



Kugluktuk

Kelli Gillard
Manager Project Monitoring
Nunavut Impact Review Board
P.O. Box 1360
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Bathurst Inlet
Kingaok

July 27th, 2020

Bay Chimo
Umingmaktok

Re: Review of TMAC's 2019 Annual report for Hope Bay Project.

Dear Kelli Gillard, the KIA has reviewed TMAC's 2019 Annual Report for the Hope Bay project to the NIRB.

Cambridge Bay
Ikaluktutiak

1) Compliance Monitoring:

The KIA's Framework Agreement (FA) and Inuit Impact and Benefits Agreement (IIBA) with TMAC Resources Inc. the cover terms and conditions of NIRB Project Certificate 009 and the NWB Type A water licenses.

Gjoa Haven
Okhoktok

The Framework Agreement is a confidential agreement between KIA and TMAC that supersedes and replaces all previous contractual arrangements between both parties. Section 3.1 of the FA covers Terms and conditions of land use license and reporting.

Taloyoak

Kugaaruk

Appendix A of Section 3.1 of the Framework Agreement specifies the details of annual reporting by TMAC to the KIA, which is summarized as follows:

TMAC is to provide an annual report to KIA providing details of its operations under any land use License, Advanced Exploration Lease and/or Commercial Lease covering the location and operations area of lands affected, and the nature of facilities and equipment at these sites. In addition, TMAC is to provide details of progressive reclamation or closure activities undertaken during the year and details of all permits, licenses, and authorizations from other regulatory bodies or agencies that are required for operations.

This annual report is to provide information on:

- Ground disturbances including land use activities for camps, infrastructure, equipment, winter roads and trails.
- Fuel and Chemical storage including Chemicals of Potential Concern inventory (COPC), fuel and chemical usage, and spill records.
- Drilling programs, locations, and methods.
- Water use and effects on water.
- Wildlife interaction, data logs, and summaries.



- Waste disposal, waste management practices, inventory of waste on site, and inventory of hazardous materials or non-combustible waste removed from site.
- Closure and reclamation progress associated with waste management, drilling, and ground disturbance along with associated costs.
- General information on annual inspection activities by staff and other agencies and their results, community consultations, future exploration work plans, submissions to NIRB, NWB, or NPC or other regulators related to mining activity, archaeological sites and burial grounds, and any incidents of storage or possession of alcohol and drugs on site.

TMAC has provided the KIA with the **Hope Bay Project 2019 Annual Report for KIA Framework Agreement** in accordance with Appendix A to Schedule 3.1 of the Framework Agreement. This report is separate from the **Hope Bay Project 2019 Annual Report to the NIRB**.

The socio-economic impact of the project on affected communities of Nunavut is covered by the IIBA, which is summarized here.

Inuit Impact and Benefits Agreement (IIBA) – Summary.

On March 30th, 2015 the Kitikmeot Inuit Association (KIA) and TMAC Resources Inc. entered into a comprehensive Framework Agreement for the development of the Hope Bay Greenstone Belt which includes the Doris North Gold Mine and the Madrid and Boston advanced exploration projects, among other exploration and development targets. The Agreement is intended to provide long term benefit and certainty to Inuit beneficiaries and long-term development and tenure certainty to TMAC.

One of the major features of this comprehensive agreement is a publicly available Inuit Impact and Benefit Agreement (IIBA) for activities on the Hope Bay Belt which addresses socio-economic interests of Inuit in the region, including employment, contracting, and training.

The purpose of the IIBA is to satisfy requirements under article 26 of the NLCA with respect to Doris North and any future Major Development Project in the Hope Bay Belt Area. It is intended by the IIBA to provide benefits to Inuit arising from TMAC's operations that may fall below the threshold of a Major Development Project.

Under the IIBA, TMAC has a commitment to inform the KIA on a regular basis on both the socio-economic and ecosystem effects of their operations in the Kitikmeot region. Socio-economic effects are reported on a regular and timely basis through the IIBA Implementation Committee, TMAC Liaison, and the IIBA Manager.



Ecosystem effects are reported through the Inuit Environmental Advisory Committee (IEAC) that was established in 2015.

The IIBA Implementation Committee meet in March and October of 2019 to discuss employment and contracting issues.

Inuit employment continues to be the priority for the committee, stressing both TMAC direct hires and contractors. The 2019 Inuit Employment Target (IET) was set at 15% Inuit employment and 70 FTEs (full time equivalents). TMAC Resources Inc. fell short of the 70 FTE target with 67.7 FTEs and had to pay KIA a penalty of \$12,880 into the KIA Training and Education Fund.

Several Hope Bay employers including Kitikmeot Cementation, Nuna West and GeoTech Ekutak had lower than anticipated Inuit employment which contributed to not achieving the IET. Despite the IET not being met, Inuit work effort grew in 2019 by 14 FTEs.

The following activities were conducted under the 2019 Inuit Training Target:

- Mining Matters, a charitable organization dedicated to educating youth on Earth sciences, the mining industry and the role of minerals in society, delivered their student program and community evening session in Cambridge Bay and Gjoa Haven with sponsorship from TMAC.
- TMAC hired two Inuit summer students, both from Cambridge Bay. One worked in the exploration department at Hope Bay and the other worked at the Cambridge Bay office.
- TMAC continued to support one Inuk apprentice in 2019.
- In kind support was provided by TMAC for GeoTech Ekutak to undertake diamond driller training at Hope Bay. 8 Inuit from across the region participated.
- TMAC continues the Inuit Trainee Program providing for on the job exposure to a number of Hope Bay positions for Inuit with limited mine or remote camp experience. TMAC hired 8 Inuit trainees in 2019.

In addition to the training targets, TMAC had conducted several other employment and training activities including:

- TMAC initiated an Inuit capacity building program for environmental field staff.
- TMAC provided significant on-the-job training for Inuit workers including: 158 hours of general training (i.e., orientation), 458 hours of health and safety training and 7,754 hours of job-specific training.



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The Roberts Bay tank farm containment area will be adding another 5mL tank that is currently being built. The rock face wall behind is not reinforced; this is a big safety concern.

Roberts Bay central laydown area has C-cans. Overall, the laydown area is neat and organized.

Only the outside incinerator is in use at the Waste Management Facility. The enclosed incinerator will be replaced with a brand new one in the next couple of years. The facility is neat and organized.

The glycol spill by Crushing and Milling plant has been cleaned up and crush taken to the land farm for remediation. There is a lot of debris all around the crushing and milling plant that is currently being cleaned and put into C-cans.

The berm is cracking at the Tank Farm in main camp, which needs to be repaired. Valves are all level at the Tank Farm. Spill kits are well organized and located throughout the site.

Permanent Power plant was insulated but outside is not finished off. Heat from the generators is used for heating the mill. The power plant pads are stable and level with minor corrosion. A generator is currently undergoing maintenance, waiting for parts.

The Secondary Road is in good condition. The Doris Creek Bridge has minor wear and tear from heavy traffic and snow clearing. Bridge is level.

The North Dam has no cracking at the crest. Both north and south face are ok.

Revegetation plots were established at the Boston salt burn in 2018 and dead willows were removed. Willows were transplanted in established plots. There is good regrowth from the sides of the burn area towards the middle. The salt burn still has some snow.

Internal Report on June Hope Bay Inspection – August 13 to 15, 2019

Summary

The inspection of TMAC Resources Inc.'s mine site and facilities was conducted on August 13th, and 15th as per established inspection schedule. Sarah Warnock of TMAC Resources Inc. (TMAC) accompanied Coral Newman on the inspection. Forty-three (43) site components out of 115 components were inspected in accordance with the established schedule.

Roads throughout camp show signs of wear and tear, especially areas with heavy traffic. All roads should be resurfaced to fix potholes.



The Roberts Bay tank farm containment area has added another 5mL tank. The rock face wall behind is not reinforced; this is a big safety concern. The berm behind tank 4 is cracking. They were in the process of fuel transfer from the tanker ship, because of this there were a couple of fuel spills beside the tanks. I also came across a cigarette butt inside the berm of the tank farm, please give extra notice to all staff in Hope bay to be smoking only in designated smoking areas, and at least 60 feet from any fuel storage tanks.

Roberts Bay central laydown area has C-cans. Overall, the laydown area is neat and organized. Workers were very busy walking the fuel transfer lines observing the lines for any leaks/spills. Each valve along the lines had a fuel spill bucket underneath the valve with matting inside the bottom of the bucket.

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The Explosive Magazine has a C-can that does not have a lock on it. Sarah and I were able to access the explosives because the C-can doesn't have a lock. This is a Very big security concern, if we were able to access the explosives without security clearance, others can as well.

Compliance Status

2) Effects of Monitoring:

- a) **Whether the conclusions reached by TMAC in the Hope Bay 2019 Annual Report to the NIRB are Valid.**



KIA’s consultants in the areas of wildlife, aquatic sciences, and geotechnical engineering reviewed the Hope Bay 2019 Annual Report to the NIRB and the following documents:

- Appendix C-3 2019 Wildlife Mitigation and Monitoring Plan Compliance Report
- Appendix C-4 2019 Aquatic Effects Monitoring Program Report.
- Appendix C-5 2019 Waste Rock, Quarry and Tailings Monitoring Report
- Doris-Madrid Water Management Plan (TMAC, 2020)
- Hope Bay Project Groundwater Management Plan (TMAC, 2020)
- Hope Bay Project Quality Assurance and Quality Control Plan (TMAC, 2020)
- 2019 Annual Geotechnical Inspection Tailings Impoundment Area Hope Bay Project, Hope Bay, Nunavut (SRK Consulting, July 2020)
- 2019 Annual Geotechnical Inspection for the Doris and Madrid Sites (TMAC, 2020)

Overall, our consultants find TMAC’s conclusions in the 2019 Annual Report to be partially valid. The KIA’s wildlife consultant could not determine in several cases whether or not TMAC’s conclusions in the Wildlife Mitigation and Monitoring Plan (WMMP) reports were valid due to lack of information. KIA’s aquatic science’s and geotechnical consultants did find the TMAC’s conclusions to be generally valid and of no concern.

- b) **Any areas of significance requiring further supporting information or changes to the monitoring program, which may be required.**

1.0 WILDLIFE MITIGATION AND MONITORING PLAN COMPLIANCE REPORT – DORIS NORTH PROJECT

1.1 KIA-NIRB-01

Review Comment Number	KIA-NIRB-01
Subject/Topic	Baseline grizzly bear and wolverine data collection through camera monitoring
References	Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report, Section 6.1, p. 6-20, Revised Term and Condition (TOC) No. 22: “The Proponent, in consultation with Government of Nunavut-Department of Environment and Kitikmeot



	<p>Inuit Association, shall immediately begin the design and implementation of baseline data collection methods to establish both the wolverine and grizzly bear population of the Hope Bay Belt region. Any baseline data results shall be reported to NIRB’s Monitoring Officer.”</p> <p>And</p> <p>Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report, Appendix C-3. Hope Bay Project: 2019 Wildlife Mitigation and Monitoring Program Compliance Report:</p> <ul style="list-style-type: none"> • Section 3.3.1, Table 3.3-1, p. 3-8; • Section 3.6.3.1, Table 3.6-1, p. 3-37; and, • Section 3.7.3.2, Table 3.7-1, p. 3-49. <p>And</p> <p>Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report, Appendix 3.2-1. Wildlife Camera Locations and Camera Effort By Month, Doris Project, June 2016 to September 2019.</p> <p>And</p> <p>Hope Bay Project, 2019 Wildlife Mitigation and Monitoring Plan, Section 3.1.2, p. 17</p>
<p>Summary</p>	<p>Changes to the wildlife camera program methods (particularly regarding increasing camera checks and maintenance) would help to improve functional camera days. An increase in functional camera days is needed, particularly in the control area. A similar comment was made in the KIA review of the 2016 and 2018 WMMP compliance reports (2016: KIA-WMMP-16; 2018: KIA-TC-06), where the KIA recommended increasing camera checks and maintenance to increase the number of cameras actively collecting data.</p>
<p>Detailed Review Comment</p>	<p>Data on grizzly bear and wolverine populations are being gathered in the Doris North and Boston project areas to analyze whether differences in spatial-temporal patterns exist in project areas (i.e. places closer to project infrastructure) relative to control areas. Camera data were gathered in three zones: the project treatment area, zone of influence (ZOI) area, and a control area during each year of project construction and operation (2012 - 2019). Numbers of photographed</p>



cameras are expressed as a function of camera effort amount sites. Camera effort is measured in functional camera days, indicating the number of days over which cameras are active and gathering data. When comparing camera days among the control, treatment, and ZOI areas, large discrepancies in effort are apparent from September 2018 - September 2019. Despite the relatively similar number of cameras deployed in each area (Treatment: 19-21 active cameras, ZOI: 16-17 active cameras, Control: 18-19 active cameras), camera days in the control area were consistently lower than in the treatment and ZOI areas. The percentage difference in camera day effort between the treatment and control area are:

Month	Percent difference in average number of camera days in control areas compared to treatment areas
September, 2018	57.5% lower
October, 2018	41.2% lower
November, 2018	30.3% lower
December, 2018	71.7% lower
January, 2019	65.2% lower
February, 2019	78% lower
March, 2019	57.6% lower
April, 2019	43.4% lower
May, 2019	26.1% lower
June, 2019	3.9% lower
July, 2019	27% lower
August, 2019	37.5% lower
September, 2019	32.3% lower



Within the WMMP Program annual compliance report, there is little discussion of why camera effort is so much lower in the control area compared to treatment areas. The distance of the control area (>10 km away from the Project) understandably provides a logistical hindrance to camera checks, but it should still be reasonable to conduct additional camera checks and maintenance during summer months when weather is favourable to ensure that cameras are capturing meaningful data. The Hope Bay Project, 2019 Wildlife Mitigation and Monitoring Plan states that: “Cameras are downloaded and checked twice annually at a minimum [...]”. The maximum camera checks within the control area may need to be re-examined given the high failure rates. To highlight some examples of low camera effort in the control area;

- Camera 9 was active 7 days in September 2018, then inactive until June 2019, where it was active for 7 days, and then was inactive for the following 3 months.
- Camera 36 was active 5 days in October 2018, then completely inactive until June 2019, where it was active for 19 days, and then was inactive for the following 3 months.
- Camera 16 was functioning in fall of 2018 with gradually decreasing functionality until there was zero camera effort during the winter. It was active again in June 2019 for 18 days, then inactive the following 3 months.

These results indicate that for certain cameras in the control area, maintenance levels are likely inadequate for ensuring adequate camera effort and camera checks need to be increased, and camera check effort itself reported on, to ensure that they collect data more continuously.

Table 3.6-1 in the 2019 WMMP Compliance Report (Grizzly Bear Events Recorded by Month at Treatment, ZOI, and Control Camera, June 2016 to September 2019), shows that grizzly bears were detected as early as April, but are most commonly detected between June and September.

Table 3.7-1 (Wolverine Events Recorded by Month at Treatment, ZOI, and Control Cameras, June 2016 to



	<p>September 2019), shows that wolverine are detected as early as February and as late as September.</p> <p>These data further highlight the importance of ensuring that cameras need to be operational to. While camera should be maintained and operational from February through to October, it appears that there would be a high value to increasing camera maintenance checks before and after June. The discrepancies in control and treatment data, resulting from differences in camera effort levels, can lead to a reduced statistical power for detecting patterns using the camera monitoring analyses.</p>
<p>Recommendation/Request</p>	<p>The KIA makes the following recommendations and requests:</p> <ul style="list-style-type: none"> • TMAC should consider ways to improve the overall camera effort such as snow shields, physical removal of snow in fall or spring, stronger bases, or by conducting monthly camera checks as early as possible in spring, or during June/July to prevent long blocks of missed camera days if a camera falls over or is knocked over by a grizzly bear. • Due to the ongoing nature of the issue of failing cameras, the KIA requests that TMAC report on their schedule of camera checks, per camera, in the next 2020 WMMP Compliance Monitoring Report to the NIRB. Details should include dates that each camera was checked, issues encountered, and maintenance performed.
<p>Importance</p>	<p>The proponent is in compliance with the TOC to gather data on grizzly bears and wolverine, but the program may not be functioning as intended due to camera maintenance issues. The KIA continues to strongly encourage the proponent to re-evaluate their camera maintenance protocols to enhance the quality and quantity of data such that they can meet their objectives.</p>

1.2 KIA-NIRB-02

<p>Review Comment Number</p>	<p>KIA-NIRB-02</p>
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Subject/Topic	Designated primary wildlife contact
References	<p>Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report, Section 6.1, p. 6-20, Revised TOC No. 23: “The Proponent shall designate one of its employees as a primary wildlife contact for the mine, who will work with the Nunavut Impact Review Board’s Monitoring Officer and regulatory officials in communicating on-site activities and to fulfill reporting requirements.”</p> <p>AND</p> <p>Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report, Appendix C-3. Hope Bay Project: 2019 Wildlife Mitigation and Monitoring Program Compliance Report: Section 3.2.2, p. 3-2</p>
Summary	<p>It is important that the proponent designates a primary wildlife contact, who is responsible for reporting and communicating on-site activities to required governing bodies.</p> <p>The KIA could not find any mention of the designation of an employee as a primary wildlife contact. It is important that annual compliance reporting include information about all on-site activities that have been completed to fulfill compliance requirements. Without directly reporting on such activities, it is not possible for outside parties and regulators to assess whether the proponent is in compliance with the TOC of the FEIS.</p>
Detailed Review Comment	<p>In the Revised TOC No. 23 of the Hope Bay Project FEIS, the Proponent must designate one of its employees as a primary wildlife contact for the mine. This person is to be responsible for reporting wildlife interactions, incidents and mortalities to the NIRB Monitoring Officer and regulatory officials and fulfill reporting requirements. While this may have been done by TMAC, there is no mention in the Hope Bay Project: 2019 Wildlife Mitigation and Monitoring Program Compliance Report that a “primary wildlife contact”, “environmental coordinator”, or “environmental superintendent” has been designated by the Proponent.</p>
Recommendation/Request	<p>Please include information in the Hope Bay Project: 2019 Wildlife Mitigation and Monitoring Program Compliance Report regarding the appointment of a primary wildlife</p>



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	contact for the mine or direct the KIA to where this information can be found.
Importance	

1.3 KIA-NIRB-03

Review Comment Number	KIA-NIRB-03
Subject/Topic	On-site Personnel Training and Awareness
References	<p>Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report, Section 6.1, p. 6-20, Revised TOC No. 24: “As part of the training for the Proponent’s on-site wildlife specialist, the Proponent shall provide training to that person in areas of bear encounters and safety, effects of noise on wildlife, recording wildlife sightings, waste management, records management, and reporting to the Nunavut Impact Review Board’s Monitoring Officer and regulatory officials.”</p> <p>And</p> <p>Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report, Appendix C-3. Hope Bay Project: 2019 Wildlife Mitigation and Monitoring Program Compliance Report;</p> <p>Section 3.2.2, p. 3-2</p> <p>And</p> <p>Hope Bay Project, 2019 Wildlife Mitigation and Monitoring Plan, Section 2.1, p. 4</p>
Summary	<p>Within the annual compliance report the KIA was unable to locate reporting on the wildlife and wildlife habitat training and awareness provided to on-site personnel and employees of the Hope Bay Project. The KIA requests that wildlife and wildlife habitat related SOPs and training policies be supplied as an appendix to the WMMP so that they can be reviewed for their applicability and compliance with related Acts and regulations. The KIA has yet to receive the SOPs for review.</p>
Detailed Review Comment	<p>The Revised TOC No. 24 states that: “As part of the training for the Proponent’s on-site wildlife specialist, the Proponent shall provide training to that person in</p>



	<p>areas of bear encounters and safety, effects of noise on wildlife, recording wildlife sightings, waste management, records management, and reporting to the Nunavut Impact Review Board’s Monitoring Officer and regulatory officials.”, and; “To be included in the Proponent’s annual report and annual wildlife report to the NIRB as required.”</p> <p>The Hope Bay Project, 2019 Wildlife Mitigation and Monitoring Plan states that all on-site personnel and employees are to receive training and awareness, including; SOP Wildlife Awareness, SOPs General Site Rules and Wildlife Awareness, SOP Bear Notification & Response, as well as several policies related to avoid staff/wildlife interactions.</p> <p>While the WMMP Plan refers to conditional future training (e.g., “are to receive”) there is not clear mention within the 2019 Annual Compliance Report, or 2019 Wildlife Mitigation and Monitoring Compliance Report that on site-personnel and employees did receive onsite training and awareness indicated within the WMMP Plan. Further, the SOPs noted for training were not included as appendices to the 2019 WMMP.</p>
Recommendation/Request	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> • Please clearly report on training provided to on-site personnel and employees in annual compliance reporting and make the training and awareness SOPs available.
Importance	

2.0 WILDLIFE MITIGATION AND MONITORING PLAN COMPLIANCE REPORT – BOSTON & MADRID

2.1 KIA-NIRB-04

Review Comment Number	KIA-NIRB-04
Subject/Topic	Noise and Vibration – Noise Abatement and Monitoring



<p>References</p>	<p>Hope Bay Project Wildlife Mitigation and Monitoring Plan (TMAC 2019)</p> <p>AND</p> <p>TMAC, Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report</p> <ul style="list-style-type: none"> • Appendix C-3
<p>Summary</p>	<p>The reporting requirement for TOC No. 4 requires the Proponent to report on noise mitigation and monitoring on an annual basis (or more frequently for monitoring results that may already be required under Project Certificate No. 003).</p> <p>TMAC as indicated that they “do not maintain a standalone Noise Abatement plan”, but “for the protection of wildlife, TMAC implements its noise management under its Wildlife mitigation and monitoring program”, which is reported on annually.</p> <p>The KIA could not find any reporting on noise monitoring in the 2019 Annual Report or in the 2019 WMMP Compliance Report (Appendix C-3), as per TOC No. 4. In Table 8-1 of the Annual Report (Main Document), TMAC states that “no formal noise monitoring was conducted in 2019”.</p>
<p>Detailed Review Comment</p>	<p>TOC No. 4 states: “The Proponent shall, in consultation with the Government of Nunavut-Department of Environment, Environment and Climate Change Canada, and Health Canada, maintain a Noise Abatement Monitoring Plan that addresses the following areas/issues:</p> <ul style="list-style-type: none"> a) measures to protect people, fish, and wildlife, from mine activity noise and vibration, including blasting, drilling, equipment, vehicles and aircraft; b) monitoring of noise at least once during each phase of the Project and following quarry blasts to demonstrate that noise levels c) adaptive management and monitoring measures to be implemented should monitoring identify an exceedance; and d) the procedure employees should follow if they have any noise complaints.”



	<p>The reporting requirement for TOC No. 4 states: “The Plan should be submitted to the Nunavut Impact Review Board (NIRB) prior to the start of construction, and reported on annually (or more frequently for monitoring results that may already be required under Project Certificate No. 003, such as TOC No. 29).”</p> <p>TMAC as indicated that they “do not maintain a standalone Noise Abatement plan”, but “for the protection of wildlife, TMAC implements its noise management under its Wildlife mitigation and monitoring program”, which is reported on annually.</p> <p>The KIA could not find any reporting on noise monitoring in the 2019 Annual Report or in the 2019 WMMP Compliance Report (Appendix C-3), as per TOC No. 4. It is not clear when the last noise monitoring was conducted or whether TMAC is in compliance with TOC No. 4.</p>
Recommendation/Request	<p>Please indicate what noise monitoring has been conducted in 2019 and if no noise monitoring was conducted in 2019, please provide a rationale for why not. Please include a schedule for when the next expected monitoring will occur.</p>
Importance	

2.2 KIA-NIRB-05

Review Comment Number	KIA-NIRB-05
Subject/Topic	Vegetation – invasive and rare plant species
References	<p>TOC No. 17 states: “The Proponent shall maintain a section of the Wildlife Mitigation and Monitoring Plan (WMMP) on invasive plant species and rare plant species with details on the following:</p> <ul style="list-style-type: none"> a) Mitigation to prevent the introduction of invasive plant species, for example, via inspection of vehicles and equipment brought to site; b) Protocols for monitoring for invasive plant species, with reference to geographic scope and frequency, and commitment to monitor through post-closure;



	<p>c) Measures to ensure that any introductions of non-indigenous plant species are promptly reported to the Government of Nunavut – Department of Environment;</p> <p>d) Mitigation to prevent the successful establishment of invasive species that may be introduced to the project area as a result of project activities; and</p> <p>e) Summary of loss of potential rare plant habitat when construction occurs in new areas”</p> <p>Reporting Requirements for TOC No. 17 state: “A description of monitoring and mitigation undertaken and a summary of related results related to introduction of invasive plant and protection of rare plants shall be provided in the Proponent’s annual report to the Nunavut Impact Review Board.”</p> <p>Hope Bay Project: 2019 Wildlife Mitigation and Monitoring Program Compliance Report, Appendix 3.10-2 Section 10 (ID #KIA-NIRB-10)</p> <p>“TMAC commits to including a section in the Wildlife Mitigation and Monitoring Plan (WMMP) on invasive plant species detection and management, and report in the annual compliance report.”</p> <p>A method for surveys specific to invasive plant species is also outlined in the response to KIA-NIRB-10 in Section 10.5 of Appendix 3.10-2.</p> <p>AND</p> <p>TMAC, 2019. Hope Bay Project Wildlife Mitigation and Monitoring Plan, Section 2.11.1</p>
<p>Summary</p>	<p>In their response to KIA-NIRB-10, pertaining to the KIA’s review of the Madrid-Boston FEIS TMAC stated the following:</p> <p>“TMAC commits to including a section in the Wildlife Mitigation and Monitoring Plan (WMMP) on invasive plant species detection and management, and report in the annual compliance report.” The Response to KIA-NIRB-10 also included a methods section for a vegetation monitoring program.</p> <p>The reporting requirement for TOC No. 17 states: “A description of monitoring and mitigation undertaken and a summary of related results related to introduction</p>



	<p>of invasive plant and protection of rare plants shall be provided in the Proponent’s annual report to the Nunavut Impact Review Board”</p> <p>The 2019 WMMP did address two points within TOC No. 17: point a) “Mitigation to prevent the introduction of invasive plant species, for example, via inspection of vehicles and equipment brought to site”, and point c) “Measures to ensure that any introductions of non-indigenous plant species are promptly reported to the Government of Nunavut – Department of Environment”. However, there was no inclusion of points b) Protocols for monitoring for invasive plant species, with reference to geographic scope and frequency, and commitment to monitor through post-closure, d) Mitigation to prevent the successful establishment of invasive species that may be introduced to the project area as a result of project activities; or e) Summary of loss of potential rare plant habitat when construction occurs in new areas”.</p> <p>In addition, the 2019 Mitigation and Monitoring Program Compliance Report did not include reporting on monitoring activities/methods for detecting invasive species in 2019.</p>
<p>Detailed Review Comment</p>	<p>While TMAC’s response to Technical Review comment KIA-NIRB-10 (Section 10 of Appendix C-3 in the 2019 NIRB Annual Report) stated that monitoring for invasive plant species will be conducted every 3 to 5 years in conjunction with other monitoring programs or as triggered by observations of exotic invasive plant species, and a term exists for inclusion of protocols for invasive species monitoring in the WMMP, it is unclear why this has not been included in the 2019 WMMP.</p> <p>It is also unclear why invasive plant species monitoring reporting has not been conducted to be in compliance with the Reporting Requirements of TOC No. 17. At minimum, a statement indicating the schedule for next monitoring of invasive species should be presented in the annual compliance reports and a protocol for monitoring should be added to the 2019 WMMP in Section 2.11.1.</p> <p>The 2019 WMMP currently states that “Invasive plant species observed will be reported to the GN DOE”; however, no focused monitoring programs or methods</p>



	<p>are included in the WMMP (as detailed as required in the TOC). Without the inclusion of a focused monitoring program with clear methods for capturing invasive species, only chance detections will be reported to the GN DOE.</p> <p>In their response to Technical Comments 2019 NIRB Annual Report (Appendix C-3, Section 10 – KIA-NIRB-10) TMAC indicated that no invasive species have been identified in the operating Doris Site during Phase 2 Project baseline surveys conducted in 2010 and during rare plant surveys conducted in 2014. However, no vegetation surveys have been reported since 2014 and (to our knowledge) no targeting surveys have been conducted for the detection of invasive plant species. TMAC included a provision in their response to KIA-NIRB-10 that monitoring would continue every 3 to 5 years in conjunction with other monitoring programs or as triggered by observations of exotic invasive plant species. If the last monitoring was conducted in 2014, monitoring for invasive plant species should have been conducted in 2019 at the latest.</p> <p>TMAC also included monitoring protocols in their response to KIA-NIRB-10; however, these protocols were not included in the 2019 WMMP. Further, a frequency table identifying when monitoring for invasive plants will be initiated has not been supplied in the WMMP. In addition, no reporting on invasive species monitoring protocols or results has been conducted in the 2019 WMMP Annual Compliance Report.</p>
<p>Recommendation/Request</p>	<p>The KIA makes the following recommendations and requests:</p> <ul style="list-style-type: none"> • Please explain why monitoring of invasive species was not undertaken during the 2019, and why reporting on invasive species was not provided within the annual compliance reporting to be in compliance with TOC No. 17. • Please provide any details of any other vegetation monitoring that has been conducted since 2014 which could have served to pick up incidental observations of invasive plants.
<p>Importance</p>	



2.3 KIA-NIRB-06

Review Comment Number	KIA-NIRB-06
Subject/Topic	Road and Traffic Management
References	<p>TMAC, Hope Bay, Wildlife Mitigation and Monitoring Plan, December 2019</p> <ul style="list-style-type: none"> • Section 2.6 <p>AND</p> <p>TMAC, 2020 Annual Report Appendix C-3 Hope Bay Project: 2019 Wildlife Mitigation and Monitoring Program Compliance Report</p> <ul style="list-style-type: none"> • Section 2.2 <p>AND</p> <p>TMAC, 2020. Hope Bay Project: 2019 Nunavut Impact Review Board Annual Report</p> <ul style="list-style-type: none"> • Section 6.2
Summary	<p>TOC No. 20 States: “The Proponent shall maintain a Road Management Plan which includes: a) maintenance of traffic logs and traffic counters along the all-weather road between the Doris-Madrid mine sites and Madrid-Boston mine sites. Where traffic levels exceed levels predicted for the Project, the Proponent shall develop and implement appropriate enhancements to its wildlife protection measures”.</p> <p>The Reporting Requirements state:” An annual summary of the monthly maximum, minimum, and average traffic levels shall be provided to the NIRB in the Proponent’s annual report, with an analysis of the effectiveness of mitigation for adverse impacts to wildlife from road operations”.</p> <p>While maximum, minimum, and average traffic levels are reported for each location within Appendix C-3 of the 2019 Annual Report, the maximum traffic levels are exceeded for the month of May and no “enhancements to its wildlife protection measures” are indicated.</p>
Detailed Review Comment	TOC No. 20 states: “Where traffic levels exceed levels predicted for the Project, the Proponent shall develop and implement appropriate enhancements to its wildlife



	<p>protection measures” we could not find any reporting on the development and implementation of any appropriate enhancements to wildlife protection measures within the 2019 compliance report, and an analysis of adverse impacts to wildlife from road operations is not provided.</p> <p>The logic that average monthly transits should be used over the course of a year to evaluate whether the Project is in compliance with predictions is flawed. With this logic, it is technically possible to exceed monthly traffic predictions by approximately a factor of 10 in any one month if the remaining months have very low traffic volumes. If an exceedance in traffic correlates with a month where wildlife presence is high, or where a major migration event is occurring, it could result in significant effects to wildlife. In the case where the traffic levels are nearing the peak monthly predicted transits, additional care should be taken to ensure that wildlife are not affected.</p>
Recommendation/Request	<p>The KIA Requests the Following:</p> <ul style="list-style-type: none"> • Please compare monthly traffic rates to monthly predictions to evaluate project exceedances. • Please explain what enhancements to wildlife protection measures will be implemented and under what scenarios these conditions will be implemented.
Importance	

2.4 KIA-NIRB-07

Review Comment Number	KIA-NIRB-07
Subject/Topic	Wildlife Mitigation Measures
References	<p>Hope Bay Project: 2019 NIRB Annual Report</p> <ul style="list-style-type: none"> • Section 6.2 <p>AND</p> <p>Hope Bay Project: 2019 Wildlife Mitigation and Monitoring Plan</p> <ul style="list-style-type: none"> • Section 2.9 <p>AND</p> <p>Hope Bay Project: 2019 Annual Report Appendix C-3</p>



Summary	Reporting requirements for TOC No. 21 have not been incorporated into the 2019 WMMP or the 2019 Annual Report (Appendix C-3 WMMP Compliance Report)
Detailed Review Comment	<p>TOC No. 21 in Section 6.2 of the 2019 NIRB Annual Report states: “In consultation with the Government of Nunavut and other relevant authorities, the Proponent shall include criteria and procedures within its Wildlife Mitigation and Monitoring Plan (WMMP) governing the deterrence of wildlife from blast zones and the relaxation of mitigation measures for animals deemed Project-tolerant”. Section 6.2 also includes the following Reporting Requirement: “The Proponent shall provide a summary discussion of its implementation of this Term and Condition to the Nunavut Impact Review Board (NIRB) through the Proponent’s annual monitoring report.”</p> <p>The 2019 Wildlife and Mitigation Monitoring Plan includes in Section 2.9 Basting Management criteria: “Prior to any blasting a pre-blasting check includes a check for wildlife with a delay in blasting when caribou or muskox are within sight. Blasting will not occur when wildlife have left the area and it is safe to proceed with blasting. In the unlikely event that animals persist in the area and blasting is required to proceed, The Environmental department will advise on methods for encouraging animals to leave the area.” To date, procedures have not been included in the 2019 WMMP, so it is not clear whether proposed procedures are in compliance with the Wildlife Act S.Nu. 2003, c.26 which states that “No person shall chase, weary, harass or molest a wild animal”.</p> <p>In addition, Appendix C-3 (2019 Wildlife Mitigation and Monitoring Program Report) of the 2019 NIRB Annual Report does not include a summary discussion of the implementation measures of this TOC as stated in the Reporting Requirements for TOC No. 21.</p>
Recommendation/Request	<p>The KIA Requests the Following:</p> <ul style="list-style-type: none"> • Please provide a protocol in the 2019 WMMP for procedures that will be followed in the case of encounter with Project-tolerant Wildlife.



	<ul style="list-style-type: none"> Please also include a summary discussion of the implementation measures of this TOC in the Annual reporting for the Project.
Importance	

2.5 KIA-NIRB-08

Review Comment Number	KIA-NIRB-08
Subject/Topic	Caribou and Muskox Mitigation Measures
References	<p>Hope Bay Project: 2019 NIRB Annual Report</p> <ul style="list-style-type: none"> Section 6.2, TOC No. 22 <p>AND</p> <p>Hope Bay Project: 2019 Wildlife Mitigation and Monitoring Plan</p> <ul style="list-style-type: none"> Section 2.2, Caribou and Muskox Management, Figure 2.2-1 <p>AND</p> <p>Hope Bay Project: 2019 NIRB Annual Report Appendix C-3</p>
Summary	<p>TOC No. 22 in Section 6.2 of the 2019 Annual Report states: “In collaboration with the Government of Nunavut, the Proponent shall specify within its Wildlife Mitigation and Monitoring Plan specific mitigation measures, trigger distances, and group size thresholds for the protection of caribou and muskox in proximity to project activities (e.g., blasting, heavy truck traffic, and aircraft).”</p> <p>In their 2019 WMMP, TMAC refers to Table 2.1.1 and Table 2.1-2 for trigger distances and group sizes and includes reference to Figure 2.1-1 (HB-19ERM-009), which illustrates the mitigation to be employed by personnel driving near caribou and muskox. However, this figure was not included in the 2019 WMMP. Figure 2.1-1 was requested for review by the KIA during their review of the 2019 WMMP (KIA-TC-4), but it has not yet been provided to the KIA.</p> <p>In addition, Reporting Requirements of TOC No. 22 state: “The Proponent shall provide a summary discussion of the implementation of the Term and</p>



	<p>Condition to the Nunavut Impact Review Board (NIRB) through the Proponent’s annual monitoring report.” No discussion on the implementation of this TOC exists within the 2019 Annual Report (Appendix C-3).</p>
Detailed Review Comment	<p>Consolidation of Wildlife Act S.Nu. 2003, c.26 states that: “No person shall chase, weary, harass or molest a wild animal.” Improper driver practices could lead to the violation of the Wildlife Act. Mitigation practices for reducing the impact of road traffic on nearby wildlife cannot be assessed without viewing the cited figure, which is missing from the WMMP. Please supply the Figure 2.2-1 (HB-19ERM-009) for review.</p>
Recommendation/Request	<p>Please include the figure that is missing for driver mitigation for caribou and muskox (Figure 2.2-1; HB-19ERM-009) for review and a summary of the implementation of caribou and muskox management with regards to blasting, heavy truck traffic, and aircraft, in the annual WMMP monitoring report. .</p>
Importance	

2.6 KIA-NIRB-09

Review Comment Number	KIA-NIRB-09
Subject/Topic	NIRB Commitment: additional baseline surveys for migratory birds at wind turbine locations
References	<p>Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report, Appendix E, E-1. Status update with project certificate commitments – Phase 2 FH commitments, NIRB Commitment KIA-FEIS-12 AND Hope Bay Project, 2019 Nunavut Impact Review Board Annual Report, Section 6.2, p. 6-76, New TOC No. 28:</p>
Summary	<p>NIRB Commitment KIA-FEIS-12 requires that TMAC complete additional migratory bird surveys to assess potential impacts due to wind turbines. Even if no turbines will be constructed in 2019, this does not preclude additional surveys in support of their development, particularly if the turbine locations have been selected. Additional information is needed</p>



	<p>regarding TMAC’s plans for wind turbines. The KIA made this comment in their review of the 2018 Hope Bay Project Annual Report as well.</p>
<p>Detailed Review Comment</p>	<p>During their review of the Project FEIS, the KIA requested that TMAC commit to additional, baseline migration surveys at the proposed wind turbine pad locations prior to construction (KIA-FEIS-12). These should be conducted during the appropriate survey time period to meet ECCC’s (2007) Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds and to capture peak migratory activity for raptors, waterbirds, and upland birds.</p> <p>TMAC’s response to KIA-FEIS-12 in Appendix E, Status Update with Project Certificate Commitments, is that “No turbines will be constructed in 2020”. The same response was given to comment KIA-FEIS-12 in their Status Update with Project Certificate Commitments in 2018. While TMAC’s reasoning may be appropriate in response to Project Certificate TOC No. 28 (wind turbine monitoring for migratory birds), the KIA’s FEIS comment centered around additional baseline data collection, which could have been initiated in 2018/2019 if proposed locations for the wind turbines have been finalized and construction is set to begin within the next 1-2 years. Multiple years of baseline data collection will provide a more complete picture of potential impacts to various migratory bird species/groups.</p> <p>If turbine locations are still unknown, and construction schedules remain ambiguous, then additional details stating this should be provided within the annual report for clarity. Delaying the collection of additional baseline data to focus on a relevant location and time period (i.e., closer to turbine construction) is understandable; but noting these delays and reasons would help the reader to understand reasons for compliance issues.</p>
<p>Recommendation/Request</p>	<p>The KIA requests the following:</p> <ul style="list-style-type: none"> • That TMAC provide an update regarding their plans and schedule for wind turbine construction, and candidate locations(s). • If locations have been selected and construction will begin within 1-2 years, additional baseline studies as



	<p>per NIRB Commitment KIA-FEIS-12 should be undertaken.</p> <ul style="list-style-type: none"> • Please provide a monitoring schedule for pre-construction monitoring. • Please provide a monitoring schedule for post-construction monitoring.
Importance	

2.7 KIA-NIRB-10

Review Comment Number	KIA-NIRB-10
Subject/Topic	Marine Environment – Shipping Contractors
References	<p>Hope Bay Project: Shipping Management Plan (TMAC 2020) AND Hope Bay Project: 2019 NIRB Annual Report AND Hope Bay Project: 2019 NIRB Annual Report Appendix C-3</p>
Summary	<p>TOC No. 30 in Section 6.2 of the 2019 Annual Report states: “The Proponent shall contract only Transport Canada certified vessels to carry cargo or fuel for the Project and shall ensure shippers are informed of the Proponent’s applicable management plans and commitments designed to address potential adverse ecosystemic effects of shipping activities to the marine environment.”</p> <p>The Reporting Requirements for TOC No. 30 state: “The Proponent shall demonstrate its compliance with this Term and Condition within its Plan and associated annual reporting to the Nunavut Impact Review Board.”</p> <p>No reporting addressing compliance with TOC No. 30 was provided in the 2019 Annual Report.</p>
Detailed Review Comment	<p>The 2019 NIRB Annual Report states: “In the fall of 2019, TMAC concluded another successful sealift operation including the purchase and delivery of 23,000,000 L of diesel fuel as well as explosives and reagents to support mining and milling activities. The sealift also included additional heavy equipment and</p>



	<p>supplies to support mining and construction operations.” This statement indicates that shipping activities were conducted in 2019 and it is not clear whether these activities are to support activities for Doris North, or whether they are to support the construction activities related to Boston/Madrid. The reporting requirement for TOC No. 30 states: “The Proponent shall demonstrate its compliance with this Term and Condition within its Plan and associated annual reporting to the Nunavut Impact Review Board.” No reporting for compliance with TOC No. 30 was found in the 2019 Annual Report or in Appendix C-3. If shipping activities included the shipping of supplies for the construction of the Boston/Madrid properties, reporting requirements for vessel use for this project should have been included in the 2019 Annual Report to the NIRB.</p>
Recommendation/Request	Please include compliance reporting for shipping as per TOC No. 30 in the 2019 Annual Report or within Appendix C-3 (Wildlife Mitigation and Monitoring Program Compliance Report).
Importance	

2.8 KIA-NIRB-11

Review Comment Number	KIA-NIRB-11
Subject/Topic	Marine Environment – Marine Wildlife Mitigation
References	<p>Hope Bay Project: Shipping Management Plan (TMAC 2020) AND Hope Bay Project: 2019 NIRB Annual Report AND Hope Bay Project: 2019 NIRB Annual Report Appendix C-3</p>
Summary	TOC No. 31 in Section 6.2 of the 2019 Annual Report states: “The Proponent shall provide its contracted vessel operators with maps and descriptions of key marine bird habitats as well as information on sensitive marine mammal habitats in the Northwest Passage,



	<p>updated annually to include newly published information as it becomes available. The guidance package shall specify that, subject to vessel safety requirements, key wildlife habitats shall be avoided by a distance of at least 500 metres, and wildlife are to be given the right of way. The Proponent shall work with Fisheries and Oceans Canada to ensure that marine mammal mitigation measures common for all vessels in the Canadian Arctic are applied to project-contracted vessels as appropriate.”</p> <p>The Reporting Requirements for TOC No. 31 state: “The Proponent shall demonstrate its compliance with this Term and Condition within its Plan and shall comment on the effectiveness of these measures within its associated annual reporting to the Nunavut Impact Review Board.”</p> <p>No reporting for compliance with TOC No. 31 was found in the 2019 Annual Report or associated appendices.</p>
<p>Detailed Review Comment</p>	<p>The 2019 NIRB Annual Report states: “In the fall of 2019, TMAC concluded another successful sealift operation including the purchase and delivery of 23,000,000 L of diesel fuel as well as explosives and reagents to support mining and milling activities. The sealift also included additional heavy equipment and supplies to support mining and construction operations.” This statement indicates that shipping activities were conducted in 2019 and it is not clear whether these activities are to support activities for Doris North, or whether they are to support the construction activities related to Boston/Madrid.</p> <p>The reporting requirement for TOC No. 31 states: “The Proponent shall demonstrate its compliance with this Term and Condition within its Plan and shall comment on the effectiveness of these measures within its associated annual reporting to the Nunavut Impact Review Board.”</p> <p>No reporting for compliance with TOC No. 31 was found in the 2019 Annual Report or in Appendix C-3. If shipping activities included the shipping of supplies for the construction of the Boston/Madrid properties,</p>



	reporting requirements for vessel use for this project should be included in the 2019 Annual Report.
Recommendation/Request	Please include compliance reporting for shipping as per TOC No. 31 in the 2019 Annual Report or within Appendix C-3 (Wildlife Mitigation and Monitoring Program Compliance Report).
Importance	

2.9 KIA-NIRB-12

Review Comment Number	KIA-NIRB-12
Subject/Topic	Marine Environment – Vessel Strikes
References	Hope Bay Project: Shipping Management Plan (TMAC 2020) AND Hope Bay Project: 2019 NIRB Annual Report AND Hope Bay Project: 2019 NIRB Annual Report Appendix C-3
Summary	TOC No. 32 in Section 6.2 of the 2019 Annual Report states: “The Proponent shall ensure that shippers retained for project related shipping immediately report any accidental contact by project vessels with marine mammals or seabird colonies to Fisheries and Oceans Canada and Environment and Climate Change Canada respectively. The Proponent shall also ensure that the circumstances of the incident are investigated to determine if additional mitigative measures are required.” The Reporting Requirements for TOC No. 32 state: “A summary of any vessel strikes, and any adaptive management steps undertaken, shall be included in the Proponent’s annual report to the Nunavut Impact Review Board.” No reporting for compliance with TOC No. 32 was found in the 2019 Annual Report or associated appendices.
Detailed Review Comment	The 2019 NIRB Annual Report states: “In the fall of 2019, TMAC concluded another successful sealift



	<p>operation including the purchase and delivery of 23,000,000 L of diesel fuel as well as explosives and reagents to support mining and milling activities. The sealift also included additional heavy equipment and supplies to support mining and construction operations.” This statement indicates that shipping activities were conducted in 2019 and it is not clear whether shipping is related to construction activities for the Boston/Madrid properties.</p> <p>The reporting requirement for TOC No. 32 states: “A summary of any vessel strikes, and any adaptive management steps undertaken, shall be included in the Proponent’s annual report to the Nunavut Impact Review Board.”</p> <p>No reporting for compliance with TOC No. 32 was found in the 2019 Annual Report or in Appendix C-3. If shipping activities included the shipping of supplies for the construction of the Boston/Madrid properties, reporting should occur as a result of vessel use for this portion of the project.</p>
Recommendation/Request	Please include compliance reporting for shipping as per TOC No. 32 in the 2019 Annual Report or within Appendix C-3 (Wildlife Mitigation and Monitoring Program Compliance Report).
Importance	

2.10 KIA-NIRB-13

Review Comment Number	KIA-NIRB-13
Subject/Topic	Marine Environment – Noise Monitoring
References	Hope Bay Project: Shipping Management Plan (TMAC 2020) AND Hope Bay Project: 2019 NIRB Annual Report AND Hope Bay Project: 2019 NIRB Annual Report Appendix C-3
Summary	TOC No 33 in Section 6.2 of the 2019 Annual Report states: “The Proponent shall develop a monitoring



	<p>protocol for assessing disturbance to marine wildlife resulting from project-related underwater noise in Roberts Bay, and to facilitate assessment of the potential short term, long term, and cumulative effects of project-related noise (including vessel noise in Roberts Bay) on marine wildlife. The Proponent is expected to work with Fisheries and Oceans Canada to determine appropriate indicators and thresholds that can be used to determine if negative impacts on marine wildlife are occurring, and adaptive management measures to mitigate adverse impacts of project-related noise.”</p> <p>The reporting requirement for TOC No. 33 states: “The monitoring protocol should be incorporated into an appropriate management plan and shall be provided to the Nunavut Impact Review Board (NIRB) prior to commencement of construction and project-related shipping, with summary discussion of associated implementation included within annual reporting to the NIRB.”</p> <p>No reporting occurs in the 2019 Annual Report or associated appendices.</p>
<p>Detailed Review Comment</p>	<p>The 2019 NIRB Annual Report states: “In the fall of 2019, TMAC concluded another successful sealift operation including the purchase and delivery of 23,000,000 L of diesel fuel as well as explosives and reagents to support mining and milling activities. The sealift also included additional heavy equipment and supplies to support mining and construction operations.” This statement indicates that shipping activities were conducted in 2019 and it is not clear whether shipping is related to construction activities for the Boston/Madrid properties.</p> <p>The reporting requirement for TOC No. 33 states: “The monitoring protocol should be incorporated into an appropriate management plan and shall be provided to the Nunavut Impact Review Board (NIRB) prior to commencement of construction and project-related shipping, with summary discussion of associated implementation included within annual reporting to the NIRB.”</p>



	No reporting for compliance with TOC No. 33 was found in the 2019 Annual Report or in Appendix C-3. If shipping activities included the shipping of supplies for the construction of the Boston/Madrid properties, reporting should occur as a result of vessel use for this portion of the project.
Recommendation/Request	Please include compliance reporting for shipping as per TOC No. 33 in the 2019 Annual Report or within Appendix C-3 (Wildlife Mitigation and Monitoring Program Compliance Report).
Importance	

3.0 Madrid Boston Project Certificate 9

3.1 KIA-NIRB-14

Review Comment Number	KIA-NIRB-14
Subject/Topic	Mine Closure and Reclamation Plan – Progressive Reclamation and Restoration Reflecting Natural Aesthetics and Community Aesthetic Values
References	Madrid Boston Project Certificate No. 9. New Condition 8 p. 6-56
Summary	The new Condition requires that “Acceptability of reclamation efforts should be confirmed through the Proponent’s public engagement with local communities and discussion of local aesthetic values (e.g., acceptability of the topography and landscape of the project areas following progressive reclamation efforts).”
Detailed Review Comment	TMAC states that “ An updated November 2017 Interim Closure and Reclamation Plan for the Doris - Madrid portions of the Project and a November 2017 Conceptual Closure and Reclamation Plan for the Boston portion of the Project, including a description of the progressive reclamation programs, were submitted and approved by the NWB with licence issuance in early 2019.” but provides no discussion of how these submitted plans reflected Natural Aesthetics and Community Aesthetic Values, how Community



	Aesthetics were determined and incorporated or where they are discussed in the submitted CRPs.
Recommendation/Request	Please provide reference to how and where Natural Aesthetics and Community Aesthetic Values were considered in the CRP, what engagement informed them and Inuit acceptance.
Importance	Moderate

3.2 KIA-NIRB-15

Review Comment Number	KIA-NIRB-15
Subject/Topic	Setbacks
References	Madrid Boston Project Certificate No. 9. New Condition 12 p. 6-60
Summary	The new Condition requires that “Unless otherwise authorized, the Proponent shall maintain an appropriate setback distance between project quarries and borrow pits from fish-bearing or permanent waterbodies as required to prevent acid rock drainage or metal leaching into such waterbodies and to mitigate the potential for impacts from runoff/sedimentation associated with project quarries and borrow pits
Detailed Review Comment	The new Condition also requires that “The Proponent shall provide information regarding quarry setback distances maintained and/or mitigation measures implemented in fulfillment of this Term and Condition in the Proponent’s annual report to the Nunavut Impact Review Board.” Setback distances are not provided in the Annual report and there is no specific reference to where they are documented.
Recommendation/Request	Please provide the setback distances between quarries, borrow pits and fish bearing waters in the Annual report or reference to the specific section of the Quarry Management Plan where they may be found.
Importance	Moderate



3.3 KIA-NIRB-16

Review Comment Number	KIA-NIRB-16
Subject/Topic	Meeting DFO Blasting Guidelines
References	Madrid Boston Project Certificate No. 9. New Condition 14 p. 6-62
Summary	The new Condition requires that The Proponent shall engage with Fisheries and Oceans Canada to develop project specific thresholds, mitigation and monitoring for any blasting activities that would exceed the requirements of Fisheries and Oceans Canada's Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.
Detailed Review Comment	<p>The new Condition also requires that "If project-specific thresholds, mitigation and monitoring requirements are developed, the Proponent shall identify these requirements in the annual report provided to the Nunavut Impact Review Board."</p> <p>The proponent response is that "No project-specific thresholds, mitigation and monitoring requirements were developed or sought from Fisheries and Oceans Canada for blasting activities in 2019."</p> <p>Does this mean that the proponent will use Generic DFO guidelines?</p>
Recommendation/Request	Please confirm what blasting guidelines are being used and will be used.
Importance	Low

3.4 KIA-NIRB-17

Review Comment Number	KIA-NIRB-17
Subject/Topic	Meeting DFO Blasting Guidelines
References	Madrid Boston Project Certificate No. 9. New Condition 14 p. 6-62
Summary	The new Condition requires that The Proponent shall engage with Fisheries and Oceans Canada to develop project specific thresholds, mitigation and monitoring



	for any blasting activities that would exceed the requirements of Fisheries and Oceans Canada’s Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.
Detailed Review Comment	<p>The new Condition also requires that “If project-specific thresholds, mitigation and monitoring requirements are developed, the Proponent shall identify these requirements in the annual report provided to the Nunavut Impact Review Board.”</p> <p>The proponent response is that “No project-specific thresholds, mitigation and monitoring requirements were developed or sought from Fisheries and Oceans Canada for blasting activities in 2019.”</p> <p>Does this mean that the proponent will use Generic DFO guidelines?</p>
Recommendation/Request	Please confirm what blasting guidelines are being used and will be used.
Importance	Low

3.5 KIA-NIRB-18

Review Comment Number	KIA-NIRB-18
Subject/Topic	Marine Environment – Noise Monitoring
References	Madrid Boston Project Certificate No. 9. New Condition 33 p. 6-81
Summary	The proponent is to “develop a monitoring protocol for assessing disturbance to marine wildlife resulting from project-related underwater noise in Roberts Bay... prior to commencement of construction and project-related shipping”
Detailed Review Comment	The proponent has committed to address marine construction activities but has not addressed “project related shipping, stating “To be addressed prior to the start of marine construction activities which are related to Madrid-Boston. No marine infrastructure related to Madrid-Boston was constructed in 2019, nor expected to commence in 2020.” We understand that marine shipping activities have been part of the project since



	inception and that, although shipping activities may increase with the new project that disturbance thresholds should not change.
Recommendation/Request	Please explain or provide reference to project protocols for monitoring disturbance to marine wildlife from project-related shipping activities and provide assurance that they are currently in place.
Importance	High

3.6 KIA-NIRB-19

Review Comment Number	KIA-NIRB-19
Subject/Topic	Incorporation of Inuit Qaujimaningit
References	Madrid Boston Project Certificate No. 9. New Condition 43 p. 6-91
Summary	The condition states “The Proponent should ensure that the development of all project monitoring plans, associated reporting and updates are undertaken with active engagement of Kitikmeot communities, land users, and harvesters. The Proponent should work with the Kitikmeot Inuit Association, the local Hunters and Trappers Organizations and the Kitikmeot Socio-Economic Monitoring Committee to report on the collection and Integration of Inuit Qaujimaningit through its monitoring programs for the Project.”
Detailed Review Comment	Although the proponent states “TMAC continued to make use of the Hope Bay Inuit Environmental Advisory Committee (“IEAC”) in 2019. The IEAC met twice in 2019 to provide TMAC and the Kitikmeot Inuit Association with advice on caribou monitoring and fisheries offsetting.” it provides no information or evidence on the outcome of these meetings and how or if IQ was used to document compliance with the condition.
Recommendation/Request	Please describe how IQ was used specifically to inform development of project monitoring plans or reference where this information may be found or where the outcome of IEAC meetings is documented.
Importance	High



4.0 2019 Aquatic Effects Monitoring Program Report

4.1 KIA-NIRB-20

Review Comment Number	KIA-NIRB-20
Subject/Topic	Sampling Locations
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report p. 2-1 Section 2.1.1.
Summary	<i>“Sampling locations for the 2019 AEMP were only those sites triggered by Doris and Madrid North construction or operations activities.... Wolverine Lake will only be included in the evaluation of effects once construction begins at Madrid South”</i>
Detailed Review Comment	Restricting sampling to only those areas under active mining or construction does not provide for adequate “Before” data for sites which will be brought into future activity and limits the ability to define a baseline of conditions for “Before/After:” analysis at later stages of the project.
Recommendation/Request	Please provide a discussion and rationale for excluding the sampling of areas that will be influenced by mining activities in the near future and how their exclusion from current sampling allows “Before/After” comparisons to be made once mining commences.
Importance	High

4.2 KIA-NIRB-21

Review Comment Number	KIA-NIRB-21
Subject/Topic	Visual Assessment of Data
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report p. 2-7, Section 2.2.2 Overview of Assessment Methodology
Summary	The methods state that <i>“potential mine effects were assessed by a visual examination of graphical trends over</i>



	<i>time and, where possible, statistical analysis of trends over time” (p. 2-7)</i>
Detailed Review Comment	We are concerned that the approach, as described, a) provides margin for subjective interpretation and b) suggests that there program may not be collecting enough data to provide for rigorous and repeatable statistical analysis.
Recommendation/Request	Please provide detail on what aspects of a systematic graphical review would trigger more rigorous interpretation or testing and how a trend could be visible without enough data to test a) significance of the trend or b) for Before/After comparisons.
Importance	High

4.3 KIA-NIRB-22

Review Comment Number	KIA-NIRB-22
Subject/Topic	Approach to Analysis
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report p. 2-7, Section 2.2.2 Overview of Assessment Methodology, bottom of page
Summary	“the BACI analysis compares the before-after trend at the exposure site with the before-after trend at a corresponding reference site”
Detailed Review Comment	We are concerned that the BA analysis is confined to testing for trends between the Control and the Impact sites only. Changes in mean values between Before and After would also indicate the potential for project effects. While we support the use of trend analysis and BACI analysis, we are concerned that the BACI analysis is only applied to trend comparisons and not to significant differences in absolute values in a Before and After comparison.
Recommendation/Request	Please provide further details on why this analytical approach is favoured and comment on the ability to detect changes using a BA comparison of trends vs a BA comparison of mean values.



Importance	High
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4.4 KIA-NIRB-23

Review Comment Number	KIA-NIRB-23
Subject/Topic	Visual Assessment of Data and DO Triggers
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report p. 2-8 p. 2-7, Section 2.2.2 Overview of Assessment Methodology p. 2-10, Section 2.2.3 Response Framework p. 3-3 Section 3.2.1 “Dissolved Oxygen”
Summary	<p>“For profile data (dissolved oxygen and temperature...trends were evaluated using a graphical analysis” (see also p. 3-4) but no description is provided on how changes would be determined.</p> <p>p. 2-10 provides four conditions that must be met to trigger a low action level response, none of which appear to be amenable to a “graphical analysis”.</p> <p>p. 3.3 states that DO profiles had to be “noticeably different” to conclude that the project had a noticeable effect on under-ice DO.</p>
Detailed Review Comment	Temperature and oxygen data are variable seasonally and between years and visual examination of profile data is not likely to detect changes in the absence of specific criteria for what types of changes, and of what magnitude, are considered significant. Section 3.2.1 (p. 3-4) refers to CCME benchmarks as the only DO benchmark for a project effect but does not address Low Action Level triggers Minimum D.O. at depth, or volume weighted oxygen content, for example, could be employed as metrics of change with certain qualifiers- such as the seasonal timing of comparisons.
Recommendation/Request	Please provide criteria and rationale for how a graphical analysis will be used to test for significant changes in profile data, how a graphical analysis of profile data can be used to trigger an action level in the Response



	Framework and what would constitute a “noticeable difference” in a DO profile.
Importance	High

4.5 KIA-NIRB-24

Review Comment Number	KIA-NIRB-24
Subject/Topic	Defining Low Action Levels
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report p. 2-10, Section 2.2.3.1 Response Framework p. 3-4, Sect. 3.2.3
Summary	<p>The text describes four conditions that must be met to trigger a low action level response.</p> <p>Condition 1 – is Identification of a statistically significant and potentially adverse change from baseline conditions Condition 2 – is the concentration of a variable exceeding its normal range based on baseline concentrations.</p> <p>Baseline conditions and normal have not been documented for AEMP variables yet Section 3.2.2 (para 1) states that “2019 values were generally within the normal range based on baseline concentration” (no reference or value is provided).</p>
Detailed Review Comment	<p>The intent of a Response Framework is to trigger management actions quickly when changes are documented and this typically requires defining Low Action Levels “a-priori”, so that there is agreement on what changes are important at the start of the interpretative process for the AEMP. This means that the Normal Ranges and Baseline statistics should be summarized “a-priori” for each variable as part of the AEMP report. Failure to do so risks prolonged discussions on whether or not changes are important, after they have happened, instead of agreeing on action levels beforehand. See, for example, Racher et al. (2011)</p> <p>https://mvlwb.com/sites/default/files/documents/IEAM-Article.pdf</p>



Recommendation/Request	Please provide: 1. Definitions of how Normal Ranges will be or have been developed for each AEMP variable 2. The existing numeric values of Normal Ranges for each AEMP variable
Importance	High

4.6 KIA-NIRB-25

Review Comment Number	KIA-NIRB-25
Subject/Topic	Water Variable Selection
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report Sect. 3.3, p. 3-8
Summary	<i>"A subset of water quality variables (see Table 2.2.1) was evaluated..."</i> but no rationale or selection criteria were provided.
Detailed Review Comment	Table 2.2.1 provides a comprehensive list of variables but the test does not describe how they were chosen or what variables were sampled but omitted from analysis.
Recommendation/Request	Please describe how the subset of water quality variables listed in Table 2.2-1 were selected for analysis.
Importance	Low

4.7 KIA-NIRB-26

Review Comment Number	KIA-NIRB-26
Subject/Topic	Clarity of Interpretation of Nutrients
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report p. 3-15 Sect. 3.3.7
Summary	The text states: <i>"Elevated under-ice ammonia concentrations could have fueled higher phytoplankton biomass levels in Doris Lake early in the open-water season; however, the chlorophyll a concentrations measured in August 2019 were within the range of historical levels."</i>



Detailed Review Comment	The interpretation does not address a) the role of phosphorus in arctic lake productivity or b) provide evidence that N is a limiting nutrient and therefore, why enriched ammonia could have led to increased phytoplankton biomass and c) does not consider the potential for ammonia toxicity.
Recommendation/Request	Please explain why ammonia enrichment is being interpreted as an indicator of potential eutrophication and not as an indicator of potential toxicity
Importance	Moderate

4.8 KIA-NIRB-27

Review Comment Number	KIA-NIRB-27
Subject/Topic	Clarity of Interpretation – Internal Contradictions
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report p. 3-48 Sect. 3.4.1 Arsenic
Summary	The text presented and Figure 3.4.1 provides contradictory evidence of effects confounding interpretation.
Detailed Review Comment	<p>The text states: <i>“The trend in arsenic concentrations over time showed...no clear directional change (Fig. 3.4.1) The sediment arsenic trend over time in Doris Lake was significantly different from a slope of zero...”</i></p> <p>Fig 3.4.1 confirms that there is an increasing trend in arsenic in Doris lake from 2011 to 2019.</p> <p>Fig. 3.4.1 supports the statement that “The sediment arsenic trend over time in Doris Lake was significantly different from a slope of zero” which contradicts the statement that “The trend in arsenic concentrations over time showed...no clear directional change (Fig. 3.4.1) “.</p>
Recommendation/Request	Please explain how can you have an observed trend in the data and a slope that is significantly different from zero but no directional change?



Importance	Moderate
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4.9 KIA-NIRB-29

Review Comment Number	KIA-NIRB-29
Subject/Topic	Benthic Data Interpretation
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report p. 3-61, 3.62 Section 3.6
Summary	Baseline data were excluded from the analysis because sampling depths were changed and benthos were not related to substrate characteristics.
Detailed Review Comment	The text states that benthos collected from 1996 – 2008 were excluded because sampling locations were changed in 2009 and benthos density can vary with depth and location. As such, valuable baseline information is not available for effects assessment. One factor driving benthic communities is substrate characteristics which will also change with location and depth in a lake, yet the AEMP does not attempt to interpret the change in benthic density in Doris Lake (p. 3-62) as a function of substrate or to interpret the pre 2009 data as a function of substrate, thus losing valuable resolution.
Recommendation/Request	Please explain how substrate characteristics could be used to interpret the benthic community results and discuss the feasibility if linking the two metrics in the AEMP.
Importance	Moderate

4.10 KIA-NIRB-30

Review Comment Number	KIA-NIRB-30
Subject/Topic	Benthic Data Interpretation
References	Appendix C-4 Hope Bay Project: 2019 Aquatic Effects Monitoring Program Report p. 3-63 Section 3.6.2



Summary	Benthic richness was assessed at the level of family, potentially losing resolution of community changes.
Detailed Review Comment	The text states that benthos richness was assessed at the family level of taxonomy. Identification and interpretation at the level of Genus provides far more resolution of taxon richness and diversity and a more rigorous and sensitive assessment of potential project effects.
Recommendation/Request	Please provide a rationale for interpretation of benthos at the family level and why future assessments cannot be based on Genus (at least) level identification.
Importance	Moderate

4.11 KIA-NIRB-31

Review Comment Number	KIA-NIRB-31
Subject/Topic	Potential Project-related Effects
References	2019 Aquatic Effects Monitoring Program – Section 3.3
Summary	Additional detail regarding elevated total ammonia and total molybdenum
Detailed Review Comment	<p>Results presented in the 2019 Aquatics Effects Monitoring Program (ERM, March 2020) indicates no adverse Project-related effects to under-ice water level, under-ice dissolved oxygen concentrations, water temperature, sediment quality, phytoplankton biomass, or benthic invertebrate community indicators were detected in the exposure lakes. The evaluation effects concluded there were potential Project-related effects to under-ice total ammonia and under-ice total molybdenum concentrations in the water column of Doris Lake – as noted by increased concentrations relative to baseline levels and increasing trends were not apparent in the reference lake. However, concentrations of total ammonia and total molybdenum remained below CCME FAL guidelines and low action level responses (under the Response Framework) were not triggered.</p> <p>Section 3.3.6 and Section 3.3.19 indicates both total ammonia and total molybdenum concentrations were</p>



	predicted to increase (as part of the FEIS; TMAC, 2017), respectively; however no further details regarding how observed trends compare to predicted concentrations are provided to understand the significance of these potential Project-related effects.
Recommendation/Request	Further detail regarding the comparison of FEIS-model predictions versus realized conditions is recommended to assess the accuracy of earlier modeling efforts and provide an understanding of the significance of these observed trends.
Importance	Moderate

5.0 Doris – Madrid Water Management Plan

5.1 KIA-NIRB-32

Review Comment Number	KIA-NIRB-32
Subject/Topic	Approved Tundra Discharge Locations
References	Water Management Plan – Section 3.1.1.
Summary	Further information regarding approved locations for discharge to the tundra.
Detailed Review Comment	The Water Management Plan (TMAC, March 2020b) indicates non-contact water and treated sewage water will be discharged to the tundra at approved locations, if deemed suitable for release; however, a map or table describing these locations is not provided nor details regarding the appropriate actions to monitor and manage discharge, if warranted.
Recommendation/Request	The number and location of tundra discharge locations is mentioned, but not described in the Water Management Plan. Can TMAC provide a map of these locations or provide the reference to the Plan or document presenting these locations? As well, it is requested that further clarification be provided on the management of these locations following discharge, to monitor for impacts to the surrounding biota.
Importance	Low



5.2 KIA-NIRB-33

Review Comment Number	KIA-NIRB-33
Subject/Topic	Commitment language
References	Water Management Plan – Section 3.2
Summary	Variability in monitoring language with select Doris Water Management facilities.
Detailed Review Comment	Section 3.2 of the Water Management Plan (TMAC, March 2020b) provides a summary of 11 types of mine infrastructure associated with the Doris Madrid Water Management Plan. An appropriate level of detail is provided for each of these facilities in regard to their operation, monitoring and inspection; however, the commitment language used to describe the monitoring programs of these facilities differs between elective (i.e., should) and compulsory (i.e., will). For example, monitoring of the sedimentation pond, pollution control ponds and sumps (Sections 3.2.1 to 3.2.4) “should be” completed, whereas monitoring associated with the Tailings Impoundment Area, mine water, Water Treatment Plant, quarry water management, sewage treatment and freshwater intake (Sections 3.2.5 to 3.2.11) “will be” completed.
Recommendation/Request	It is recommended that the commitment language be consistent within the Water Management Plan, or if commitment rigor does vary between facilities, rationale or further detail is warranted for those locations with “elective” monitoring schedules/programs.
Importance	Moderate

6.0 Hope Bay Ground Water Management Plan

6.1 KIA-NIRB-34

Review Comment Number	KIA-NIRB-34
Subject/Topic	Groundwater Management Plan Updates
References	Groundwater Management Plan – Revisions table, Section 2.1



Summary	Aspects of mine water treatment are not provided in this document
Detailed Review Comment	The Groundwater Management Plan (TMAC, March 2020c) indicates the recent revision updated to Section 2.1 to include aspects of mine water treatment; however, this section does not provide details regarding treatment. Instead, Section 2.2.1 discusses some treatment methods that allow for the physical settling of coarse suspended solids along underground sumps and states that secondary and tertiary treatment (following settling sumps) occurs at the Water Treatment Plant. Details of the latter two treatments are not provided.
Recommendation/Request	Can TMAC provide the details regarding these treatment methods as well as any criteria used to assess whether further treatment (through these secondary or tertiary methods) of mine inflow is required?
Importance	Low

6.2 KIA-NIRB-35

Review Comment Number	KIA-NIRB-35
Subject/Topic	Specific Performance Threshold (SPT) - 1
References	Groundwater Management Plan - Module A – Table A.1
Summary	Level of appropriateness of mine inflow SPTs
Detailed Review Comment	<p>The Mine Inflow Management Program (MIMP) for Doris includes Specific Performance Thresholds that are inflow rate-based decision points, which trigger an escalating level of action to manage the total mine discharge volumes and/or localized inflows.</p> <p>Module A states that the Doris MIMP has set its highest SPT (i.e., SPT-3) to be lower than the predicted maximum mine inflow (of 3,000 m³/d), which is based on output provided by the 2015 hydrogeological model developed for the Doris Mine (SRK, June 2015).</p> <p>Appendix E (SRK, March 26, 2020) of the Hope Bay 2019 NWB Annual Report indicates measured 2019 mine water flows reflect 40% of the predicted flow. The deviation of predicted to measured 2019 mine inflows suggests SPTs for Doris may require re-evaluation,</p>



	<p>which aligns with text found in Section 4.2 of the Groundwater Management Plan (TMAC, March 2020c) stating,</p> <p>“to ensure SPTs are appropriate, the inflows are measured such that the behaviour of the inflow system can be assessed as mining progresses and the SPTs are re-evaluated as part of the review process.”</p>
Recommendation/Request	<p>Are the Doris SPTs appropriate for its MIMP? Can TMAC comment on the conservativeness of using SPTs derived from mine inflow predictions that are significantly higher than measured values?</p>
Importance	<p>High</p>

6.3 KIA-NIRB-36

Review Comment Number	KIA-NIRB-36
Subject/Topic	Specific Performance Threshold (SPT) - 2
References	Groundwater Management Plan – Modules A, B and C
Summary	Absence of water quality related SPTs
Detailed Review Comment	<p>Trigger Action Response Plans (TARPs), which form a component of Groundwater Management Plans, generally include physical as well chemical threshold levels to trigger follow up actions and responses. The Hope Bay Project describes these thresholds as SPTs, which are based on mine inflow rates (only) and no water quality thresholds are provided. As discussed in Technical Review Comment No. 4, measured inflow rates are considerably lower than previously predicted values (SRK, June 2015). The reason for the lower mine inflow rates is not presented, but an earlier version of the Groundwater Management Plan (Rev. 1; SRK, August 2016) suggested that lesser permeable lake bed sediments may support lower mine inflow rates and, if such scenario did occur, the resulting groundwater concentrations would be predicted to increase.</p> <p>Section 5.2 of the Groundwater Management Plan (TMAC, March 2020c) provides details of the sampling and analytical schedule for mine water discharge sampling at TL-12 and backfilled stopes (TL-11), with a note that the Environmental Superintendent is</p>



	responsible for conducting/documenting inflow water quality sampling and maintenance of such records at site. No further discussion is provided regarding the review and use of this data to assess if additional investigation or actions are required. Similarly, the Water Management Plan does not provide details of the water quality aspects of groundwater management and refers the reader back to the Groundwater Management Plan.
Recommendation/Request	Can TMAC comment on how groundwater quality results, managed by the Environmental Superintendent, are used at the Hope Bay Project? As well, can TMAC comment on why water quality data is not used to define a SPT within the various MIMPs presented in the Groundwater Management Plan (TMAC, March 2020c)?
Importance	High

7.0 2019 Annual Geotechnical Inspection TIA

7.1 KIA-NIRB-37

Review Comment Number	KIA-NIRB-37
Subject/Topic	Ice entrainment in tailings
References	2019 Annual Geotechnical Inspection TIA – Section 2.4.6
Summary	Further information regarding monitoring for ice entrainment
Detailed Review Comment	The report notes storage capacity assessments for the TIA include an allowance for 25% ice entrainment. The report also notes that there is no evidence to suggest that there is any significant entrained ice within the deposited tailings. No information is provided on methods used to assess ice entrainment.
Recommendation/Request	Provide information on how ice entrainment within the TIA will be monitored going forward.
Importance	Low

7.2 KIA-NIRB-38

Review Comment Number	KIA-NIRB-38
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Subject/Topic	North Dam Thermosyphon - North 2
References	2019 Annual Geotechnical Inspection TIA – Section 4.2.2
Summary	Further information regarding modelling impacts of non-functioning thermosyphon
Detailed Review Comment	The report notes thermosyphon North 2 has not functioned appropriately since 2012. The report further notes that, following an inspection and potential mitigation actions undertaken by Arctic Foundations of Canada Inc. in 2019, TMAC has exhausted the practical repair options for the thermosyphon. It is also stated that additional thermal modelling of the North Dam was previously undertaken considering the non-functioning North 2 thermosyphon which shows the North Dam performance will not be adversely impacted, but that design redundancy is slightly reduced. This modelling is not included in the report nor is a reference provided.
Recommendation/Request	Provide the results of the additional thermal modelling or if it was included in previous project documentation, provide the reference in which the results were included.
Importance	Moderate

7.3 KIA-NIRB-39

Review Comment Number	KIA-NIRB-39
Subject/Topic	South Dam Ground Temperature Monitoring
References	2019 Annual Geotechnical Inspection TIA – Section 4.3, Appendix L – South Dam Thermal Performance Review
Summary	Plan for replacement of inactive ground temperature monitoring cables
Detailed Review Comment	The report notes several ground temperature monitoring cables installed within and beneath the South Dam to monitor thermal performance of the structure are inactive and some are considered irreparable. Given the performance of the structure relies on maintaining a frozen foundation, thermal monitoring of the structure is essential. The report recommends replacement of some temperature cables, but not all due to the practical limitations of placement within the dam post-construction.



Recommendation/Request	Provide a plan and schedule for which cables will be replaced and any other measures (monitoring, modelling or otherwise) being undertaken in consideration of the fact that some cables will not be able to be replaced.
Importance	High

7.4 KIA-NIRB-40

Review Comment Number	KIA-NIRB-40
Subject/Topic	South Dam Tailings Beach Monitoring
References	2019 Annual Geotechnical Inspection TIA, Appendix I – TIA Water Levels, Section 3
Summary	Monitoring of length of beach at South Dam in TIA
Detailed Review Comment	The report notes the South Dam is designed to have a tailings beach with a minimum length of 100 m. While information is provided in the tailings deposition plan, monitoring data demonstrating the beach length with time showing compliance with the design criteria is not explicitly provided.
Recommendation/Request	Provide a summary of beach length with time for 2019 demonstrating compliance with the minimum beach length criteria.
Importance	Moderate

7.5 KIA-NIRB-41

Review Comment Number	KIA-NIRB-41
Subject/Topic	Tailings Deposition Planning – Tailings density assessment
References	2019 Annual Geotechnical Inspection TIA, Appendix N – Tailings Deposition Update, Section 5
Summary	Assessment of placed tailings density
Detailed Review Comment	The report notes tailings deposition modelling was completed for an overall density of 1.3 t/m ³ . The report goes on to note that the capacity of the TIA could be significantly impacted by tailings density and recommends that as-placed density be checked



	throughout to ensure the density assumption remains valid.
Recommendation/Request	Provide methods that will be used to assess the as-placed density of the tailings and an assessment of what this value currently is, including calibration method for the results. If the in-situ density appears significantly different from the assumed value of 1.3 t/m ³ , then the deposition modelling should be updated.
Importance	Moderate

8.0 2019 Annual Geotechnical Inspection for the Doris and Madrid Sites

8.1 KIA-NIRB-42

Review Comment Number	KIA-NIRB-42
Subject/Topic	Waste Rock Pile Pad T – Oversteepening of Slopes
References	2019 Annual Geotechnical Inspection for the Doris and Madrid Sites, Attachment 2
Summary	Over-steepened slopes of waste rock pile on Pad T
Detailed Review Comment	Based on SRK’s inspection of the waste rock pipe on Pad T, the pile was noted to be both over-steepened and to exceed its maximum design height. TMAC’s response was that the waste rock pile has been re-worked to reduce the height and slope angles and will continue to work with SRK to achieve the design parameters and safety factors. No details on the observed height or slope angles were provided.
Recommendation/Request	Provide the current (regraded) geometry of the waste rock pile and if not within the design criteria, an assessment of current safety factors and a plan to comply with the design criteria.
Importance	High

