
Mr. Mark Cliffe-Phillips  
Mackenzie Valley Environmental Impact Review Board  
200 Scotia Centre  
Box 938, 5102-50th Avenue  
Yellowknife, NT X1A 2N7

Dear Mr. Cliffe-Phillips,


The Wek’èezhìi Land and Water Board (Board) met on January 30, 2020 and made a preliminary screening determination for Diavik Diamond Mines (2012) Inc.’s (DDMI’s) Application to amend its Type A Water Licence (Licence) (W2015L2-0001) to allow for underground mining at the A21 kimberlite pipe (Project), in accordance with the Mackenzie Valley Resource Management Act (MVRMA).

Based on the evidence on the public record for the proceeding, the Board is satisfied the screening has been completed according to section 125 of the MVRMA and has decided not to refer the project to environmental assessment. The Board’s reasons for decision, as required by section 121 of the MVRMA, are attached.

If the Board does not receive notice of referral to environmental assessment, it will resume the Water Licensing process on February 10, 2020. If you have any questions or concerns regarding this letter, please contact Ryan Fequet at (867) 765-4589 or email rfequet@wlwb.com.

Yours sincerely,

Joeseph Mackenzie  
Chair, Wek’èezhìi Land and Water Board

Copied to: DDMI Distribution List  
Sean Sinclair, DDMI

Attached: Preliminary Screening Reasons for Decision

Amendment for Underground Mining at A21
Reasons for Decision

<table>
<thead>
<tr>
<th>Reference/File Number:</th>
<th>W2015L2-0001 (Type “A” Water Licence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensee:</td>
<td>Diavik Diamond Mines (2012) Inc. (DDMI)</td>
</tr>
<tr>
<td>Subject:</td>
<td>Preliminary Screening Determination – A21 Underground Amendment</td>
</tr>
</tbody>
</table>

Decision from the Wek’ëzhìi Land and Water Board
Meeting of January 30, 2020

1.0 Decision

The Wek’ëzhìi Land and Water Board (WLWB or the Board) met on January 30, 2020 and considered Diavik Diamond Mines (2012) Inc.’s (DDMI’s) application to amend its Type A Water License W2015L2-0001 to allow for underground mining of the A21 kimberlite pipe (the Project).¹ The Board conducted a preliminary screening of this Amendment application according to subsection 124(1) of the Mackenzie Valley Resource Management Act (MVRMA), based on DDMI’s application package and the public review. Based on the evidence provided, it is the Board’s view that there is not enough evidence to suggest that the proposed underground mining of the A21 kimberlite pipe might have a significant adverse impact on the environment or might be a cause of public concern, as set out in paragraph 125(1)(a) of the MVRMA.

The Board has therefore decided the following:

1. Not to refer the Project to Environmental Assessment; and
2. If the Board does not receive a notice of referral to environmental assessment by February 10, 2020, the Board will resume the Water Licensing process as outlined in the Work Plan.

2.0 Background

DDMI submitted a complete application to amend its Type A Water Licence (W2015L2-0001) on November 8, 2019 to allow for underground mining of the A21 kimberlite pipe (see Attachment 1). The proposed Underground Mining of the A21 Kimberlite Pipe (the Project) “will enable DDMI [to] recover kimberlite/ore within the deeper zones of the A21 kimberlite pipe than is feasible with ongoing surface/open pit mining of the A21 kimberlite pipe”. As described in the Amendment Application “underground mining activities at A21 were not part of the scope of the original Environmental Assessment as approved in 1999 for the Mine and are not part of the scope of the current approved Water Licence (W2015L2-0001)”. Construction and operations associated with the A21 Below Pit Mining Project is scheduled for over a 3-year period.

DDMI states that it will “use existing permitted surface infrastructure at the Diavik Mine, including access roads, site water management system, waste rock and processed kimberlite storage areas, camp, equipment staging area, fuel storage, and maintenance shops to support the Project”. Additional/new infrastructure for the project includes:
- underground workings to access the lower sections of the A21 kimberlite pipe;
- pipeline extensions deeper into A21 kimberlite pipe for Mine water handling;
- fresh air raise for ventilation;
- a refueling area; and
- a pad for temporary ore and waste rock storage area.

In the Project Description, DDMI states that the Project would include the following activities:
- use of the sub-level retreat mining and/or vertical cutter mining, large diameter drilling and continuous flight auger mining;
- placement of waste rock in the South Waste Rock Storage Area or for use in construction/progressive reclamation;
- operational maintenance of minewater during mining; and
- reclamation of the constructed facilities and structures.

In accordance with paragraph 125(1)(a) of the MVRMA, the Board must conduct a preliminary screening of the Amendment Application to determine and report to the Review Board whether, in its opinion, the development might have a significant adverse impact on the environment or might be a cause of public concern. The preliminary screening identifies potential impacts and mitigations for the proposed activities.

To assist the Board in completing a preliminary screening of this Amendment Application, the Board distributed the Amendment Application for public review on November 18, 2019 inviting Parties to provide comments and recommendations (e.g., on impacts and mitigation measures) using the Online Review System (ORS). Comments were due December 19, 2019 with responses from the proponent due January 9, 2020. The Board received comments and recommendations from Environment and Climate Change Canada (ECCC), Environmental Monitoring and Advisory Board (EMAB), Department of Fisheries and Oceans Canada (DFO), the Government of Northwest Territories (GNWT) Department of Environment and Natural Resources (ENR); Board staff also submitted questions.

2 See WLWB Online Review System (ORS)
3 See WLWB Online Registry for Diavik - 2019 Water Licence Amendment - Review Summary and Attachments - Jan 9_20
Water quality specialists EcoMetrix Inc. assisted with the review of DDMI’s assessment on the predicted water quality calculations presented by DDMI in the Summary Environmental Assessment attached with the application.

Since there were no requests to extend the reviewer comment deadline, the Board is satisfied that a reasonable period of notice was given to affected communities and First Nations, as required by subsection 63(2) of the MVRMA and subsection 43(1) of the Waters Act. The Board is also satisfied that the Tłı̨chǫ Government has been consulted in accordance with section 63 of the MVRMA. The Board also provided notification to the Tłı̨chǫ Government on the Application in accordance with the MVRMA for a “major mining project”, as defined in Chapter 23 of the Tlîchô Land Claims and Self-Government Agreement.

2.1 Preliminary Screening

The Board completed a preliminary screening of the Amendment Application in accordance with subsection 124(1) of the MVRMA. The Board conducted its own analysis of potential impacts and proposed mitigations summarized below.

2.2 Potential Impacts and Proposed Mitigations

In the Summary Environmental Assessment attached with the Amendment Application, DDMI included an assessment of the “potential interactions” (i.e., impacts) from the Project activities that could affect the Valued Components (VCs) as well as mitigations for those potential impacts. Table 1 below provides:

- a summary of the impacts for the proposed activities and the associated mitigations;
- a discussion of concerns that were identified during the public review and how DDMI addressed those concerns; and
- The Board’s analysis of potential impacts and proposed mitigations.

In the Summary Environmental Assessment, DDMI determined that the potential effects from most of the impacts would either be removed by “environmental design features and mitigations so that the Project results in no detectable (i.e., measurable) change” or could “result in a minor change, relative to existing conditions or guideline values, but the change is sufficiently small that it would have a negligible residual effect on a VC”.

DDMI did identify one impact from the Project that could “likely...result in a change relative to existing conditions or guideline values that could contribute to greater than negligible residual effects on a VC relative to existing conditions or guideline values”. This impact was further assessed by DDMI in the Summary Environment Assessment provided with the Application. The impact DDMI identified was “increased discharge from [the North Inlet Water Treatment Plan (NIWTP)] as a result of the Project may alter water quality (e.g., suspended sediments, metals, nutrients) in the receiving waterbody (i.e., Lac de Gras)”. DDMI provided water quality predictions for the water at discharge in consideration of the proposed Project. DDMI indicated that “Potential effects on water quality were evaluated based on anticipated changes in effluent chemistry and quantity, and Total Dissolved Solids (TDS), total nitrogen (TN) and total phosphorus (TP) loading to Lac de Gras”.

The assessment determined that “Chemistry of the final effluent to Lac de Gras is expected to remain similar to existing conditions, and all variables with currently applicable [effluent quality criteria (EQC)]
are predicted to remain below EQC”. DDMI also made the following conclusions related to this potential impact:

- “Residual effects of the Project will not influence the suitability of surface water quality in Lac de Gras and downstream for healthy and sustainable ecosystems and traditional use.
- The Project will not influence the ability of fish populations to be self-sustaining and ecologically effective.
- Adverse effects on fisheries productivity are not predicted as a result of the Project.”

There were several questions asked during the Public Review on this particular assessment. These questions are further discussed in Table 1, along with DDMI’s proposed mitigations and the Board’s analysis on this potential impact.
**Table 1 Summary of Potential Impacts of the Proposed Project and Proposed Mitigations**

<table>
<thead>
<tr>
<th>Potential Impact</th>
<th>Activity</th>
<th>Proposed Mitigations</th>
</tr>
</thead>
</table>
| Changes to permafrost conditions | Construction/heavy equipment use/road use; Construction or placement of new surface infrastructure | • Concerns:  
  o *Identified by DDMI:* In the Summary Environmental Assessment, DDMI describes that “Loss and alteration of permafrost from the project footprint has the potential to affect groundwater, surface hydrology, soils, vegetation and land use and traditional land use.”  
  o *Identified during the public review:* No comments were received during the public review related to this potential impact.  
  • Mitigations:  
  o DDMI included the following mitigations in the Summary Environmental Assessment:  
    ▪ “design of the project minimizes the construction of new infrastructure that might have an effect on permafrost;  
    ▪ New infrastructure will be constructed in locations that have been previously disturbed. There will be no additional alteration to undisturbed areas of aquatic and terrestrial land cover;  
    ▪ Existing facilities and those constructed for the Project will be insulated to minimize heat loss”.  
  • Board Analysis and Determination:  
  o Based on the mitigations described above, the Board does not believe these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern. |
| Alteration of wildlife habitat (or use of) | Noise (e.g. use of heavy equipment, blasting, crushing, drilling); lights; human presence; vehicle traffic along the haul and access roads. | • Concerns:  
  o *Identified by DDMI:* As DDMI describes in the Summary Environmental Assessment, activities associated with the Project “may generate sensory disturbances including increased noise levels and visual disturbances from moving vehicles and humans during construction and operations”. This can result in “changes to the habitat use, movement, and behaviour of wildlife, and subsequently influence land use and traditional land use”.  
  o *Identified during the public review:* No comments were received during the public review related to this potential impact. |
<table>
<thead>
<tr>
<th>Loss, direct injury, and/or mortality of wildlife; changes to predator numbers and predation risk</th>
<th>Storage and use of petroleum products; onsite storage of wastes (food, other domestic garbage, waste petroleum product).</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mitigations</td>
<td>• Concerns:</td>
</tr>
<tr>
<td>o The Project will occur in existing disturbed areas;</td>
<td>o Identified by DDMI: In the Summary Environmental Assessment, DDMI describes that “Food smells and other aromatic compounds such as petroleum-based chemicals, grey water, and sewage can attract carnivores to human developments”. In addition, “infrastructure may also attract carnivores as it can serve as a temporary refuge to escape extreme heat or cold” which could lead to “increase predation pressure on prey species (e.g., caribou, passerines, and waterfowl), and may cause declines in local abundance in these prey species”.</td>
</tr>
<tr>
<td>o DDMI included the following mitigations in the Summary Environmental Assessment: ▪ “The Wildlife Management Plan (WMP) implemented at the Mine will apply to the Project and provides input for adaptive management; ▪ Use of existing surface facilities will limit the area disturbed at construction and limit the quantity of new sensory disturbances; ▪ The current, effective practices and mitigations for safety of wildlife on roads, the airstrip, and other areas of the Mine will be continued. These practices include reporting of wildlife sightings by all employees, and control of encounters by Environment Department staff; ▪ Environmental training will be provided for personnel; ▪ Wildlife always have the right-of-way; ▪ Vehicles encountering wildlife on roads will communicate the presence of wildlife on the roads to the Environment Department and others in the area; ▪ Modified traffic patterns and road closures will be used as necessary to protect caribou and people; ▪ Equipment used on site is regularly maintained”.</td>
<td>o Identified during the public review: No comments were received during the public review related to this potential impact.</td>
</tr>
<tr>
<td>• Board Analysis and Determination:</td>
<td>• Mitigations:</td>
</tr>
<tr>
<td>o Based on the mitigations described above, the Board does not believe these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern</td>
<td>o The Project will occur in existing disturbed areas;</td>
</tr>
</tbody>
</table>
| Alteration of wildlife habitat (or use of) and fragmentation of plant communities | Construction or placement of new surface infrastructure | • Concerns:  
  o Identified by DDMI: In the Summary Environmental Assessment, DDMI indicated that there is the potential for “direct loss and fragmentation of plant communities and wildlife habitat from the Project footprint”.  
  o Identified during the public review: No comments were received during the public review related to this potential impact.  
• Mitigations:  
  o DDMI included the following mitigations in the Summary Environmental Assessment:  
    ▪ “The Project will make full use of existing surface infrastructure to avoid additional loss and alteration of undisturbed aquatic and terrestrial land cover (i.e., habitat);  
    ▪ Waste rock generated from the Project will be stored within the existing [South Waste Rock Storage Area], which has been sized to store all A21 waste rock, or alternatively used for closure and reclamation activities.”  
• Board Analysis and Determination |
Based on the mitigations described above, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.

### Contamination of soil and water from spills of fuels, petroleum products and reagents.

<table>
<thead>
<tr>
<th>Use of motorized equipment; transfer and use of petroleum products</th>
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<tbody>
<tr>
<td>• Concerns:</td>
</tr>
<tr>
<td>o <strong>Identified by DDMI:</strong> In the Summary Environmental Assessment, DDMI indicated that spills (i.e., fuels, petroleum products, reagents) from motorized equipment or from refueling activities in the Project area “may cause changes to water and soil quality.”</td>
</tr>
<tr>
<td>o <strong>Identified during the public review:</strong> No comments were received during the public review related to this potential impact.</td>
</tr>
<tr>
<td>• Mitigations:</td>
</tr>
<tr>
<td>o DDMI included the following mitigations in the Summary Environmental Assessment:</td>
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<tr>
<td>▪ “Contingency Plan is in place for the Mine and will incorporate the Project;”</td>
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<tr>
<td>▪ Regular equipment maintenance is conducted (e.g., regular checks for leaks);</td>
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<tr>
<td>▪ Drip trays and/or absorbent pads are used during servicing and refueling;</td>
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<tr>
<td>▪ All hazardous substances are stored and handled on site in accordance with applicable regulations;</td>
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<tr>
<td>▪ Fuel is stored at the South Tank Farm and fuel tanks are housed within secondary containment facilities that include berms, release prevention barriers and impervious liners;</td>
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<tr>
<td>▪ The Project will follow standard policies used at the Mine in the event of a spill; spill response training is provided and updated;</td>
</tr>
<tr>
<td>▪ Hydrocarbon-impacted material will continue to be handled in accordance with the approved management plan.”</td>
</tr>
<tr>
<td>• Board Analysis and Determination</td>
</tr>
<tr>
<td>o Based on the mitigations described above, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.</td>
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</table>

### Soil erosion and sedimentation

<table>
<thead>
<tr>
<th>Construction or placement of new surface infrastructure</th>
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</thead>
<tbody>
<tr>
<td>• Concerns:</td>
</tr>
<tr>
<td>o <strong>Identified by DDMI:</strong> In the Summary Environmental Assessment, DDMI indicated that “Soil erosion and sedimentation from construction of new and/or upgraded infrastructure required for the Project may cause changes to surface water quality in nearby waterbodies”. For instance, there is potential for increased sediment runoff to downstream waterbodies as a result of excavating activities associated with the Project.</td>
</tr>
</tbody>
</table>
| Alteration, damage, or loss of a heritage resource | Construction or placement of new surface infrastructure | **Concerns:**  
- **Identified by DDMI:** In the Summary Environmental Assessment, DDMI indicated that “Construction of the Project may cause disturbance or destruction of heritage resources”.  
- **Identified during the public review:** No comments were received during the public review related to this potential impact.  
**Mitigations:**  
- The Project will occur in existing disturbed areas;  
- DDMI included the following mitigations:  
  - “Archaeological surveys have been completed at the Mine;  
  - The Project will make full use of existing surface infrastructure to avoid additional loss and alteration of undisturbed aquatic and terrestrial land cover (i.e., habitat);  
  - Management practices for the avoidance or preservation of archaeological and/or heritage materials discovered during mine activities are in place at the Mine.”  
**Board Analysis and Determination**  
- Based on the mitigations described above, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern. |
DDMI also indicated that “inhalation of air or ingestion of water, soil or vegetation that has been chemically altered by air and dust emissions” could be a concern.

- Identified during the public review: No comments were received during the public review related to this potential impact.

**Mitigations:**
- The License requires that DDMI’s Waste Management Plan include “a section that addresses the Licensee’s plan for the mitigating and monitoring of dust resulting from its operations”;
- DDMI included the following mitigations in the Summary Environmental Assessment:
  - “The [Environmental Air Quality Monitoring and Management Plan] EAQMMP implemented at the Mine will encompass the Project and provides input for adaptive management;
  - Heavy equipment and Mine vehicles undergo regular maintenance of engines, maintain emission guidelines for internal combustion engines, and use low-sulphur diesel fuel;
  - Use of existing surface facilities will limit the area disturbed at construction and limit the quantity of new air and dust emissions;
  - Dust suppression measures are applied, as appropriate, to haul roads, airstrip, and laydown areas;
  - Speed limits are established on all roads to reduce production of dust;
  - The majority of exhaust air from the underground mine will exit at a location within the existing Mine footprint adjacent to the A21 dike.”

**Board Analysis and Determination**
- Based on the mitigations described above, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.

<table>
<thead>
<tr>
<th>Changes to local hydrology (surface water flows and drainage patterns) from the Project footprint and construction or placement of new surface infrastructure</th>
<th>Concerns:</th>
</tr>
</thead>
</table>
| - Identified by DDMI: As DDMI describes in the Summary Environmental Assessment, there is potential for “changes to local hydrology from the Project footprint” such as changes to surface water flows and drainage patterns. This in turn “can affect surface water quality, and thus fish and fish habitat, soils, vegetation, caribou, carnivores, raptors, aquatic and migratory birds, and land use and traditional land use”.
- Identified during the public review: DDMI was asked during the public review if it would propose any additional measures outside the current Drainage Control and Collection (DCC) System for managing runoff and Seepage from the Project facilities (WLWB staff comment |
In response to the WLWB staff comment 14, DDMI indicated that “The Project will rely on existing water management infrastructure associated with the DCC System to mitigate the potential for changes to local hydrology (surface water flows and drainage patterns)”.

- **Mitigations:**
  - Part H, Condition 2 requires that “the Licensee shall operate in accordance with the approved Water Management Plan”.
    - The Water Management Plan describes how all water and runoff from this site is handled.
  - DDMI included the following mitigations in the Summary Environmental Assessment:
    - “The Project will make full use of existing surface infrastructure to avoid additional loss and alteration of undisturbed aquatic and terrestrial land cover (i.e., habitat);
    - Waste rock generated from the Project will be stored within the existing SCRP, which has been sized to store all A21 waste rock, or alternatively used for closure and reclamation activities;
    - Existing roads will be used to access the Project;
    - Infrastructure that serves the Mine (i.e., airstrip, main camp, North Inlet, roads) is satisfactorily sized and requires no replacement or modification due to the Project;
    - Management of runoff and seepage from Project facilities, as appropriate, to avoid adverse environmental effects in downstream waterbodies Use of erosion and sediment control practices (e.g., silt fences, runoff management) applicable to northern environments and already in place at the Mine during construction of new infrastructure and around disturbed areas, where appropriate;
    - Construction will be timed, where appropriate, to take place during dry or frozen conditions to minimize disturbance to soils and vegetation, and runoff to local waterbodies.”

- **Board Analysis and Determination**
  - Based on the mitigations described above and the information provided in response to Board staff’s comment, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.

<table>
<thead>
<tr>
<th>Possible effects to surface water quality</th>
<th>Water used for processing</th>
<th>Processed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concerns:</strong></td>
<td></td>
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<tr>
<td>- Identified by DDMI: In the Summary Environmental Assessment, DDMI indicated that there is potential for changes to surface water flows and water levels “from the water supply</td>
<td></td>
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</tr>
<tr>
<td>(surface water flows and water levels) from the water supply requirements (process water and potable water)</td>
<td>Kimberlite (PK); potable water requirements</td>
<td></td>
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<td>---</td>
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</tr>
</tbody>
</table>
| Kimberlite (PK); potable water requirements | requirements (i.e., mining and potable) for the Project”. DDMI also indicated that changes to water flows and levels “can affect surface water quality, fish and fish habitat, soils, vegetation, caribou, carnivores, raptors, aquatic and migratory birds, and land use and traditional land use”.
| | Identified during the public review: During the public review, there was one question asked about the water balance for the Project, but this is discussed below as part of the discussion on ‘Surface water quantity changes’. No specific comments were received during the public review related to this potential impact.
| | **Mitigations:**
| | o Part H, Condition 2 requires that “the Licensee shall operate in accordance with the approved Water Management Plan”.
| | ▪ A requirement of the Water Management Plan is to include “measures that will be undertaken to minimize the amount of raw water required from Lac de Gras” (Schedule 6, Item 1a).
| | o DDMI included the following mitigations in the Summary Environmental Assessment:
| | ▪ “The existing potable water system at the Mine will be used for the Project;
| | ▪ No increase in Water License limits for process water and potable water use is anticipated due to the Project;
| | ▪ Applicable Best Management Practices from DFO will continue to be adhered to (DFO 1995, 2011);
| | ▪ Recycled water is used for operation of the Processing Plant;
| | ▪ The existing site water management system is designed to recycle water, where applicable, and reduce requirements for water withdrawal.”
| | **Board Analysis and Determination**
| | o Based on the mitigations described above, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.
| Surface water quantity changes | Increased discharge to Lac de Gras from the North Inlet Water Treatment Plant (NIWTP) |
| **Concerns:**
| o Identified by DDMI: As DDMI describes in the Summary Environmental Assessment, additional groundwater from dewatering activities associated with the Project will be directed to the North Inlet Water Treatment Plant (NIWTP) for treatment before discharge to Lac de Gras. This additional volume of discharge water “has the potential to influence surface water quality, fish and fish habitat, and land use and traditional land use”.

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Identified during the public review: During the public review, DDMI was asked how the additional estimated discharge volumes from the Project were calculated (WLWB staff comment 2). DDMI was also asked additional information on the water balance for the site in consideration of the Project, specifically how DDMI determined that a “near net zero water balance” would be achieved (WLWB staff comment 9).

- In response to WLWB staff comment 2, DDMI provided calculations on how the additional estimated discharge volumes from the Project were calculated. Based on the methods described in the response, the Board is of the opinion that this response addresses the comment.
- In response to WLWB staff comment 9, DDMI responded that “additional A21 water sourced from groundwater as part of the A21 Below Pit Project will be captured in the existing water management system and treated and released back into Lac de Gras (LDG)”. DDMI further stated that “the 'net zero balance' refers to no change in the water level in LDG or in the discharge [to] the Coppermine River”.

- Mitigations:
  - DDMI included the following mitigations in the Summary Environmental Assessment:
    - “A mine Water Management Plan will be implemented for the Project and will be based on previous experience at site;
    - Water for the Project will be sourced from the various drainage galleries, and once used, the waste water streams will be collected in sumps and pumped out of the underground via the skid water system. The Mine operations will also use water directly from Lac de Gras as make-up water to supplement the cycle;
    - Overall, a near net zero water balance is achieved with the A21 operations.”

- Board Analysis and Determination
  - Based on the mitigations and information provided in the public review comments, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.

<table>
<thead>
<tr>
<th>Surface water quality changes in Lac de Gras</th>
<th>Increased discharge to Lac de Gras from the NIWTP</th>
</tr>
</thead>
</table>

Concerns:
- Identified by DDMI: As DDMI describes in the Summary Environmental Assessment, “increased discharge from NIWTP as a result of the Project may alter water quality (e.g., suspended sediments, metals, nutrients) in the receiving waterbody (i.e., Lac de Gras)”. This potential impact from the Project was identified as the one impact that “may lead to measurable environmental changes and residual effects to VCs, after implementing mitigation and environmental design features”.

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Identified during the public review: DDMI evaluated the potential effects on water quality based on anticipated changes in effluent chemistry and quantity, and Total Dissolved Solids (TDS), total nitrogen (TN) and total phosphorus (TP) loading to Lac de Gras. Several public review comments were related to the water quality predictions, particularly with respect to providing supporting data/information on the water quality predictions:

- DDMI did not provide the data or detailed methods it used to estimate the water quality predictions (ECCC comments 2 and 3; EMAB comments 5 and 6; GNWT ENR comment 1 and 2; WLWB comments 19 and 20);
  - In response to these comments, DDMI provided data tables and more detailed information on how it calculated the predictions. The Board is of the opinion that this response addresses the questions.
- DDMI quantitatively assessed the increase in discharge loadings to Lac de Gras for total dissolved solids (TDS), total nitrogen (TN) and total phosphorus (TP); while effects on other parameters were evaluated qualitatively (ECCC comment 1; WLWB staff comments 17 and 18);
  - In response to ECCC comment 1, DDMI provided a summary table for the additional parameters from Well 19 that were not presented in the Summary Environmental Assessment (i.e., in addition to TDS, TN and TP). Overall DDMI summarized that it “does not expect there to be a change to the overall mine effluent quality”. The Board also notes that DDMI listed the following as a mitigation below: “As a requirement of the existing Mine Water Licence, water Discharged from the NIWTP to Lac de Gras will meet EQC in the Water Licence”;
  - In response to WLWB staff comment 17, DDMI provided additional information on why it only assessed TDS, and not the individual ions that make up TDS (e.g., calcum, chloride, sodium and sulphate). DDMI stated that the assessment of TDS would inherently consider the constituent ions (i.e., calcium, chloride, sodium, and sulphate). DDMI also stated that “the predicted changes in TDS concentration in the receiving environment were assumed to be proportional to the expected changes in dissolved ion concentrations” and since “only a slight increase in TDS loading is expected, measurable changes in TDS concentrations are unlikely”. DDMI also stated that “Monitoring programs (i.e., Surveillance Network Program [SNP], AEMP) are already in place at the Mine to monitor and respond to effects on lake
water quality through adaptive management, if required”. Based on this additional information provided and the information in the Application, the Board is of the opinion that this explanation has addressed the question;

- In response to WLWB staff comment 18, DDMI provided additional information on why it did not directly assess the parameters that triggered Action Level 2 in the AEMP Response Framework. DDMI stated that “parameters considered in detail for the Summary EA for the Project included those most likely to result in biological effects based on the ongoing AEMP for Lac de Gras (i.e., nutrient enrichment), most notably TP” and that the “effects on concentrations of metals were evaluated qualitatively based on treatment efficiency for TSS, which is a major driver of metal and TP concentrations in Mine effluent.” DDMI also responded that “an Action Level 2 trigger does not equate to existing risk to the aquatic environment”. Based on the additional information provided and the information in the Application, the Board is of the opinion that this explanation has addressed the question.

- DDMI indicated that “TP loadings varied widely in Lac de Gras since 2002, from 37 kg/year (2002) to 742 kg/year (2013) with an overall increasing trend”, but did not provide a reason for this variability in TP loadings over time (which is relevant to understanding TP loads expected from the Project) (WLWB comment 23). DDMI also indicated that “TP affected area resulting from loadings under the Project is qualitatively predicted to be up to 10% of Lac de Gras, localized in the area near the diffuser” but it was unclear if this area was conservative enough given the variability of the TP loads and lake areas affected over time (WLWB staff comment 25).

- In response to comment 23, DDMI provided additional information on the TP loading variability in the lake that indicated that the years where the TP loads were increasing would have been due to treatment of increased volumes of water. However, the TP loads have since been decreasing since 2013 due to improvements to the North Inlet Water Treatment Plant (NIWTP). The Board is of the opinion that this additional information has addressed the question;

- In response to comment 25 DDMI indicated that 10% was conservative since the upper estimate of TP load to Lac de Gras from the existing Diavik Mine operations plus the A21 Below Pit Operations is 487 kg/yr and the area of Lac de Gras with TP concentrations above the Normal Range has been
significantly less that 10% every year that the effluent TP load was below 500 kg.

- EMAB raised another concern related to potential water management issues from the potential mining methods. In the Project Description, DDMI describes possible mining methods for the Project that can be conducted under a dry or flooded pit-bottom surface. EMAB commented that “Information on the potential effects that may arise from conducting these activities under flooded-pit conditions is not provided” (EMAB comment 4).
  - DDMI responded to EMAB’s comment that if the A21 pit was partially flooded during mining “this physical barrier (i.e. the A21 Dike) would constrain any potential impact within the current DDMI Water and Waste Management systems”. DDMI also indicated that “In pit water would likely be maintained at a depth of about 5m” and “this water cap thickness would be maintained by removing additional water from groundwater inflow using the current water management system”. DDMI also stated that “Excess water would be sent to the North Inlet for treatment prior to discharge” and that it successfully “managed large volumes of high TSS waters during the construction and dewatering of A21” and that it “did not experience any issues treating higher TSS water”. DDMI also stated that “If the North Inlet and NIWTP were unable to effectively remove excess TSS, DDMI could use Pond 3 as an additional intermediate settling pond”. Since DDMI has indicated that the current water management system would be able to handle potential water management issues with this mining method, the Board does not think the flooded pit mining scenario might have a significant adverse impact on the environment or might be a cause of public concern.

- Mitigations:
  - DDMI included the following mitigations in the Summary Environmental Assessment:
    - “All decant water from the tailings storage facility, waste or ore stockpiles, as well as effluents and runoff from the Processing Plant and the mining area is recycled into the Processing Plant or directed to the NIWTP for treatment before releasing into the lake;
    - A mine Water Management Plan will be implemented for the Project and will be based on previous experience at site;
    - As a requirement of the existing Mine Water Licence, water Discharged from the NIWTP to Lac de Gras will meet EQC in the Water Licence;
    - Water discharged from the NIWTP to Lac de Gras is monitored as part of the overall...
mine water management program (i.e., SNP), as well as in the receiving environment (i.e., AEMP), which provides input for adaptive management.”

- Board Analysis and Determination
  - Based on the mitigations described above, the water license requirements (i.e. Part H, Condition 26 of the Water License “shall ensure that all Discharges to Lac de Gras from the Water Treatment Facilities...meet the...Effluent Quality Criteria”), as well as the results of DDMI’s assessment on the predicted changes in water quality, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.

<table>
<thead>
<tr>
<th>Surface water quality changes in Lac de Gras</th>
<th>Processed Kimberlite (PK) management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concerns:</strong></td>
<td></td>
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<tr>
<td>o Identified by DDMI: In the Summary Environmental Assessment, DDMI indicated that “Storage of PK generated from the Project may cause changes in surface water quality in Lac de Gras, which may lead to effects to fish and fish habitat, soils, vegetation, caribou, carnivores, raptors, aquatic and migratory birds, and land use and traditional land use, and community health and well-being.”</td>
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<td>o Identified during the public review: No comments were received during the public review related to this potential impact.</td>
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<tr>
<td><strong>Mitigations</strong></td>
<td></td>
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<tr>
<td>o DDMI included the following mitigations in the Summary Environmental Assessment:</td>
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</tbody>
</table>
  - “Storage of PK for the Project will be in approved facilities, as per existing Mine operations;
  - As a requirement of the existing Mine Water License, water discharged from the NIWTP to Lac de Gras will meet EQC in the Water License;
  - Water discharged from the NIWTP to Lac de Gras is monitored as part of the overall Mine water management program (i.e., SNP), as well as in the receiving environment (i.e., AEMP), which provide input for adaptive management.” |
<p>| <strong>Board Analysis and Determination</strong>        |                                     |
| o DDMI indicated in the Summary Environmental Assessment that since a change to PK storage and management is not expected as a result of the Project, this interaction was determined to have no linkage to effects to surface water quantity and quality, fish and fish habitat, soils, vegetation, caribou, carnivores, raptors, aquatic and migratory birds, land use and traditional land use, and community health and well-being”. Based on this information, and the available mitigations listed above, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern. |</p>
<table>
<thead>
<tr>
<th>Surface water quality changes in Lac de Gras</th>
<th>Reconnection of Lac de Gras and the local hydrological system after closure of the project.</th>
<th>concern.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concern:</strong></td>
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<tr>
<td>• <strong>Identified by DDMI:</strong> As described in the Summary Environmental Assessment, at closure, decommissioning of the site would occur (e.g., removal of equipment and infrastructure) and the A21 underground and pit would be flooded with water from Lac de Gras. DDMI indicated that the “Project may alter post-closure surface water quality in Lac de Gras following all closure and reclamation activities, which can influence fish and fish habitat, caribou, carnivores, raptors, aquatic and migratory birds, land use and traditional land use, and community health and well-being”.</td>
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<tr>
<td>• <strong>Identified during the public review:</strong> In Section 6.4.3.10 of the Summary Environmental Assessment, DDMI indicated that “The Project has the potential to affect groundwater inflows to the bottom of the A21 pit during post-closure” but “due to the presence of meromixis within the pit, this is not expected to measurably affect water quality predictions for the mixolimnion (upper layer of the pit), or Lac de Gras”. As DDMI explains, “[m]eromixis occurs when water below a certain depth does not undergo physical mixing with the upper layer, due to its high density relative to the density of the upper layer”. DDMI also states that “[m]eromixis is anticipated because of the combination of higher salinity groundwater continually entering the pits at depth, the pit geometry resulting in very deep water with steep sides, and a relatively small lake surface area protected from wind-driven mixing by the residual dike sections.” EMAB commented that other modeling on the A21 pit (related to the processed kimberlite (PK) deposition to underground amendment) suggested that meromixis “is expected to break down over some time period (on the order of decades), dispersing the contaminant load from the deep waters into the shallower pit waters and Lac de Gras once the lake is reconnected to the pit” (EMAB comment 2).</td>
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<td>• In response to EMAB’s comment on meromixis, DDMI responded that “the proposed A21 Below Pit Project would result in a deeper pit [than what was previously modeled] with an open sub-level retreat (SLR) which will improve the stability of meromixis at closure”. The Board notes, as indicated in the mitigations below, that as part of the CRP, DDMI must provide “contingencies for Pit Water treatment during closure” and that the Pits will be re-connected to Lac de Gras as per the final approved CRP.</td>
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<td>• <strong>Mitigations:</strong></td>
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<tr>
<td>• A Closure and Reclamation Plan (CRP) is required under Park K, Condition 1 of the License. As per the License, the CRP shall include “contingencies for Pit Water treatment during closure”</td>
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<tr>
<td>Issue</td>
<td>Description</td>
<td>Analysis and Determination</td>
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<td>--------------------------------------------------------</td>
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<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Surface water quantity and quality changes in downstream waterbodies</td>
<td>Removal of project infrastructure at closure</td>
<td><strong>Concern:</strong>&lt;br&gt;o Identified by DDMI: In the Summary Environmental Assessment, DDMI indicated that “following completion of the A21 underground mining, the removal of Project infrastructure will occur, which may alter surface water quantity and quality, which can influence fish and fish habitat, caribou, carnivores, raptors, aquatic and migratory birds, and land use and traditional land use.”&lt;br&gt;o Identified during the public review: No comments were received during the public review related to this potential impact.</td>
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<td>o Based on the mitigations described above, the Board does not think activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.</td>
</tr>
<tr>
<td>Groundwater and surface water quality</td>
<td>Management of South Waste Rock Storage Area</td>
<td><strong>Concerns:</strong>&lt;br&gt;o Identified by DDMI: In the Summary Environmental Assessment, DDMI indicated that “Seepage from the waste rock disposal areas and kimberlite stockpiles can cause changes in groundwater and surface water quality.”</td>
</tr>
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<td></td>
<td></td>
<td>o Based on the mitigations described above, the Board does not think activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.</td>
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</tbody>
</table>
| Changes from Seepage; soil and vegetation changes from Seepage | Country Rock Pile (South WRSA) and kimberlite stockpiles | groundwater and surface water quality”. Seepage from Waste Rock piles that contain potentially acid-generating Waste Rock may have a significant influence on the resulting water quality due to localized development of acidic conditions and therefore increase rates of sulphide oxidations and metal release. DDMI also indicated that "ingestion of soil, vegetation, or water that has been chemically altered by seepage from waste rock piles and kimberlite stockpiles” could also cause effects “to caribou, carnivores, raptors, aquatic and migratory birds, land use and traditional land use, and community health and well-being”.

- Identified during the public review: During the public review, DDMI was asked questions on the geochemical characterization of the A21 underground. In the Project Description Report with the Application, DDMI provided an overview of the geochemical characterization of the A21 footprint; however, the characterization was for depths in the open pit at A21, not for the underground (DDMI response to EMAB comment 3). Even though DDMI assumes that the underground Waste Rock will be non-PAG (since 99.5% of the open pit has been non-PAG), there has been no drilling program at the underground depths to support this.

- Mitigations:
  - DDMI committed “to characterize A21 Below Pit waste rock during active development” and that “[s]hould A21 Below Pit Operations proceed, verification methodology for [underground] UG development waste rock would be approved through an updated Waste Rock Management Plan” (response to EMAB comment 3).
  - While DDMI does state that it is unlikely that Waste Rock from the Project would be PAG, it is unclear if the North Waste Rock Storage Area could accommodate this rock if it were PAG. A Waste Rock Management Plan (WRMP) is required by the License (Part H, Condition 8) and provides the details on how and where Waste Rock will be segregated, including the placement of Type III (or PAG) Waste Rock. The WRMP must also include “a description of the verification program that will be used to confirm Waste Rock by type and potential uses, in particular to verify that Type I rock that will be used in construction is non-PAG”. The verification program will assist DDMI in properly classifying the Waste Rock so that PAG rock is properly managed. DDMI has committed to providing an updated Waste Rock Management Plan to include this Project. This updated Plan would undergo a public review, which would allow for reviewer comments and recommendations.
  - The Closure and Reclamation Plan is a requirement of the License (Part K, Condition 1) and includes the closure plan for the Waste Rock Storage Areas.
  - DDMI included the following mitigations in the Summary Environmental Assessment:
    - Waste Rock generated from the Project will be stored within the existing [south
WRSA], which has been sized to store all A21 waste rock. Portions of the waste rock may be hauled from the A21 pit to other areas of the Mine site to complete closure and reclamation activities;
- The rock mined from the Project will be primarily tonalite and pegmatite (i.e., non-potentially acid generating [non-PAG]) rock;
- Monitoring programs and the WRMP are implemented at the Mine, which provide input for adaptive management;
- Seepage is monitored and managed, if necessary, as described in the WRMP.”

**Board Analysis and Determination**
- Based on the mitigations described above and the responses to the public review comments, the Board does not think these activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.

<table>
<thead>
<tr>
<th>Groundwater and Surface water quality and quantity changes</th>
<th><strong>Concerns:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater inflow to the underground mine workings</td>
<td>• <strong>Identified by DDMI:</strong> In the Summary Environmental Assessment, DDMI indicated that “groundwater inflow to the Project may alter local or regional groundwater quality”. DDMI indicated that “mining of the underground portion of the A21 kimberlite pipe will induce groundwater to flow toward the underground operation” and “this inflow will consist of moderate TDS groundwater from deep bedrock and low TDS groundwater from surface water sources” which can affect surface water quantity and quality.</td>
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<td></td>
<td>• <strong>Identified during the public review:</strong> No comments were received during the public review related to this potential impact.</td>
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<tr>
<td></td>
<td>• <strong>Mitigations:</strong></td>
</tr>
<tr>
<td></td>
<td>• DDMI included the following mitigations in the Summary Environmental Assessment:</td>
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<td>• “A Water Management Plan will be implemented for the project and will be based on previous experience at site;</td>
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<td></td>
<td>• The SNP and AEMP implemented at the Mine will encompass the Project and provide input for adaptive management;</td>
</tr>
<tr>
<td></td>
<td>• During mining, sumps, the water conveyance system, and pumping will be employed to manage water entering the underground workings. Groundwater inflows collected in the A21 underground will be pumped out via a Pipeline and treated prior to discharge back to Lac de Gras</td>
</tr>
<tr>
<td></td>
<td>• <strong>Board Analysis and Determination:</strong></td>
</tr>
</tbody>
</table>
|                                                           |   • The Board notes that the Summary Environmental Assessment also stated that “No measurable reduced water levels in the surrounding lakes are anticipated in response to A21
underground dewatering based on operating experience and data gained at the Mine over the past 14 years of Mine operations.” Based on this information and the mitigations described above, the Board does not think activities associated with the Project might have a significant adverse impact on the environment or might be a cause of public concern.
2.3 Summary of Potential Environmental Impacts

Based on the evidence provided above, the Board considered whether the A21 Underground Project might have a significant adverse impact on the environment. Mitigation measures for various potential impacts are specifically identified in Table 1 above. In general, impacts of the A21 Underground Project on the environment can be mitigated through:

- The use of Water License conditions of two general types (as listed below), both of which will be discussed in further detail by all parties through the Water Licensing process (as set out in the Work Plan established by the WLWB). The conditions in the License would be finalized by the Board following completion of the Water Licensing proceeding and after providing opportunities for comments from all Parties and the public:
  1. conditions in the existing DDMI Water License, including management and monitoring plans, that will be applied to the A21 Underground Project with revisions where necessary to account for unique characteristics of the A21 Underground Project;
  2. new or unique conditions that may be needed to mitigate specific aspects of the A21 Underground Project that may not be covered by the conditions in the existing License, and which may be established by the Board as per the MVLWB Standard Process for Creating New Conditions.

2.4 Public Concern

In addition to determining if the development might have a significant adverse impact on the environment, the Board must also consider whether a proposed development might be a cause of public concern. Although public concern may be less clearly defined than the questions related to significant adverse environmental impacts, it is the Board’s responsibility to evaluate public concern as a potential trigger for an Environmental Assessment.

The Board notes that no reviewers voiced public concern in review of the application. In addition, in reviewing the comments provided during the public review the Board did not identify any comments or issues that indicate a possible cause for public concern.

2.5 Preliminary Screening Recommendations from Reviewers

As part of the public review, EMAB commented that “further analysis through an environmental assessment does not appear to be needed” (EMAB comment 7). EMAB provided the following rationale:

The information provided in the "Project Description - A21 Below Pit Mining Project" including the "Summary Environmental Assessment" (Appendix B) indicates that potential effects of the proposed project are not substantially different or greater than those associated with existing activities at the Diavik Diamond Mine. With the exception of specific issues raised in this memo [(i.e., security updates, water quality predictions, flooded pit mining, Waste Rock geochemistry)] it appears that potential effects can be managed through effective implementation of mitigation measures described in the designs and plans that are part of the existing regulatory structure.

No other reviewers made specific recommendations regarding the screening determination.
2.6 Conclusion

The Board have reviewed all the evidence received from DDMI and reviewers with respect to the Preliminary Screening of the proposed Diavik A21 Underground Project. Based on the information provided in the application and the public review, it is the Board’s view that there is not enough evidence to suggest that the proposed underground mining of the A21 kimberlite pipe might have a significant adverse impact on the environment or might be a cause of public concern and therefore, has decided not to refer the Project to Environmental Assessment. If the Board does not receive a notice of referral to environmental assessment by February 10, 2020, the Board will resume the Water Licensing process as outlined in the Work Plan.

Signed the 30th day of January 2020, on behalf of the Wek’èezhii Land and Water Board

Witness

Joe Mackenzie
Chair, Wek’èezhii Land and Water Board