



Box 32, Wekweètì, NT X0E 1W0
Tel: 867-713-2500 Fax: 867-713-2502

#1-4905 48th Street, Yellowknife, NT X1A 3S3
Tel: 867-765-4592 Fax: 867-765-4593
www.wlwb.ca

September 30, 2021

W2015L2-0001

Kofi Boa-Antwi
Diavik Diamond Mines (2012) Inc.
P.O Box 2498
Suite 300, 5201-50th Avenue
Yellowknife, NT X1A 2P8

Dear Kofi,

Re: Updated Phase 7 Dam Raise and Spillway Design Report and Processed Kimberlite (PK) Management Plan, Version 6

The Wek'èezhìi Land and Water Board (WLWB) met on September 30, 2021 and considered Diavik Diamond Mines (2012) Inc.'s (DDMI's) Updated Phase 7 Dam Raise and Spillway Design Report (the Design Report) and Processed Kimberlite Management Plan, Version 6 (the Plan) submitted to the Board on July 24, 2021.

As detailed in the attached Reasons for Decision, the Board has decided to approve the Design Report with additional direction related to the Processed Kimberlite Containment Facility Closure Plan and requirements related to notifications if the trigger action response plan is activated. The Board also approved the PK Management Plan with additional revisions in the next version.

Sincerely,

A handwritten signature in blue ink, appearing to read "Joseph Mackenzie".

Joseph Mackenzie
Acting Chair, Wek'èezhìi Land and Water Board

BCC: DDMI Distribution List



Box 32, Wekweètì, NT X0E 1W0
Tel: 867-713-2500 Fax: 867-713-2502

#1-4905 48th Street, Yellowknife, NT X1A 3S3
Tel: 867-765-4592 Fax: 867-765-4593
www.wlwb.ca

Reasons for Decision

Reference/File Number:	W2015L2-0001 (Type "A" Water Licence)
Licensee:	Diavik Diamond Mines (2012) Inc. (DDMI)
Subject:	Updated Processed Kimberlite Containment Facility (PKCF) Phase 7 Dam and Spillway Design Report, and Processed Kimberlite (PK) Management Plan, Version 6.

Decision from the Wek'èezhìi Land and Water Board Meeting of September 30, 2021

1.0 Decision

On September 30, 2021, the Wek'èezhìi Land and Water Board (WLWB or the Board) considered Diavik Diamond Mines (2012) Inc.'s (DDMI's) Processed Kimberlite Management Plan, Version 6 (the Plan),¹ and Updated Phase 7 Dam Raise and Spillway Design Report (the Design Report).² In consideration of the submissions, reviewer comments, and proponent responses, the Board has made the following decisions:

1. The Board approved the updated PKCF Phase 7 Dam and Spillway Design Reports including the associated drawings and Quality Assurance/ Quality Control (QA/QC) Manual
2. The Board approved the PK Management Plan, Version 6;
3. DDMI is required to include settling and consolidation of the PKCF in the PKCF Closure Plan;
4. DDMI is required to notify the Board and the Inspector as soon as possible if any of the triggers in its trigger action response plan (TARP) for coarse processed kimberlite (CPK) placement are

¹ See WLWB (www.wlwb.ca) Online Registry for [Diavik - PK Management Plan V6 - Jul 24 21](#).

² See WLWB Online Registry for [Diavik - Updated PKCF Phase 7 Design Reports - Part 1 of 6 - Jul 24 21](#), [Diavik - Updated PKCF Phase 7 Design Reports - Part 2 of 6 - Jul 24 21](#), [Diavik - Updated PKCF Phase 7 Design Reports - Part 3 of 6 - Jul 24 21](#), [Diavik - Updated PKCF Phase 7 Design Reports - Part 4 of 6 - Jul 24 21](#), [Diavik - Updated PKCF Phase 7 Design Reports - Part 5 of 6 - Jul 24 21](#), [Diavik - Updated PKCF Phase 7 Design Reports - Part 6 of 6 - Jul 24 21](#).

activated, describe the trigger, identify what actions will be taken, and state when they will be implemented;

5. The Board requires DDMI to include a discussion in the PKCF Closure Plan on whether moving extra-fine Processed Kimberlite from the PKCF to the mine workings is feasible.; and
6. DDMI is required to include the revisions listed in Section 3.7 in the next version of the PK Management Plan

2.0 Background

DDMI submitted an update to the Phase 7 Dam Raise on July 24, 2021. The PKC Facility Design Report is a requirement of Part E, Condition 10 and Schedule 5, Condition 3. The original Phase 7 Design Report was approved by the Board a on September 27, 2018, and proposed the dam be constructed in two lifts: the first to an elevation of 469 metres; and then to 473 metres.³ DDMI has now proposed to complete construction of the Phase 7 dam to an elevation of 469 meters, and to raise the coarse processed kimberlite (CPK) berm located upstream (in the inner perimeter) of the final dam raise to 473 metres instead of 469 metres. DDMI indicated that this raise of the CPK berm would allow for storage of fine processed kimberlite (FPK) to above 469 metres and was necessary to provide storage of FPK until November 2022 when FPK will then be deposited in the underground mine.

The updates to the Design also included a change to the spillway design, given the previous Phase 7 spillway was not designed for FPK deposition above an elevation of 469 meters. DDMI will construct a cemented rockfill (CRF) lined trapezoidal spillway with a maximum invert elevation of 468.2 metres. The CPK berm will not retain a pond and will slope towards the decant sump and the spillway in the northwest corner of the Facility.

The Design Report also included a Quality Assurance/Quality (QA/QC) Manual as required by Part E, Condition 25 and Schedule 5, Condition 6. The QA/QC Manual was updated to include the CPK berm raise and spillway changes.

The PK Management Plan, Version 6 was also submitted for approval. The PK Management Plan is a requirement of DDMI's Licence under Part G, Condition 4 and Schedule 6, Condition 2. The Plan was updated to reflect the updates to the Design Report.

The submission package also included a letter from the Diavik Geotechnical Review Board (DGRB). The DGRB stated that they overall supported the updates to the design and found no fatal flaws with the design.

2.1 Review Process

The submissions were distributed for public review on July 26, 2021. Reviewers were asked to provide comments by August 24, 2021. A request to extend the review comment deadline to August 31, 2021 was

³ See WLWB Online Registry [Diavik - PKC Facility Phase 7 Design - Board Directive and Reasons for Decision - Oct 9 18](#)

granted on August 10, 2021. Comments and recommendations were received by the Tłıchq Government (TG), the Government of the Northwest Territories – Environment and Natural Resources (GNWT-ENR), the Environmental Monitoring Advisory Board (EMAB), and Environment and Climate Change Canada (ECCC); Board staff also submitted questions. Fisheries and Oceans Canada and the Wek'èezhii Renewable Resources Board indicated they had no comments. Proponent responses were submitted by the updated deadline of September 7, 2020. Reviewer comments and recommendations, as well as the proponent's responses are available on the WLWB Online Registry.⁴

3.0 Reasons for Decision

The Board has reviewed the submissions for conformity to the applicable sections of the Licence (see Section 2.0 above). The Board also reviewed all reviewer comments, recommendations, and proponent responses submitted during the public review period, as well as the DGRB letter. Based on the review, the Board has decided to approve the updated PKCF Phase 7 Dam and Spillway Design Report including the associated drawings and QA/QC Manual. The reasons for this approval are:

- The DGRB supported the design of the PKCF Phase 7 Spillway and the berm raise, and stated:
 - “no fatal flaws have been identified with the proposed Phase 7 strategy”; and
 - that it “supports the strategy to slope the deposition surface toward the spillway; allowing the spillway to flow more routinely to Pond 3 under various freshet, summer melt and extreme rainfall events”.
- While the GNWT-ENR and EMAB both had recommendations related to the Design, which are discussed in sections below, both commented that the design approach could be beneficial for closure (GNWT-ENR comment 3; EMAB comment 3); and
- Other parties (TG and ECCC) provided recommendations that the Board is of the opinion were either addressed in DDMI's response or can be addressed by the Board's decision. These are discussed in sections below.

➤ ***Decision # 1: The Board approves the updated PKCF Phase 7 Dam and Spillway Design Report, including the associated drawings and Quality Assurance/ Quality Control (QA/QC) Manual.***

The Board also approves Version 6 of the PK Management Plan given the Plan supports the changes to the Design Report. The Board requires revisions to the next version of the Plan as described in Section 3.7 below.

➤ ***Decision #2: The Board approves the PK Management Plan, Version 6.***

3.1 Closure

Closure components of the PKCF were discussed in the Design; however, DDMI was clear that this updated Design was for operational purposes. Despite this, reviewers had questions about how this Design will affect closure. EMAB recommended that “Any approval for the operational spillway should specifically

⁴ See WLWB Online Registry for [Diavik - Updated PKCF Phase 7 Design Reports - Review Summary and Attachments - Sep 7 21](#)

state that approval is only for operational purposes and that updated design, rationale and potential modification will be required to support closure” (EMAB comment 13). DDMI was also asked to discuss the implications of proceeding with the Design in advance of an approved Closure Plan (WLWB staff comment 3). DDMI indicated that “one closure implication of note with regard to the FPK deposition is that it has fixed the location of the closure spillway”; however, DDMI did note that “the spillway design will be assessed as part of closure and the design will be updated, including rationale, as required to support closure” (response to EMAB comment 13).

Currently, a PKCF Closure Plan has not been approved by the Board and is now expected to be submitted by October 2022 (as indicated in response to the TG comment 1). The conceptual closure plan does indicate that a closure spillway would be part of the closure plan for the PKCF.⁵ While the updated spillway design did consider closure components, DDMI was clear that the basis for this updated Design was for operational purposes.⁶ Therefore, if the approved PKCF Closure Plan differs from this Design, the risk is on DDMI with constructing components in consideration of closure without an approved Closure Plan. Reviewers will have an opportunity to comment on the PKCF Closure Plan when submitted.

Both the TG and EMAB commented on whether the design should have been submitted with the PKC Facility Closure Plan. The TG commented that “the Phase 7 design may influence or even dictate the final configuration of the PKC before closure activities begin” and that it anticipates “an opportunity to evaluate the merits of a wet cover vs a dry cover and other key PKCF closure aspects before a decision on the closure plan is made” (TG comment 1). The TG asked DDMI to comment “on the merits of reviewing the PKC Facility closure plan at the same time as the Stage 7 final design and management plan” (TG comment 1). EMAB recommended that “DDMI should be required to demonstrate that it has a practical and feasible closure plan for the proposed PK [Containment Facility], and characterize the implications of the changes on the overall closure plan for the site” (EMAB comments 1-5).

DDMI responded that “in an ideal world it would be preferable to review both [the design and the closure plan] at the same time but since the Phase 7 design and management plan inform closure designs (they set the starting conditions for closure) the final closure designs will be informed by the final raise design and management plans” (response to TG comment 1 and EMAB comment 5). DDMI also indicated that the current design would not close the door on a wet or dry facility (response to TG comment 1 and WLWB staff comment 3).

As described throughout the Closure Reclamation Guidelines, proponents need to consider closure during the mine design stage of a project to minimize post-reclamation efforts and ensure attainment of closure objectives;⁷ in other words, closure should inform the design when possible. While the Board agrees that

⁵ See WLWB Online Registry for [Diavik - Closure and Reclamation Plan - Version 4.1 - Appendix X\(5-9\) - Dec 17 19](#)

⁶ See WLWB Online Registry for [Diavik - Updated PKCF Phase 7 Design Reports - Part 5 of 6 - Jul 24 21](#), Table 1.

⁷ See WLWB Online Registry for [Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories](#)

it would be ideal to review the Design Report with the Closure Plan, the Board does not believe a PKC Facility Closure Plan is necessary at this time for these reasons:

- The current closure concept for the PKC Facility includes components described in the Design, including a small water pond adjacent to an open channel closure spillway;⁸
- The current closure concept stated that DDMI was continuing to evaluate whether the PKC Facility could be closed as a wet or dry facility. The Design still allows for either option to be considered for closure;
- The Design Report does not preclude the option of removing extra-fine processed kimberlite from the PKC Facility and depositing in the underground, which some Parties had questioned during the review (see Section 3.3 below);
- the PKC Facility Closure Plan will be distributed for public review; and
- the risk is to DDMI if the approved Closure Plan differs from this Design.

EMAB commented on whether during post-closure the long-term landscape will maintain a slope, allowing water to move across the facility and out the spillway (comments 6 and 7). EMAB recommended that approval of the Design Report and Plan should include requirements for monitoring and investigation of settling and consolidation and their variability across the PKCF (EMAB comment 7). DDMI responded that “the consolidation and settling of the facility is a key component of the current ongoing closure design” and committed to incorporating this into the closure design for the PKCF. Given DDMI has committed to monitoring for consolidation and settling as part of the closure design, the Board would expect to see this included in the PKCF Closure Plan.

➤ ***Decision #3: The Board requires DDMI to consider settling and consolidation of the PKCF in the PKCF Closure Plan.***

EMAB raised a concern that if the mine unexpectedly closed without finishing the sloped to spillway geometry, that there could be an additional liability to construct the PKC Facility to the correct geometry (EMAB comment 11). EMAB recommended that “Any approval of the [Processed Kimberlite management Plan] PKMP v6 should include a reconsideration of the peak closure liability that will accumulate during operations, including consideration of the costs associated with establishing free draining closure topography if the mine closes after the new plan is implemented, but before adequate FPK has been placed”. DDMI responded that “the current topography of the FPK in the PKCF already supports the slope-to-spillway concept if the mine closed today”, and therefore, the Board is of the opinion that DDMI has addressed EMAB’s concern.

3.2 CPK Berm Stability

EMAB questioned whether there would be any stability concerns with constructing the CPK berm on the FPK (comments 8 to 10) and recommended DDMI provide “details about construction quality assurance/quality control for the CPK embankment, including what construction monitoring, triggers and

⁸ See WLWB Online Registry for [Diavik - Closure and Reclamation Plan - Version 4.1 - Appendix X\(5-9\) - Dec 17 19](#)

response plans will be applied in areas where material will be placed on FPK beaches” (comment 10). DDMI responded that “operations have been placing CPK over the FPK since degrit process was started in June 2016, and existing operational experience and procedures were used to inform the final design”. DDMI also stated that “Areas of stability concern have operational monitoring plans that were developed by Golder and DDMI and are currently being implemented”. In section 2.7 of the Design Report, DDMI indicates that a trigger action response plan (TARP) was also developed for upstream CPK placement.

In the Design Report, DDMI conducted a stability analysis for the CPK berms and determined based on the criteria and factors of safety applied that “slip surfaces for downstream stability...unlikely extend far enough upstream to result in loss of containment and factors of safety that exceed design criteria for stability”. In section 2.7 of the Design, DDMI indicates that “observations during CPK placement over grit-rich FPK beaches have shown minimal deformation and instability” such as “minor cracking and subsidence”. While DDMI does provide data showing that stability will not likely be a concern, the Board recognizes that changes in stability could occur over time and could be a concern. For this reason the Board requires DDMI to notify the Board and Inspector, if during CPK placement, any triggers from the operational trigger action response plan (TARP) are activated, or if any unexpected stability issues occur thereafter. The notification should describe the trigger, identify what actions will be taken, and state when they will be implemented.

- ***Decision #4: The Board requires DDMI to notify the Board and the Inspector as soon as possible if any of the triggers in its TARP for CPK placement are activated, describe the trigger, identify what actions will be taken and state when they will be implemented.***

The Board would also like to note that as per Part E, Condition 24 of the Licence, DDMI is required to submit an As-built Report stamped and signed by a Professional Engineer, which is to include “documentation with rationale of field decisions that deviate from the original plans” and “any data used to support these decisions”. Previously, DDMI has submitted a Construction Record Report upon completion of the dam raises, which included (but was not limited to) sections on Design Modifications during Construction, Construction Quality Assurance and Quality Control Activities and Deficiencies;^{9,10} the Board would expect at a minimum similar content in the As-Built Report for the Phase 7 Raise.

⁹ See WLWB Online Registry for: [Diavik - PKC - Phase 6 Raise Construction Record Report - Part 1 of 7 - Feb 25 16.pdf](#), [Diavik - PKC - Phase 6 Raise Construction Record Report - Part 2 of 7 - Feb 25 16.pdf](#), [Diavik - PKC - Phase 6 Raise Construction Record Report - Part 3 of 7 - Feb 25 16](#), [Diavik - PKC - Phase 6 Raise Construction Record Report - Part 4 of 7 - Feb 25 16](#); [Diavik - PKC - Phase 6 Raise Construction Record Report - Part 5 of 7 - Feb 25 16](#), [Diavik - PKC - Phase 6 Raise Construction Record Report - Part 6 of 7 - Feb 25 16](#), [Diavik - PKC - Phase 6 Raise Construction Record Report - Part 7 of 7 - Feb 25 16](#)

¹⁰ See WLWB Online Registry for: [W2007L2-0003 - Diavik - PKC - Phase 5 Raise Construction As-Built Report 2010 - Apr 7 11](#), [W2007L2-0003 - Diavik - PKC - Phase 5 Raise Construction As-Built Report 2010 - Appendix A - Part 1 of 2 - Apr 7 11](#), [W2007L2-0003 - Diavik - PKC - Phase 5 Raise Construction As-Built Report 2010 - Appendix A - Part 2 of 2 - Apr 7 11](#), [W2007L2-0003 - Diavik - PKC - Phase 5 Raise Construction As-Built Report 2010 - Appendix B - Part 1 of 2 - Apr 7 11](#), [W2007L2-0003 - Diavik - PKC - Phase 5 Raise Construction As-Built Report 2010 - Appendix B - Part 2 of 2 - Apr 7 11](#), [W2007L2-0003 - Diavik - PKC - Phase 5 Raise Construction As-Built Report 2010 - Appendices C,D,E - Apr 7 11](#).

The Board is of the opinion that DDMI has addressed EMAB's stability and monitoring concerns from an operational perspective because:

- DDMI's stability analyses concluded that the CPK berms will be constructed more stable than the design criteria under static and pseudo-static loading for downstream slip surfaces;
- DDMI has controls in place to monitor upstream CPK placement, including a trigger action response plan;
- DDMI is required to provide notification if the trigger action response plan is activated (Decision #4 above); and
- DDMI will be using their experiences with CPK placement to determine the best sequence for CPK placement from a stability perspective.

The Board also notes that additional closure stability analyses would be expected for the stability of the downstream side of the rockfill PKCF Dams in consideration of the additional load from the final Phase 7 CPK berm raise. The Board would expect closure stability analyses be considered in the closure planning for the PKCF.

EMAB also commented that the DGRB recommended that the engineering of the CPK berm should address several items, including investigations of FPK foundation materials, presence of variable frozen and thawed ground, and monitoring of excess pore pressures during fill placement. EMAB recommended that DDMI "describe specifically how it has addressed each of the suggestions from the Geotechnical Review Board about construction of the CPK embankment on FPK foundations" (comment 10). DDMI responded that it had addressed the DGRB's recommendations in the final design, and in a table attached with the cover letter. DDMI indicated that the comments from the DGRB relating to upstream CPK construction were related to construction safety and not related to concerns for potential loss of FPK containment downstream. DDMI addressed each recommendation:

- The DGRB recommended that "limit equilibrium slope stability analyses should be calibrated against these various experience-based observations and sensitivity cases run that consider the range of potential conditions that could be encountered". DDMI's response was that "It is not possible to calibrate stability because there are too many variables that affect stability" but that DDMI had "not reported any instabilities of note since upstream CPK placement started in 2016". The Board notes that DDMI's stability analysis demonstrated that the stability design criteria have been met. As well, DDMI indicated it has been placing CPK on FPK since 2016 and will use its previous field experiences to inform its construction methodology. Given DDMI's previous experience with CPK placement and that DDMI has demonstrated that the CPK berm will meet the design stability criteria, the Board is of the opinion that DDMI has addressed the DGRB's recommendation.
- The DGRB recommended "Additional instrumentation and implementation of the observational method should be used to verify assumptions made in the analysis and modify the upstream section if necessary as it is raised". DDMI has addressed the DGRB's

recommendation by committing to installation of thermistors and continuing to use observational methods for upstream CPK placement.

- The DGRB recommended that DDMI consider using a more conservative factor of safety in the model. DDMI responded that since this design is only for short-term (not for closure), the factor of safety is acceptable. The Board notes that the design factors of safety and stability inputs that were used follow the Canadian Dam Association guidelines. The Board agrees with DDMI that the factor of safety used is appropriate for this short-term scenario.

Given the DGRB supported the Design overall and for the reasons in the bullets above, the Board is of the opinion that DDMI has addressed the DGRB's recommendations regarding the CPK berm.

ECCC commented on the presence of unfrozen FPK layers encountered in test holes (ECCC comment 1). ECCC recommended DDMI "clarify what the causes are of the thawed layers and what mitigation will be implemented to address any resulting issues from these thawed layers." DDMI explained that the layers of thawed material are formed due to deposition of FPK at different times of the year. FPK will generally freeze after deposition in the winter, but FPK deposited "during above 0 °C ambient temperatures are thawed and then progressively freeze over time" (response to ECCC comment 1). This results in layers of frozen and thawed FPK in the FPK beach. DDMI explained that where CPK placement extends over the FPK beach beyond where the CPK berm is currently constructed, frozen conditions are required before CPK placement. To verify this, DDMI has committed to installing thermistors "in the FPK foundation below the upstream CPK zone to support construction safety". Given DDMI's experience with placement of CPK over FPK and that DDMI is monitoring for frozen FPK prior to construction, the Board believes DDMI has addressed ECCC's recommendation.

3.3 Extra-Fine Processed Kimberlite

During the review of the Design Report, reviewers commented on management of extra-fine PK. During the recent Water Licence amendment to allow PK to be deposited into the underground mine, some intervenors requested DDMI report on whether it is feasible to remove the extra-fine PK from the PKC Facility and place in the underground, to move towards a dry facility. In response to intervenors during the proceeding, DDMI indicated that its intent is "to submit an updated PKC Closure Design with the Annual CRP Progress Report in March/April 2021 which will include information to address [the feasibility of moving extra-fine processed kimberlite from the PKCF]"¹¹. In the Board's decision on the amendment, the Board stated that "Given DDMI has indicated that an impending submission related to the closure of the PKC Facility is forthcoming, and that this submission will include whether DDMI is proposing to close the PKC Facility using a wet or dry cover, the Board has currently not required a feasibility study as recommended by EMAB".

¹¹ [Diavik - WL Amendment - A21 Underground - RFD and Recommendation to Minister - Sep 24 20.pdf \(mvlwb.ca\)](#), pg. 15/94

The TG asked if there is still an option to remove the extra-fine processed kimberlite from the PKCF to deposit in the underground mine workings (TG comment 2). EMAB also commented that the proposed Plan appeared to “foreclose on any future opportunities to relocate Extra Fine PK into mine workings because those materials will likely be quickly inundated by the newly deposited FPK” (comment 4); EMAB provided no specific recommendation related to extra-fine PK. In response to the TG, DDMI stated that while the updated design “would not technically preclude the possibility of moving extra fine processed kimberlite from the PKC and depositing it into the mine workings... there are currently no plans to do this” (response to TG comment 2).

The Board understands that the PKC Closure Plan will now be submitted in October 2022 (see response to EMAB comment 5). As described above, it was the Board’s expectation that the PKCF Closure Plan would be submitted much earlier than October 2022. The Board still expects a discussion included in the PKCF Closure Plan on whether it is feasible to remove the extra-fine processed kimberlite. To ensure that a discussion is included in the PKCF Closure Plan and given that reviewers continue to raise questions about the feasibility of moving the extra-fine processed kimberlite, the Board requires a discussion on the feasibility of moving extra-fine processed kimberlite be included in the PKCF Closure Plan.

- ***Decision #6: The Board requires DDMI to include a discussion in the PKCF Closure Plan on whether moving extra-fine Processed Kimberlite from the PKCF to the mine workings is feasible.***

3.4 Spillway Construction

Recommendations and questions were asked related to the spillway construction. DDMI indicated that cemented rock fill (CRF) would be placed along the spillway across the dam crest for erosion protection. The GNWT-ENR recommended that DDMI clarify the potential for the CRF to crack due to thermal effects and/or settlement and describe how this could affect spillway stability (comment 4). DDMI responded that the Phase 6 spillway was constructed with CRF and no significant issues were encountered over the past year. DDMI also stated that the CRF will be “constructed over filter compatible granular material, so erosion is unlikely, even if there is localized cracking” (response to GNWT-ENR comment 4).

The DGRB also made recommendations related to the spillway design and potential erosion. They recommended DDMI consider an engineered spillway design, instead of a low-point in the dike wall, since Pond 3 will be used more routinely to accept overflow from the PKCF. DDMI responded that the “The PKC Spillway is expected to be used somewhat regularly for smaller flows (much less than the IDF)” and “erosion is unlikely because the spillway has been designed to manage much higher flows (IDF)” (response to WLWB staff comment 4). The DGRB also recommended that DDMI consider whether bedding material for the rockfill protective layer may provide additional resilience for the spillway chute. DDMI responded that “The rockfill erosion protection layer in the PKC spillway chute is designed to provide protection during flows from an IDF (PMP) event” (response to WLWB staff comment 5). The Licence also requires DDMI to report any deterioration or erosion of any engineered structure associated with the PKCF and repair immediately (Part G, Condition 27(f)).

Given that the hydrologic and hydraulic assessment included in the Design Report demonstrates that the spillway can handle the modeled design flows; that the CRF will be constructed over granular material; and that a condition in the licence requires DDMI to fix any deterioration, the Board considers the DGRB's recommendations and GNWT-ENR's recommendation addressed.

3.5 Potential Erosion of the CPK Berm

In the Design Report, DDMI states that the CPK “shall provide freeboard for wave up-rush prior to freshet” in the northwest corner of the facility.¹² EMAB commented that the CPK material may be prone to erosion given DDMI describes the CPK as fine- to coarse-grained sand (comment 12). EMAB recommended that DDMI “provide analysis that demonstrates the suitability of CPK material for erosion protection in wave run-up condition”. DDMI responded that since the CPK berm is approximately 50 to 100 m wide on the upstream side of the lined dams, this provides a buffer between the pond and the lined dams. A rockfill berm will also be constructed at the toe of the CPK berm along the sides of the spillway channel which will provide additional protection for wave rush-up. DDMI is also planning to maintain a minimal PKC pond to the north and west dams, which will limit wave rush-up. The geometry of the facility due to FPK deposition will direct water to the sump in the northwest corner. DDMI also stated that wave rush-up could occur during an extreme flood event but would only occur over a short period. The DGRB did not specifically comment on potential for erosion of the CPK berms but did recommend that DDMI monitor and repair any erosion as part of the routine maintenance activities at the spillway; DDMI responded that it would implement this recommendation and is part of current operational procedures.¹³ Given the mitigations in place (e.g., width of the CPK berms, rockfill berm at the downstream toe of the CPK berm, slope of the facility towards the northwest sump, and monitoring for erosion) and that the pond size will be minimal, the Board agrees that wave rush-up will likely be minimal and therefore large-scale erosion unlikely.

3.6 Water Management in Pond 3

GNWT-ENR commented that during a severe flood event “that it is likely that runoff from exposed PK beaches will have elevated [total suspended solids] TSS, and if there is water that cannot be managed at Pond 3, there could be an overflow from Pond 3 to the environment 3” (GNWT-ENR comment 3). GNWT-ENR recommended DDMI confirm sufficient storage volume and/or pumping capacity to manage the runoff from the PKCF (comment 3). DDMI responded that flows from the PKC Facility “may have elevated TSS” but confirmed that “The available storage capacity in Pond 3 is sufficient to manage storm events”. DDMI also stated that it has “developed a water management monitoring and trigger action response plan (TARP) for the PKC Facility and Pond 3 to ensure that the water level in Pond 3 is maintained below an elevation to maintain storage for the IDF in Pond 3”. Given the mitigations in place to manage the pond water levels and that the pond has sufficient capacity for storm events, the Board is of the opinion that DDMI has addressed GNWT-ENR's recommendation.

¹² [Diavik - Updated PKCF Phase 7 Design Reports - Part 1 of 6 - Jul 24 21.pdf \(mvlwb.ca\)](#) Section 6.3

¹³ [Diavik - Updated PKCF Phase 7 Design Reports - Part 1 of 6 - Jul 24 21.pdf \(mvlwb.ca\)](#), Table of conformity to DGRB Recommendation, Cover Letter.

3.7 PK Management Plan

The Board requires DDMI incorporate the following revisions in the next version of the PK Management Plan:

- Bullet 2 on page 9 references a photo, but the photo is not provided. Please edit accordingly;
- There are various locations in the document where the formatting appears to combine words incorrectly; edit accordingly;
- Section 3.5 references the management responses to the 2021 freshet. EMAB recommended that DDMI include a description of the results of the activities in response to freshet and any future plans related to freshet (EMAB comment 15). DDMI responded with a description of both the 2021 freshet response as well as future freshet management; DDMI's response should be included in this section of the PK Management Plan; and
- EMAB commented that statements in Section 3.2 related to the storage capacity of Pond 3 were inconsistent with other statements in the Plan; EMAB commented that Section 3.2 implied that water from an inflow design flood (IDF) may exceed the design capacity of the Pond, when in other sections DDMI states that Pond 3 maintains enough storage to hold an IDF. DDMI committed to revise Section 3.2 to state that "DDMI continues to maintain enough storage to hold an IDF for the PKCF and Pond 3 catchments without discharge to Lac de Gras".

➤ ***Decision #6: The Board requires DDMI to include the revisions listed in Section 3.7 in the next version of the PK Management Plan.***

Signed the 30th day of September 2021, on behalf of the Wek'èezhìi Land and Water Board



Witness



Joseph Mackenzie
A/Chair, Wek'èezhìi Land and Water Board