

Diavik Diamond Mines (2012) Inc.  
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Yellowknife, NT X1A 2P8  
Canada  
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Joseph Mackenzie, A/Chair  
Wek'èezhii Land and Water Board  
PO Box 32  
Wekweètì, NT X1A 3S3  
Canada

1 June 2018

Dear Mr. Mackenzie:

**Subject: DDMI Water License W2015L2-0001 Amendment Request for the Deposition of Processed Kimberlite to Mine Workings**

Please accept the attached Water License Amendment Application and supporting documents for Diavik Diamond Mines (2012) Inc. (DDMI) request to amend Water License WL2015L2-0001 to allow for the deposition of Processed Kimberlite (PK) material into mine workings. Additionally, DDMI has proposed administrative updates to the Water License to remove select Items that have been completed and incorporate previous directives issued by the Wek'èezhii Land and Water Board (WLWB or 'the Board').

The primary purpose of this amendment request is to allow the option of placing PK material from the Process Plant into the mine workings. DDMI has had the opportunity to meet with community and regulatory stakeholders in early 2018 and there appears to be general support for this concept. DDMI seeks to confirm this support as part of the amendment process and obtain regulatory confirmation of the option to place this material into mine workings. DDMI expects that this process will clarify the additional information, approvals and timeline required to advance this project from conceptual engineering to a final design. Further information on this proposed amendment is included as Attachment-1: Amendment Overview – Deposition of Processed Kimberlite into Mine Workings.

DDMI has attempted to identify the relevant Items to address the design, management and monitoring requirements related to placement of PK materials into mine workings and incorporate these proposed additions into WL2015L2-0001. These are defined in Attachment-2: W2015L2-0001 Proposed Amendments, which is provided in 'track change' mode in an effort to streamline the review process. Recognizing that placement of PK material in mine workings would not be initiated until approximately 2022, this amendment request includes a provision for providing updated Management Plans and Design Reports in time, however the application itself does not include updated versions of these documents.

As the Diavik mine has advanced, a number of Water License requirements have been completed and are no longer relevant to the operation. The WLWB review process has also resulted in Directives issued by the Board that are requirements for Diavik to achieve, but are not necessarily incorporated into the License itself. This amendment process provided an opportunity for a thorough review of the Water License to incorporate these types of administrative updates that

improve transparency and clarify DDMI's compliance requirements. These administrative revisions are included in Attachment-2, complete with the rationale for the proposed change.

Please note that there are no proposed changes to the Effluent Quality Criteria developed for the Diavik mine in relation to this amendment.

Should you have any questions regarding this submission, please contact the undersigned at [sean.sinclair@riotinto.com](mailto:sean.sinclair@riotinto.com).

Yours sincerely,



Sean Sinclair  
Superintendent, Environment

cc:      Kassandra DeFrancis, WLWB  
          Sarah Elsasser, WLWB

Attach: DDMI Water License Amendment Application  
          Attachment-1: Amendment Overview – Deposition of Processed Kimberlite into Mine  
          Workings  
          Attachment-2: W2015L2-0001 Proposed Amendments (in track changes)



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 www.wlwb.ca

**APPLICATION FOR A NEW WATER LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE**

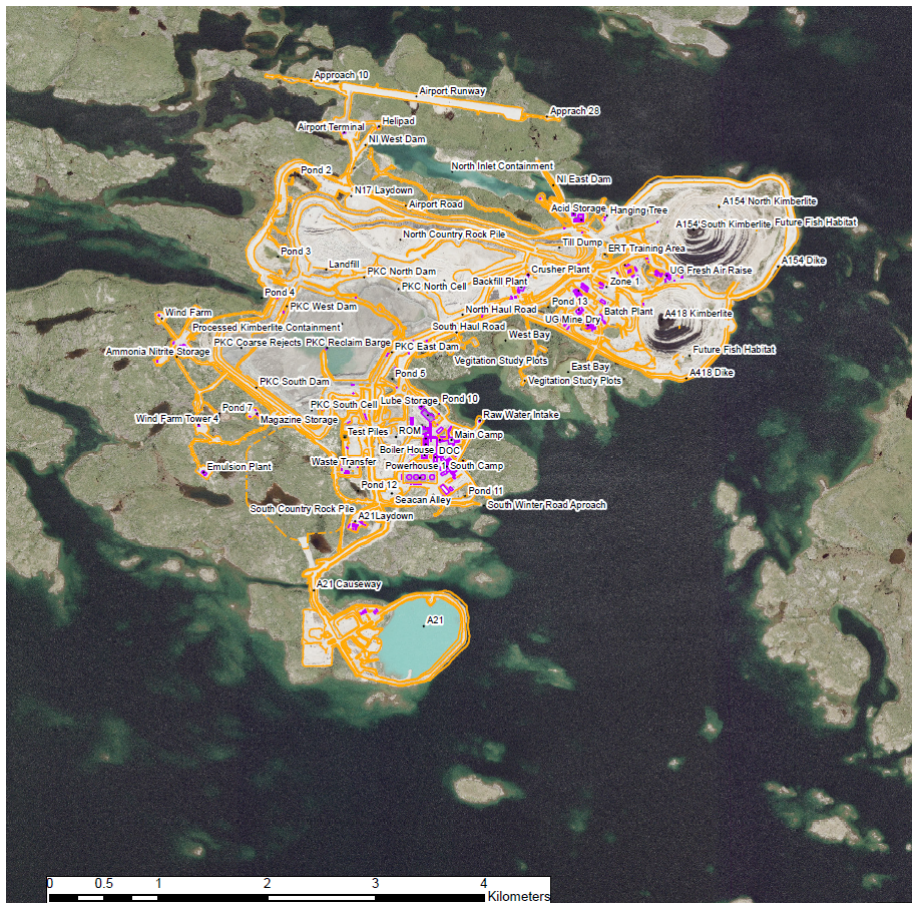
**Application/Licence No:** W2015L2-0001

(amendment or renewal only)

<p><b>1. Name and Mailing Address of Applicant</b></p> <p>Diavik Diamond Mines (2012) Inc. (DDMI)          Suite 300, 5201 - 50th Ave          P.O. Box 2498          Yellowknife, NT X1A 2P8</p> <p>Telephone: 867.669.6500</p> <p>Fax: 866.313.2754</p>	<p><b>2. Address of Head Office in Canada if Incorporate</b></p> <p>Same as in #1</p>
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**3. Location of Undertaking (Describe and attach a map, indicating watercourses and location of any proposed waste deposits).**

The Diavik Diamonds Project is located on and adjacent to the east island located on the eastern side of Lac de Gras, which is approximately 300 kilometers northeast of Yellowknife. Please refer to the attached GIS data for a full quality 1:50,000 scale map of the mine.



Latitude 64 degrees 31 min. north

Longitude 110 degrees 20 min. west

#### 4. Description of Undertaking (Describe and attach plans)

In brief, the undertaking involves the dewatering of inland lakes, the construction of dikes adjacent to the east island, transferring of water, followed by open pit mining and underground mining to excavate kimberlite from four identified economical kimberlite pipes and mine closure.

The kimberlite will be processed to extract diamonds. Mined country rock will be placed on the east island with a considerable amount of the material being utilized in dike construction. All other infrastructure associated with the undertaking will be located on the east island.

The *Comprehensive Study Report* [CSR.pdf](#) provides a more complete description.

With this Amendment Application, DDMI is requesting confirmation of the option to place Processed Kimberlite (PK) material into underground/open pit mine workings. Attachment-1 – Amendment Overview, Deposition of Processed Kimberlite into Mine Workings, focuses on the A418 mine workings. However, DDMI is requesting to place PK material into any mine workings, acknowledging that the mine plan may change and impact the availability of specific mine workings.

Proposed revisions to Water License W2015L2-0001 that reflect the conditions and approvals required prior to commencing placement of PK in mine workings have been included in Attachment-2 - W2015L2-0001 Proposed Amendments, 2018. In addition to these revisions, DDMI is requesting administrative updates to select Items in the license, including the expiry date. The purpose of the proposed changes are to clarify license requirements, capture WLWB Directives issued since the License came into effect, remove requirements that no longer apply and correct administrative errors. All proposed changes are identified in a track changes version

of W2015L2-0001 (Attachment-2) and include comments which describe the associated rationale for each change.

**5. Type of Undertaking.**

- |                       |              |                  |       |
|-----------------------|--------------|------------------|-------|
| 1. Industrial         | _____        | 5. Agriculture   | _____ |
| 2. Mining and Milling | <u>  X  </u> | 6. Conservation  | _____ |
| 3. Municipal          | _____        | 7. Recreation    | _____ |
| 4. Power              | _____        | 8. Miscellaneous | _____ |

**6. Water Use**

- |  |              |                                      |              |
|--|--------------|--------------------------------------|--------------|
| To obtain water                            | <u>  X  </u> | Flood control                        | _____        |
| To cross a watercourse                     | _____        | To divert water                      | <u>  X  </u> |
| To modify the bed or bank of a watercourse | <u>  X  </u> | To alter the flow of, or store water | <u>  X  </u> |

Other (describe): \_\_\_\_\_

**7. Quantity of water involved (litres per second, litres per day or cubic meter per year), including both quantity to be used and quality to be returned to source.**

The mine operations use water from Lac de Gras as make-up water to supplement recycle water for ore processing. DDMI's current and proposed future Water License state a maximum annual withdrawal rate of 1.28 Mm<sup>3</sup> for domestic, mining, milling and associated purposes and includes pre-determined Water Quality Objectives for mine effluent. No amendment to water quantity or quality has been requested.

**8. Waste deposited (quantity, quality, treatment and disposal)**

A Waste Management Plan for the proposed activities is to be developed in accordance with the Board's *Guidelines for Developing a Waste Management Plan* (accessible at [www.mvlwb.com](http://www.mvlwb.com)) and submitted as an attachment to the application form. A template for this Plan is provided in the Guidelines. Applications for a municipal licence do not need to include a Waste Management Plan as this information is required under the Operation and Maintenance Plan.

In addition, applicants are referred to the Board's *Water and Effluent Quality Management Policy* (accessible at [www.mvlwb.com](http://www.mvlwb.com)) to understand the Board's approach

to managing the deposit of waste into the receiving environment through enforceable terms and conditions set in water licences.

DDMI developed a Waste Management Plan in accordance with the Board's Guidelines and the most recent version of this Plan (Version 2) was submitted to the Board on December 8, 2017 and approved by the Board on February 23, 2018. Water License W2015L2-0001 at Part H Item 12 specifies that the Waste Management Plan must be submitted 90 days prior to any proposed changes to the requirements in the approved Plan. DDMI expects that placement of PK material in mine workings would not occur until 2022 and therefore requests that a revised Waste Management Plan be submitted as per Part H Item 12, rather than with this amendment application.

**9. Other persons or properties affected by this Undertaking (give name, mailing address and location). Attach a list if necessary.**

The *Comprehensive Study Report* [CSR.pdf](#) includes descriptions of potentially affected parties and the approved Engagement Plan lists the Affected Parties for the Diavik mine. There are no potential affects to nearby operators.

**10. Predicted environmental impacts of Undertaking and proposed mitigation.**

As part of the response to this section, a spill contingency plan for the proposed activities is to be developed in accordance with INAC's *Guidelines for Spill Contingency Planning, April 2007*. (Accessible at <http://www.ainc-inac.gc.ca/ai/scr/nt/pdf/SCP-EUD-eng.pdf>). This plan is to be submitted as an attachment to the application form.

The *Comprehensive Study Report* [CSR.pdf](#) includes descriptions of predicted environmental impacts for the Diavik mine and proposed mitigations. While the *Comprehensive Study Report* did not specifically consider potential environmental effects associated with deposition and storage of processed kimberlite into mine workings, preliminary studies suggest that management of PK material and its associated decant water will minimize potential environmental effects. There is continued expectation that there will be no significant adverse environmental effects. Potential environmental impacts from the proposed deposition and storage of processed kimberlite in mine workings are summarized below along with planned mitigation measures.

<b>Potential Impacts</b>	<b>Mitigation(s)</b>
Climate and Air Quality <ul style="list-style-type: none"> <li>• Increased dust generation during pipeline construction</li> <li>• Decreased dust generation during operations due to fewer trucks hauling CPK</li> <li>• No significant adverse effects anticipated</li> </ul>	<ul style="list-style-type: none"> <li>• Dust control following established procedures.</li> <li>• Maximize transport of PK by pipeline, as feasible.</li> <li>• New pipeline alignment twinned with existing pipelines where possible.</li> </ul>

Potential Impacts	Mitigation(s)
<p>Global Climate Change</p> <ul style="list-style-type: none"> <li>• Length of pipeline for PK deposition is longer, requiring more energy</li> <li>• Pipeline has net elevation loss, which requires less energy than the existing pipeline that gains elevation</li> <li>• Decreased vehicle emissions during operations due to fewer trucks hauling CPK</li> <li>• No significant increase in GHG emissions</li> </ul>	<ul style="list-style-type: none"> <li>• Optimize pipeline design to minimize operational energy requirements where feasible.</li> <li>• Maximize transport of PK by pipeline, as feasible.</li> </ul>
<p>Vegetation and Terrain</p> <ul style="list-style-type: none"> <li>• Loss of vegetation due to new pipeline construction</li> <li>• No significant adverse effects anticipated</li> </ul>	<ul style="list-style-type: none"> <li>• New pipeline alignment twinned with existing pipelines, or placed in other developed areas, where possible.</li> </ul>
<p>Wildlife</p> <ul style="list-style-type: none"> <li>• Loss of wildlife habitat due to new pipeline construction</li> <li>• Increased potential for wildlife interaction/disruption near new pipeline</li> <li>• Potential improvement in post-closure surface conditions for wildlife if it proves feasible to move PK slimes (extra fine PK) to mine workings</li> <li>• No significant adverse effects anticipated</li> </ul>	<ul style="list-style-type: none"> <li>• New pipeline alignment twinned with existing pipelines where possible.</li> <li>• Pipeline construction and operation following established site methods.</li> <li>• Existing site procedures for wildlife reporting and ensuring wildlife have right-of-way will continue to be implemented.</li> <li>• Evaluate feasibility/practicality of moving slimes from the PKC Facility to mine workings to minimize potential post-closure impacts of the PKC Facility on wildlife.</li> </ul>
<p>Surface Water</p> <ul style="list-style-type: none"> <li>• Decrease in mine water discharge to Lac de Gras as mine working areas are filled with PK.</li> <li>• Potential change in mine and/or discharge water quality during operations.</li> <li>• Potential change in post-closure water quality in flooded mine areas.</li> <li>• Potential for reduced seepage from the PKC Facility post-closure, if a dry cover option proves feasible.</li> <li>• Potential for pipeline rupture and release of PK to the receiving environment.</li> <li>• No significant adverse effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>• Optimize operational level of decant water, where practical, to manage seepage to other mine workings.</li> <li>• Bulkheads designed and constructed to prevent the flow of PK material or decant water into the A154 mine.</li> <li>• Reuse decant water via transfer to the Process Plant; alternatively transfer decant water to the North Inlet for treatment prior to discharge</li> <li>• Placement of a water cap atop the PK in mine workings at closure; depth of water cap to limit post-closure resuspension of PK.</li> <li>• Water circulation within the closure water cap to be optimized for water quality.</li> <li>• Pipeline alignment on upstream side of roads/berms to contain possible spills.</li> <li>• Evaluate feasibility/practicality of moving slimes from the PKC Facility to the mine workings to facilitate a dry-cover closure option for the PKC Facility, likely reducing potential post-closure seepage.</li> </ul>

Potential Impacts	Mitigation(s)
<p>Groundwater</p> <ul style="list-style-type: none"> <li>Decrease in groundwater inflows to mine workings as areas are filled with PK.</li> <li>No significant adverse effects anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Optimize operational level of decant water, where practical, to manage seepage to other mine workings.</li> <li>Bulkheads designed and constructed to prevent the flow of PK material or decant water into the A154 mine.</li> <li>Any seepage that may occur will be collected and transported to the Process Plant or the North Inlet.</li> </ul>
<p>Fish and Fish Habitat</p> <ul style="list-style-type: none"> <li>A potential change in post-closure water quality in flooded mine areas could affect constructed fish habitat.</li> <li>Potential for uptake of PK material by fish after closure.</li> <li>No significant adverse effects anticipated</li> </ul>	<ul style="list-style-type: none"> <li>Depth of closure water cap that limits post-closure resuspension of PK.</li> <li>Optimize the post-closure elevation of the PK surface in mine workings to limit the potential for direct interaction with fish.</li> <li>Water circulation within the closure water cap to be optimized for fish and fish habitat.</li> </ul>
<p>Socio-Economic</p> <ul style="list-style-type: none"> <li>No identified changes to socio-economic impacts</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>

The most recent version of DDMI's Contingency Plan (Version 22), which includes spill contingency plans in accordance with INAC 2007, was submitted to the WLWB on September 7, 2017 and approved by the WLWB on October 24, 2017. Water License W2015L2-0001 at Part I Item 2 specifies that the Contingency Plan must be submitted 90 days prior to any proposed changes to the requirements in the approved Plan. DDMI expects that placement of PK material in mine workings would not occur until 2022 and therefore requests that a revised Contingency Plan be submitted as per Part I Item 2, rather than with this amendment application.

**11. Contractors and sub-contractors (names, addresses and functions). Attach a list if necessary.**

Over the past 15 years, Diavik has retained a number of contractors in order to complete the environmental baseline studies, impact assessment studies, engineering studies and environmental monitoring programs. Listed below are the key consultants involved in the areas related to the water license:

- i) Bryant Environmental Consulting Ltd/Acres International  
Yellowknife, N.T. X1A 2N9  
(Function - Baseline data collection in 1994 and 1995)
- ii) Golder Associates  
Yellowknife, NT  
(Function - Baseline data collection for water quality, fisheries, hydrology, EA document, monitoring studies, Geotechnical and Hydrogeological investigations, AEMP, air quality)
- iii) Vista Engineering  
Yellowknife, N.T. X1A 2P5



- (Function - Baseline data collection and air quality)
- iv) Sala Groundwater Inc  
Dr. David Blowes  
University of Waterloo  
Waterloo, Ontario  
(Function - Baseline geochemistry program)
- v) Geochemica  
Mr. Mark Logsdon  
Ojai, California  
(Function - baseline geochemistry programs)
- vi) Jacques Whitford Consulting Engineers and Environmental Consultants  
Yellowknife, NT  
(Function - Collection of meteorological/climate baseline data, environmental monitoring studies)
- vii) Cirrus Consultants  
Vancouver, B.C. V6B 4M9  
(Function - Impact analysis for air quality - 1998)
- viii) EBA Engineering Consultants Ltd  
Edmonton, Alberta T5L 2M7  
(Function - Geotechnical/foundation investigations)
- ix) Acres International Engineering Ltd  
Calgary, Alberta T2W 4X9  
(Function – Design Engineering)
- xi) Nishi-Khon / SNC Lavalin  
Calgary, Alberta  
(Function – Design Engineering)
- xii) Rescan Environmental Services Ltd  
Yellowknife, NT  
(Function – Environmental monitoring studies)
- xiii) Dillon Consulting Ltd.  
Yellowknife, NT  
(Function – Environmental monitoring studies)
- xiv) Canadian Rivers Institute and University of Manitoba  
Winnipeg, Manitoba  
(Function – Environmental monitoring studies)
- xv) Rae Band  
(Function – fish salvage programs)
- xvi) Kitikmeot Inuit Association  
(Function – fish salvage programs)
- xvii) University of Alberta  
Edmonton, Alberta  
(Function – Environmental monitoring studies, test piles research, revegetation studies)
- xviii) University of British Columbia  
Vancouver, B.C.  
(Function – Environmental monitoring studies, test piles research)
- xix) University of Waterloo  
Waterloo, Ontario  
(Function – Environmental monitoring studies, test piles research)
- xx) University of Saskatchewan

- Saskatoon, Saskatchewan  
(Function – Environmental monitoring studies)
- xxi) AMEC Earth and Environment  
Vancouver, B.C.  
(Function – closure planning and engineering)
- xxii) ERM Rescan  
Vancouver, B.C.  
(Function – air quality, risk assessment)
- xxiii) Environmental Monitoring Advisory Board  
Yellowknife, NT  
(Function – Community Based monitoring programs)

**12. Studies undertaken to date. Attach a list if necessary.**

Please refer to the attached list of relevant reports that could apply or be considered in relation to the proposed amendment. Section 3 of Attachment-1 outlines the relevant information from current studies being conducted in relation to placing PK in the mine components; these are in progress and are not yet available for release.

**13. Proposed time schedule.**

Start date: 2000

Completion date: Post-Closure Monitoring 2030

Name (print): Sean Sinclair Signature:



Title (print): Superintendent, Environment Date: May 31, 2018

***Please make all cheques payable to "Receiver General of Canada"***

***FOR OFFICE USE ONLY***

**Application Fee Amount:**

**\$\_\_\_\_\_**

**Receipt No:**

\_\_\_\_\_

**Water Use Deposit Amount:**

**\$\_\_\_\_\_**

**Receipt No:**

\_\_\_\_\_

## Summary of Studies Undertaken to Date

[\\*Reports are available on the WLWB Public Registry](#)

### Submission Date (d/m/year )

### Report Title\*

#### Annual Reports

31-3-2018	2017 Annual Seepage Survey Report
31-3-2018	2017 Annual Water License Report
31-3-2017	2016 Annual Seepage Survey Report
31-3-2017	2016 Annual Water License Report
31-3-2016	2015 Annual Seepage Survey Report
31-3-2016	2015 Annual Water License Report
31-3-2015	2014 Annual Seepage Survey Report
31-3-2015	2014 Annual Water License Report
31-3-2014	2013 Annual Water License Report
25-3-2013	2012 Annual Seepage Survey Report
26-3-2013	2012 Annual Water License Report
30-3-2012	2011 Annual Water license Report
31-3-2011	2010 Annual Water License Report
31-3-2010	2009 Annual Water License Report
31-3-2009	2008 Annual Water License Report
31-3-2008	2007 Annual Water License Report

#### Designs and As-Built

15-11-2004	A418 Dike Design Drawings Volume 1 & 2
15-11-2004	A418 QA/QC Report
14-5-2007	A418 As-built Report
9-5-2017	A21 Instrumentation Monitoring Schedule
10-3-2016	Modification - A21 Dike Design and Construction Update
05-1-2015	A21 Dike 2014 Design Report Update Final
5-1-2015	QAQC
5-1-2015	Final Drawings Part 1
5-1-2015	Final Drawings Part 2
1-3-2013	PKC Dam Raise Phase VI Design Report
2-11-2012	Geotechnical and Hydrogeological Feasibility Report) Case V-VI A21 Open Pit Design DDMI
7-9-2012	Report No 3:Diavik A21 Geotechnical Review Panel Meeting Aug27/28 2012 Review of Dike A21 Design
1-8-2012	A21 Dike: Final Design Report: 2012 Update Volume 1
1-8-2012	A21 Dike: Final Design Report: 2012 Update Volume 2
28-7-2009	DDMI North Inlet Raising As-Built Report
16-12-2010	PKC Phase 5 Raise Construction As Built Report 2010

#### Operations and Notifications

23-4-2012	Technical Memorandum: Proposed 2012 Phase 6 PCK Facility Instrumentation Plan, DDMI - Golder Associates
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24-7-2012	PCK Facility Phase 6 Rockfill Shell Construction Technical Specifications - Golder Associates
22-3-2012	Technical Document North Inlet East Dike: Evaluation of Performance Under Hydraulic Gradient Recommendation for Remedial Work
11-10-2009	Pond 3 Dewatering Report

#### Other

16-8-2010	Diavik Report - Historical Variations in Mercury and Organic Matter in Lac de Gras
12-8-2011	Lakebed Sediment, Water Quality and Benthic Invertebrate Study, A154 Year 4
30-6-2010	Drainage Control and Collection System Modification Notice
7-8-2009	North Inlet Water Treatment (NIWTP) - Initial SNP Monitoring Results

#### Pits, Dikes, Ponds and North Inlet

25-8-2007	North Inlet Water Treatment Plant Modification
5-1-2009	Report on Fish Habitat Design for the A418 Pit Shelf Area at the Diavik Diamond Mine

#### Waste Rock Seepage

31-3-2018	2017 Annual Seepage Survey Report
31-3-2017	2016 Annual Seepage Survey Report
31-3-2016	2015 Annual Seepage Survey Report
31-3-2015	2014 Annual Seepage Survey Report
31-3-2014	Diavik Diamond Mine (2012) Inc. Seepage Survey 2013 Annual Report
30-3-2012	Diavik Diamond Mine Seepage Survey 2011 Annual Report
31-3-2011	Diavik Diamond Mine Seepage Survey 2010 Annual Report
5-4-2010	Diavik Diamond Mine Seepage Survey 2009 Annual Report
1-4-2009	Diavik Diamond Mine Seepage Survey 2008 Annual Report
28-3-2008	2007 Seepage Report

#### Interim Closure and Reclamation Plan

20-4-2017	Closure and Reclamation Plan Version 4
3-4-2018	Interim Closure and Reclamation Plan for the Waste Rock Storage Area-North Country Rock Pile Version 1.2
27-7-2011	Interim Closure and Reclamation Plan Version 3.2

#### Ammonia Management

18-8-2017	Diavik Diamond Mines Inc. Ammonia Management Plan Version 6.1
17-10-2013	Diavik Diamond Mines Inc. Ammonia Management Plan Version 5
22-2-2012	Diavik Diamond Mines Inc. Ammonia Management Plan V 4.1
30-6-2011	Quarterly Ammonia Report, June 2010 – May 2011
7-4-2011	Quarterly Ammonia Report, March 2010 – February 2011
31-3-2011	Diavik Diamond Mines Inc. Ammonia Management Plan V 4-0
13-1-2011	Quarterly Ammonia Report, December 2009 – November 2010
1-11-2010	Quarterly Ammonia Report - Sep-09 through Aug 10
8-7-2010	Quarterly Ammonia Report - Jun 09 through May 10
30-7-2011	Quarterly Ammonia Report, June 2010 – May 2011
7-4-2011	Quarterly Ammonia Report, March 2010 – February 2011
13-1-2011	Quarterly Ammonia Report, December 2009 – November 2010
1-11-2010	Quarterly Ammonia Report September 2010

31-3-2010	Quarterly Ammonia Report March 2010
20-1-2010	Quarterly Ammonia Report December 2009
8-10-2009	Quarterly Ammonia Report September 2009
13-7-2009	Quarterly Ammonia Report June 2008 - May 2009
7-4-2009	Quarterly Ammonia Report Feb 2009 Feb 2009
31-12-2008	Quarterly Ammonia Report Dec 2007- November 2008
30-9-2008	Quarterly Ammonia Report Sep 2007 August 2008
22-4-2008	Ammonia Management Plan Version 3.0
7-7-2008	Section 8 Investigations Plans

#### **Adaptive Management Plan**

24-8-2007	Diavik Diamond Mine Adaptive Management Plan for Aquatic Affects
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#### **Assorted Management**

2-3-2018	PKC Facility Operations Plan V4
31-3-2011	Diavik Diamond Mine Facilities Operations Plan Sewage Treatment Plant
1-10-2010	North Inlet Water Treatment Plant (NIWTP) Operation Manual

#### **Spill - Contingency - Emergency Response**

7-9-2017	Diavik Diamond Mine Contingency Plan Version 22
30-3-2016	Hazardous Materials Management Plans Version 19

#### **Water Management**

6-3-2018	DDMI Water Management Plan Version 14.1
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#### **Engagement Plan**

22-3-2018	Diavik Diamond Mine Engagement Plan Version 2.1
12-11-2014	Diavik Diamond Mine Engagement Plan Version 1

#### **Waste Rock and Tailings Management**

3-5-2018	Waste Rock Management Plan Version 8
16-1-2016	Waste Rock Management Plan Version 7.1

#### **Aquatic Effects Monitoring Program (AEMP)**

12-4-2018	Reference Conditions Report Version 1.3
30-6-2016	Quality Assurance Project Plan Version 3
23-4-2018	AEMP Study Design Version 5
20-6-2017	AEMP Study Design Version 4.1
13-4-2018	2017 AEMP Annual Report
12-4-2018	2014-2016 AEMP 3-year Re-evaluation Report
10-11-2017	2016 AEMP Annual Report Version 1.1
20-6-2017	2015 AEMP Annual Report Version 1.1
14-12-2016	2014 AEMP Annual Report Version 1.1
21-12-2007	Limnology Report
15-10-2014	Aquatic Effects Monitoring Program Version 3.0 (2011 to 2013) Summary Report
1-6-2014	AEMP Study Design Version 3.5
31-1-2014	AEMP Study Design Version 3.4

31-1-2014	AEMP Study Design Version 3.3
15-10-2013	AEMP Study Design Version 3.2
28-10-2011	AEMP Study Design Version 3.0
7-5-2008	Diavik Diamond Mine: AEMP Quality Assurance Project Plan (QAPP) Version 1.1
28-3-2013	Quality Assurance Project Plan Version 2.0 (QAPP)
18-7-2011	2007 to 2010 AEMP Summary Report
28-3-2014	AEMP 2013 Annual Report
28-3-2013	AEMP 2012 Annual Report
30-3-2012	AEMP 2011 Annual Report
31-3-2011	AEMP 2010 Annual Report
9-5-2011	North South Consultants Review
31-3-2010	AEMP 2009 Annual Report
17-6-2010	Correction to 2009 Annual AEMP Report – Dust Deposition
30-4-2009	AEMP 2008 Annual Report
13-1-2010	Final Errata - 2008 Aquatic Effects Monitoring Program
14-4-2008	AEMP 2007 Annual Report
14-4-2008	Request for Modification to AEMP – Part K Item 9 – W2007L2-0003
31-3-2008	Dust Deposition Monitoring Report 2007
2-4-2008	Effluent and Water Chemistry Report in Support of the 2007 AEMP Annual Report for the Diavik Diamond Mine, NWT
3-4-2008	Sediment Report in Support Of The 2007 AEMP Annual Report For Diavik Diamond Mine, NWT
2-4-2008	Benthic Invertebrate Report in Support Of the 2007 AEMP Annual Report For The Diavik Diamond Mine, NWT
9-4-2008	Fish Report in Support Of The 2007 AEMP Annual Report For The Diavik Diamond Mine, NWT
17-5-2007	Lakebed Sediment, Water Quality and Benthic Invertebrate Study A154 Dike
2-4-2008	Plankton Report In Support Of The 2007 AEMP Annual Report For The Diavik Diamond Mine, NWT
4-4-2008	Eutrophication Indicators Report In Support Of The 2007 AEMP Annual Report For Diavik Diamond Mine, NWT
9-4-2008	Weight of Evidence (WOE) Assessment in Support Of The 2007 AEMP Annual Report For The Diavik Diamond Mine, NWT

**Attachment-1: Amendment Overview**

Deposition of Processed Kimberlite into Mine  
Workings

W2015L2-0001 Amendment Request

**Document #: ENVI-830-0518 R0**

1 June 2018



## Contents

<b>1.</b>	<b>Introduction</b>	<b>5</b>
1.1	Purpose and Scope	5
1.2	Site Overview	5
1.3	Regulatory Approvals and Authorizations	7
1.3.1	Canadian Environmental Assessment Agency	7
1.3.2	Environmental Agreement	7
1.3.3	Surface Leases	7
1.3.4	Water Licence	8
1.3.5	Fisheries Act Authorizations	8
1.3.6	Navigation Protection Act Approvals	8
1.4	Current Processed Kimberlite Management	8
1.5	Proposed Changes to PK Management	12
<b>2.</b>	<b>Processed Kimberlite Management Options</b>	<b>13</b>
2.1	Option Selection	13
2.2	Traditional Dam Raise (Option 1)	13
2.3	A418 Deposition with Current PKC Dam Height (Option 2)	14
2.4	Additional Onsite Storage Options (Option 3)	14
2.5	Combination of a PKC Dam Raise and A418 Deposition (Option 4)	14
<b>3.</b>	<b>Technical Data and Supporting Information</b>	<b>16</b>
3.1	DDMI's Evaluation for Use of A418 for PK Storage	16
3.2	Processed Kimberlite Quantities	16
3.3	A418	18
3.3.1	Void Volume	18
3.3.2	A418 FPK Capacity	21
3.3.3	Bulkhead Design	24
3.3.4	Fatal Flaw Assessments	25
3.3.5	Pipeline Route	27
3.3.6	Options for PKC Facility Closure Relating to A418 PK Storage	29
<b>4.</b>	<b>Project Integration with the Diavik Mine</b>	<b>30</b>
4.1	Overview and Approach	30
4.2	Infrastructure Requirements	30

4.2.1	Currently Existing Infrastructure	30
4.2.1.1	Process Plant	30
4.2.1.2	Reclaim Barge	30
4.2.1.3	Pipelines	30
4.2.1.4	Containment	30
4.2.2	New Infrastructure	31
4.2.2.1	FPK Pipeline	31
4.2.2.2	Underground Bulkheads	31
4.3	Engineering	31
4.4	Monitoring	32
4.4.1	Measuring	32
4.4.2	Water Quality	32
4.4.3	Engineering	33
4.5	Adaptive Management	33
4.6	Closure and Reclamation	33
4.6.1	Closure and Reclamation Plan	33
4.6.2	Post-Closure Monitoring	34
4.7	Benefits	34
4.8	Contingency Planning	34
<b>5.</b>	<b>Community Engagement</b>	<b>35</b>
<b>6.</b>	<b>Licence Amendments</b>	<b>38</b>
6.1	Licence Terms and Conditions	38
6.1.1	Existing	38
6.1.2	Anticipated	39
6.2	License Schedules and Management Plans	40

## **Appendix I: Summary of Engagement**

### **Figures**

Figure 1: Diavik Diamond Mine Site Plan ..... 7

Figure 2: Original Process Flow Diagram ..... 9

Figure 3: 'Degrit' Process Flow Diagram .....	10
Figure 4: Processed Kimberlite Containment Facility .....	11
Figure 5: A418 Void Volume .....	20
Figure 6: Conceptual drawing of PK Placement in A418 Mine Workings (includes bulkhead locations) .....	23
Figure 7: Bulkhead Conceptual Design .....	24
Figure 8: Proposed Pipeline Route from the Process Plant to A418 .....	28

**Tables**

Table 1: Diavik Diamond Mine Ore Bodies .....	6
Table 2: Summary of PK Deposition Options Evaluation.....	15
Table 3: PK Upside Estimates .....	17
Table 4: Annual PK Quantities .....	17
Table 5: PK Storage Requirements .....	18
Table 6: A418 Void Volume .....	19
Table 7: A418 Filling Levels .....	21
Table 8: A418 Potential Decant Volumes – 9,260 mRL Decant .....	21

## **Background**

### **1. Introduction**

#### **1.1 Purpose and Scope**

This document provides supporting information for the application to amend Water Licence W2015L2-0001 ('the License') to allow for the placement and storage of processed kimberlite (PK) into completed mine workings (underground/open pit) at the Diavik Diamond Mine. With this amendment application for the deposition of PK into mine workings, Diavik Diamond Mines (2012) Inc. (DDMI) seeks to obtain:

- Support for the concept;
- Regulatory mechanism to permit the option; and
- Clarity on additional information, conditions, approvals and timelines required.

DDMI anticipates that additional submissions and approvals will be required prior to proceeding with this project, and that these requirements and timelines would be specified within an amended License.

This document outlines conceptual plans for placing PK into the A418 mine workings but it would be transferable to both the A154 and A21 mines. Flexibility is required due to the potential of unforeseen circumstances which may deem the A418 unavailable for PK deposition, such as geotechnical events, mine plan changes and economic pressures.

A summary of the License amendments relevant to this project description are outlined in Section 6. As part of this Licence amendment submission, DDMI has also included additional administrative updates which are not a part of this project description. All requested amendments to Water License W2015L2-0001 have been provided in 'track changes', complete with the rationale for the request, in Attachment-2 (Water License W2015L2-0001 Proposed Amendments).

#### **1.2 Site Overview**

The Diavik Diamond Mine is located at Lac de Gras approximately 300 km northeast of Yellowknife, Northwest Territories. The mine is an unincorporated joint venture established by Diavik Diamond Mine (2012) Incorporated (DDMI) and Dominion Diamond Mines (DDM). DDMI is a wholly owned subsidiary of Rio Tinto plc of London, England. Under the Joint Venture Agreement, DDMI has a 60% participating interest in the project, and DDM a 40% participating interest. DDMI has been appointed Manager and is the corporate entity responsible for conducting project activities.

The Diavik kimberlite pipes are located underwater, beneath Lac de Gras. A series of water-retention dikes have been constructed to permit open pit mining of the pipes. All mine infrastructure is located on the 20 km<sup>2</sup> East Island located within Lac de Gras. Commercial production commenced in 2003 and is currently forecasted to cease in 2025.

The mine is regulated to operate under numerous regulatory instruments, including Water Licence W2015L2-0001, issued by the Wek'èezhii Land and Water Board (WLWB or 'the Board').

Open pit and underground mining removes kimberlite ore from four kimberlite ore bodies. The Diavik ore bodies are referred to as the A154 North (A154N), A154 South (A154S), A418 and A21 kimberlite pipes.

The upper portions of A154N and A154S were mined from the A154 open pit while the upper portion of the A418 pipe was mined from the A418 open pit. With mining in both the A154 and A418 open pits complete, all three pipes are currently being mined from underground developments that share a common decline. Underground production started in 2010 and is expected to continue to mid-2021 for A418, 2022 for A154S and through 2025 for A154N.

The A21 open pit mine is under development with mining commencing in 2018 and no plans for underground mining (Table 1).

**Table 1: Diavik Diamond Mine Ore Bodies**

<b>Kimberlite Pipe</b>	<b>Access</b>	<b>Mine Status</b>
A154 North	A154 open pit A154 underground	- Open pit mining completed Q3 2008 - Underground mining active - Expected completion 2025
A154 South	A154 open pit A154 underground	- Open pit mining completed Q3 2010 - Underground mining active - Expected completion 2022
A418	A418 open pit A418 underground	- Open pit mining completed Q3 2012 - Underground mining active - Expected completion mid-2021
A21	A21 pit	- Under development - Open pit mining started in 2018 - Expected completion mid-2023



Figure 1: Diavik Diamond Mine Site Plan

### 1.3 Regulatory Approvals and Authorizations

#### 1.3.1 Canadian Environmental Assessment Agency

The Diavik Diamonds Project underwent an Environment Assessment (EA) in 1998 under the Canadian Environmental Assessment Act. The project was deemed to not likely cause significant adverse environmental effects and was approved in June, 1999. The EA included the mining of all four kimberlite ore bodies, processing and waste storage.

#### 1.3.2 Environmental Agreement

The Environmental Agreement was signed by the Governments of Canada, the Northwest Territories, Diavik, Tłı̄chǵ Ndek'áowó (Tlicho Government, formerly the Dogrib Treaty 11 Council), Łutsel K'e Dene First Nation, Yellowknives Dene First Nation, North Slave Métis Alliance and the Kitikmeot Inuit Association in March of 2000. The agreement is intended to ensure the environmentally sustainable development of the project by ensuring mitigations, monitoring, and reporting is completed in a transparent way that ensures the continued use of the land by Indigenous stakeholders. Updates to the Environmental Agreement are not required as part of this Water Licence Amendment request. The Environmental Agreement expires following final abandonment and reclamation.

#### 1.3.3 Surface Leases

Diavik currently holds five land leases with the Government of the Northwest Territories (GNWT). Uses for the leases include mining, waste storage, infrastructure, and the airstrip.

An amendment to the Lease is not required for the proposed amendment. An adjustment to the lease which covers the mine workings would be required. Initial discussions with representatives from the GNWT Department of Lands have indicated that an update to the lease to allow deposition of processed kimberlite would not be problematic. Adjustments to the lease would be conducted independent of this Water Licence amendment. The current Leases expire in 2030.

#### **1.3.4 Water Licence**

Diavik currently holds a Type A Water Licence (W2015L2-0001) issued under the Waters Act and the Mackenzie Valley Resource Management Act. The Water Licence allows for the withdrawal and use of water and the discharge of waste including; waters, waste rock, and processed kimberlite. The proposed License amendments relating to the project are outlined in Section 6 and included in Attachment-2. W2015L2-0001 currently expires in 2023.

#### **1.3.5 Fisheries Act Authorizations**

Diavik currently holds a Fisheries Authorization from Fisheries and Oceans Canada which allowed for the construction of the water retention dikes, open pit mining, construction of the water intake structure, North Inlet Dike and North Inlet, and draining of six fish bearing inland lakes for the construction of the mine infrastructure. Updates to the Fisheries Authorization are not required as part of this Water Licence Amendment request. The current authorization expires in 2025.

#### **1.3.6 Navigation Protection Act Approvals**

Diavik currently holds a Navigable Waters Permit for the construction and presence of the A154 and A418 dikes. Changes to the Navigable Waters Act meant that no permit was required for the construction and existence of the A21 dike. Updates to the Navigable Waters Permit are not required as part of this Water Licence Amendment request. The A154 permit expires in 2030 and the A418 permit expires in 2055.

### **1.4 Current Processed Kimberlite Management**

Kimberlite ore mined from each of the pipes is processed using physical processing methods within the Process Plant. Fine processed kimberlite (FPK) is discharged as a slurry to the Processed Kimberlite Containment (PKC) Facility, and coarse processed kimberlite (CPK) is placed in the PKC Facility, and may be used as a construction material within the PKC. The water and extra fine PK material (slimes) contained within the FPK slurry flows to the centre of the Facility and forms the PKC Pond.

Water License W2015L2-0001 currently authorizes disposal of Processed Kimberlite (PK) to the PKC Facility, The purpose of this amendment application is to expand this authorization to include mine workings.

The PKC Facility is designed to permanently store PK produced during ore processing; this includes CPK and FPK products, and the decant water from the FPK slurry. Containment is provided by perimeter dams constructed with a rockfill shell and upstream liner system that extends into frozen cut-off trenches excavated in ice-poor till or bedrock. Six phases of dam construction have been completed over the past 15 years to fully contain the area and raise the dam height to the current 465 m elevation (9,465 mRL in the mine datum). The PKC Facility includes long FPK beaches surrounding a central pond and designated CPK deposition areas located within the perimeter of the PKC dam. The facility was originally designed to store 68% FPK and 32% CPK. The actual FPK to CPK ratio that could be achieved by the Process Plant until 2016 was closer to 87:13 (Figure 2).

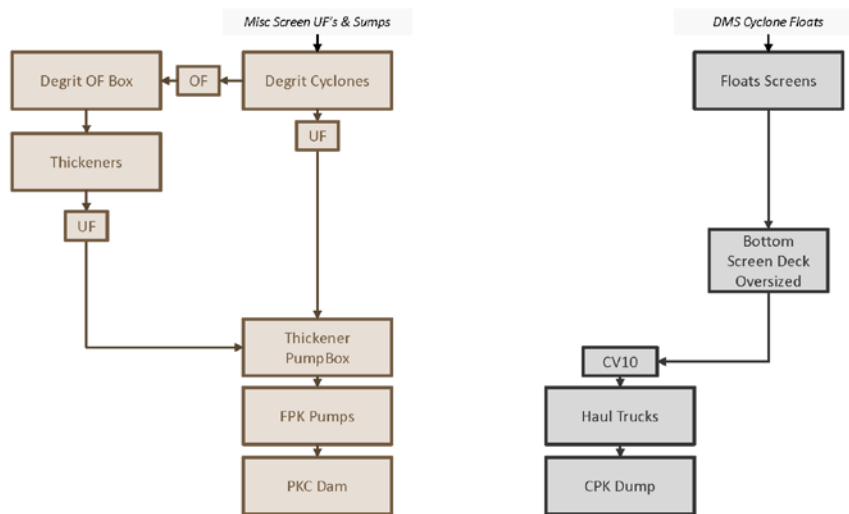


Figure 2: Original Process Flow Diagram

DDMI began studying options for increasing PK storage in the PKC Facility in late 2015. It was determined that increasing the ratio of the solids fraction deposited in the PKC could potentially increase storage volume. The process of increasing the solids ratio was called 'degrit'. Due to numerous unknowns, a trial was required to determine material properties and operational constraints.

In 2016 (following completion of Phase 6 PKC dam construction), the Process Plant was modified to initiate a PK Trial. The purpose of the PK Trial was to change the FPK:CPK ratio through a 'degrit' process (Figure 3) that would reduce the percentage of FPK (hydraulically deposited) and increase the percentage of CPK (manually placed/compacted). The benefit of manually placed CPK is that it can be strategically located, dewatered and compacted, as compared to FPK which offers less control on placement, density and water/ice entrainment.



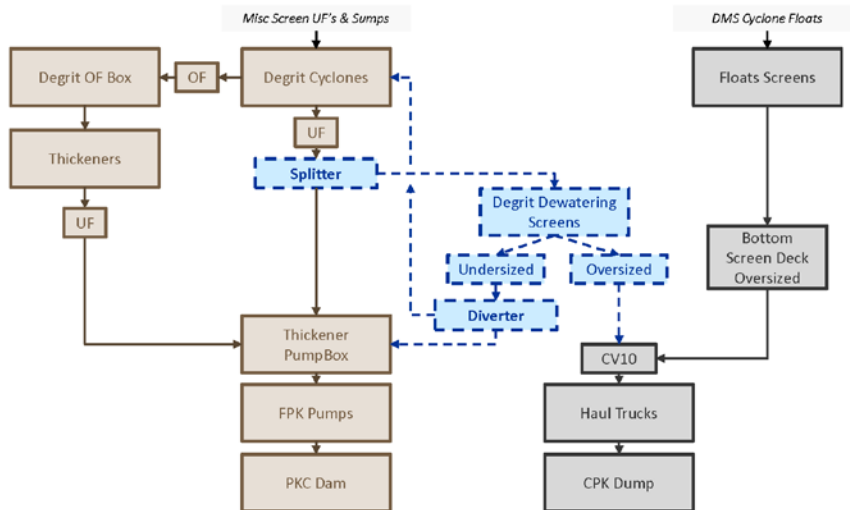


Figure 3: 'Degrit' Process Flow Diagram

On the 31st of March 2016 DDMI notified the WLWB of plans to undertake a feasibility study, which included modifications to the Process Plant, to determine the optimal ratio of Coarse Processed Kimberlite (CPK) and Fine Processed Kimberlite (FPK) for deposition in the Processed Kimberlite Containment (PKC) Facility. To facilitate this study, DDMI amended the PKC Facility Plan (as per Schedule 6 Item 2) and submitted these revisions to WLWB for review and approval. The trial was planned to proceed for one year and scheduled to commence on 7 June 2016. Update reports for the PK Trial have been submitted to the WLWB every 3 months for the duration of the Trial.

On 24 March 2017, DDMI submitted a trial extension request to the WLWB. The extension allows DDMI to gather additional data on CPK and FPK characteristics that have changed as the trial advanced; namely, FPK deposition during summer months (beach slopes) and CPK compaction and 'truckability'. DDMI further requested an extension of the PK Trial until 1 April 2018. With this request, the target CPK:FPK ratios remain the same, but total material volumes generated during the extended trial period would increase accordingly.

The FPK:CPK target ratio is now approximately 40:60, although the ratio can be as low as 50:50 or increase as high as 70:30, based on plant feed (ore types) and variation within each orebody itself. CPK is placed in a series of cells delineated by a perimeter berm (road) constructed of CPK material inside of the PKC Facility, and offset from the lined dams as shown in the photo below (Figure 4). FPK is deposited from spigots placed along the CPK perimeter berm, creating beaches and a central pond as has always been the practice for FPK deposition.



Figure 4: Processed Kimberlite Containment Facility

With the information and confidence gained from the PK Trial, Diavik plans to continue using the degrit process to maximize on-land storage within the PKC Facility.

At the height of the current PKC Facility Dams, it would be filled to capacity in 2021, leaving a PK storage deficit for the remaining mine life. Completing a seventh dam raise on the PKC is complicated by:

- Limited space to extend the base of the dams as required to advance the height;
- Requirement for a raise greater than 5 metres; and
- Increased costs.

DDMI is currently in a position to consider development options to provide PK containment capacity for the life-of-mine (LOM) and has completed an options analysis of PK management strategies which forms the basis of this current licence amendment process.

## 1.5 Proposed Changes to PK Management

The PK Trial that commenced in June 2016 provided data to assess alternative options for the management of PK with lower costs while continuing to conform to the original design intent of the PKC Facility. On this basis, a significant body of work has been undertaken on the evaluation of the performance of the de grit circuit within the Process Plant and the impacts of the PK Trial on PK management, both in terms of FPK spigotting and the use of grit-rich CPK as a PKC Facility construction material. Updates to the Processed Kimberlite Containment Facility Plan (Version 4) confirm DDMI's intent to continue using the 'degrit' process as part of operations and was submitted to the WLWB in March 2018.

Longer-term considerations and the development and assessment of alternative options for the future management of PK and the PKC Facility were also evaluated within the scope of the PK Trial. This report provides a consolidated summary of the work undertaken to reach a decision on the preferred PK management strategy including the:

- alternative options considered and evaluated;
- estimate of PK material schedule for LOM; technical considerations related to the selected PK management option;
- analysis process undertaken by DDMI with summary of conclusions; and
- stakeholder engagement conducted on the selected PK management option.

# Alternatives/Options

## 2. Processed Kimberlite Management Options

### 2.1 Option Selection

The ability to adjust the grit percentage of the FPK:CPK within the process plant has provided a number of opportunities for the ongoing management of the PKC Facility with a particular focus on the methods of construction of future dam raises and minimisation of seepage. This flexibility plus the availability of the A418 void for possible storage of PK from late 2021 has enabled a range of life-of-mine (LOM) management options for PK.

Four options were explored:

1. Full LOM PK storage through traditional PKC dam raise.
2. Full LOM PK storage through current PKC dam height and A418 deposition.
3. Full LOM PK storage through current PKC dam height and alternative onsite storage options.
4. Combination of PKC dam raise and A418 deposition.

Further details on each option is listed in the following sections. This proposed amendment to the Water License is based on DDMI's preference to proceed with Option 4.

### 2.2 Traditional Dam Raise (Option 1)

The PKC dams are lined rockfill dams. The existing dam has been constructed utilizing six 5 meter lifts to obtain an elevation of 465 meters above sea level. The dam raises have been completed by placing rock on the downstream side to increase the foundation base to allow an overall increase in height. The Phase 6 raise took three years to complete. DDMI anticipates a similar timeframe for a full Phase 7 dam raise if undertaken.

Completing a traditional downstream 5 meter rockfill dam raise is constrained by a lack of footprint on the east and west dam portions of the PKC. Additionally a dam raise greater than 5 meters would be required to contain remaining PK. Given the technical, engineering, and costs associated with completion of a traditional downstream dam raise, DDMI has explored other options for extending the storage capacity of the PKC.

DDMI is proceeding with submission of a Phase 7 dam raise design for the PKC Facility in 2018. The Phase 7 raise is being designed with an initial raise of 5 m being constructed from 2018-2021. This approach provides certainty and contingency for short-term PK storage as well as operational flexibility for long-term PK storage considerations.

### **2.3 A418 Deposition with Current PKC Dam Height (Option 2)**

DDMI considered options that would not require a PKC Facility dam raise, given that the current dam height would be sufficient to contain the predicted volume of PK materials through to 2021. The option to accelerate underground mining of the A418 kimberlite pipe to make the A418 underground and open pit available for PK deposition prior to 2021 was evaluated. It is currently not feasible to mine out the A418 kimberlite prior to 2021 given the current constraints of mine depth and stope design. Proceeding with the option would mean there would be no contingency if the PKC was filled to capacity before A418 mine workings became available. Further, regulatory uncertainty exists regarding placement of PK into the mine workings.

### **2.4 Additional Onsite Storage Options (Option 3)**

DDMI evaluated the option of storing PK in the onsite collection ponds and/or the north inlet. There is not enough cumulative storage capacity within these facilities to accommodate PK material predictions. Additionally, each of these facilities has an operational purpose and filling them with PK would prevent their intended use.

### **2.5 Combination of a PKC Dam Raise and A418 Deposition (Option 4)**

Completing a partial dam raise on the PKC with planned future deposition of PK in the A418 open pit/underground mine workings is DDMI's preferred option to manage life of mine PK permanent deposition and storage. Commencing a smaller PKC dam raise reduces the operational risk if the current amendment application were rejected or if PKC capacities were reached sooner than planned. As it takes three years to complete a dam raise, an immediate decision was taken to proceed with a dam raise concurrent with this amendment application. The degrit process would be utilized to maximize PKC storage in the short-term, if disposal to mine workings is authorized the degrit process would be discontinued. At that time, target CPK:FPK ratios would revert back to 25:75, with CPK placement likely continuing in the PKC Facility. Depositing PK in the mine workings reduces DDMI expenditures in the later years of the mine life, while also enabling alternative closure options and schedules for the PKC.

A summary of the options considered and criteria evaluated are provided below in Table 2.

**Table 2: Summary of PK Deposition Options Evaluation**

<b>Option</b>	<b>Key Advantages</b>	<b>Key Disadvantages</b>
1, Traditional Dam Raise	<ul style="list-style-type: none"> <li>• permitted</li> <li>• known approach</li> </ul>	<ul style="list-style-type: none"> <li>• high cost</li> <li>• footprint restrictions</li> <li>• new construction necessary</li> <li>• limited closure options</li> </ul>
2. A418 Deposition with Current Dam Height	<ul style="list-style-type: none"> <li>• lower cost</li> <li>• maximum use of existing storage capacity</li> <li>• no new dam construction</li> </ul>	<ul style="list-style-type: none"> <li>• license amendment</li> <li>• high risk of running out of PKC storage before A418 is available.</li> <li>• enhanced closure options</li> </ul>
3. Additional On-Site Storage	<ul style="list-style-type: none"> <li>• no new dam construction</li> <li>• lowest cost</li> <li>• enhanced use of existing facilities</li> </ul>	<ul style="list-style-type: none"> <li>• loss of original facility functionality</li> <li>• license amendment</li> <li>• site runoff risk</li> <li>• expanded closure footprint</li> </ul>
4. PKC Dam Raise and A418 Deposition	<ul style="list-style-type: none"> <li>• limits risk of running out of storage space</li> <li>• maximize use of existing storage capacity</li> </ul>	<ul style="list-style-type: none"> <li>• moderate cost</li> <li>• new dam construction necessary</li> <li>• enhanced closure options</li> <li>• license amendment</li> </ul>

# PK to Mine Workings Technical Data and Supporting Information

## 3. Technical Data and Supporting Information

### 3.1 DDMI's Evaluation for Use of A418 for PK Storage

DDMI has completed a number of internal assessments to determine the suitability of depositing PK into the A418. This work has been completed by DDMI and external experts and included:

- Assessment of the field trials of the placement of grit-rich CPK in the PKC Facility;
- Determination of LOM PK quantities based on the current mine plan;
- Calculation of the available storage volume and specification of the maximum filling level in the A418 void;
- Concept level design of hydrostatic bulkheads in the underground development between A418 and A154S;
- Hydrogeological and geotechnical fatal flaw assessments for A154S/A154N based on filling of the A418 void with FPK and water to a range of elevations; and
- Determination of an alignment and pipeline design for the transfer of FPK from the processing plant to the A418 void.

### 3.2 Processed Kimberlite Quantities

Remaining PK quantities were determined based on the projected mine plans for A154N, A154S, A418 and A21 as of 1 September 2017 and comprised annual estimates of PK from each reserve.

As DDMI is planning LOM PK management, it was necessary to be conservative in the estimates of PK quantities. This conservatism was made by including an upside estimate for each reserve at the end of each mine plan. This process added an additional 1.4 Mt of PK to the design parameters as detailed in Table 3.

There is potential for mining to extend a further 10 m at A21, however this opportunity is subject to optimization of the mine plan and may be limited by geotechnical constraints. As such no additional reserve was applied to A21.

DDMI notes that all values provided throughout Section 3 are based on concept-level engineering and are subject to change.

**Table 3: PK Upside Estimates**

<b>Reserve</b>	<b>Additional Reserve (tonnes)</b>	<b>Sources</b>
A418	0	Increase in reserve
A418	500,000	A418 blanket
A154S	400,000	A154S increase in reserve
A154S	500,000	A154S blanket
A154N	0	Increase in reserve
A21	0	Increase in reserve

Annual estimates of PK quantities is summarised in Table 4.

**Table 4: Annual PK Quantities**

<b>Year</b>	<b>Processed Kimberlite (tonnes)</b>
2018	2,347,189
2019	2,442,204
2020	2,520,871
2021	2,557,358
2022	2,315,672
2023	1,797,158
2024	1,284,085
2025	181,819
<b>Total</b>	<b>15,446,357</b>

To determine the required storage capacity of the A418 void (commencing in 2022), it was assumed that the 60:40 CPK:FPK split was maintained until the A418 void was available at which time the degrit process would be no longer used. At that time 75% of the PK production would be as FPK to the A418 void and 25% as CPK which would continue to be managed within the PKC Facility.



Table 5 summarises the annual CPK and FPK storage requirements for the LOM assuming placement in both the PKC and A418.

**Table 5: PK Storage Requirements**

<b>Year</b>	<b>Processed Kimberlite (tonnes)</b>	<b>CPK to PKC (tonnes)</b>	<b>FPK to PKC (tonnes)</b>	<b>FPK to A418 (tonnes)</b>
2018	2,347,189	1,408,314	938,876	0
2019	2,442,204	1,465,322	976,882	0
2020	2,520,871	1,512,523	1,008,349	0
2021	2,557,358	1,534,415	1,022,943	0
2022	2,315,672	578,918	0	1,736,754
2023	1,797,158	449,290	0	1,347,869
2024	1,284,085	321,021	0	963,064
2025	181,819	45,455	0	136,364
<b>Total</b>	<b>15,446,357</b>	<b>7,315,257</b>	<b>3,947,049</b>	<b>4,184,051</b>

Based on the de-grit field trials, dry densities used in the calculation of storage volumes within the PKC Facility were grit-rich CPK 1.8t/m<sup>3</sup>, grit-poor CPK 1.35t/m<sup>3</sup> and FPK 0.75 t/m<sup>3</sup>. The dry density of FPK within the A418 void is discussed below in Section 3.3.2.

### **3.3 A418**

#### **3.3.1 Void Volume**

As of the current mine plan, mining of A418 will be completed in Q2 2021 to an elevation of 8,770 mRL. The void volume at this stage was calculated as the cumulative volume over the 8,770 mRL to 9,415 mRL mining interval (the surface of Lac de Gras is 9,415 mRL or 415 m above sea level. DDMI has added a “9” in front of the actual sea level elevation to determine mRL and avoid negative elevations if only sea level was used). The base of the A418 open pit was taken as 9,165 mRL.

Two methods of calculations were used to take into account the fact that mining is still progressing. For the elevations in the range of 9,085 mRL to 9,415 mRL (Lac de Gras surface level) a drone-based pit scan method was used whilst for the elevations from 8,770 mRL to 9,085 mRL the volume was based on the anticipated production volume.

The volume of development for the underground interval below 9,240 mRL was calculated using drift dimensions of 5.25 m width x 5.6 m height at a grade of -12% plus an allowance of 18% for cut-outs etc. The -12% grade results in a drift length of 170 m over the 20 m vertical resolution and 210 m over the 25 m vertical resolution of the volume calculation.

The A418 void volume is provided in Table 6 and shown graphically in Figure 5.

**Table 6: A418 Void Volume**

<b>Level</b>	<b>Slice (m)</b>	<b>Elevation (m)</b>	<b>Slice Volume (m<sup>3</sup>)</b>	<b>Development (m<sup>3</sup>)</b>	<b>Volume (m<sup>3</sup>)</b>	<b>Total Volume (m<sup>3</sup>)</b>
9415 - 9400	15	9415	5,598,762		5,598,762	33,892,406
9400 - 9380	20	9400	5,109,760		5,109,760	28,293,645
9380 - 9360	20	9380	4,473,032		4,473,032	23,183,884
9360 - 9340	20	9360	3,644,512		3,644,512	18,710,853
9340 - 9320	20	9340	3,068,251		3,068,251	15,066,340
9320 - 9300	20	9320	2,560,339		2,560,339	11,998,089
9300 - 9280	20	9300	1,936,170		1,936,170	9,437,751
9280 - 9240	20	9280	1,470,802	5,898	1,476,699	7,501,581
9260 - 9240	20	9260	1,080,942	5,898	1,086,839	6,024,881
9240 - 9220	20	9240	694,025	5,898	699,922	4,938,042
9220 - 9200	20	9220	483,327	5,898	489,224	4,238,120
9200 - 9180	20	9200	335,257	5,898	341,155	3,748,896
9180 - 9160	20	9180	320,733	5,898	326,631	3,407,741
9160 - 9145	15	9160	232,798	4,510	237,308	3,081,110
9145 - 9125	20	9145	302,638	5,898	308,535	2,843,802
9125 - 9105	20	9125	288,138	5,898	294,036	2,535,266
9105 - 9085	20	9105	252,289	5,898	258,187	2,241,230
A9085 - A9065	20	9085	239,503	5,898	245,400	1,983,044
A9065 - A9045	20	9065	232,527	5,898	238,425	1,737,644
A9045 - A9020	25	9045	225,754	7,285	233,040	1,499,219
A9020 - A8995	25	9020	219,179	7,285	226,464	1,266,179
A8995 - A8970	25	8995	195,553	7,285	202,838	1,039,715

Level	Slice (m)	Elevation (m)	Slice Volume (m <sup>3</sup> )	Development (m <sup>3</sup> )	Volume (m <sup>3</sup> )	Total Volume (m <sup>3</sup> )
A8970 - A8945	25	8970	168,192	7,285	175,477	836,877
A8945 - A8920	25	8945	156,238	7,285	163,523	661,399
A8920 - A8895	25	8920	128,196	7,285	135,481	497,876
A8895 - A8870	25	8895	100,525	7,285	107,810	362,395
A8870 - A8845	25	8870	81,985	7,285	89,270	254,584
A8845 - A8820	25	8845	67,602	7,285	74,887	165,314
A8820 - A8795	25	8820	46,563	7,285	53,848	90,427
A8795 - A8770	25	8795	29,293	7,285	36,578	36,578

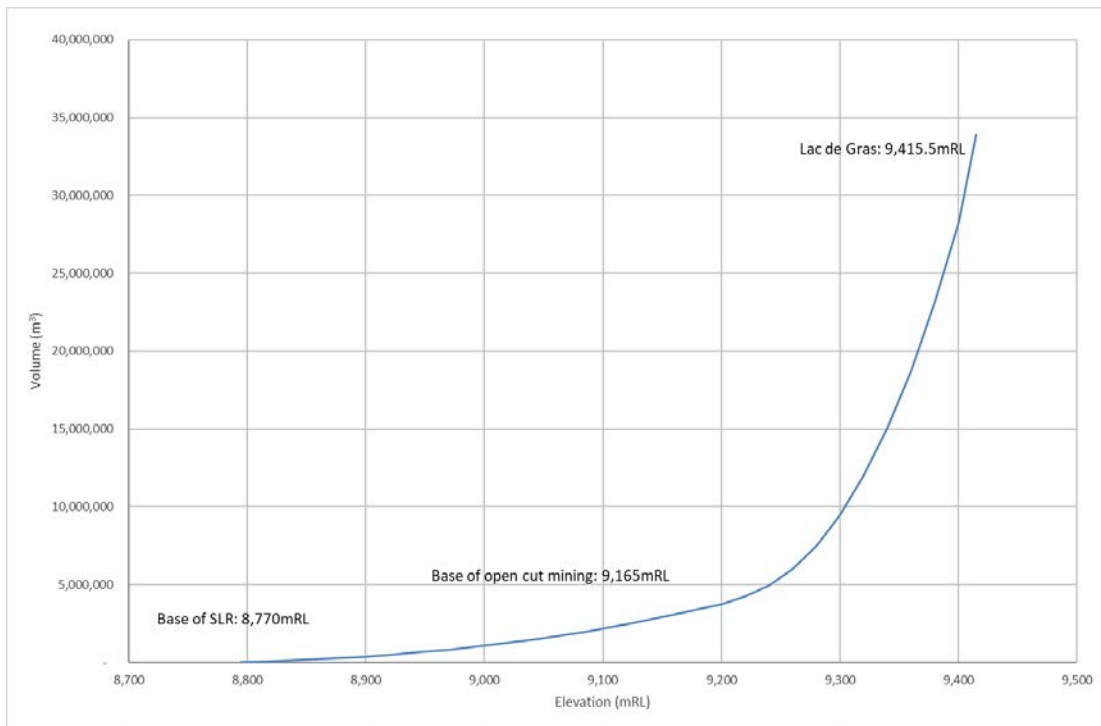


Figure 5: A418 Void Volume

### 3.3.2 A418 FPK Capacity

The A418 void becomes available for the storage of FPK from the beginning of 2022. At this point, the degrit process ceases and the FPK:CPK ratio becomes 75:25. As per Table 7, there would 4,184,051 t of FPK pumped to the A418 void in the four year period from 2022 to 2025.

The capacity of the A418 void to store this FPK is governed by the in-situ density of the deposited FPK and the level to which the void is filled. The nominated maximum fill level of 9,260 mRL is shown on Figure 6. In order to provide a conservative assessment of storage volume it was assumed that the dry density of the placed FPK was 0.8t/m<sup>3</sup> and that no increase in density occurred through consolidation. Estimates of FPK elevation were made using this dry density and a specific gravity of 2.6 and are presented in Table 7.

**Table 7: A418 Filling Levels**

End of FPK Year	of FPK (tonnes)	FPK (m <sup>3</sup> )	Entrained water (m <sup>3</sup> )	Settled total volume (m <sup>3</sup> )	Cumulative total volume (m <sup>3</sup> )	Level in A418 (mRL)
2022	1,736,754	667,982	1,502,960	2,170,943	2,170,943	9,100
2023	1,347,869	518,411	1,166,425	1,684,836	3,855,778	9,204
2024	963,064	370,409	833,421	1,203,830	5,059,608	9,242
2025	136,364	52,448	118,007	170,455	5,230,063	9,245

Potential decant water volumes were determined on the basis of a groundwater inflow to the void of 2,180m<sup>3</sup>/day, a slurry density of 1.2 t/m<sup>3</sup> and a decant level of 9,260 mRL (i.e. 10m below the A9270 portal) and are shown in Table 11. At a decant level of 9,260 mRL the A418 void has a storage capacity of 6,024,881 m<sup>3</sup> (refer to Table 8).

**Table 8: A418 Potential Decant Volumes – 9,260 mRL Decant**

End of Total FPK Settled total Excess slurry Groundwater Total volume Decant	Year	of slurry (m <sup>3</sup> )	volume (m <sup>3</sup> )	water (m <sup>3</sup> )	inflow (m <sup>3</sup> )	in year (m <sup>3</sup> )	volume (m <sup>3</sup> )
2022	5,343,859	2,170,943	3,172,916	796,368	6,140,227	115,345	
2023	4,147,288	1,684,836	2,462,452	796,368	5,740,024	5,740,024	
2024	2,963,274	1,203,830	1,759,444	796,368	4,556,010	4,556,010	
2025	419,582	170,455	249,127	796,368	2,012,381	2,012,381	

In practice, decant volumes would be contingent on the decant strategy which would dictate the 'operational freeboard' elevation of water within the void and hence the position of the decant pumping system. If, for example, the decant elevation was set at 9,320 mRL (i.e. a storage capacity of 11,998,089 m<sup>3</sup>), there would be no need to commence pumping from the pit until 2024 and the total decant volume would reduce from 12,423,697m<sup>3</sup> to 6,450,489m<sup>3</sup>. However, similar to operation of the PKC Facility, DDMI intends to utilize the decant water from A418 as reclaim water for the Process Plant.

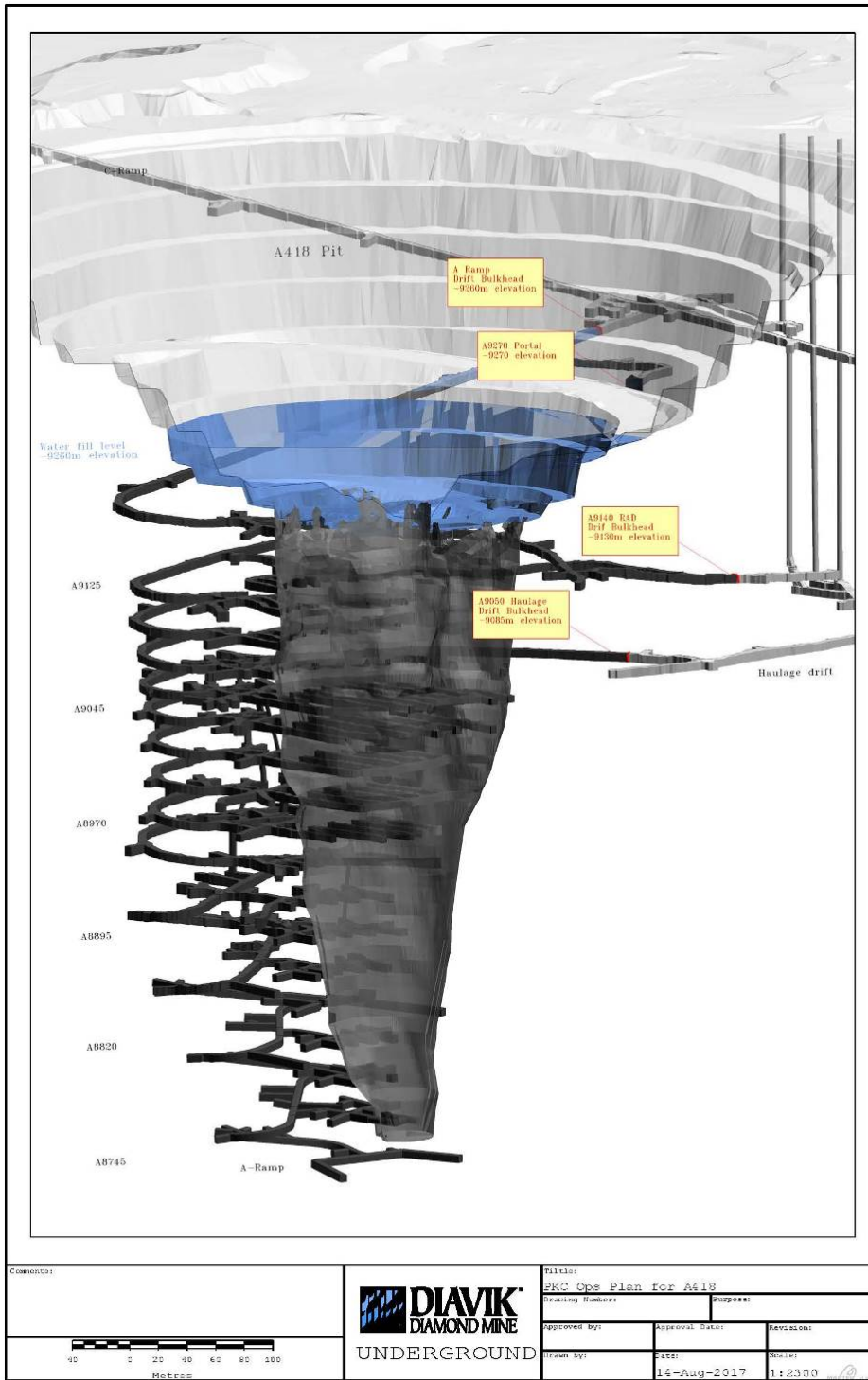


Figure 6: Conceptual drawing of PK Placement in A418 Mine Workings (includes bulkhead locations)

### 3.3.3 Bulkhead Design

The placement of FPK in the A418 void while continuing to underground mine in the A154 ore bodies necessitates the construction of bulkheads at appropriate locations within the development between A418 and A154. These would serve to prevent the flow of PK material or decant water into the A154 mine and are required to protect the health and safety of the underground employees and the integrity of the mine. Three potential locations have been assessed:

- A9050 Haulage Drift – elevation 9,085mRL
- A9140 RAD Drift – elevation 9,130mRL
- A Ramp Drift – elevation 9,260mRL.

The locations of these are shown in relation to the nominated maximum fill level of 9,260 mRL in Figure 6.

A conceptual design has been completed for the bulkheads by Golder Associates Ltd and is shown below in Figure 7. The conceptual design entailed consideration of plug dimensions, typical formwall requirements, recommended construction sequence, recommended instrumentation, contact and consolidation grouting and pressure relief holes.

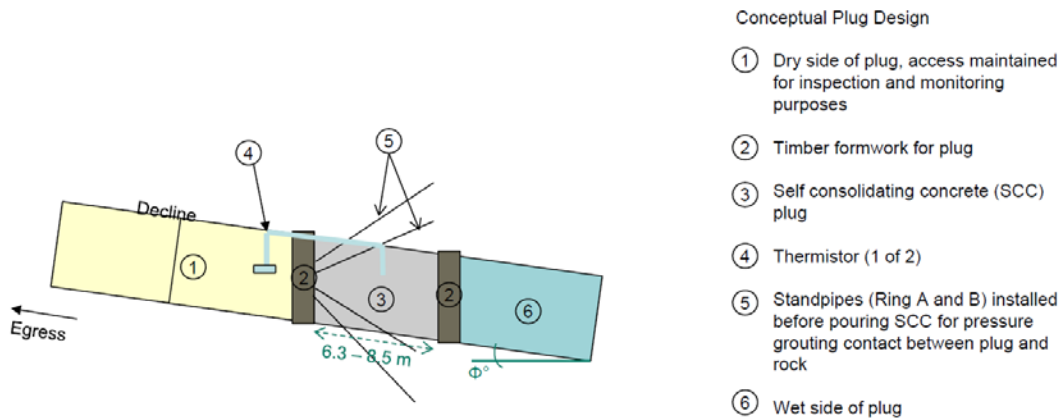


Figure 7: Bulkhead Conceptual Design

Design bulkhead lengths were assessed on the basis of five potential failure modes: punching shear, deep beam flexure, hydraulic jacking of surrounding rock, excessive downstream seepage with associated erosion of concrete and long term disintegration of concrete. The nominated design length was increased by 0.1m to allow for seismic loading.

The final design lengths were:

- A9050 Haulage Drift                      8.5m
- A9140 RAD Drift                         8.4m
- A Ramp Drift                              6.3m

### 3.3.4 Fatal Flaw Assessments

Two potential fatal flaws associated with the placement of FPK and water in the A418 void were identified as being related to (a) water inflow risks to mining and dewatering efforts in A154S and A154N and (b) geotechnical stability risks within A154S and A154N as a result of an increase in hydrostatic pressure from A418.

For DDMI's planning purposes, Golder Associates Ltd. was enlisted to complete an assessment of both potential fatal flaws. The scope of work for each assessment was very similar and entailed:

- Data review and compilation;
- Analysis and assessment of effects; and
- Reporting.

The work assessed the inflow and geotechnical risk associated with three A418 filling scenarios – 9,260 mRL, 9,360 mRL and 9,420 mRL – being the nominated FPK filling elevation, the Lac de Gras elevation and a midpoint elevation.

The hydrogeological assessment informed the geotechnical work and found that:

- The hydrogeological connection between the A154 pipes and A418 pipe appears to be stronger at shallower depth (up to 8,975 mRL elevation) and reduced at depth, likely controlled by a lower hydraulic conductivity along the different structures;
- Because of the dewatering effects at the A154 prior to development of the A418 pit, interactions between the pits could not be quantified during initial development of the A418 pit;
- Recent drilling in the A154-D8825 Middle dewatering galley intersected very little water compared to higher galleries, and there are no responses observed in the A418 area;



- Responses at the deepest piezometers in A418 (8,810 mRL elevation) however, were observed during activation of the A154-D8925 Middle and A154-S8925 South galleries; and
- Total flow rates have changed little since 2011 and will need to be maintained through to end of mining. Flow rates to A154 will increase when A418 is flooded.

The assessment concluded the following.

- The effects of filling the A418 void with FPK and water on the depressurization at the A154N and A154S pipes resulted in additional pumping and additional water pressure in A154S, if additional water quantity and pressures can be handled the option does not appear to significantly affect mining.
- Mitigation includes maintaining/replacing all A154 drainage galleries below 8,975 mRL and continued operation of the A418 SE well field during the filling period to the 9,420 mRL elevation. In addition, a drainage gallery was recommended to be installed in a haulage drift in close proximity to the A-Ramp to limit the inflows from Lyndon's Fault to the A154 area.
- From a hydrogeological perspective, filling A418 with FPK/water did not represent a fatal flaw.

An evaluation of potential mitigation options was undertaken by DDMI and concluded that drilling of north-westerly orientated drain holes from a temporary drilling bay out of C-Ramp at an elevation of 9,010 MRL would be able to intercept flows to the west of A154S. This drilling bay would be to replace existing drilling bays S9000, S8975 DWG and possibly S8925 DWG that are already decommissioned. A preliminary design of the drilling bay indicates that development would be approximately 100m although this would be subject to optimization.

The geotechnical assessment assumed that drainage in the A154 underground is effective at handling the additional inflow and water pressures at the A154 pipes and that all the drainage galleries on the 8975 mRL elevation and below remain active and effective. The assessment concluded that conservative estimates of the water table in the southwest wall of the A154 pit for each of the three filling elevations considered were:

- With the water level in the A418 at 9,260 mRL, the water table does not pose a risk to stability;
- For the case with the A418 pit full of water (9,420 mRL), there is the potential that pressures will be unacceptably high and seepage zones may be present in the A154 pit wall; and
- Half way between these two extremes, the stability of the A154 pit walls will depend on the actual measured pressure increase.

In terms of the A418 pit, the assessment concluded that, with the exception of the southeast wall, water pressures in the wall are expected to be less than or equal to the water pressures in the flooded workings. In the southeast wall, water pressures are elevated due to a sub-horizontal enhanced permeability zone that is connected to Lac de Gras and will continue to remain elevated until the void is filled to lake level. The depressurization wells commissioned in this area in late 2017 will need to be maintained until the void is completely filled to lake level in order to ensure stability of the A418 wall and A418 dike.

Overall the geotechnical assessment concluded that, with mitigation measures in place so that water pressures are maintained equal to or below existing values, the filling of the A418 void with FPK/water does not pose a geotechnical fatal flaw.

### **3.3.5 Pipeline Route**

In order to deposit FPK in the A418 void a new pipeline is required to be constructed from the processing plant to the A418 mine. A preliminary design for a pipeline ranging in length between 3.8 and 7.6 kilometers (km) was developed for this purpose, with the final length dependent on how far the pipeline is placed along the A418 decline. The design assumes twin 25 cm insulated and heat traced HDPE pipelines. Pumping infrastructure may be required to move the slurry along the pipeline route.

The PKC Barge which currently pumps water from the main PKC Pond to the Process Plant to allow the use of reclaim water in the Process Plant would be relocated to A418. Currently it is unknown if reclaim water from A418 would be pumped directly to the Process Plant or if it would first report to the North Inlet prior to transferring it to the Process Plant via the existing East Side pipeline.

A potential pipeline alignment that follows the South Haul Road would run parallel to existing pipelines, where present. The pipeline would be installed in locations where, if leaks developed, it would drain into the existing Drainage Control and Collection System. The pipeline would be installed behind road safety berms to ensure mobile equipment cannot inadvertently damage the pipeline in case of collision or during routine road maintenance/snow clearing.

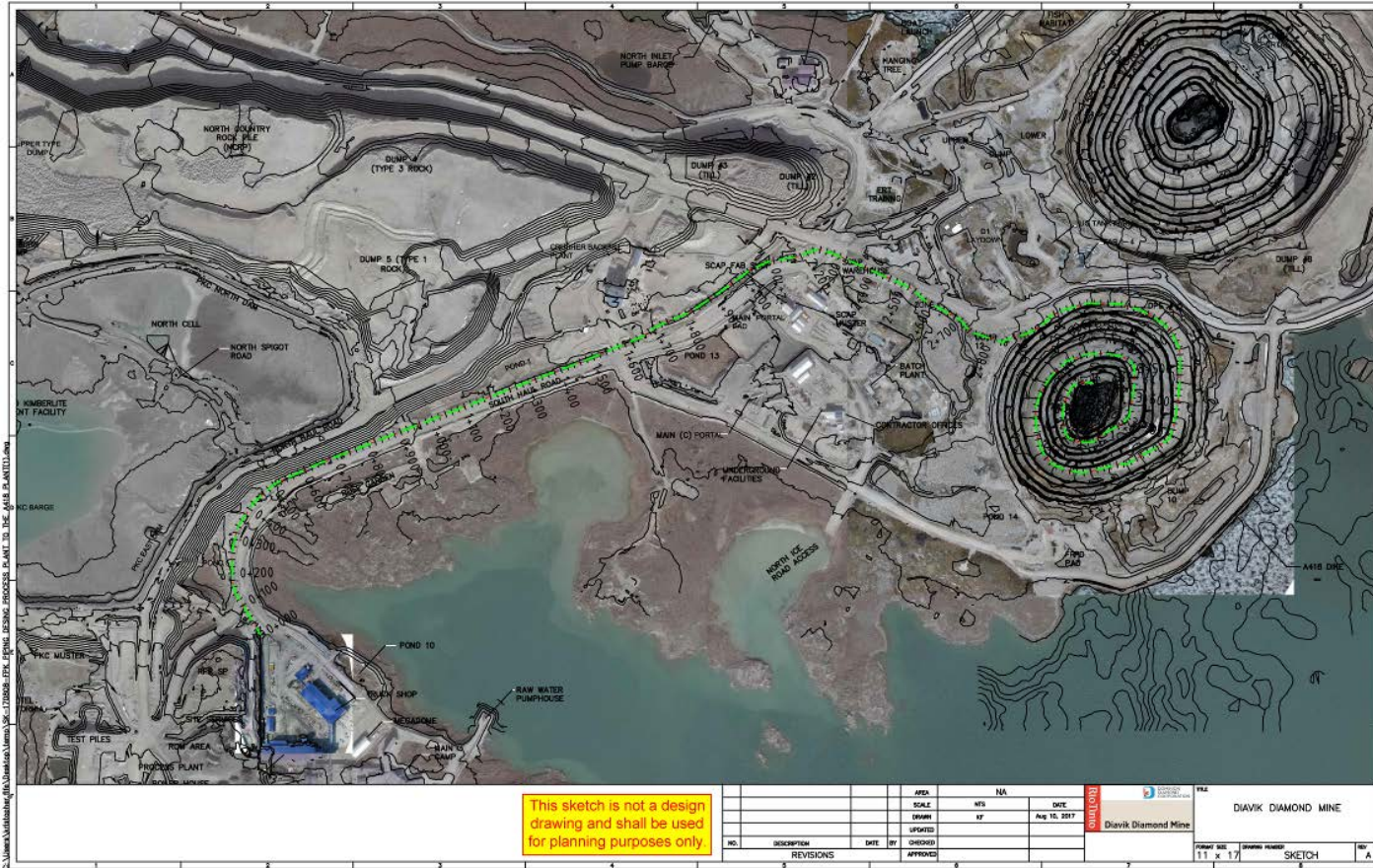


Figure 8: Proposed Pipeline Route from the Process Plant to A418

### 3.3.6 Options for PKC Facility Closure Relating to A418 PK Storage

Consideration is being given to placement of the estimated 5,000,000 m<sup>3</sup> of slimes (extra fine processed kimberlite) from the PKC Facility in to the A418 void. These slimes are extremely slow to consolidate and removal could assist with closure of the PKC Facility by allowing the construction of a dry cover. An assessment of the impact on A418 storage capacity and decant water volume requirements has been made on the following basis:

- Dry density of slimes in PKC Facility: 0.4t/m<sup>3</sup>
- Time to remove 5 Mm<sup>3</sup>: 4 years
- Percent solids in pipeline: 20% (slurry density of 1.14t/m<sup>3</sup>)
- Dry density of slimes in A418: 0.5t/m<sup>3</sup>

Based on these parameters, the addition of the slimes to the A418 void will create an additional 1,192,308 m<sup>3</sup>/year decant water and consume 4,000,000 m<sup>3</sup> of storage volume. This will increase the level of FPK in A418 to 9,298 mRL (9,230,063 m<sup>3</sup>), well below the top of the A418 void but still 38 m above the nominated fill elevation of 9,260 mRL. Please refer to Section 4.6 for addition discussions on closure.

# Project Integration with the Diavik Mine

## 4. Project Integration with the Diavik Mine

### 4.1 Overview and Approach

The following sections review overall aspects of the project and how the planned infrastructure, engineering, monitoring, management and mitigations, closure, benefits, and risks will integrate with existing operations.

### 4.2 Infrastructure Requirements

#### 4.2.1 Currently Existing Infrastructure

The following section outlines current infrastructure that would be required to facilitate the deposition of processed kimberlite into the A418 open pit and underground.

##### 4.2.1.1 Process Plant

No changes are required within in the process plant. The degrit circuit will be turned off upon the commencement of deposition in the A418, allowing for increased FPK production. CPK will continue to be deposited in the PKC.

##### 4.2.1.2 Reclaim Barge

The reclaim barge allows for the Process Plant to reuse water from the PKC pond. Once the decant water in A418 reaches a level that allows for barge installation, the reclaim barge would be moved from the PKC Facility to the A418. The reclaim barge would be used to allow the reuse of decant water from the A418 in the process plant.

##### 4.2.1.3 Pipelines

Where possible existing pipelines would be used for water management, provided sufficient volume exists or the pipeline is currently not in use and can be repurposed. Decant water from A418 would be pumped from the reclaim barge (relocated from the PKC Facility) to the North Inlet, the Process Plant or both through existing in-pit HDPE pipelines and the East Side pipeline.

##### 4.2.1.4 Containment

The PKC Facility would continue to be the primary storage area for PK materials and decant water until 2021. The mine workings would serve as the containment infrastructure for FPK materials and decant water generated commencing in 2022, with plans to continue CPK material placement in the PKC Facility. The Drainage Control and Collection System and mine dewatering infrastructure would collect seepage and runoff water from existing and new infrastructure required to support PK placement in A418.

## 4.2.2 New Infrastructure

The following section outlines new infrastructure requirements that would be required to facilitate the deposition of processed kimberlite into the A418 mine workings.

### 4.2.2.1 FPK Pipeline

DDMI has completed a conceptual design and routing of a FPK pipeline which would be used to transport FPK slurry from the Process Plant to the A418. The proposed route is shown in Figure 8. The pipeline would run adjacent to the current East Side Pipeline along the south haul road. The pipeline would be placed in a manner that would allow unexpected discharges from potential line breaks to drain into containment.

The pipeline would consist of 25 cm HPDE which would be insulated and heat traced. The pipeline would extend between 3.8 to 7.6 km from the Process Plant to A418, with the overall length dependent upon how far the pipeline is placed along the open pit ramp.

It is anticipated that construction of the pipeline would be completed in the summer of 2020.

### 4.2.2.2 Underground Bulkheads

As detailed in Section 3.3.3 cement bulkheads would be required underground to prevent flooding of the A154 underground workings. These bulkheads would be required prior to filling the A418 underground to the operating water elevation.

## 4.3 Engineering

Currently, conceptual engineering has been completed for the deposition of PK into the A418 void. Once the License amendment to allow PK deposition in mine workings is approved, final engineering designs, management plans and drawings will be submitted for approvals as required.

Engineering design and construction are covered by Part F of the Water Licence. As the mine workings will receive "Waste", DDMI anticipates that additional clauses will be added to both Part F and Schedule 5 of the Water Licence.

As identified in Section 6 of this report and Attachment-2, engineering specifics in relation to Part F of the Water Licence could include:

- At least forty-five (45) days prior to the start of Construction of any Dams or Engineered Structure (including those related to closure) intended to contain, withhold, divert or retain water or Wastes, the Licensee shall submit to the Board for approval, design drawings stamped by a Geotechnical Engineer.

- Processed Kimberlite containment structures for the mine workings shall be constructed in accordance with the Processed Kimberlite Containment in Mine Workings Design Report (including drawings stamped by a Geotechnical Engineer and/or Engineering Geologist), which shall be in accordance with Schedule 5 Item 2(b) and submitted for approval a minimum of 6 months in advance of commencing construction.

## **4.4 Monitoring**

### **4.4.1 Measuring**

The volume and tonnage of PK produced in the Process Plant will continue to be measured and reported in the monthly SNP and Annual Water Licence Reports. Tonnage by disposal area (PKC or mine working) will be added.

Reclaim water use will continue to be measured, with the source of water changing to the appropriate mine workings rather than the PKC Facility once the reclaim barge is relocated. Any water that is removed/transferred either into or out of the PKC Facility will continue to be measured. Water flows will continue to be reported in the monthly SNP and Annual Water Licence Reports.

An update to the Water Management Plan and Waste Management Plan would be required to describe revisions to the water transfer system and PK deposition plans. The site water balance as required in the Water License would be updated to include the mine workings as a deposition option for PK and as a water source. An update to what is currently titled the PKC Facility Plan would be required to address changes to placement locations for FPK and CPK. The Contingency Plan would also require updates to reflect any changes in contingency measures associated with the placement of PK material into the mine workings. Given that deposition of PK material into the mine workings would not begin until 2022, Diavik suggests that updates to the relevant management and facility plans could be postponed until the deposition of PK into the mine workings is approved.

Decant water levels and the PK solids level within the mine workings would be recorded and reported in the monthly SNP and Annual Water Licence Reports, similar to how the North Inlet water level is reported. This level would also be used for reporting the operational freeboard limit as described below.

### **4.4.2 Water Quality**

An SNP station would be added to measure decant water quality in the mine workings. DDMI suggests that the same frequency and parameters that are measured in the PKC Facility (Station 1645-16) be applied to the new station added for the mine workings. No updates to the aquatic effects monitoring plan (AEMP) would be required as a result of depositing PK into the mine workings.

#### **4.4.3 Engineering**

An operational water elevation limit would be required as part of Schedule 6 and established within the mine workings, with elevations measured and reported on a monthly basis. The operational water elevation limit would ensure that water levels do not rise above a predetermined level that relates to the highest constructed bulk head elevation. This operational water elevation limit may change over time if/when additional bulk heads are constructed, and is therefore best established through Schedule 6 and the associated facility plan that would be reviewed through the Board's process. The operational water elevation would allow for adequate storage of design rainfall/snowmelt events.

Stability monitoring of the pit walls will continue as required by the Mine Safety Act and internal Rio Tinto Standards.

#### **4.5 Adaptive Management**

As noted previously, this submission is based on conceptual level engineering. It is recognized that additional studies and submissions may be required as a condition of this License amendment.

#### **4.6 Closure and Reclamation**

##### **4.6.1 Closure and Reclamation Plan**

A Closure and Reclamation Plan (CRP) for the Mine includes approved closure concepts for the PKC Facility and the A154, A418 and A21 mines as they currently exist. The A418, A154 and A21 open pit, underground and dike areas will be flooded at closure and the areas re-joined with Lac de Gras by excavating small sections of the dikes. Fish habitat enhancements, constructed during the mine operations in the pit shelf area, will provide additional habitat for the fish of Lac de Gras. DDML expects that the overall closure plan for these areas would remain the same with deposition of PK to the mine workings. Updates to the CRP would be required to address the addition of PK into the mine workings.

The currently approved closure approach for the PKC is to cover the exposed beaches with a layer of waste rock to separate wildlife from PK and to protect against wind/water erosion. A centralized pond would remain over the slowly consolidation FPK. Overflow from the pond will pass safely through a designed spillway. There are potential closure benefits to the PKC Facility if mine workings are utilized for PK deposition. The possibility of moving slimes (extra fine PK) into the mine workings would potentially allow the PKC to be closed as a dry cover facility, rather than the currently approved concept which includes a pond over the slimes in the central portion of the facility.

Under the current arrangement the PKC is required until the end of commercial operations (2025); hence limited progressive reclamation of the facility. Depositing PK in the mine workings starting in 2022 could allow greater progressive reclamation of the facility.



Additional investigations are required to determine the feasibility of such an approach, and would proceed if this amendment application is approved. Closure concepts for the PKC Facility and the mine workings would be updated in future versions of the Closure and Reclamation Plan, as determined during the amendment process.

#### **4.6.2 Post-Closure Monitoring**

Post closure monitoring is described in the Closure and Reclamation Plan. When the plan is updated to include closure of the PKC and mine workings, any additional post closure monitoring requirements will be determined. Monitoring will include, but not be limited to, water quality of the mine pool area following pumping of fresh water to refill the pit to the Lac de Gras water level, as well as updates to the AEMP and PKC related monitoring programs, as required.

#### **4.7 Benefits**

Deposition and storage of PK in the A418 will maintain the sustainable development of the Diavik resource to its full potential. The two key benefits to the project are:

1. Continued operation of the Diavik mine with safe storage for the life of mine production of Processed Kimberlite and a limited raise to the PKC Dam.
2. Provide another option for the safe closure and reclamation of the PKC Facility.

#### **4.8 Contingency Planning**

Incidents that could result in unintended consequences to the environment and worker safety are minimized by Diavik's numerous management plans, operating procedures and monitoring programs. Safety mitigations are addressed under the Mine Safety Act. DDMI has an extensive Contingency Plan to address potential environmental incidents and outline applicable preventative measures and response plans to address such potential issues. The requirement for this Contingency Plan is included in the License and DDMI commits to updating the Plan accordingly to address environmental concerns related to the placement of PK materials in the mine workings as identified through the amendment process.

# Engagement

## 5. Community Engagement

In considering this amendment, DDMI sent a letter requested meetings with each of the five Participation Agreement (PA) community organizations, in addition to regulators, in accordance with the Engagement Plan. The following is a list of organizations contacted on December 21, 2017:

- Yellowknives Dene First Nation (YKDFN)
- Tlicho Government (TG)
- North Slave Metis Alliance (NSMA)
- Kitikmeot Inuit Association (KIA) and the Hunters and Trappers Association
- Lutsel K'e Dene First Nation (LKDFN)
- Environmental Monitoring Advisory Board (EMAB)
- Department of Fisheries and Oceans (DFO)
- Government of the Northwest Territories, Lands; Environment and Natural Resources (GNWT-Lands, GNWT-ENR)
- Environment and Climate Change Canada (ECCC)

Appendix I includes the letter template sent to each party requesting an opportunity to meet to discuss the proposed amendment. This appendix also includes a copy of the presentation shared during engagement meetings with each organization. Finally, a Record of Engagement provides a summary of the meetings conducted in accordance with DDMI's Engagement Plan.

In addition to the above, the Traditional Knowledge (TK) Panel for the Diavik mine focused on the concept of placing processed kimberlite into the mine workings during their eleventh session in May 2018. This session included an underground and open pit tour in an effort to help Panel members understand the size and depth of the void. The key questions for the session were:

1. What other information do you need to feel comfortable with PK material being placed in mine areas?
2. Can you share your knowledge of how fish use deeper waters to help predict fish behaviour in the pits once they are filled with water?
3. If Diavik goes ahead with putting the PK in the pits and the mine shafts, what would you want to watch at closure to know that it is good?

The TK Panel has discussed this concept before, most notably in relation to the benefits that could be realized for PKC Facility closure. Overall, the Panel was supportive of the concept and provided the following recommendations to Diavik. Please note that the final report for the session has yet to be completed.

- If the PK goes to the mine area, the TK Panel recommends that all of the PKC slimes also be put into the pits. There is interest in moving as much of the slimes as possible from the PKC into the mine area.
- If Diavik moves ahead with putting PKC slimes into the mine areas, the Panel requests to review any changes to the PKC closure plan. For example, if it is not possible to move all of the slimes in the PKC to the mine area and some of the slimes remain in the PKC, the TK Panel may recommend that the PKC is topped with large boulders to discourage wildlife and people from entering.
- The beach materials and rough kimberlite should stay in the PKC area (i.e. anything that can support a rock cover).
- TK holders know that fish generally go where there is food (nutrients) and oxygen so they are unlikely to go to the depth where PK would be.
- The Panel would like additional scientific research to see what the effects of PK (ingestion) might be on fish specific to Lac de Gras.
- If PK were to go in any mine area, the Panel requests an opportunity to learn more about the depth of water for fish habitat to cover PK (TK and western science).
- The Panel requests that Diavik provide a list of items/equipment that will remain and be removed from underground before flooding or filling the mine with PK/water.

- The TK Panel recommends that their members are present for at least some of the time when the slimes are moved from the PKC into the A418.
- The TK Panel wants to monitor how water behaves when placed on PK. They would like to see the PK and water in the A418 as soon as it is safe to do so and when there is a good visual of the material, as well as at regular intervals afterwards.
- The TK Panel recommends that they monitor the fish habitat within the pits, shoreline modifications (e.g. ramps) for wildlife as well as the stability of the dikes on a regular and ongoing basis.
- The TK Panel recommends that they monitor freeze-up and break-up within the contained areas (i.e. within the dikes) to see if the formation and melting is any different - with a view towards safety for people and wildlife.
- The TK Panel would like to see the PK vegetation plots again.
- The TK Panel recommends that we test slimes/PK in a fish tank to see if any water plants would grow on the PK.

# Licence Amendment

## 6. Licence Amendments

### 6.1 Licence Terms and Conditions

DDMI expects that specific terms and conditions of the Water License will change if this amendment is approved. The relevant conditions and Schedule items for which changes are anticipated are outlined below and included in Attachment-2. DDMI has limited the scope of proposed Schedule changes to those directly related to the management of Processed Kimberlite, recognizing that these requirements will inform required changes to other Schedules and Management Plans that can occur independently through the Board's process, at a later date.

In addition to these changes, DDMI is requesting additional administrative changes to clarify various requirements of the current License and has submitted a 'track changes' version of the License that highlights these proposed changes. Diavik is seeking to obtain approval for these administrative changes as part of this amendment process. Some of these are the result of previous Board decisions that have yet to be updated in the License, while others relate to the interpretation of License requirements. The rationale for each proposed change is included as a comment adjacent to the relevant Item in Attachment-2.

#### 6.1.1 Existing

Water License W2015L2-0001 includes the following relevant sections to be considered as part of this amendment.

- Part F – Conditions Applying to Construction
  - Item 4: At least forty-five (45) days prior to the start of Construction of any Dams, dikes or structures intended to contain, withhold, divert or retain water or Wastes, the Licensee shall submit to the Board for approval, design drawings stamped by a Geotechnical Engineer.
- Part H – Conditions Applying to Water and Waste Management
  - Item 4: The Licensee shall operate in accordance with the approved Processed Kimberlite Containment Facility Plan. The Plan shall be in accordance with Schedule 6, Item 2.
  - Part H Item 20: Engineering Standards – Water Retention Dikes.

- Part H Item 21(d): the solids fraction of all Processed Kimberlite shall be deposited and permanently contained within the Processed Kimberlite Containment Facility.

### 6.1.2 Anticipated

Proposed amendments to the sections identified above are outlined below.

- Part F – Conditions Applying to Construction
  - Item 4: At least forty-five (45) days prior to the start of Construction of any Dams or Engineered Structure (including those related to closure) intended to contain, withhold, divert or retain water or Wastes, the Licensee shall submit to the Board for approval, design drawings stamped by a Geotechnical Engineer.
  - Item Addition: Processed Kimberlite containment structures for the A418/A154/A21 mine workings shall be constructed in accordance with the Processed Kimberlite Containment in Mine Workings Design Report (including drawings stamped by a Geotechnical Engineer and/or Engineering Geologist), which shall be in accordance with Schedule 5 Item 2(b) and submitted for approval a minimum of six (6) months in advance of commencing construction.
- Part H – Conditions Applying to Water and Waste Management
  - Item 4: The Licensee shall operate in accordance with the approved Processed Kimberlite Containment Plan: Processed Kimberlite Containment Facility and Mine Workings. The Plan shall be in accordance with Schedule 6, Item 2.
  - Item 20 Revisions/Additions:
    - Processed Kimberlite may be deposited and permanently contained within the Water Retention Dikes, in accordance with Schedule 6 Item 2. [new]
    - Six (6) months prior to deposition of Processed Kimberlite into mine components, DDMI will establish the operational freeboard limit and bulkhead design, along with supporting documentation, as recommended by a Geotechnical Engineer and approved by the Board. [new]

- Weekly inspections of the Water Retention Dikes, Processed Kimberlite and decant water pipeline(s) for the mine workings shall be conducted and the records of these inspections and all monitoring records shall be kept for review upon request of an Inspector. [Item 20(d)]
  - Any decant water or Seepage water through the bulkhead shall be collected and directed to the Process Plant or North Inlet prior to being sent to treatment; [new]
- Item 21(d) Revision:
  - The solids fraction of Processed Kimberlite shall be deposited and permanently contained within the Processed Kimberlite Containment Facility or Mine Workings.

## 6.2 License Schedules and Management Plans

DDMI has included possible changes to Schedules 5 (Construction) and 6 (Water and Waste Management) within Attachment-2. In general, DDMI suggests that the Processed Kimberlite Containment designs and facility requirements for the PKC Facility and Mine Workings should be stated within the existing Item of each respective Schedule.

For example, Schedule 5 Item 2 would be revised to state, "The Processed Kimberlite Containment Design Reports referred to in Part F Item 7 and Part F Item \*9\* of the License, shall include, but not necessarily be limited to, the following:

- a) Processed Kimberlite Containment Facility Design Report (Part F Item 7):  
[list of requirements]
- b) Processed Kimberlite Containment in Mine Workings Design Report (Part F Item \*9\*):  
[list requirements]"

Schedule 6 Item 2 would be revised to refer to the "Processed Kimberlite Containment Plan: Processed Kimberlite Containment Facility and Mine Workings, (formerly the Processed Kimberlite Containment Facility Plan)" referred to in Part H, Item 3 of the Water License. The draft License amendments in Attachment-2 provide additional details on the changes proposed to address the requirements for storage of PK in the mine workings for the list of conditions in Schedule 6 Item 2.

**Appendix I**  
**Summary of Engagement**



Diavik Diamond Mines (2012) Inc.  
P.O. Box 2498  
Suite 300, 5201-50<sup>th</sup> Avenue  
Yellowknife, NT X1A 2P8  
T (867) 669 6500  
F 1-866-313-2754

Robert Jenkins  
Director, Water Resources  
Environment and Natural Resources  
Yellowknife, NT

Thursday, December 21, 2017

Dear Mr. Jenkins,

**Re: Meeting to Discuss Amendments to our Water Licence**

This winter, Diavik Diamond Mines (2012) Inc. (DDMI) will be submitting an amendment to our Water Licence (W2015L2-0001) to allow for permanent storage of Processed Kimberlite (PK) in the A418 open pit and underground, as well as various administrative updates to the licence.

To assist with this process, DDMI is looking to meet with you and your staff so that we can provide information on the proposed plans, clarify any information, and ensure that any issues or concerns you may have are understood and considered. Would we be able to meet and present to you during the week of January 22, 2018?

During the meeting, we will present the following topics:

1. **Proposal to deposit Processed Kimberlite (PK) to A418:** As discussed with you during the fall of 2016, we are looking to make an amendment to DDMI's Water License to allow for permanent storage of PK in DDMI's A418 pit and underground workings.
2. **Administrative Amendments:** Various administrative revisions intended to clarify our Water License requirements.

As always, there will also be an opportunity to submit your official comments during the WLWB review process, but we are hoping to meet with you before submitting our amendment so that we can understand and consider any of your concerns and address any questions that you may have.

Please do not hesitate to contact me, if you would like to discuss this further.

Sincerely,

A handwritten signature in dark ink, appearing to read 'D Wells', with a large, stylized initial 'D'.

David Wells  
Superintendent, Environment  
Diavik Diamond Mines (2012) Inc.  
Phone: (867) 669-6500 ext. 5536  
Email: david.wells@riotinto.com



**RioTinto**

# W2015L2-0001 Amendment

PK to A418 and Administrative Updates

Document Control #:

Template #: DCON-029-1010 R8

# Agenda

1. Overview
2. PK Production and Storage
3. PK Storage Options Analysis
4. Licence Amendment – PK Management and Storage
5. Licence Amendment – Administrative Changes
6. Next Steps and Questions



# Overview

- Kimberlite is the rock that contains diamonds.
- It is processed on site and any remaining material is deposited on site.
- The remaining material is referred to as 'processed kimberlite' (PK).



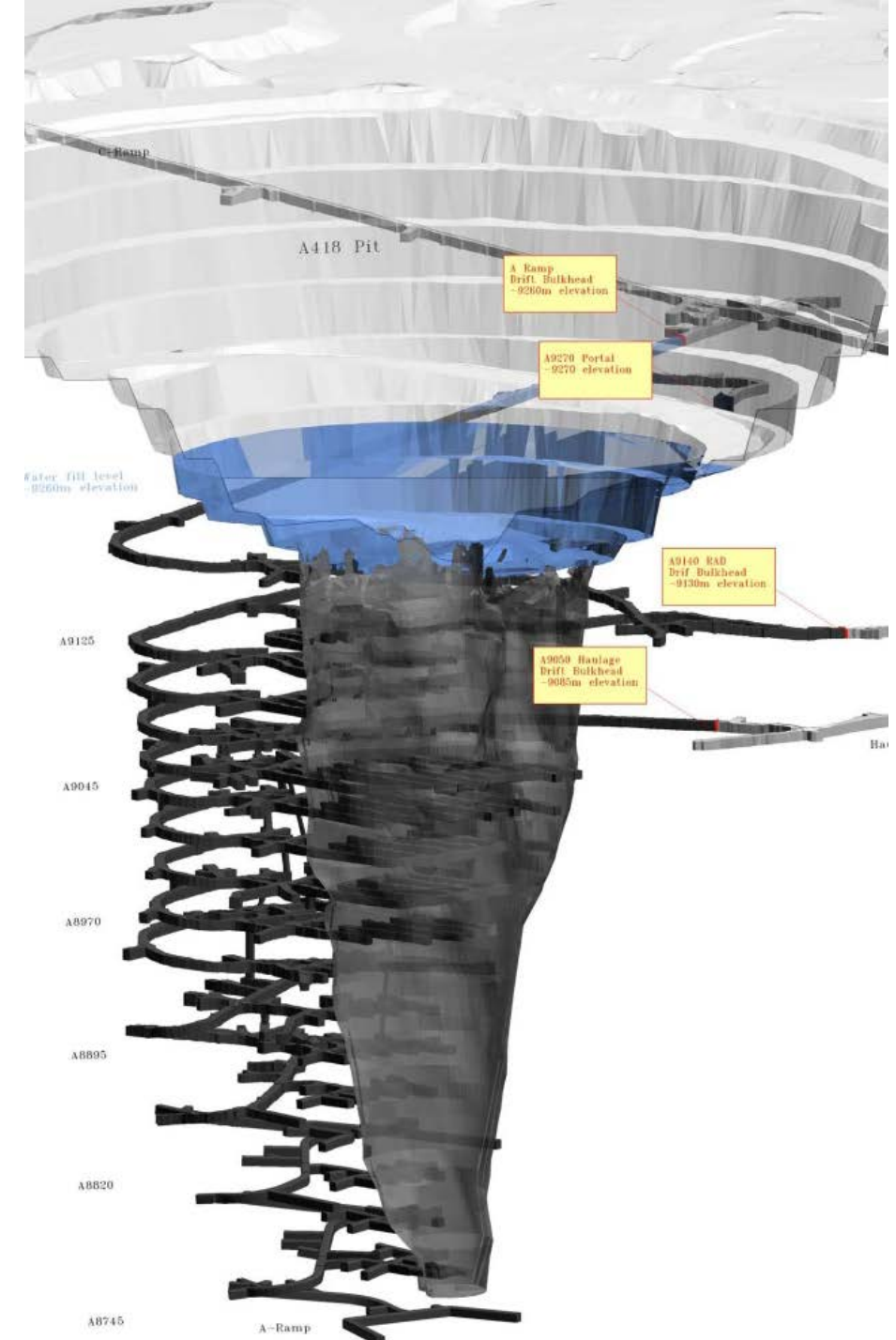
# Overview

- Processed kimberlite is currently stored within the Processed Kimberlite Containment (PKC) Facility
- The PKC Facility is surrounded by a lined dam that DDMI has constructed and made higher over the years
- The amount of storage area left within the PKC will not fit the amount of processed kimberlite that will be produced during the remaining years of mining.
- PKC dam expansion opportunities are limited by the size of East Island.



# Overview

- We have explored options for what we can do with PK, using existing facilities within the mine footprint.
- To increase storage in the PKC, DDMI started a 'PK Trial' in June 2016; this has been successful and we've submitted an updated PKC Facility Plan to continue using this 'degrit' method for PK. However, additional storage is still needed.
- DDMI is proposing a combined approach as the preferred option: a PKC Dam raise and storage of PK in the A418 Open Pit and Underground.
- Storage of PK in mined-out pits is currently done at the Ekati Diamond Mine.



# Overview

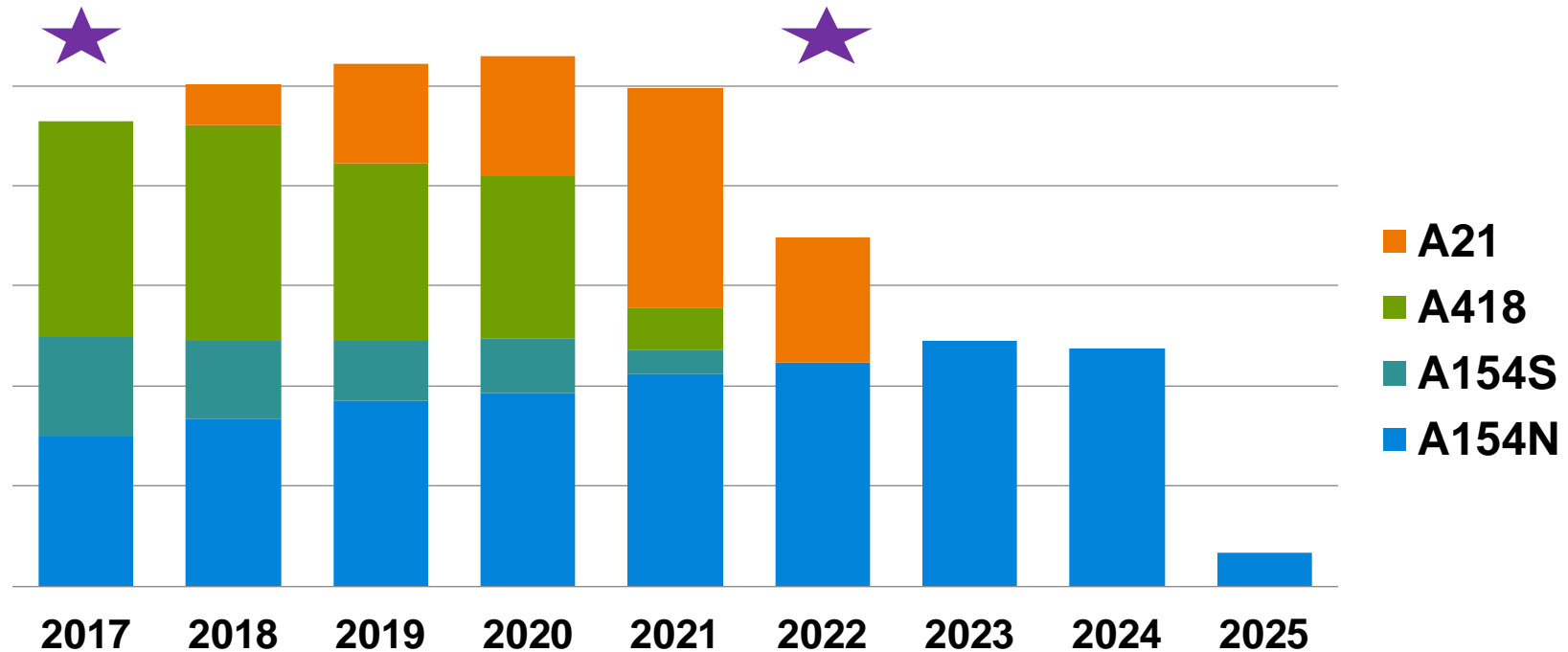
- Storage of PK in the A418 Underground and Open Pit has been previously discussed at a high-level with community leadership and staff, the Traditional Knowledge Panel and regulators
- A Water Licence Amendment is required to place and store PK in A418
- During the Amendment Process, DDMI will also seek administrative updates to wording in the Water Licence





# PK Production and Storage

- Based on the current mine plan, the PKC will be full in 2021.
- Underground mining of the A154S and A418 kimberlite pipes will be completed by 2022.
- Underground mining of the A154N kimberlite pipe will be completed in 2025.
- Open pit mining of the A21 kimberlite pipe will be completed by 2023.
- ★ DDMI requires a short-term option for PK deposition (2017-2022), and a long-term option (2022-closure)

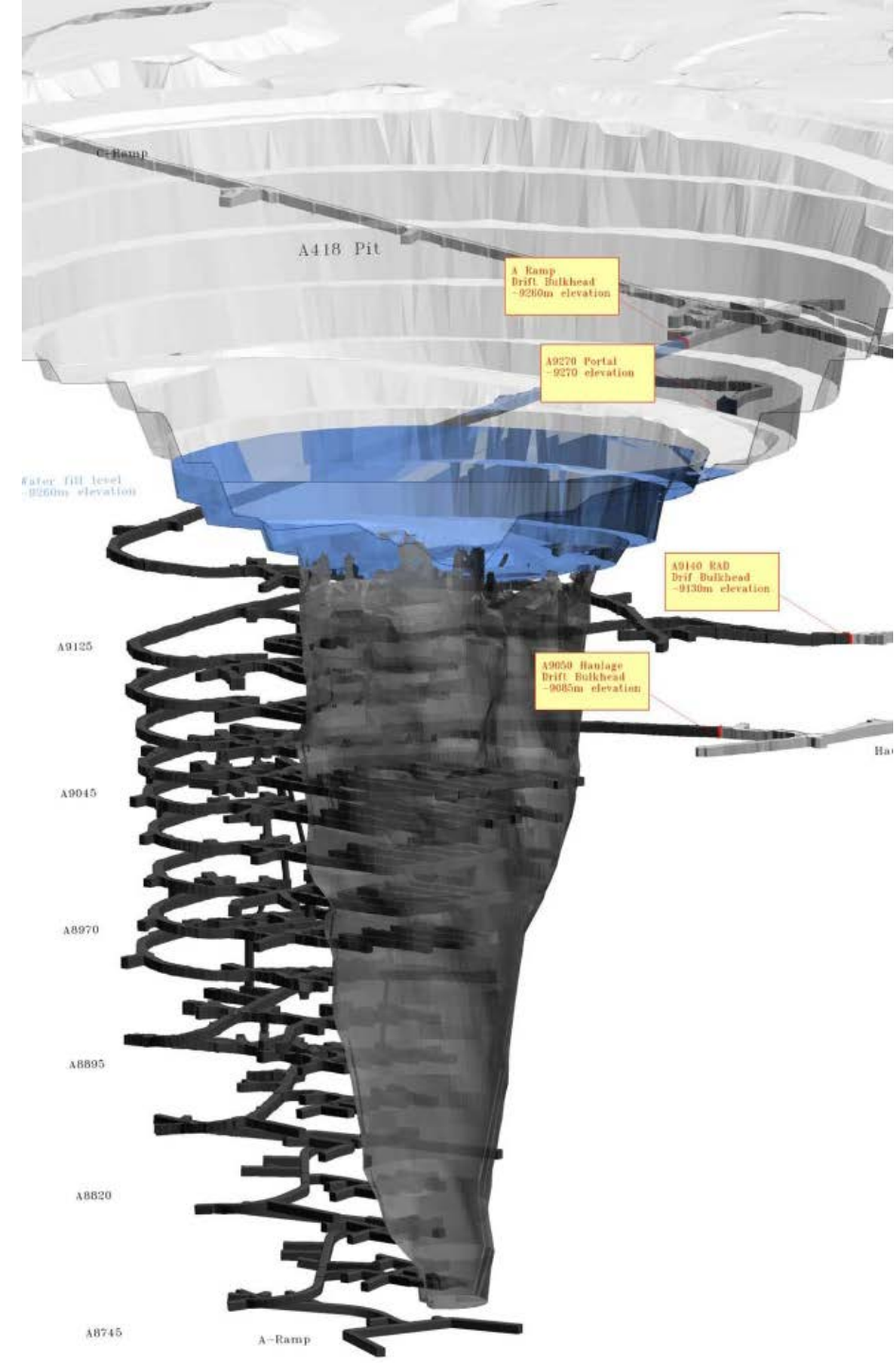


# PK Storage Options Analysis

- Multiple options were explored for PK storage:
  1. Traditional PKC Dam raise to hold full PK volume
  2. Remaining PK stored in A418 once mining is complete
  3. Alternative storage locations (North Inlet, collection ponds, etc.)
  4. Combination PKC Dam Raise and A418 storage
- Option 4 was the preferred option based on technical, engineering, closure and cost factors.



# Conceptual Drawing



# Environmental Considerations

Future updates to Management and Monitoring Plans include:

- **Management Plans:** PKC Facility Plan, Water Management Plan, and anticipate a new Management Plan for A418 PK deposition.
- **Monitoring:** The Aquatic Effects Monitoring Program (AEMP) in Lac de Gras will continue (water quality, sediment, fish and bugs within the water and sediment), and anticipate additional Surveillance Network Program (SNP) stations (water quality) for A418 PK deposition.
- **Closure Plans:** Anticipate a beneficial change to the PKC Facility closure concept; closure concept for A418 remains the same with plans to reconnect the area to LDG
- **Toxicological Studies:** Summary of what has been done to date on PK and any upcoming studies

# Licence Amendment – PK Management and Storage

- New clauses will be required within the Water Licence to deposit and store PK in A418.
- **Currently**, PK deposition and storage is covered by:
  - The Processed Kimberlite Containment Facility Plan, Part H Item 4 and Schedule 6 Item 2; and
  - Several operational clauses (ie. Construction (Part F), freeboard limits, water against the dam (Part F, Item 9), engineering standards/geotechnical monitoring (Part H, Item 21) and environmental monitoring (SNP, Annex A)).
- **Through the Amendment Process**, DDMI will be requesting an amendment to:
  - Part H Items 20 and 21 (Engineering Standards) to allow for deposition and storage of PK in A418; and
  - Part H Item 4 and the corresponding Schedule 6 for management of PK materials.

# Timelines and Schedule – PK Management

	January 2018	February 2018	Summer 2018	February 2019	Summer 2019	Summer 2020	2022	2023 - 2025
PK Management / Operations	Submit Updated PKC Facility Plan to WLWB							Commence progressive closure of PKC
	Submit Phase 7 Dam Design		Commence dam raise		Continue dam raise	Complete dam raise	Placement of PK in A418	Placement of PK in A418
Amendment		Amendment Submission		Revised Water Licence				
A418							A418 UG Completed	

# Licence Amendment – Administrative Changes

- DDMI has also noted several administrative changes which are required in the Licence
- Updates are required to reflect previous Board directives and approved operational practices, as well as to add clarity for DDMI and all stakeholders.
- Some examples that DDMI is requesting include:
  - License term extension to 2025
  - Remove requirements relating to A21 dewatering /dredging and construction
  - Part F Item 9 to apply to PKC Pond water against the dam
  - Apply EQC to 1645-18 and 1645-18B
  - Relocate clauses to more applicable sections/Parts
  - Update submission timelines for various items
  - Remove historical references no longer applicable

# Next Steps and Questions?

- DDMI is currently engaging with communities and regulators about the Amendment
- DDMI will submit a Water License Amendment application to the WLWB in late February 2018
- The amendment process will follow the WLWB process which includes additional stakeholder engagement (i.e. Initial comments, technical hearing, public hearing, etc.)
- The amendment process is anticipated to take approximately 12 months
- If you have any questions after this presentation, please touch base with Rebecca



**2018**

**DIAVIK COMMUNITY ENGAGEMENT RECORD**

**W2015L2-0001 AMENDMENT  
PK TO MINE WORKINGS AND ADMINISTRATIVE  
UPDATES**

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Approval: Final

Recorded By: [DDMI, Communities & External Relations](#)

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DATE & TIME	ENGAGEMENT TRIGGER	ATTENDEES	LOCATION/ ENAGEMENT ACTIVITY TYPE	ISSUES RAISED	DDMI RESPONSE	MATERIALS PROVIDED TO ENGAGED PARTY	MINUTES (Y/N)
12 January 2018	Amendment to Environmental Management Plans and programs; -Processed Kimberlite management and storage -Administrative changes	<ul style="list-style-type: none"> <li>North Slave Metis Alliance staff (3)</li> </ul>	<ul style="list-style-type: none"> <li>DDMI Corporate Office, Yellowknife, NT - Meeting</li> </ul>	<ul style="list-style-type: none"> <li>No concerns or issues.</li> <li>Discussions focused on: dam raise and PK to A418, timing, methods and process for moving PK, Ekati's PK storage methods, mine life, potential PKC closure options, minimizing footprint &amp; utilizing underground, timeline for amendment process.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y
29 January 2018	Amendment to Environmental Management Plans and programs; -Processed Kimberlite management and storage -Administrative changes	<ul style="list-style-type: none"> <li>Lutsel K'e Dene First Nation Chief</li> <li>LKDFN Staff (1)</li> <li>LKDFN Councillor (1)</li> <li>LKDFN Member (1)</li> </ul>	<ul style="list-style-type: none"> <li>Diavik mine site, Lac De Gras, NT - Meeting</li> </ul>	<ul style="list-style-type: none"> <li>No concerns or issues.</li> <li>Discussions focused on: dam raise and PK to A418, timing, methods and process for moving PK, Ekati's PK storage methods, mine life, potential PKC closure options, minimizing footprint &amp; utilizing underground, timeline for amendment process.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y

30 January 2018	Amendment to Environmental Management Plans and programs; -Processed Kimberlite management and storage -Administrative changes	<ul style="list-style-type: none"> <li>• YKDFN Chiefs (2)</li> <li>• YKDFN Staff (3)</li> </ul>	<ul style="list-style-type: none"> <li>• DDMI Corporate Office, Yellowknife, NT - Meeting</li> </ul>	<ul style="list-style-type: none"> <li>• Requested information of other examples of this type of process, if it has been done in other operations – not including Ekati.</li> <li>• Will this change meromictic effect in pit?</li> <li>• How will this impact caribou and fish?</li> <li>• How will the impact long term water quality and closure plan?</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual design to date; with further modeling to be completed in second phase of amendment process.</li> <li>• Detailed studies on water quality will be guided by the Amendment process</li> <li>• AEMP will monitor fish health and effects in the lake and the closure plan will be updated.</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y
2 February 2018	Amendment to Environmental Management Plans and programs; -Processed Kimberlite management and storage -Administrative changes	<ul style="list-style-type: none"> <li>• Kwe Beh Resource Working Group (5)</li> </ul>	<ul style="list-style-type: none"> <li>• TG Office, Yellowknife, NT - Meeting</li> </ul>	<ul style="list-style-type: none"> <li>• Asked if the AEMP would monitor for possible effects from this.</li> <li>• No other concerns were noted.</li> </ul>	<ul style="list-style-type: none"> <li>• DDMI confirmed the AEMP would monitor for possible effects from this change.</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y
13 February 2018	Amendment to Environmental Management Plans and programs; -Processed Kimberlite management and storage -Administrative changes	<ul style="list-style-type: none"> <li>• KIA Lands and Environment Staff (At request of President and ED) (6)</li> </ul>	<ul style="list-style-type: none"> <li>• KIA Office,</li> <li>• Kugluktuk, NU</li> </ul>	<ul style="list-style-type: none"> <li>• What is the anticipated quantity of “slime” slurry?</li> <li>• Are there expected effects of nitrate to the lake from the PK slurry at closure?</li> <li>• Interested if there will be seepage of the material to the lake after closure.</li> <li>• Noted that the key difference for Diavik’s amendment is PK storage in Lac de Gras at closure (vs in-land pit lakes).</li> <li>• Asked how the PK material will stay in place.</li> </ul>	<ul style="list-style-type: none"> <li>• Estimate just over 4Mt of operational PK to the mine workings</li> <li>• Detailed studies on water quality will be guided by the Amendment process</li> <li>• Water table will try to equalize with the mine workings; water to flow in to the mine vs from the mine.</li> <li>• Agreed</li> <li>• Freshwater cap on top of PK</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y

28 February 2018	Amendment to Environmental Management Plans and programs; -Processed Kimberlite management and storage -Administrative changes	<ul style="list-style-type: none"> <li>• Kugluktuk Hunters and Trappers Organization</li> </ul>	<ul style="list-style-type: none"> <li>• Telephone</li> </ul>	<ul style="list-style-type: none"> <li>• Manager of HTO to present to Board at next meeting &amp; send DDMI any comments or questions in 1 week; none received.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y
30 January 2018	Amendment to Environmental Management Plans and programs; -Processed Kimberlite management and storage -Administrative changes	<ul style="list-style-type: none"> <li>• Department of Fisheries and Oceans</li> </ul>	<ul style="list-style-type: none"> <li>• Yellowknife, DDMI boardroom</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion about fish habitat compensation within the A418 footprint</li> <li>• Suggested providing an overview and rationale for recommended changes to the Water License</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat compensation plans for A418 closure currently remain the same.</li> <li>• Overview and rationale for all changes will be provided with Amendment application.</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y
23 January 2018	Amendment to Environmental Management Plans and programs; -Processed Kimberlite management and storage -Administrative changes	<ul style="list-style-type: none"> <li>• Environment and Climate Change Canada</li> </ul>	<ul style="list-style-type: none"> <li>• Teleconference</li> </ul>	<ul style="list-style-type: none"> <li>• No concerns or issues.</li> <li>• Discussions focused on: dam raise and PK to A418, timing, methods and process for moving PK, Ekati's PK storage methods, mine life, potential PKC closure options, minimizing footprint &amp; utilizing underground, timeline for amendment process.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y

24 January 2018	<p>Amendment to Environmental Management Plans and programs;</p> <ul style="list-style-type: none"> <li>-Processed Kimberlite management and storage</li> <li>-Administrative changes</li> </ul>	<ul style="list-style-type: none"> <li>• Government of the Northwest Territories, ENR</li> </ul>	<ul style="list-style-type: none"> <li>• ENR Boardroom, Scotia Center</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts/benefits to PKC closure?</li> <li>• Asked if security estimate revision is required with application. Mentioned ENR supports sequencing security updates later.</li> <li>• Discussed deposition plans and monitoring requirements.</li> <li>• Suggested possible extension of Water License term to 2026 and benefit of avoiding simultaneous operation and closure licenses.</li> <li>• Asked about pipeline spill contingency.</li> <li>• Effect on water quality in pit at closure?</li> </ul>	<ul style="list-style-type: none"> <li>• Discussed possible change in closure option for PKC and the expected overall benefit to PKC closure.</li> <li>• It is DDMI's view that it is not required at this time.</li> <li>• N/A</li> <li>• DDMI to request 2025.</li> <li>• An updated Contingency Plan will incorporate this risk.</li> <li>• Detailed studies on water quality will be guided by the Amendment process.</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y
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24 January 2018	<p>Amendment to Environmental Management Plans and programs;</p> <ul style="list-style-type: none"> <li>-Processed Kimberlite management and storage</li> <li>-Administrative changes</li> </ul>	<ul style="list-style-type: none"> <li>• Government of the Northwest Territories, Lands - Inspector</li> </ul>	<ul style="list-style-type: none"> <li>• Yellowknife, DDMI Boardroom</li> </ul>	<ul style="list-style-type: none"> <li>• Modelling for requirements of water cap on top of PK?</li> <li>• Would filling the pits with water constitute a water usage?</li> <li>• Is a potential freeboard limit required? If so, how would it be measured?</li> <li>• Suggested possibly extending the term of the Water License to 2026</li> </ul>	<ul style="list-style-type: none"> <li>• Modelling work is in progress and detailed studies on water quality will be guided by the Amendment process.</li> <li>• Unsure at this time. Filling of the pits will be covered by future closure license.</li> <li>• Operational limit will be required that is significantly below the freeboard of the pits (lake level).</li> <li>• DDMI to request 2025.</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y
1 February 2018	<p>Amendment to Environmental Management Plans and programs;</p> <ul style="list-style-type: none"> <li>-Processed Kimberlite management and storage</li> <li>-Administrative changes</li> </ul>	<ul style="list-style-type: none"> <li>• Government of the Northwest Territories, Lands - Administration</li> </ul>	<ul style="list-style-type: none"> <li>• Yellowknife, Lands Boardroom</li> </ul>	<ul style="list-style-type: none"> <li>• PK storage is not described within the use of current mining lease.</li> <li>• Suggest administrative adjustment of the boundaries of Mining lease #76D/8-5-2 and PK containment lease #76D/8-6-2.</li> </ul>	<ul style="list-style-type: none"> <li>• DDMI agrees and will submit an administrative lease boundary adjustment before which time this change takes effect.</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y
28 February 2018	<p>Amendment to Environmental Management Plans and programs;</p> <ul style="list-style-type: none"> <li>-Processed Kimberlite management and storage</li> <li>-Administrative changes</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Monitoring Advisory Board and Staff</li> </ul>	<ul style="list-style-type: none"> <li>• Teleconference</li> </ul>	<ul style="list-style-type: none"> <li>• How high can be PK be deposited in the pit so as not to impact water quality in Lac de Gras?</li> </ul>	<ul style="list-style-type: none"> <li>• Modelling work is in progress and detailed studies on water quality will be guided by the Amendment process.</li> </ul>	<ul style="list-style-type: none"> <li>• 2018-01-11 DDMI_PK to A418 Engagement Presentation.pdf</li> </ul>	Y



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

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

Pursuant to the *Mackenzie Valley Resource Management Act* and Regulations, the Wek'èezhii Land and Water Board, hereinafter referred to as the Board, hereby grants to:

Diavik Diamond Mines (2012) Inc.  
(Licensee)

of P.O. Box 2498 Suite 300, 5201-50<sup>th</sup> Avenue, Yellowknife, NT X1A 2P8  
(Mailing Address)

Hereinafter called the Licensee, the right to alter, divert or otherwise use water and deposit Waste subject to the restrictions and conditions contained in the *Waters Act* and Regulations and in accordance with the conditions specified in this Licence.

Licence Number: W2015L2-0001 (Formerly W2007L2-0003, MV2005L2-0009, N7L2-1645)

Licence Type: A

Water Management Area: NORTHWEST TERRITORIES 05

Location: LAC DE GRAS, NT

Purpose: WATER USE AND WASTE DISPOSAL

Description: DIAMOND MINING AND MILLING

Quantity of water **not to be exceeded**: SEE PART D, ITEM 2

Effective Date of Licence: OCTOBER 19, 2015

Term of Licence: 8 YEARS

Expiry Date of Licence: OCTOBER 18, ~~2023~~2025

This Licence issued and recorded at Yellowknife includes and is subject to the annexed conditions.

**Wek'èezhii Land and Water Board:**

Witness

Chair

APPROVED BY:

Minister of Environment and Natural Resources

**Commented [CE1]:** The proposed revisions to this document include an updated expiry date for the License to reflect a change to the end of commercial production to 2025 and align with Final Closure and Reclamation Plan submission requirements in Part K. This change was also suggested by GNWT-ENR during the engagement meeting on the License amendment.



## Table of Contents

### **PART A: SCOPE AND DEFINITIONS**

### **PART B: GENERAL CONDITIONS**

Annual Report - Schedule 1

### **PART C: CONDITIONS APPLYING TO SECURITY DEPOSITS**

Security Requirements - Schedule 2

### **PART D: CONDITIONS APPLYING TO WATER USE**

Water Use - Schedule 3

### **PART E: CONDITIONS APPLYING TO DEWATERING**

A21 Dewatering Summary Report - Schedule 4

### **PART F: CONDITIONS APPLYING TO CONSTRUCTION**

Results of Comprehensive Delineation Program - Schedule 5, Item 1

Processed Kimberlite Containment Facility Design Report - Schedule 5, Item 2

A21 Construction Environmental Management Plan - Schedule 5, Item 3

### **PART G: CONDITIONS APPLYING TO MODIFICATIONS**

### **PART H: CONDITIONS APPLYING TO WATER AND WASTE MANAGEMENT**

Water Management Plan - Schedule 6, Item 1

Processed Kimberlite Containment (PKC) Facility Plan - Schedule 6, Item 2

North Inlet Water Treatment Plant Operations Plan - Schedule 6, Item 3

Sewage Treatment Facility Operations Plan - Schedule 6, Item 4

Waste Rock Management Plan - Schedule 6, Item 5

Seepage Survey Report - Schedule 6, Item 6

North Inlet Hydrocarbon Investigation Report - Schedule 6, Item 7

North Inlet Sludge Management Report - Schedule 6, Item 8

### **PART I: CONDITIONS APPLYING TO CONTINGENCY PLANNING**

Contingency Plan - Schedule 7

### **PART J: CONDITIONS APPLYING TO AQUATIC EFFECTS MONITORING**

AEMP Design Plan - Schedule 8, Item 1

Specific Effects Studies - Schedule 8, Item 2

AEMP Response Plan - Schedule 8, Item 3

AEMP Annual Report - Schedule 8, Item 4

Aquatic Effects Re-evaluation Report - Schedule 8, Item 5

### **PART K: CONDITIONS APPLYING TO CLOSURE AND RECLAMATION**

Closure and Reclamation Progress Report - Schedule 9





**Schedules:**

- Schedule 1: General Conditions
- Schedule 2: Security
- Schedule 3: Water Use
- Schedule 4: Dewatering
- Schedule 5: Construction
- Schedule 6: Water and Waste Management
- Schedule 7: Contingency Planning
- Schedule 8: Aquatic Effects Monitoring
- Schedule 9: Closure and Reclamation

**Annex 1: Surveillance Network Program**

- Part A: Reporting Requirements
- Part B: Flow and Volume Measurement Requirements
- Part C: Sampling and Analysis Measurements
- Part D: Other Monitoring Requirements



## PART A: SCOPE AND DEFINITIONS

### 1. Scope

This Licence entitles Diavik Diamond Mines (2012) Inc. (DDMI) to use water, dewater a portion of Lac de Gras, and dispose of Waste, for the purpose of Construction, operation, closure, and Reclamation of the Diavik Diamonds Project in the Lac de Gras area of the Coppermine Watershed, Northwest Territories, as shown on Figure 2.1, (Overall Site Plan, page 13, Diavik Diamonds Project Supporting Documentation Class A Water Licence Application, August 1999).

### 2. Definitions

**"A154 Pit"** means the developed open pit and underground mine workings for the mining of the A154 North and South Kimberlite Pipes [which are designated as Engineered Structures and may be used as containment basins for Processed Kimberlite.](#)

**"A21 Pit"** means the developed open pit for the mining of the A21 Kimberlite Pipe [which is designated as an Engineered Structure and may be used as a containment basin for Processed Kimberlite.](#)

**"A418 Pit"** means the developed open pit and underground mine workings for the mining of the A418 Kimberlite Pipe [which is designated as an Engineered Structure and may be used as a containment basin for Processed Kimberlite.](#)

**"Acid Rock Drainage (ARD)"** means the production of acidic leachate, Seepage or drainage from underground workings, pits, ore piles, Waste Rock, tailings, and overburden that could lead to the release of metals to Groundwater and surface water during the life of the mine and after mine closure.

**"Act"** means the *Waters Act*.

**"Action Level"** means a predetermined qualitative or quantitative event which, if met, requires the Licensee to take appropriate actions including, but not limited to: further investigations, changes to operations, or enhanced mitigation measures.

**"Analyst"** means an Analyst designated by the Minister under section 65(1) of the Act.

**"Annual Load of Total Phosphorus"** means the sum of monthly loads from a calendar year.

**"Aquatic Effects Monitoring Program (AEMP)"** means a monitoring program designed to determine the short and long-term effects in the aquatic environment resulting from the Project, to evaluate the accuracy of impact predictions, to assess the effectiveness of impact mitigation measures, and to identify additional impact mitigation measures to reduce or eliminate environmental effects of the licensed undertaking.

**"Average Annual Loading of Total Phosphorus"** means the sum of annual loads divided by the number of annual loads summed.

**"Board"** means the Wek'èezhii Land and Water Board established under section 57.1 of the *Mackenzie*

Commented [CE2]: Definitions for A154, A21 and A418 all updated to reflect the requested amendment to deposit PK material into Mine Workings.



Valley Resource Management Act.

**"Closure and Reclamation Plan"** means either an Interim or Final Closure and Reclamation Plan approved under this Licence and as described in the Mackenzie Valley Land and Water Board's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories*.

**"Closure Criteria"** has the same meaning as that term in the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories*.

**"Closure Objectives"** has the same meaning as that term in the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories*.

**"Construction"** means any activities undertaken to construct or build any components of, or associated with, the development of the Diavik Diamond Mine.

**"Cut-off Wall Trench"** means a trench excavated vertically through a dike to allow the Construction of a Diaphragm Wall Seepage barrier.

**"Dam"** means an Engineered Structure that meets the definition of a dam under the *Dam Safety Guidelines* and is intended to contain, withhold, divert, or retain water or Waste.

**"Dam Safety Guidelines (DSG)"** means the Canadian Dam Association's (CDA) *Dam Safety Guidelines*, 2007 (2013 edition). The scope and applicability of the DSG referred to in this Licence, is presented in section 1 of the DSG.

**Decant Water** is surplus water that pools above the settled Processed Kimberlite solids and is available for pumping to the Process Plant or the North Inlet.

Commented [CE3]: Add a definition of Decant Water to assist with distinguishing waste streams related to the amendment.

**"Dewatering"** is the complete removal of water from an existing water body or portion thereof by pumping or draining.

**"Diaphragm Wall"** means the plastic concrete Cut-off Wall constructed in a dike as a Seepage barrier.

**"Diavik Geotechnical Review Board"** means the Expert Review Board established by DDMI to review dike designs.

**"Dike Rock Placement"** means the placement of rock associated with the Construction of a dike.

**"Dike Seepage"** means any water which passes through a dike.

**"Discharge"** means the direct or indirect release or deposit of any water or Waste to the Receiving Environment.

**"Drainage Control and Collection System"** means the ditches, ponds, and associated piping and pumps used for the diversion collection, and disposal of surface runoff and Seepage.



~~"Dredging Activities" means excavating and moving lake bottom sediments and glacial till below the high water mark and from the bottom of Lac de Gras in the area of the footprints of the dikes.~~

Commented [CE4]: Dredging activities are complete; definition no longer required.

"**East Island**" means the large eastern-most island in Lac de Gras as identified in Figure I.1 B (Final Design Report Site Location, Volume II-A, Part A, Water Management Plan, Version 1, Water Licence Application, August 1999).

"**Engagement Plan**" a document developed in accordance with the Board's *Engagement and Consultation Policy* and *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*.

"**Engineered Structure**" means any constructed facility which was, or, in the Boards' view, normally would be, designed and approved by a Professional Engineer.

"**Engineering Geologist**" means a professional geologist registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists and whose principal field of specialization is the investigation and interpretation of geological conditions for civil engineering purposes.

"**Freeboard**" means the vertical distance between the water line and the effective water containment crest on a dam's or dike's upstream slope.

"**Frozen Core**" means a permafrost core comprising frozen ice-saturated aggregate material and functioning as an impervious Seepage barrier to water or tailings.

"**Geotechnical Engineer**" means a Professional Engineer whose principal field of specialization is the design and Construction of earthworks in a permafrost environment.

"**Ground Ice**" means ice that occupies pores and crevices in rock and soil.

"**Groundwater**" means all water below the ground surface.

"**ICP Metal Scan**" means the elements detected using an inductively coupled plasma mass spectrometer.

"**Inspector**" means an Inspector designated by the Minister under section 65(1) of the Act.

"**Licensee**" means the holder of this Licence.

"**LC20**" is the concentration of effluent in water that is estimated to be lethal to 20% of the test organisms. The LC20 and its 95% confidence limits are usually derived by statistical analysis of percent mortalities in several test concentrations, after a fixed period of exposure. The duration of exposure must be specified (e.g., 48-h LC20).

"**Management Plans**" means the specific plans required by the Board under this Water Licence.

"**Maximum Average Concentration**" means the moving average of any five (5) consecutive analytical



results collected at six (6) day intervals as submitted to the Board in accordance with the sampling and analysis requirements specified in the Surveillance Network Program.

**"Metal Leaching"** means the production of leachate under neutral or alkaline conditions, Seepage or drainage from underground workings, pits, ore piles, Waste Rock, tailings, and overburden that could lead to the release of metals to Groundwater and surface water during the life of the mine and after mine closure.

**"Mine Design"** means the detailed engineered designs for all mine components stamped by a design Engineer.

**"Mine Plan"** means the plan for development of the proposed mine, including the sequencing of the development.

**"Minewater"** means any water that accumulates in any underground workings or open pits.

**"Mine Workings"** means the underground and/or open pit area resulting from the development of an ore body.

**"Minister"** means a duly-appointed member of the Executive Council who is responsible for the Act or the department responsible for administering the Act.

**"Modification"** in respect of an Engineered Structure, means a change, other than an expansion, that does not alter the purpose or function of a structure.

**"Monthly Load of Total Phosphorus"** means the load calculated from the daily flow volume measurements and analytical results collected at 6-day intervals that fall within a calendar month.

**"Mount Polley Report"** means the *Report on Mount Polley Tailings Storage Facility Breach* (January 30, 2015), prepared by the Independent Expert Engineering Investigation and Review Panel established by the B.C. Government, the Williams Lake Indian Band, and the Soda Creek Indian Band.

**"North Inlet Facility"** means the containment facility that is constructed within the North Inlet of East Island of Lac de Gras.

**"North Inlet Water Treatment Plant"** includes the treatment facility designated for the treatment of waters associated with the North Inlet Facility.

**"Pit Water"** means the water that seeps into and/or is collected within an open pit.

**"Processed Kimberlite"** means material rejected from the process plant after the recoverable minerals have been extracted.

**"Processed Kimberlite Containment Facility"** comprises the tailings containment basins and the Engineered Structures that are designed to contain tailings ~~as identified in Drawing Number 1-110-42D3-1005 (Overall Site Plan, Volume II-B-Part L, Processed Kimberlite Containment, Water Licence Application, August 1999)~~ in accordance with the approved design.

**Commented [CE5]:** Suggest omitting 'any' in light of the Decant Water that would be present in A418 as part of the amendment, and would more closely represent Process versus mine water.

**Commented [CE6]:** Added a definition of Mine Workings to assist with distinguishing PK storage locations related to the amendment.

**Commented [CE7]:** Removed reference to drawing in 1999 Water License application and updated with a reference to the approved design, which better aligns with requirements of the current Part F Item 7.



**"Professional Engineer"** means a person who is registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists in accordance with the *Engineering and Geoscience Professions Act*, as a Professional Engineer.

**"Progressive Reclamation"** has the same meaning as that term in the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories*.

**"Project"** means the undertaking described in Part A, Item 1.

**"Receiving Environment"** means, for the purpose of this Licence, the natural environment that receives any Discharge of Waste, including Seepage and runoff, from the Project.

**"Reclamation"** has the same meaning as that term in the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories*.

**"Regulations"** means Regulations proclaimed pursuant to section 63 of the Act.

**"Response Framework"** is a systematic approach to responding when the results of a monitoring program indicate that an Action Level has been reached.

**"Response Plan"** is a part of the Response Framework and describes the specific actions to be taken by the Licensee in response to reaching or exceeding an Action Level.

**"Seepage"** includes water or Waste that drains through or escapes from any structure designed to contain, withhold, divert, or retain water or Waste.

**"Sewage"** means all toilet Waste and greywater.

**"Sewage Treatment Facility"** means the facility that is designed to contain and treat Sewage.

**"Spillway"** means an Engineered Structure to facilitate the emergency release of water or Waste from a facility. The Spillway elevation is the elevation at which water or Waste begins to flow through the Spillway structure.

**"Unauthorized Discharge"** means any Discharge of any Waste not authorized by law or under this Licence.

**"Waste"** has the meaning set out in section 1 of the Act.

**"Waste Rock"** means all unprocessed rock materials that are produced as a result of mining operations.

**"Waste Rock Storage Area"** includes the engineered facilities for the disposal of rock and till, which are designated as the [North Country Rock Pile](#) and the [South Waste-RockCountry Rock Piles](#).

**"Water Intake Facility"** comprises the water intake infrastructure as identified in Drawing Number

**Commented [CE8]:** Added references for the long-standing terminology that Diavik uses to distinguish between the North and South Waste Rock Storage Areas, given that construction of the South Country Rock Pile commenced in 2017.



1135-41D1-1001 (Raw Water Intake Earthworks & Section, Volume II-A, Part E, Water Intake Structure, WLA, August 1999).

**"Water Licence Application"** means the Type A Water Licence Application as submitted to the NWT Water Board and all additional supporting documents.



## PART B: GENERAL CONDITIONS

1. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of Waste of any type in any waters or in any place under any conditions where such Waste or any other Waste that results from the deposits of such Waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended under the *Waters Act*, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited, or under which any such Waste may be so deposited this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations.
2. The Licensee shall take every reasonable precaution to protect the environment.
3. In conducting its activities under this Licence, the Licensee shall make every reasonable effort to consider and incorporate any scientific and traditional knowledge that is made available to the Licensee.
4. Compliance with the terms and conditions of this Licence does not excuse the Licensee from its obligation to comply with the requirements of any other applicable federal, territorial, Tichq, or municipal laws.
5. The Licensee shall ensure a copy of this Licence is maintained at the site of operations at all times.
6. The water use fee shall be paid annually, in advance of any water use, in accordance with the Mackenzie Valley Land and Water Board's *Water Use Fee Policy*.
7. The Licensee shall file an **Annual Water Licence Report** with the Board no later than March 31 of the year following the calendar year reported. The Report shall contain the information set out in Schedule 1, Item 1.
8. The Licensee shall comply with the Schedules, which are annexed to and form part of this Licence, and any amendments to the Schedules as may be made by the Board.
9. The Licensee shall comply with the Surveillance Network Program annexed to this Licence, and any amendment to the Surveillance Network Program as may be made by the Board, pursuant to the conditions of this Licence.
10. The Surveillance Network Program, Schedules, and compliance dates specified in the Licence may be modified at the discretion of the Board.
11. The Licensee shall install, operate, and maintain meters, devices, or other such methods employed for measuring the volumes of water used and Waste discharged, to the satisfaction of an Inspector.
12. The Licensee shall locate and maintain the signs identifying the stations of the Surveillance Network Program to the satisfaction of an Inspector.





13. The Licensee shall operate in accordance with the approved **Engagement Plan**, review the Plan annually, and submit updates to this Plan to the Board for approval at the following times:
- a) a minimum of ninety (90) days prior to any proposed changes to the approved Plan; and,
  - b) upon the request of the Board.
14. Any revised Plan submitted to the Board under this Licence shall include a list of notable revisions to the Plan.
15. The Plans referred to in Part H, Items 2, 4, 5, 6, 7, 9, and 10, shall be presented in a format consistent with the Mackenzie Valley Land and Water Boards' *Standard Outline for Management Plans*, unless otherwise approved by the Board.
16. The Licensee shall operate in accordance with any Plans approved pursuant to the conditions of this Licence.
17. Any reference to a Plan, Guideline, Act, or Regulation in this Licence is a reference to the most current version unless otherwise explicitly stated.



**PART C: CONDITIONS APPLYING TO SECURITY DEPOSITS**

1. The Licensee shall post and maintain a security deposit with the Minister in an amount which is in accordance with Schedule 2.
2. Upon request of the Board, the Licensee shall submit an updated mine Reclamation liability estimate utilizing the current version of RECLAIM or another method acceptable to the Board.
3. The amount of the security deposit required by Part C, Item 1 and Schedule 2 may be revised by the Board based on estimates of the mine Reclamation liability referred to in Part C, Item 2 of this Licence or based on such other information as may become available to the Board.
4. If the amount of the security deposit is revised by the Board as described under Part C, Item 3, the Licensee shall post the revised amount with the Minister within ninety (90) days of the Board giving notice of the revised amount.



**PART D: CONDITIONS APPLYING TO WATER USE**

1. The Licensee is authorized to use water from the Water Intake Facility or as approved by the Board.
2. The quantity of water used for all purposes shall not exceed the following:

~~1,750,000 cubic metres annually during the period from November 1, 2008 until December 31, 2009, during the operational phase for domestic, mining, milling and associated purposes;~~

**Commented [CE9]:** Removed as no longer applicable.

a) 1,280,000 cubic metres annually commencing January 1, 2010, during the operational phase for domestic, mining, milling and associated purposes;

b) ~~11,400,000 cubic metres during the Dewatering of the A21 pool water; and,  
3,500,000 cubic metres during in-lake Dredging Activities;~~

**Commented [CE10]:** Removed because A21 dredging and dewatering activities are complete.

3. The Licensee shall construct and maintain the water intake(s) with a fish screen designed to prevent impingement and entrainment of fish. The fish screen shall be in accordance with the detailed guidance referred to in Schedule 3, Item 1.



**PART E: CONDITIONS APPLYING TO DEWATERING**

~~1. The Licensee is authorized to dewater a portion of Lac de Gras to facilitate mining the A21 kimberlite pipe.~~

**Commented [CE11]:** Dewatering of A21 is complete; this item is no longer required.

~~2.1~~ Each water source shall be sampled and analyzed in accordance with the requirements set out in the Surveillance Network Program and the results shall be provided to an Inspector for approval prior to the commencement of Dewatering.

~~3.2~~ The Licensee shall ensure that any waters associated with Dewatering activities that are to be discharged to Lac de Gras, satisfy the effluent quality criteria specified in Part H, Items 26 and 29.

~~4.3~~ All Dewatering Discharge structures shall be designed and located to minimize erosion and impacts on receiving water quality.

~~5.4~~ During the Dewatering of any water source that is to be discharged to Lac de Gras, daily erosion inspections of the Discharge points shall be carried out and records of these inspections shall be kept for review, upon the request of an Inspector. If any erosion is observed, the Licensee shall immediately notify an Inspector and take the necessary corrective action to mitigate the erosion problem to the satisfaction of an Inspector.

~~6. Within sixty (60) days of the completion of Dewatering the A21 Pit, the Licensee shall submit to the Board an A21 Dewatering Summary Report that shall include, but not be limited to, the requirements of Schedule 4.~~

**Commented [CE12]:** Dewatering of A21 is complete and the Dewatering Summary Report will be submitted prior to this amendment being complete.



**PART F: CONDITIONS APPLYING TO CONSTRUCTION**

1. The Licensee shall ensure that all structures intended to contain, withhold, divert, or retain water or Waste are designed, constructed, and maintained to prevent escape of Waste to the Receiving Environment.
2. The Licensee shall ensure that all Dams are designed, constructed, and maintained to meet or exceed the *Dam Safety Guidelines*.
3. The Licensee shall ensure that all Engineered Structures are constructed and maintained in accordance with the recommendations of the Professional Engineer responsible for the design, including but not limited to recommendations regarding field supervision and inspection requirements.
4. At least forty-five (45) days prior to the start of Construction of any Dams ~~or, dikes, or structures~~ Engineered Structure (including those related to closure) intended to contain, withhold, divert or retain water or Wastes, the Licensee shall submit to the Board for approval, design drawings stamped by a Geotechnical Engineer.
5. All rock used in Construction must meet the geochemical criteria specified in the approved **Waste Rock Management Plan** as per Part H, Item 7.
6. Prior to the start of Construction the Licensee shall undertake and submit to the Board, the **Results of a Comprehensive Delineation Program** to identify soil, rock, and Ground Ice conditions along the centerline of all containment structures and runoff control ditches. This program shall be developed in accordance with Schedule 5, Item 1.
7. The Processed Kimberlite Containment Facility shall ~~be constructed~~ according to ~~the approved~~ **Processed Kimberlite Containment Facility Design Report** (including drawings stamped by a Geotechnical Engineer and/or Engineering Geologist) in accordance with Schedule 5, Item 2(a).
8. The Processed Kimberlite Containment Facility shall be designed, constructed, maintained, and operated to prevent Discharge to the Groundwater system.
- ~~8.9. Processed Kimberlite containment structures for the A418/A154/A21 mine workings shall be constructed in accordance with the Processed Kimberlite Containment in Mine Workings Design Report (including drawings stamped by a Geotechnical Engineer and/or Engineering Geologist), which shall be in accordance with Schedule 5 Item 2(b) and submitted for approval a minimum of 6 months in advance of commencing construction.~~
- ~~9. There shall be no accumulation of water against the containment Dam structures of the Processed Kimberlite Containment Facility, unless approved by the Board.~~
10. The Licensee shall comply with the approved **A21 Construction Environmental Management Plan** which shall be in accordance with Schedule 5, Item 3.
- ~~11. The Licensee shall annually review the **A21 Construction Environmental Management Plan** and shall submit updates to the Board, for approval, at the following times:~~

**Commented [CE13]:** Preference is to update this Item to include options for closure-related structures and use terminology provided in the Definitions section of the License.

**Commented [CE14]:** DDMI suggests including both PK Containment design reports within Schedule 5 Item 2 and distinguishing between their requirements as 'a' (PKC Facility) and 'b' (Mine Workings). Please refer to the draft Schedule 5 Item 2 that DDMI has included within this document.

**Commented [CE15]:** New clause added to reflect the need to submit the design document for PK Containment in Mine Workings to the Board.

**Commented [CE16]:** Removed to reflect the recent WLWB decision relating to DDMI's submission requesting clarity on the water against the dam requirements. This has been moved to Part H, Engineering Standards for the PKC Facility, to reflect that this applies throughout construction and operations.

**Commented [CE17]:** Removed because A21 dike construction will be complete by the end of the amendment process and no further updates would be required.



- a) ~~a minimum of ninety (90) days prior to any proposed changes to the requirements in the approved Plan; and,~~
- b) ~~upon request of the Board.~~

12.11. ~~The~~ Licensee shall implement the approved **Characterization of Enhanced Permeability Zones and Hydrogeological Test Work Plan for the A21 Pit Area.**

**Commented [CE18]:** Work has been completed for Items originally numbered as 10, 12 through 18 and 21, but DDMI recognizes that removing these Items could result in challenges related to evaluating compliance.

13.12. The Licensee shall construct the A21 Water Retention Dike in accordance with the **Final A21 Dike Design Report** stamped by a Geotechnical Engineer and/or Engineering Geologist.

14.13. The Licensee shall construct the A21 Mine according to the **Final Detailed Mine Design Report**, stamped by a Geotechnical Engineer and/or an Engineering Geologist. This Report shall be developed in accordance with Schedule 5, Item 4.

15.14. The Licensee shall submit a comprehensive report from the Diavik Geotechnical Review Board that indicates their assessment and approval of the **Final Dike Design Report** and plastic concrete wall performance.

16.15. A minimum of six (6) months prior to the commencement of Construction of the south Waste Rock Storage Area, the Licensee shall submit a **Waste Rock Storage Area Design Report**. The Licensee shall construct the Waste Rock Storage Area according to the **Waste Rock Storage Area Design Report** stamped by a Professional Engineer and/or Engineering Geologist and meet the requirements of Schedule 5, Item 5.

17.16. The Licensee shall construct the Drainage Control and Collection System according to the final detailed **Drainage Control and Collection System Design Report** (including representative cross sections and drawings of the Drainage Control and Collection System stamped by a Professional Engineer and/or Engineering Geologist).

18.17. The Licensee shall ensure that all Construction of Engineered Structures is supervised by a Professional Engineer and/or Engineering Geologist. The Licensee shall also ensure that Construction records of Engineered Structures are maintained and made available at the request of the Board and/or Inspector.

18. ~~The Licensee shall notify the Board of any in-water activities related to Construction at least 6 months prior to the start of Construction, to provide for an opportunity to determine if management measures are required.~~

**Commented [CE19]:** Added to reflect a WLWB Directive from 8 June 2016.

19. The Licensee shall, within ninety (90) days after completion of any ~~structures identified in Part F Item 4~~ **Dam**, submit to the Board a **Geotechnical Engineering Report** prepared by a Professional Engineer and/or Engineering Geologist that shall include as-built drawings, documentation of field decisions that deviate from original plans, and any data used to support these decisions.

**Commented [CE20]:** DDMI's preference is to clarify that a Geotechnical Engineering Report (Item 19) and a Quality Assurance/Quality Control Manual (Item 20) are required for any structure identified under Part F Item 4.

20. Prior to the start of Construction of ~~structures identified in Part F Item 4, all on-land water and Waste management structures~~, the Licensee shall prepare a **Quality Assurance/Quality Control Manual**. The Manual shall be submitted to the Board for approval, prior to the commencement of the Construction of those structures. This Manual shall be developed in accordance with



Schedule 5, Item 6.

21. The Licensee shall operate in accordance with the approved **Quality Assurance/Quality Control Manual** for the Construction of the A21 Dike. The Manual shall be in accordance with Schedule 5, Item 7.



## PART G: CONDITIONS APPLYING TO MODIFICATIONS

1. The Licensee may, without written approval from the Board, carry out Modifications to Engineered Structures **required by Part F Item 4** related to water use and Waste disposal provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:
  - a) the Licensee has notified the Board in writing of such proposed Modifications at least forty-five (45) days prior to beginning the Modifications;
  - b) the Modifications do not place the Licensee in contravention of either the Licence or the Act;
  - c) the Board has not, during the forty-five (45) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than forty-five (45) days;
  - d) an Inspector has confirmed the acceptability of the proposed Modification to the Board in writing; and,
  - e) the Board has not rejected the proposed Modifications.
2. Modifications for which all of the conditions referred to in Part G, Item 1, have not been met may be carried out only with written approval from the Board.
3. Within ninety (90) days of the completion of Modifications referred to in Part G, Item 1, the Licensee shall provide as-built drawings stamped by a Professional Engineer to the Board.

**Commented [CE21]:** DDM's preference is to clarify that Part G applies to any structure identified under Part F Item 4.





**PART H: CONDITIONS APPLYING TO WATER AND WASTE MANAGEMENT**

1. ~~Within ninety (90) days of the effective date of this Licence, t~~The Licensee shall ~~submit-operate in accordance with the approved~~ **Waste Management Plan**. The Plan shall be in accordance with the Mackenzie Valley Land and Water Board's *Guidelines for Developing a Waste Management Plan*, 2011. In addition to conforming to the Guidelines, the Plan shall include a section that addresses the Licensee's plan for the mitigating and monitoring of dust resulting from its operations. ~~Once approved, the Licensee shall operate in accordance with the approved~~ **Waste Management Plan**.
2. The Licensee shall operate in accordance with the approved **Water Management Plan**. The Plan shall be in accordance with Schedule 6, Item 1.
3. ~~Within sixty (60) days of the effective date of this Licence, the Licensee shall submit an updated~~ **Water Management Plan**, for approval.
3. The Licensee shall operate in accordance with the approved **Processed Kimberlite Containment Plan:- Processed Kimberlite Containment Facility and Mine WorkingsPlan**. The Plan shall be in accordance with Schedule 6, Item 2.
4. The Licensee shall operate in accordance with the approved **North Inlet Water Treatment Plant Operations Plan**. The Plan shall be in accordance with Schedule 6, Item 3.
5. The Licensee shall operate in accordance with the approved **Sewage Treatment Facility Operations Plan**. The Plan shall be in accordance with Schedule 6, Item 4.
6. The Licensee shall operate in accordance with the approved **Waste Rock Management Plan**. The Plan shall be in accordance with Schedule 6, Item 5.
7. ~~A minimum of six (6) months prior to the commencement of Construction of the south Waste Rock Storage Area, the Licensee shall submit an updated~~ **Waste Rock Management Plan**, for approval.
8. The Licensee shall operate in accordance with the approved **Hazardous Materials Management Plan**.
9. The Licensee shall operate in accordance with the approved **Ammonia Management Plan**.
10. ~~A minimum of twelve (12) months prior to pre-stripping of the A21 Pit, the Licensee shall submit an updated~~ **Ammonia Management Plan**, for approval.

**Commented [CE22]:** Update clause to reflect current status, given that Part H Item 12 requires updates to the Waste Management Plan 90 days in advance of a change.

**Commented [CE23]:** Remove clause to reflect current status, given that Part H Items 2 and 12 require a Water Management Plan and identify the requirement to update the Plan 90 days in advance of a change.

**Commented [CE24]:** Proposed new title for the facility plan related to PK containment. DDMI suggests including both PK Containment plans within Schedule 6 Item 2 as most requirements are similar for both areas. Those that are unique to one versus the other would be clearly distinguished within the Item description. Please refer to the draft Schedule 6 Item 2 that DDMI has included within this document.

**Commented [CE25]:** Remove clause to reflect current status as this requirement is complete and the approved Waste Rock Management Plan includes considerations for the South Country Rock Pile.

**Commented [CE26]:** Remove clause to reflect current status as this requirement is complete the approved Ammonia Management Plan includes considerations for A21 mining.



~~11-10.~~ The Licensee shall annually review the **Waste Management Plan, Water Management Plan, Processed Kimberlite Containment Facility Plan, North Inlet Water Treatment Plant Operations Plan, Sewage Treatment Facility Plan, Waste Rock Management Plan, Hazardous Materials Management Plan, and Ammonia Management Plan** referred to in Part H, Items 1, 2, 4, 5, 6, 7, 9, and 10, respectively, and shall submit updates to the Plans to the Board, for approval, at the following times:

- a) a minimum of ninety (90) days prior to any proposed changes to the requirements in the approved Plan; and,
- b) upon request of the Board.

~~12-1.~~ The Licensee shall implement the approved Standard Operating Procedures for pH adjustment for all Discharges to Lac de Gras from SNP Station # 1645-18.

~~13-11.~~ Upon instruction from the Board, the Licensee shall modify the Standard Operating Procedures for pH adjustment referred to in Part H, Item 13, to reflect directives from the Board. The modified Procedures shall be submitted to the Board for approval and shall be implemented upon approval.

~~14-12.~~ The Licensee shall conduct Seepage surveys for all constructed rock piles, stockpiles of Reclamation rock, ore stockpiles, areas constructed with mined or quarried rock, and water retention dikes and dams. The Seepage surveys shall be in accordance with Schedule 6, Item 6.

~~15-13.~~ By March 31 each year, the Licensee shall submit to the Board, for approval, a **Seepage Survey Report**. The Report shall be in accordance with Schedule 6, Item 6.

~~16-14.~~ Within six (6) months following the effective date of this Licence, the Licensee shall submit a **Mount Polley Report Evaluation** prepared by a Professional Engineer. The Report shall assess the applicability of the recommendations in the Mount Polley Report to the Diavik Diamond Mine Project.

~~17-15.~~ On or before January 31, 2016, the Licensee shall submit a **North Inlet Hydrocarbon Investigation Report**. The objective of the Plan is to identify sources of hydrocarbon contamination in the North Inlet Facility. The Plan shall be in accordance with Schedule 6, Item 7.

On or before January 31, 2016, the Licensee shall submit to the Board, for approval, a **North Inlet Sludge Management Report**. The objective of the Report is to determine whether North Inlet Water Treatment Plant sludge should be disposed in an alternative location in order to meet the Closure Objectives in the approved **Closure and Reclamation Plan**. The Report shall be in accordance with Schedule 6, Item 8.

**Commented [CE27]:** Terminology change to reflect one plan related to PK containment at the PKC Facility and in the Mine Workings included in the amendment.

**Commented [CE28]:** These two Items (originally numbered as Part H Items 13 and 14) have been moved to Part I – Conditions Applying to Contingency Planning – as pH adjustment for Discharge to Lac de Gras is only considered contingency and is not used for water treatment.



**Engineering Standards**

~~18-16.~~ The Licensee shall operate and maintain the Water Retention Dikes to engineering standards such that at a minimum they comply with the *Dam Safety Guidelines*, and in accordance with the following:

- a) the lowest point on the upper edge of the Diaphragm Wall shall not be lower than 419.0 metres above mean sea level, or as recommended by a Geotechnical Engineer and as approved by the Board;
- b) the Licensee shall install and maintain geotechnical instrumentation in the Water Retention Dikes as described in ~~each of the Water Retention Dikes Final Design Report, dated July 1999 Dike Design Reports;~~
- ~~c) a schedule of reading the instrumentation shall be submitted to the Board for approval not less than three (3) months before Dewatering is scheduled to commence.~~ The Licensee shall carry out the instrumentation reading schedule, ~~as upon approval approved of by~~ the Board;
- d) ~~Processed~~ Kimberlite may be deposited and permanently contained within the Mine Workings, in accordance with Schedule 6 Item 2.
- e) ~~6 months prior to deposition of Processed Kimberlite into the Mine Workings, DDMI will establish the operational water elevation limit, along with supporting documentation, as required in Schedule 6 and as recommended by a Geotechnical Engineer and approved by the Board.~~
- ~~e)f) weekly inspections of the Water Retention Dikes and Processed Kimberlite and decant water pipeline(s) for the mine workings shall be conducted and the records of these inspections and all monitoring records shall be kept for review upon request of an Inspector;~~
- g) any Seepage through the Water Retention Dikes that does not meet the effluent quality criteria Part H, Items 26 and 29 shall be collected and directed to the North Inlet or the Processed Kimberlite Containment Facility, and measures shall be employed to reduce Seepage;
- ~~e)h) any Decant water or Seepage water that passes through the bulkhead(s) shall be collected and directed to the Process Plant or North Inlet prior to being sent to treatment;~~
- ~~e)i) any deterioration or erosion of any Engineered Structures associated with the Water Retention Dikes shall be reported to an Inspector and repaired immediately; and,~~
- ~~f)j) an inspection of the Water Retention Dikes shall be carried out annually, between June and September, in August by a Geotechnical Engineer. The Engineer's report shall be submitted to the Board within ninety (90) days of completing the inspection, including a covering letter from the Licensee outlining an Implementation Plan for addressing each of the Engineer's recommendations.~~

**Commented [CE29]:** Remove reference to 1999 design report to reference each applicable design report for A154/A418/A21.

**Commented [CE30]:** Remove reference to requirement to submit an instrumentation reading schedule as this has been completed. Reference to the reading schedule remains for compliance purposes and is updated to reflect the WLWB Directive from 16 August 2017 relating to the A21 schedule.

**Commented [CE31]:** Addition of ability to deposit PK in mine workings, in accordance with the amendment request, and identification of material management requirements as per Schedule 6 Item 2.

**Commented [CE32]:** DDMI suggests that this information should be contained within Schedule 6 and the PK to Mine Components Plan in order to allow flexibility on the limit as PK deposition levels advance. DDMI emphasizes that the term 'freeboard' was not included because this operational water elevation limit will be significantly below the dike freeboard limits and will be based on water elevation restrictions to prevent flooding underground mine workings.

**Commented [CE33]:** Add inspection requirements for infrastructure associated with the amendment request to deposit PK into mine workings.

**Commented [CE34]:** Added management requirements for seepage that may occur at the bulkhead(s).

**Commented [CE35]:** Revise the timing and reporting requirements for annual Engineer inspections to provide more flexibility on the timing of the inspection and clarify the due date for the report and implementation plan.

~~19-17.~~ The Licensee shall operate and maintain the Processed Kimberlite Containment Facility to engineering standards such that:



a) a minimum Freeboard limit of ~~1.50.4~~ metres below the lowest surveyed point of the dam crest liner or of the engineered emergency Spillway, whichever is lower, shall be maintained at all times; or as recommended by a Geotechnical Engineer and as approved by the Board;

**Commented [CE36]:** Updated to reflect the WLWB Directive from 20 April 2017.

b) Temporary accumulation of ponded surface water against Phase 6 of the containment Dam structures of the Processed Kimberlite Containment Facility shall be limited to 14 days, unless otherwise approved by the Board. Occurrences of such accumulation are to be reported in accordance with Schedule 6 Item 2.

**Commented [CE37]:** Updated to reflect the WLWB Directive from 15 May 2018. This Item was relocated from Part F to clarify that it applies to construction and operations. Two Items were added to separately address ponded surface water and PKC pond water.

c) Temporary accumulation of Processed Kimberlite Containment Facility pond water against Phase 6 of the containment Dam structures of the Processed Kimberlite Containment Facility shall be limited to 14 days and shall be approved by the Engineer of Record, unless otherwise approved by the Board. Occurrences of such accumulation are to be reported in accordance with Schedule 6 Item 2.

a)d) if Seepage from the Processed Kimberlite Containment Facility occurs, the Licensee shall collect and return the Seepage to the Processed Kimberlite Containment Facility, ~~or the North Inlet or other on-site containment structures forming the Drainage Control and Collection System,~~ and measures shall be undertaken to eliminate the Seepage;

**Commented [CE38]:** Updated to reflect the options required to effectively manage PKC seepage and pond water elevations during current operations, and once PK is directed to the mine workings.

b)e) any deterioration or erosion of any Engineered Structures associated with the Processed Kimberlite Containment Facility shall be reported to an Inspector and repaired immediately;

e)f) the solids fraction of ~~all~~ Processed Kimberlite shall be deposited and permanently contained within the Processed Kimberlite Containment Facility ~~or Mine Workings;~~

e)g) weekly inspections of the Processed Kimberlite Containment Facility Dams, emergency Spillway(s), pipeline(s), and catchment basin(s) shall be conducted and the records of these inspections shall be kept for review upon the request of an Inspector; and,

e)h) an inspection of the Processed Kimberlite Containment Facility shall be carried out annually ~~in July between June and September~~ by a Geotechnical Engineer. The **Engineer's Report** shall be submitted to the Board within ninety (90) days of completing the inspection, including a covering letter from the Licensee outlining an **Implementation Plan** for addressing each of the Engineer's recommendations.

**Commented [CE39]:** Revise the timing and reporting requirements for annual Engineer inspections to provide more flexibility on the timing of the inspection and clarify the due date for the report and implementation plan.

20-18. The Licensee shall operate and maintain the Drainage Control and Collection System to engineering standards such that:

a) a minimum Freeboard limit of one (1) metre below the engineered emergency Spillways shall be maintained at all times or as recommended by a Geotechnical Engineer and as approved by the Board;

b) Seepage from the Drainage Control and Collection System shall be minimized, collected, and returned to the Drainage Control and Collection System, ~~the or~~ Processed Kimberlite Containment Facility or the North Inlet;

**Commented [CE40]:** Updated to reflect the options required to effectively manage collection pond seepage and water elevations during current operations, and once PK is directed to the mine workings.

c) any deterioration or erosion of any Engineered Structures associated with the Drainage Control and Collection System shall be reported to an Inspector and repaired immediately;

d) weekly inspections of the Drainage Control and Collection System, emergency Spillway(s),



pipeline(s), and catchment basin(s) shall be conducted and the records of these inspections shall be kept for review upon the request of an Inspector;

- e) during the weekly inspections required by Part H, Item 22(d), if DDMI detects Seepage,
  - i. the following information shall be reported in the subsequent monthly SNP report: date Seepage identified, location, rate of flow each day, number of days until Seepage was contained, and the results of the analysis of the Seepage for the parameters outlined in Part H, Item 22(e)(ii).
  - ii. DDMI must notify the Inspector immediately and provide any information requested by the Inspector. The Seepage must be sampled daily until contained and the daily samples analyzed for the following parameters outlined in Schedule 6 Item 6(c): total metals, pH, total ammonia, NO<sub>3</sub>, Cl, and SO<sub>4</sub>.
- f) an inspection of the Drainage Control and Collection System shall be carried out annually in July between June and September by a Geotechnical Engineer. The **Engineer's Report** shall be submitted to the Board within ninety (90) days of completing the inspection, including a covering letter from the Licensee outlining an **Implementation Plan** for addressing each of the Engineer's recommendations.

**Commented [CE41]:** Schedule and License clauses currently specify different parameter requirements; revised to clarify requirements by linking this clause to the associated Schedule.

**Commented [CE42]:** Revise the timing and reporting requirements for annual Engineer inspections to provide more flexibility on the timing of the inspection and clarify the due date for the report and implementation plan.

21-19. The Licensee shall operate and maintain the North Inlet Facility to engineering standards such that:

- a) a minimum Freeboard limit of 1.5 metres below the engineered emergency Spillway shall be maintained at all times or as recommended by a Geotechnical Engineer and as approved by the Board;
- b) any deterioration or erosion of any Engineered Structures associated with the North Inlet Facility shall be reported to an Inspector and repaired immediately;
- c) the solids fraction of the lake bed sediments that are disposed in the North Inlet Facility shall be permanently contained within the North Inlet Facility or as approved by the Board;
- d) Seepage from the west dike of the North Inlet Facility shall be minimized, collected, and returned to the North Inlet Facility;
- e) weekly inspections of the North Inlet Facility, emergency Spillway(s), pipeline(s), and catchment basin(s) shall be carried out and records of these inspections shall be kept for review upon the request of an Inspector; and,

e) an inspection of the North Inlet Facility shall be carried out annually in August between June and September by a Geotechnical Engineer. The **Engineer's Report** shall be submitted to the Board within ninety (90) days of completing the inspection, including a covering letter from the Licensee outlining an **Implementation Plan** for addressing each of the Engineer's recommendations.

**Commented [CE43]:** Revise the timing and reporting requirements for annual Engineer inspections to provide more flexibility on the timing of the inspection and clarify the due date for the report and implementation plan.

22-20. The Licensee shall conduct Dam Safety Reviews of the following:

- a) the Processed Kimberlite Containment Facility in 2017 and every seven (7) years thereafter, or at a frequency approved by the Board;
- b) the A418 dike in 2017 and every five (5) years thereafter, or at a frequency approved by the Board;



- c) the A154 dike in 2018 and every five (5) years thereafter, or at a frequency approved by the Board; and,
- d) the A21 dike in 2020 and every five (5) years thereafter, or at a frequency approved by the Board.

The Dam Safety Reviews shall be conducted in accordance with the *Dam Safety Guidelines* by a Professional Engineer. The timing of the Dam Safety Review inspection will be at the discretion of the review Engineer conducting the inspection.

23-21. ~~Within ninety (90) days after completing a~~The Dam Safety Review ~~inspection shall be completed prior to 31 December of the inspection year, and~~ the Licensee shall submit to the Board:

- a) the Engineer's **Dam Safety Review Report**; and,
- b) an **Implementation Plan** outlining how the Licensee will respond to each recommendation in the Engineer's **Dam Safety Review Report**, including a rationale for any decisions that deviate from the Engineer's recommendations.

**Commented [CE44]:** Dam Safety Reviews differ from annual engineer inspections and require significantly more data review and analysis. DDMI suggests that it is more appropriate to define a due date at the end of the inspection year so as to allow sufficient time to complete this lengthy review.



**Effluent Quality Criteria (EQC)**

24-22. The Licensee shall ensure that all Discharges to Lac de Gras from the Water Treatment Facilities at SNP Station # 1645-18 and 1645-18B meet the following Effluent Quality Criteria:

**Commented [CE45]:** The expansion of the North Inlet Water Treatment Plant resulted in two effluent streams reporting to Lac de Gras. DDMI has added the second SNP station reference to confirm that EQC apply to both effluent streams.

Parameter	Maximum Average Concentration	Maximum Concentration of Any Grab Sample
Total Ammonia	6.0 mg/L	12.0 mg/L
Total Aluminum	1.5 mg/L	3.0 mg/L
Total Arsenic	0.05 mg/L	0.1 mg/L
Total Copper	0.02 mg/L	0.04 mg/L
Total Cadmium	0.0015 mg/L	0.003 mg/L
Total Chromium	0.02 mg/L	0.04 mg/L
Total Lead	0.01 mg/L	0.02 mg/L
Total Zinc	0.01 mg/L	0.02 mg/L
Total Nickel	0.05 mg/L	0.1 mg/L
Nitrite	1.0 mg/L	2.0 mg/L
Total Suspended Solids	15.0 mg/L	25.0 mg/L
Turbidity	10 NTU	15 NTU
BOD <sub>5</sub>	15.0 mg/L	25.0 mg/L
Total Petroleum Hydrocarbons	3.0 mg/L	5.0 mg/L
Faecal Coliforms	10 CFU/100ml	20 CFU/100ml

25-23. All other authorized Discharges to Lac de Gras shall meet the Effluent Quality Criteria as specified in Part H, Items 26 and 29.

26-24. All surface runoff Discharged to Lac de Gras shall have a pH between 5.0 and 8.4 unless it can be demonstrated that a pH outside this range was not caused by mine activities.

27-25. All authorized Discharges to Lac de Gras (except for surface runoff) shall have a pH between 6.0 and 8.4.

28-26. No Discharge to Lac de Gras by the Licensee from the Water Treatment Facilities at SNP Station #1645-18 and 1645-18B shall be acutely toxic under the following tests to be conducted as per the Surveillance Network Program annexed to this Licence:

**Commented [CE46]:** Refer to above comment relating to the two effluent streams from the water treatment plant.

- a) acute lethality to rainbow trout, *Oncorhynchus mykiss* as per Environment Canada’s Environmental Protection Series Biological Test Method EPS/1/RM/13; and,
- b) acute lethality to the crustacean, *Daphnia magna* (as per Environment Canada’s Environmental Protection Series Biological Test Method EPS/1/RM/14.



~~29.~~ The Licensee shall ensure that all in-lake dredging, dike construction, or other in-lake activities meet the following criteria: At SNP Station #1645-82 to 1645-84 inclusive, and at a 200 metre distance in any direction from the centerline of the dike footprint the maximum concentration for Total Suspended Solids shall not exceed 25 mg/L over the background concentration at SNP station #1645-55, in any grab sample.

**Commented [CE47]:** Remove this item as this work is complete and the reference is no longer required for compliance purposes.

~~30-27.~~ Total phosphorus loads from all treatment facilities discharging to Lac de Gras must be controlled, as per approved operations plans, such that loads of total phosphorus do not exceed a maximum of 300 kg per month during the life of the mine, and do not exceed an average annual loading of 1,000 kg per year during the life of the mine, and do not exceed a maximum loading of 2,000 kg per year in any year during the life of the mine.

~~31-28.~~ The Licensee shall provide water sampling results to an Inspector prior to any authorized Discharge to the Receiving Environment. Discharge shall not commence until authorized in writing by an Inspector.





## PART I: CONDITIONS APPLYING TO CONTINGENCY PLANNING

1. The Licensee shall operate in accordance with the approved **Contingency Plan**. The Plan shall be in accordance with Indian and Northern Affairs Canada's *Guidelines for Spill Contingency Planning*, 2007, and Schedule 7, Item 1.
2. The Licensee shall annually review the **Contingency Plan** and shall submit updates to the Plan to the Board, for approval, at the following times:
  - a) a minimum of ninety (90) days prior to any proposed changes to the requirements in the approved Plan; and,
  - b) upon request of the Board.
3. If, during the period of this Licence, an Unauthorized Discharge of Waste occurs or is foreseeable, the Licensee shall:
  - a) implement the approved **Contingency Plan**;
  - b) report the incident immediately, ~~via the 24 Hour Spill Report Line (867) 920-8130 in accordance with the instructions contained in the Spill Report Form NWT 1752/0593;~~ [according to the current requirements outlined by the Government of the Northwest Territories.](#)
  - c) report each spill and Unauthorized Discharge to an Inspector within 24 hours; and,
  - d) within thirty (30) days of an Unauthorized Discharge or an incident reported under Part I, Item 3b, the Licensee shall submit a detailed report to the Board and an Inspector. The report shall include descriptions of causes, response actions, and any changes to procedures proposed to prevent similar occurrences in the future.
4. The **Contingency Plan** required under Part I, Item 1, shall not include the extraction of water from Lac de Gras for the purpose of pre-diluting the effluent as an ongoing operational approach for dealing with elevated levels of ammonia.
5. ~~The Licensee shall implement the approved Standard Operating Procedures for pH adjustment for all Discharges to Lac de Gras from SNP Station # 1645-18 and 1645-18B.~~
- 4-6. ~~Upon instruction from the Board, the Licensee shall modify the Standard Operating Procedures for pH adjustment referred to in Part H, Item 5.13, to reflect directives from the Board. The modified Procedures shall be submitted to the Board for approval and shall be implemented upon approval.~~
- 5-7. All spills and Unauthorized Discharges shall be reclaimed to the satisfaction of an Inspector.

**Commented [CE48]:** Spills are no longer reported via the 24 Hour Spill Report Line. This clause has been updated to be more generic and allow for a change in procedure, as determined by the GNWT.

**Commented [CE49]:** Moved from what was originally numbered as Part H Items 13 and 14 to more accurately reflect that pH adjustment is not used in water treatment plant operations and is only considered a contingency. The second effluent waste stream was also added to this Item.



## PART J: CONDITIONS APPLYING TO AQUATIC EFFECTS MONITORING

1. ~~The Licensee shall submit for approval a revised version of the May 2006 report, Historical Information Review – Aquatic Environmental, that was submitted under Licence N7L2-1645, if directed by the Board.~~

**Commented [CE50]:** Remove this item as this work is complete and the reference is no longer required for compliance purposes.

2. The Licensee shall comply with the approved **AEMP Design Plan**. The **AEMP Design Plan** shall include a **Response Framework with defined Action Levels** and be in accordance with Schedule 8, Item 1.

**Commented [CE51]:** Add reference to the established Action Levels within the AEMP Design and Response Framework.

3. The Licensee shall review and revise, as necessary, the **AEMP Design Plan** every three years, or as directed by the Board.

~~3.4. The Licensee shall utilize the approved Reference Conditions Report, and the associated pre-determined normal ranges, in their evaluation of Action Levels for water and sediment quality variables.~~

**Commented [CE52]:** Add reference to the Reference Conditions Report developed for evaluating AEMP Action Levels.

4.5. The Licensee shall comply with the approved **AEMP Quality Assurance Project Plan**. To reflect changes to the **AEMP Design Plan**, the Licensee shall, every three years or as directed by the Board, review and revise the **AEMP Quality Assurance Project Plan**, for Board approval.

~~5.6. The Licensee shall complete Specific Effects Studies and shall submit the Specific Effects Study Reports to the Board for approval. These studies shall include, but not necessarily be limited to, those listed in Schedule 8, Item 2.~~

**Commented [CE53]:** Remove this Item as originally identified Special Effects Studies were completed and this reference is no longer required for compliance purposes. Additionally, the requirements for an AEMP Response Framework and Response Plans would identify any follow up or special studies required.

6.7. If any Action Level defined in the approved **Response Framework** is exceeded, the Licensee shall:

- a) ~~notify the Board within thirty (30) days of when the exceedance is detected on or before 31 March of the year following their occurrence;~~ and,
- b) within ninety (90) days of ~~when the exceedance is detected~~ completing Part J Item 7(a), submit a **Response Plan** that satisfies the requirements of Schedule 8, Item 3 to the Board for approval.

**Commented [CE54]:** Clarify the process and timelines for notifying the Board of Action Level exceedances (a) and submitting associated Response Plans (b). As noted in DDMI's letter of 22 October 2015, exceedances are first detected during the preparation of the annual AEMP report due on March 31 each year. Therefore, this notification will be specifically included in the cover letter accompanying the AEMP report.

7.8. The Licensee shall implement **Response Plans** as, and when, approved by the Board, ~~in accordance with Schedule 8, Item 3.~~

**Commented [CE55]:** Reference to Schedule 8 Item 3 added to reflect the WLWB Directive of 28 August 2017.

8.9. On or before March 31 each year, the Licensee shall submit an **AEMP Annual Report** to the Board for approval. This Report shall satisfy the requirements of Schedule 8, Item 4, and include information relating to data collected in the preceding calendar year.

(3) The Licensee shall submit an **Aquatic Effects Re-evaluation Report** for Board approval every three (3) years, or upon direction from the Board. The Report shall meet the following objectives and satisfy the requirements of Schedule 8, Item 5:

- a) To describe the Project-related effects on the Receiving Environment compared against Environmental Assessment (EA) predictions;
- b) To update predictions of Project-related effects on the Receiving Environment based on



monitoring results obtained since Project inception; and,

- c) To provide supporting evidence, if necessary, for proposed revisions to the **AEMP Design Plan**.

9.10. If not approved by the Board, the Plans and Reports referred to in Part J, Items 2, 4, 5, 6, 8, and 9 shall be revised and resubmitted in accordance with directives from the Board.



#### PART K: CONDITIONS APPLYING TO CLOSURE AND RECLAMATION

1. The Licensee shall implement the **Closure and Reclamation Plan** as approved by the Board and endeavour to carry out Progressive Reclamation as soon as is reasonably practicable.
2. Updates to the **Closure and Reclamation Plan** shall be in accordance with the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories*. In addition to conforming with the Guidelines, the Plan shall be in accordance with Schedule 9, Item 1, and any other direction from the Board.
3. The Licensee shall submit a revised **Closure and Reclamation Plan** upon request of the Board.
4. Prior to December 31 of each year, the Licensee shall submit an **Annual Closure and Reclamation Plan Progress Report**. The Report shall be developed in accordance with the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories*, Schedule 9, Item 2, and any other direction from the Board.
5. Following the closure and/or Reclamation of components of the Project, the Licensee shall submit a **Reclamation Completion Report** to the Board for approval. The Report shall be developed in accordance with the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites within the Northwest Territories*.
6. Once the Licensee has determined that Closure Objectives and Closure Criteria have been met, the Licensee shall submit a **Performance Assessment Report** to the Board for approval. The Report shall be developed in accordance with the Mackenzie Valley Land and Water Board's *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites within the Northwest Territories*.
7. The Licensee shall submit a **Final Closure and Reclamation Plan** to the Board for approval three (3) years prior to the expiry date of this Licence or a minimum of twenty-four (24) months prior to the end of commercial operations, whichever occurs first.



## Schedule Updates Related to the Amendment Request

### Schedule 5 Item 2

The Processed Kimberlite Containment Design Reports referred to in Part F Item 7 (Processed Kimberlite Containment Facility) and Part F Item \*9\* (Processed Kimberlite Containment in Mine Workings) of the Licence, shall include, but not necessarily be limited to, the following:

- a) Processed Kimberlite Containment Facility (Part F Item 7)
  - i. a comprehensive description of all sources and types of Waste and wastewater which will be deposited in the Processed Kimberlite Containment (PKC) Facility;
  - ii. a description of any proposed physical or chemical treatment of Waste or wastewater prior to its Discharge to the PKC Facility and prior to Discharge from the PKC Treatment Facility to the Receiving Environment;
  - iii. a description, including maps to scale, of the locations of all monitoring stations within the PKC Facility and Discharge locations to and from the PKC Facility. The description should include the sampling protocols for each station;
  - iv. a description of the management and scheduling of all Processed Kimberlite deposition within the PKC Facility;
  - v. stage-volume curves and water, solids and ice balance calculations showing life expectancy of the PKC Facility;
  - vi. any operational and/or structural Modifications which may be implemented that will affect the management of the PKC Facility and associated wastewater operations;
  - vii. a description of the methods that will be used to determine the volume in cubic metres of fine and coarse fractions of Processed Kimberlite disposed of in the PKC Facility on an annual basis;
  - viii. a description of the procedures that will be used to characterize the physical, thermal and chemical properties of the fine kimberlite in the frozen and thawed condition within the PKC Facility;
  - ix. a description of the procedures that will be used to characterize pore water within frozen and thawed zones; and,
  - x. a description of the thermal monitoring of Dam structures that will be conducted to ensure that the Frozen Core develops as planned and is maintained throughout the life of the mine.
  - xi. Upon accumulation of ponded surface water against the PKC Facility Dams, DDMI is required to:
    - a. Immediately notify the Inspector and the Board;
    - b. Report the following in the Annual Dam Safety Inspection of the PKC Facility:
      - i. Date and locations of water ponding against the PKC Facility Dams
      - ii. Duration that water ponding against the PKC Facility Dams has occurred
      - iii. Depth and spatial extent of water ponding
      - iv. Likely source of water contributing to the water ponding
      - v. Any corrective actions and assessment
  - xii. Upon accumulation of the PKC Facility Pond against the PKC Facility Dams as approved the Engineer of Record, DDMI is required to:

Commented [CE56]: Added to address the WLWB Directive of 15 May 2018.

Commented [CE57]: Added to address the WLWB Directive of 15 May 2018.

- a. Immediately notify the Inspector and the Board;
- b. Report the following in the Annual Dam Safety Inspection of the PKC Facility:
  - i. Date and locations of the PKC Facility Pond against the PKC Facility Dams
  - ii. Duration that water ponding against the PKC Facility Dams has occurred
  - iii. Depth and spatial extent of water ponding
  - iv. Reason the PKC Facility Pond accumulated against the Dams
  - v. Any corrective actions and assessment.
- c. Increase the frequency of key monitoring data; the details of what to monitor and when to monitor can be at the discretion of the Engineer of Record;
- d. Conduct a complete evaluation of the key monitoring data on an expedited basis while the ponded water is against (or near) the PKC Facility Dams
- ii-xiii. DDMI is required to include a list of contingencies to address ponded water accumulated against the Dams.

**Commented [CE58]:** Added to address the WLWB Directive of 15 May 2018.

- b) Processed Kimberlite Containment (in Mine Workings) (Part F Item \*9\*)
  - i. a description of the mine working area to be used for PK containment including the estimated containment volume by elevation;
  - ii. a description of any bulk heads or new structures to be constructed to enable containment or isolation from other mine workings including an expected construction schedule;
  - iii. representative cross-sections of any bulk heads or containment structures; and,
  - iv. a description of the expected hydrogeological and geotechnical performance of the containment area and likely impacts to operation of any adjacent mine area(s).

**Commented [CE59]:** Added to incorporate requirements for placing PK in mine workings. Proposed as Item 9 in current amendment.

#### Schedule 6 Item 2

2. The **Processed Kimberlite Containment Plan: Processed Kimberlite Containment Facility and Mine Workings**, (formerly the **Processed Kimberlite Containment Facility Plan**) referred to in Part H, Item 43, shall be in accordance with the NWT Water Board's "Guidelines for Tailings Impoundment in the Northwest Territories, February 1987", and will include, but not necessarily be limited to, the following:
  - a. a comprehensive description of all sources and types of process Waste and wastewater which will be deposited in the Processed Kimberlite Containment (PKC) Facility and Mine Workings;
  - b. a description of any proposed physical or chemical treatment of process Waste or wastewater prior to its Discharge-discharge to the PKC Facility or and Mine Workings, and prior to Discharge from the PKC Treatment Facility or Mine Workings to the Receiving Environment;
  - c. a description, including maps to scale, of the locations of all monitoring stations within the PKC Facility and Mine Workings, as well as Discharge locations to and from the PKC

**Commented [CE60]:** Add reference to mine workings to reflect the amendment request.

**Commented [CE61]:** Remove clause relating to discharge of process Waste or wastewater to the Receiving Environment; DDMI does not discharge process waste in this manner.

**Commented [CE62]:** Add reference to mine workings to reflect the amendment request. Change reference from 'Discharge' to 'discharge' as the definition of 'Discharge' in the License implies release to the Receiving Environment, and these do not exist for the PKC Facility or Mine Workings.

Facility **and Mine Workings**. The description should include the sampling protocols for each station;

d. a description of the management and scheduling of all Processed Kimberlite deposition within the PKC Facility **and Mine Workings**;

e. stage-volume curves and water, solids and ice balance calculations showing life expectancy of the PKC Facility **and Mine Workings, as applicable**;

f. any operational and/or structural Modifications which may be implemented that will affect the management of the PKC Facility, **Mine Workings** and associated wastewater operations;

g. a description of the methods that will be used to determine the volume in cubic metres of fine and coarse fractions of Processed Kimberlite disposed of in the **Mine Workings as well as the volumes disposed in, or relocated from, the** PKC Facility, on an annual basis;

**h.** a description of the procedures that will be used to characterize the physical, thermal and chemical properties of the fine kimberlite in the frozen and thawed condition within the PKC Facility;

**h.i.** a description of the procedures that will be used to characterize the consolidation properties and pore water quality of the processed kimberlite within the **Mine Workings**;

**i.j.** a description of the procedures that will be used to characterize pore water within frozen and thawed zones **of the PKC Facility**; and,

**j.k.** a description of the thermal monitoring of Dam structures that will be conducted **for the PKC Facility** to ensure that the Frozen Core develops as planned and is maintained throughout the life of the mine.

**Commented [CE63]:** Add reference to mine workings to reflect the amendment request. discharge

**Commented [CE64]:** Add reference to mine workings to reflect the amendment request. Ice balance calculations will not be required for the PK deposition in mine workings as this material is not expected to freeze, hence the use of 'as applicable' in this Item.

**Commented [CE65]:** Add reference to mine workings to reflect the amendment request.

**Commented [CE66]:** Add reference to mine workings to reflect the amendment request. Include the requirement to report volumes of PK material moved from the PKC Facility to A418 should this be determined as favourable for closure.

**Commented [CE67]:** Add reference to specific monitoring requirements related to PK deposition into mine workings to reflect the amendment request.

**Commented [CE68]:** Clarify that these procedures are only required for the PKC Facility as DDMI does not expect PK in the mine workings to freeze.

**Commented [CE69]:** Clarify that this monitoring is only required for the PKC Facility as the dikes are not designed to have a frozen core.