estimated at 7,800,000 m<sup>3</sup> with a maximum depth of 58 m based on bathymetric data collected in 2019 (Figure 1). The estimated volume of water to be pumped to Lac de Sauvage in Stage 1 is 5,850,000 m<sup>3</sup> and the estimated volume of water to be pumped to King Pond Settling Facility (KPSF) and Lynx open pit in Stage 2 is 1,950,000 m<sup>3</sup>. Some water may be pumped from KPSF to Lynx open pit during the Dewatering period per established procedures.



**Figure 1. Point Lake Bathymetry**

An estimated maximum of 200,000 m<sup>3</sup> of Stage 1 Dewatering outflow may be directed to Connor Lake if required through the Point Lake Project *Fisheries Act* Authorization. This expectation is based on site-specific baseline hydrology data and the actual quantity will be determined through the *Fisheries Act* Authorization.

**b) A schedule for Dewatering and maximum pump rates:**

Dewatering of Point Lake is a critical path Project activity that is scheduled for summer 2022.

The schedule plans to remove the water from Point Lake after 2022 spring freshet. The pumps and barges are planned to be placed on the lake ice prior to freshet. Pumping is expected to begin mid-June and will be conducted in two stages. Stage 1 will continue until the threshold for total suspended solids (TSS) in the pumped water is reached (anticipated to be approximately 80 days, see Section 3 below). This is anticipated to represent approximately the upper 40 m of the lake. During Stage 1 pumping, water will be pumped to Lac du Sauvage, with a minor volume potentially directed to Connor Lake if required through the Point Lake Project *Fisheries Act* Authorization. Stage 2 will be the pumping of the lower portion of Point Lake to KPSF and Lynx open pit. Stage 2 pumping will proceed until the lake is Dewatered (anticipated to be approximately an additional 30 days). Water may be pumped from KPSF to Lynx open pit during the Dewatering period for operational reasons. The pipeline routes are illustrated on Figure 2.

The approach to Dewatering consists of barge-mounted pumps anchored over the deepest part of the lake. The barge-based pumps will pump from the lake to the pumping destination (i.e., Lac du Sauvage, Lynx open pit or KPSF) It is likely that four barge-mounted pumps will be used, 3 in operation and one spare. The total pumping rate is estimated to average approximately 3,000 m<sup>3</sup>/hour with a maximum of 3,500 m<sup>3</sup>/hr. These pumping rates apply to both Stage 1 and Stage 2. The flow rate to Connor Lake, if required, will vary to meet fisheries needs up to an estimated maximum flow rate in the order of 100 m<sup>3</sup>/hr.

Dewatering is scheduled to be complete by September 30, 2022.

The pipelines along the Point Lake access road and the Lac du Sauvage Road (formerly Jay Road) will be removed at the completion of Dewatering, prioritizing retrieval of the pipeline east of Point Lake as soon as reasonably achievable after completion of Stage 1 pumping. The lake pumps and barge will be removed at the completion of Dewatering if access can be safely achieved; otherwise the in-lake equipment will be removed once mining has reached a level that enables safe and efficient retrieval.



**Figure 2. Pipeline Routes**

**c) Pumping methods including locations of intake and outflow structures:**

The pumping and pipeline configuration, including intake locations, is described in item b above.

All pumps will be powered by an onsite diesel generator, which will be a portable power plant housed in a trailer with a double walled on-board fuel tank. The area will be visually inspected during refueling operations. Fuel will be trucked to the site from Misery using the existing fuel truck fleet.

Barge-mounted pumps will be equipped with appropriately sized fish screens as required in the Water Licence.

Stage 1 pumping outflow to Lac du Sauvage will occur near the northeast extent of the Lac du Sauvage Road as illustrated on Figure 3. The final outflow location will be authorized by the Inspector prior to use. This location offers good accessibility for pipeline installation and monitoring without additional road construction and a near shore boulder zone that will reduce erosion risk (see item d below).

Dewatering outflow directed to Connor Lake, if required, will flow into Connor Lake or into the Connor Lake outflow channel as required through the *Fisheries Act* Authorization.



**Figure 3. Stage 1 Outflow Area**

**d) The design of any erosion prevention structures in the areas where water or Waste is Discharged:**

Erosion prevention for the Stage 1 pump outflow at Lac du Sauvage includes selection of a natural boulder zone to the extent practicable and accessible, with enhancement through placement of additional armour rock and/or other protective materials to the satisfaction of the Inspector. Non-natural materials would be removed following completion of the Dewatering program. The volume of additional armour rock that may be placed at the outflow location is estimated at approximately 20 m<sup>3</sup> and will not exceed 50 m<sup>3</sup>.

Daily monitoring of the Stage 1 outflow location at Lac du Sauvage will be undertaken. If monitoring identifies erosion requiring mitigation (see item e below), potential end of pipe structures to reduce velocities, disperse flow, and mitigate erosion may include building an end of pipe riprap pad or the adjustment of boulders to allow for appropriate flow. Additional measures may include adjusting the flow rate to decrease potential erosion or relocating the outflow location. Alternately, flow could be switched to KPSF or Lynx open pit to avoid erosion at the Lac du Sauvage outflow location. The need for mitigation will be determined based on the monitoring and inspection program.



Dewatering outflow to Connor Lake, if required, will be within natural flow limits and located to avoid risk of erosion such that no erosion prevention structures are anticipated. Daily monitoring of the outflow location will be undertaken. If monitoring identifies erosion requiring mitigation (see item e below), a concrete flow block or similar structure may be temporarily placed in accordance with Inspector authorization.

No erosion protection structures are required for the Stage 2 Dewatering to KPSF and Lynx open pit beyond those desired by Arctic for good operational implementation. KPSF is an authorized mine water management facility with monitoring and control on releases regulated through the Water Licence. Lynx open pit is a secure storage location for settlement of suspended solids.

**e) The description of procedures for inspecting any erosion along the affected watercourse:**

For all stages of Dewatering, operations personnel will perform daily visual inspections of the active Dewatering pipeline and the active outflow location to identify significant or unexpected erosional issues. Observations of erosion will trigger mitigative work where necessary as described in item d above.

**f) A description of, and mitigation measures for, any predicted hydrological or water quality impacts to downstream water bodies:**

There are no predicted hydrological impacts to Lac du Sauvage as a result of Stage 1 Dewatering. Previous analyses of Lac du Sauvage conducted for the 2016 Jay Project Environmental Assessment demonstrate that the volumes and inflow rates of water pumped from Point Lake are less than those assessed for the Jay Project and do not represent a Project risk. Specifically, the assessed Dewatering inflow to Lac du Sauvage for the Jay Project was 14.8 Mm<sup>3</sup> over six months duration at an average flow rate of 6,500 m<sup>3</sup>/hr at a similar location, which is approximately twice the volume and flow rate over a similar timeframe and at a similar inflow location as the Point Lake Project.

There are no predicted water quality effects to Lac du Sauvage as a result of Stage 1 Dewatering. Both lakes are representative of pristine local waters and outflow from Point Lake naturally flows to Lac du Sauvage. The volume of water to be pumped from Point Lake into Lac du Sauvage during Dewatering is a small percentage (1%) of the volume of water in Lac du Sauvage (estimated 575 Mm<sup>3</sup>).

There are no predicted hydrological or water quality effects to Connor Lake, Connor Lake outflow, or Lac du Sauvage as a result of pumping, if required through the *Fisheries Act* Authorization, a portion of Stage 1 Dewatering outflow to Connor Lake. The Dewatering outflow introduced to Connor Lake would be within natural lake levels and flow experience in the Connor Lake outflow channel such that there is negligible risk of erosion. If required, erosion prevention would be implemented as described in item d. Point Lake outflow water naturally flows to Lac du Sauvage through Connor Lake such that there is no risk to water quality.

Water quality and water levels in KPSF are actively monitored and managed through routine operating procedures. Water chemistry within KPSF will be improved by the inflow of Point Lake water and pond water levels will be maintained within acceptable elevations through pumping to Lynx pit (per existing procedures). Adequate capacity is present in Lynx pit to

contain water pumped from Point Lake and KPSF during Dewatering of Point Lake. Water level monitoring in Lynx pit is conducted on an operational basis and is not a requirement of the Dewatering plan.

**g) The schedule and locations for water quality monitoring:**

During the Stage 1 pumping program (anticipated to be approximately 90 days), water quality samples will be collected and analysed consistent with Surveillance Network Program (SNP) Part A.1. Grab samples of the Dewatering outflow to Lac du Sauvage will be collected daily for analysis of pH, TSS, and turbidity. The SNP location will be at the end-of-pipe Discharge point into Lac du Sauvage. Additionally, grab samples of the Dewatering outflow to Lac du Sauvage will be collected at the SNP location once prior to commencement of Dewatering and once on the final day of Dewatering for analysis of TSS, total ammonia as nitrogen, major ions, physical parameters, and total metals. All water quality data will be reported to the WLWB in the Dewatering Summary Report, which will be provided within 60 days following completion of Dewatering per Water Licence condition E.7.

There are no predicted water quality effects to Lac du Sauvage as a result of Stage 1 Dewatering. Both lakes are representative of pristine local waters and outflow from Point Lake naturally flows to Lac du Sauvage. However, Arctic will conduct field turbidity monitoring in Lac du Sauvage within proximity of the point of Discharge on a weekly basis during Discharge with additional samples collected once a month for confirmatory TSS laboratory analysis. In addition, should the weekly turbidity measurement reach 9.57 NTU in Lac du Sauvage, the frequency of TSS sample collection would be increased to weekly. A turbidity of 9.57 NTU is equivalent to a TSS concentration of 15 mg and is an appropriate trigger threshold at which to increase sample collection frequency for confirmatory TSS laboratory analysis in Lac du Sauvage. The relationship between turbidity and TSS concentration was established during baseline monitoring and data analyses for the Jay Project.

Water quality monitoring is not required under this Plan related to directing, if necessary, a portion of Stage 1 Dewatering outflow to Connor Lake. This is a minor component of the pumped Point Lake water that will be sampled at the prescribed SNP sampling location at the outflow to lac du Sauvage.

Water quality is measured in KPSF as part of the routine requirements of the Water Licence and as part of the SNP. Monitoring of water quality in the Receiving Environment downstream of KPSF (Cujo Lake) is measured as part of the Aquatic Effects Monitoring Program. The results of these programs are reported to the WLWB monthly (SNP) and annually (AEMP/Water Licence Annual Report). No additional monitoring is required in King Pond.

Water quality in Lynx pit is monitored on an operational basis and is not a requirement of the Dewatering Plan.

**h) The frequency, location, and procedures for monitoring flow rates in the Discharge stream and where appropriate, in the receiving water body:**

Flow rates and total volumetric flows will be monitored daily by way of flow meters in the pipelines. Flow rates and total volumes will be reported to the WLWB in the Dewatering Report. Flow rates from KPSF to Lynx pit are monitored on an operational basis and not a requirement of the Dewatering Plan. Monitoring within Lac du Sauvage is not required.



**i) The design of the pipeline and related facilities;**

HDPE pipe with a planned diameter of 30" will be used for both Stage 1 and Stage 2 Dewatering to Lac du Sauvage and KPSF/Lynx Open Pit. These pipelines will be placed on existing roads and covered with crushed rock at prescribed intervals to facilitate caribou passage over the pipelines and to prevent movement during Dewatering periods. Prescriptions for pipeline covering to facilitate caribou passage are specified in the Point Lake Project Addendum to the Wildlife Effects Monitoring Plan.

The pipeline from Point Lake to Connor Lake will be 8" in diameter or similar and will be retrieved at the completion of pumping.

Pipeline routes are described in item b above.

**j) The procedures and rates for Dewatering to minimize erosion of the downstream water bodies, adjacent shorelines and, in winter, damage to spawning habitat from the development of icings, overflows, or glaciation.**

Items c, d, e, and f above describe location selection, design, inspection and mitigation procedures for managing the risk of erosion at the Lac du Sauvage shoreline. Dewatering is planned for the open-water season such that there is no risk of glaciation, icings, or overflows.

### **3. Water Quality Action Level**

Water will be pumped to the Receiving Environment (Lac du Sauvage) only during Stage 1. The indicator to end Stage 1 pumping is the concentration of TSS in the pumped water. The Water Licence Effluent Quality Criteria for TSS (25 mg/L, grab sample and 15 mg/L average of four consecutive weekly samples) will be used as the action threshold. Daily sampling of Stage 1 pumped water for TSS analysis is described in item 2g above. Analysis for TSS is conducted at the Ekati Mine Environment laboratory such that the actual concentrations will be known within several hours of sample collection. Pumping to Lac du Sauvage will stop before TSS exceeds the EQC maximum average or grab sample limit. At that time, Arctic will conduct a thorough inspection of the lake basin to identify possible causes of a temporary spike in TSS concentration.

TSS concentrations in the pumped water are expected to generally increase as the lake level is lowered. However, the increase is not anticipated to be linear. Natural variability or transient events such as sloughing within the lake basin may result in temporary increases in TSS concentration. TSS concentrations may vary above and below 25 mg/L for some period of time. It is advantageous to maximize the volume of water pumped to Lac du Sauvage to minimize the mixing of pristine lake water with poorer quality mine waters and to facilitate operation of mine water management facilities. Therefore, Arctic may choose to continue to collect daily samples for TSS analysis after an initial sample has triggered cessation of pumping to Lac du Sauvage. If two such consecutive daily samples (collected at the Dewatering outflow to KPSF or Lynx open pit) return results of less than 25 mg/L, pumping to Lac du Sauvage may resume with continued daily analysis.

No water quality action levels are required for the Stage 2 pumping to KPSF and Lynx open pit. KPSF is part of the internal minewater management facilities and, as such, provides protection to the Receiving Environment through the Effluent Quality Criteria defined in the Water Licence. Lynx open pit is a contained facility.