



JAY PROJECT

**Tłıchǫ Government**

# **TECHNICAL REPORT RESPONSES**

August 2015

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## Abbreviations

Abbreviation	Definition
AQEMMP	Air Quality and Emissions Monitoring and Management Program
CRMP	Caribou Road Mitigation Plan
DAR	Developer's Assessment Report
Dominion Diamond	Dominion Diamond Ekati Corporation
Ekati Mine	Ekati Diamond Mine
GNWT	Government of the Northwest Territories
IBA	Impact Benefit Agreement
IEMA	Independent Environmental Monitoring Agency
IR	Information Request
MVEIRB	Mackenzie Valley Environmental Impact Review Board
NU	Nunavut
NWT	Northwest Territories
Project	Jay Project
TK	Traditional Knowledge
VC	valued component
WCB	Worker's Compensation Board
WEMP	Wildlife Effects Monitoring Plan
WLWB	Wek'èezhii Land and Water Board
WROMP	Waste Rock and Ore Storage Management Plan
WRSA	Waste Rock Storage Area
ZOI	Zone of Influence

## Units of Measure

Unit	Definition
%	percent
km	kilometre
m	metre

# 1 INTRODUCTION

Dominion Diamond submitted a Developer's Assessment Report (DAR) to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) in November 2014. Following completion of the DAR, Dominion Diamond submitted Round 1 and Round 2 information request responses (April 7, 2015 and July 3, 2015, respectively), and attended Technical Sessions hosted by MVEIRB in Yellowknife between April 21 and 24, 2015, to address regulator and parties' questions and concerns in regard to the Jay Project (Project) and the DAR.

On July 31, 2015, Tłıchq Government submitted their technical report to MVEIRB for the Project outlining recommendations on remaining topics of concern. This report provides responses to those recommendations outlined in the Tłıchq technical report (Tłıchq 2015), with the intent of clarifying these remaining topics as the Project moves into the MVEIRB Hearings Phase.

## 2 RECOMMENDATION AND RESPONSE

### 2.1 Cumulative Impacts to Caribou

#### 2.1.1 Recommendation 1

In order to better understand and prevent a significant adverse impact to caribou:

- Minimize the project footprint's ecological disturbance (IEMA (2015) Section 3.0 Measure 1)
- Further research (including Traditional Knowledge) by the developer on caribou reviewing the pre-development baseline to study the changes that have occurred as a result of development.

#### 2.1.2 Response 1

All factors were formally assessed and considered in the determination of significance. Further, at MVEIRB's request, the effects of the Project were incorporated into a population model created for the Bathurst herd (Adequacy Review DAR-MVEIRB-15). The population model parameters were selected to examine the maximum potential effects of all human-related development on the Bathurst herd. Despite the application of maximum effects, the conclusion of the population modelling was that additional energetic costs from changes in movement and behaviour associated with the Project and other developments were not expected to decrease population resilience and increase the risk to the viability of the Bathurst herd at any phase of the population cycle. The negative trend in Bathurst herd population growth associated with the current estimates of vital rates for reference conditions were predicted to be similar with and without the development-related cumulative changes in habitat quantity and quality, and caribou behaviour and energetics. That finding was consistent with Adamczewski et al. (2009) who indicated that effects from the previous and existing mines are limited and unlikely a major contributing factor in the recent decline of the Bathurst caribou herd.

Based on its technically sound and conservative assessment of current information, Dominion Diamond concludes that the Project will not have a significant adverse effect on caribou.

##### 2.1.2.1 *Ecological Disturbance - Direct Habitat Loss*

As stated in the Developer's Assessment Report (Section 1 and Section 3), the Project currently maximizes the use of the existing Ekati Diamond Mine (Ekati Mine) infrastructure to reduce the environmental footprint. Direct habitat loss from the residual physical footprint of the Project (e.g., waste rock storage areas) is less than 0.1 percent (%) of the seasonal ranges of the Bathurst herd. Physical disturbance from previous and existing developments has had little, if any, ecologically measurable influence on the carrying capacity of the seasonal ranges (less than 2% cumulative direct habitat loss).

##### 2.1.2.2 *Ecological Disturbance - Jay Haul Road Route Selection*

Dominion Diamond has identified the Jay Road route and design that minimizes the effects on barren-ground caribou. Dominion Diamond's work has included engagement with members of all of the Impact Benefit Agreement (IBA) communities including aerial reconnaissance and on-land engagement to gather input on the most appropriate route for the Jay Road. In this Recommended Measure, the Tłıchq cite the

Independent Environmental Monitoring Agency (IEMA 2015) recommended Measure 1 to minimize the disturbance footprint of the Jay Road on high quality caribou habitat. As discussed in DAR Section 12.6.2, the direct loss of habitat is not considered to pose a risk to the assessment endpoint for barren ground caribou. Additionally, the historic caribou trail map on which Anne Gunn proposed Alternative 4 for the Jay Road is a map of the density of observed caribou trails (not habitat quality), which is not the sole or primary driver for selection of the best route for the Project. In the response to DAR-IEMA-IR-28 it was noted that methods for identifying caribou trails from aerial photographs and later used for trail distribution mapping were not able to distinguish between historic caribou trails and trails that are actively in use. The density of caribou trails is also limited by detectability from aerial photographs and field observations. Dominion Diamond has provided a thorough analysis of road routes (including Alternative 4) that integrates all of the relevant information.

In the first round of Information Requests, IEMA (DAR-IEMA-IR-28) requested that the preferred Jay Road alternative meet a different objective:

*“DDEC should re-evaluate the Jay road options and demonstrate that from a caribou movement perspective that the route selected has the least potential to disturb caribou movement through the project.”*

Dominion Diamond considers this to be a more relevant request than Recommended Measure 1 in IEMA's Technical Report. Disturbance to caribou movement was addressed in DAR Section 12.6.2. The area of the Jay Road is recognized as a historic migration route for the Bathurst caribou herd; the main caribou migration route in the Project area runs northwest-to-southeast towards the Narrows. All alternatives for the Jay Road, including Alternative 4 (the Anne Gunn route), must run in an approximately east-west direction to connect the Misery Road to the Jay Pit. As such, all alternatives for the Jay Road cross the main caribou migration path in the area and traffic on the road will affect caribou similarly under all alternatives. Beyond traffic, the other factor contributing to the barrier effect of the Jay Road is the physical structure of the road. A detailed alternatives analysis was conducted on all Jay Road alternatives (Technical Sessions Undertaking Request Response DAR-MVEIRB-UT-02) and the selected alternative for the Jay Road crosses the least amount of the esker and requires the least amount of road to be constructed with safety berms, which present obstacles to caribou crossing. Alternative 4 also has two very significant downsides. First, it has a steep maximum grade that may not be technically feasible for large payload haul trucks to climb. Reducing haul truck payload would increase the frequency of haul truck traffic, an undesirable outcome. Second, it passes through the Misery Camp, increasing potential concerns for Health and Safety and traffic management. There is no corresponding reduction in risk to caribou that would offset these negative aspects of Alternative 4.

Dominion Diamond has indicated that the main portion of the Jay Road (i.e., roughly between King Pond Dam and the junction with the Jay North Road, a distance of 2.8 kilometres [km]) will be constructed with caribou crossings. However, no caribou crossings will be constructed where raised safety berms are required or where portions of the pipeline will require visual inspection (i.e., joints, valves, vents, and drains). Dominion Diamond will continue to engage with our IBA communities and other people affected by the Project to receive input regarding the design of the caribou crossings for the Jay Road. This input will be incorporated into the final detailed design of the Jay Road. Once roads are constructed, it is anticipated that as part of annual visits of community members to the Ekati Mine and for monitoring the effectiveness of the caribou crossings will be reviewed, and if necessary, modifications can be

implemented. This procedure is currently in place for the Ekati Mine and would be continued for the Project.

The selected alternative for the Jay Road (Alternative 3) is consistent with the minimization of the barrier effect of the Jay Road to caribou movement and migration, a key element of the Caribou Road Mitigation Plan (CRMP) for the Project (Dominion Diamond 2015a), which was informed by substantial engagement with communities.

### **2.1.2.3      *Ecological Disturbance - Additional Mitigation Measures***

The CRMP developed by Dominion Diamond (2015a) describes the mitigation and monitoring for the Jay and Misery roads with respect to caribou. Dominion Diamond hosted two workshops (in May and June 2015) to receive suggestions on earlier versions of the CRMP, and the current version (Dominion Diamond 2015a) includes revisions based on those workshops. Based on the framework of adaptive management, it is important to note that the CRMP will evolve through time. The CRMP is included as an Appendix in the Conceptual Wildlife Effects Monitoring Plan (WEMP) (Dominion Diamond 2015b).

The objectives of the CRMP include:

- avoiding and minimizing (reducing) the risk of caribou and other wildlife mortalities from traffic;
- avoiding and minimizing the barrier effect of the Jay and Misery roads (and other Ekati Mine roads) to caribou movement and migration; and,
- limiting the effect of sensory disturbance from roads and traffic on caribou behaviour.

Dust caused by vehicles driving on roads, mitigation and monitoring of dust is addressed through the Conceptual Air Quality and Emissions Monitoring and Management Plan (AQEMMP) for the Project (Dominion Diamond 2015c). Mitigation to control dust at the Ekati Mine has included watering and applying dust suppressant to the roads. More detail regarding dust mitigation and monitoring can be found in the Ekati Mine Air Quality Management and Monitoring Program (Section 1.3 and 3.5 of ERM [2015]), and the conceptual AQEMMP for the Project (Section 2.4), and Section 4.1.6 of the WEMP.

### **2.1.2.4      *Ecological Disturbance - Esker Crossing***

This Recommended Measure was previously addressed in the response to DAR-IEMA-IR-43.

As noted in the response regarding the Jay Road Route Selection above, the concerns regarding the Jay Road do not arise from loss of habitat (including esker habitat) but from the potential of the road and traffic to function as a barrier to caribou movement, in this case along the esker. Under all road alternatives, the same amount of traffic will cross the esker. In accordance with Worker's Compensation Board of the Northwest Territories (NWT) and Nunavut (WCB NWT and NU) Mine Health and Safety Regulations (1995), for two-way haul traffic, the minimum operating road width is required to be three times the width of the widest truck that will operate on the road. The maximum operating width of the haul traffic that will operate on the Jay Road is anticipated to be 8.3 metres (m), which corresponds to an operating width of 25 m for two-way traffic, and the total base width would be 37.4 m. In particular, due to the short summer construction season, having two-way traffic through the esker crossing is necessary from a traffic management and safety perspective.

For comparison purposes, if the road were to be built as a single lane through the esker, the minimum operating road width would be twice the operating width of the widest truck, which corresponds to 16.6 m, and the total base width of the excavation would be 29.1 m. This would reduce the width of the esker cut by 8.3 m (width of a haul truck), but would not be practical or safe from an operating standpoint.

Furthermore, as described above, the same amount of traffic would be present along the Jay Road.

Tłıchq Elders' advice has also been utilized in the development of the closure and restoration for the plan for the esker, at the completion of the Project. Esker material excavated during construction of the road crossing will be stockpiled and retained for use during closure. During closure, the power line and pipelines along the Jay Road will be removed; once road access to the dike is no longer required, natural drainage patterns around the esker will be re-established, and the natural grades of the esker will be re-established. Stockpiled esker material will be used to dress the re-graded esker.

Research suggests that effects from power lines are minor when compared to active roads (Berger et al. 2000; Reimers et al. 2000, 2007; Vistnes et al. 2008). Qualitative analysis predicted that the presence of the powerlines should result in negligible changes to caribou movements and distribution relative to increased traffic on the Misery and Jay roads; rather it is the potential adverse effects of increased traffic on Misery and Jay roads that are recognized as the focus of concern. Burying the powerline through the esker cut would require substantive extra work to bring the (high-voltage) cables to the ground, encase them in a protective conduit, and elevate them again. The loss of ability for safety inspection on that portion of the high-voltage cables would introduce unnecessary operational and safety risks, for no apparent environmental benefit.

The location where the road crosses the esker has been selected to minimize disturbance by selecting a portion of the esker with a natural depression and where the width of the esker is narrow. The total length of the esker cut is approximately 80 m. Community engagement was conducted to aid in the selection of the most appropriate location to cross the esker. This included visits to the esker. Community members who visited the esker were in general agreement that having the road cross at this location was most appropriate.

### ***2.1.2.5 Further Research on Pre-Development Baseline Conditions***

Pre-development baselines were established and used as the Base Case in the residual effects analyses in the DAR. Available TK from reports helped to provide context for the environmental assessment of wildlife valued components (VCs), identify effects pathways and mitigation, was part of the quantitative analysis of caribou energetics, and the qualitative analysis of the impacts of natural factors such as climate change. A similar approach to that used in DAR Sections 12 and 13 was used to assess the effects of the Project on other VCs throughout the DAR. Local and TK information was integrated into the DAR.

Community/cultural representation of TK in the DAR is dependent on the nature of the information that is publicly available or provided throughout the course of Project engagement, site visits, funded TK projects, and monitoring programs. Some of the information shared by communities includes concerns about impacts of the Project (and other developments in general), and traditional land use, important habitat types to caribou and wildlife, caribou migration routes, and changes in species abundance and distribution. Community concerns are a reflection of the VCs most relevant to the communities and the potential Project impacts of greatest concern. These concerns helped to inform the monitoring, management, mitigation, and Project design presented in the DAR.



The DAR provides a snapshot of available TK and traditional land use information. The anticipated impacts of the Project and determination of significance of those impacts are presented in the context of available TK and traditional land use information. In an effort to continually supplement the existing body of knowledge, Dominion Diamond continues to support long-term monitoring programs and community-based TK projects. One goal of these programs is to support the ongoing collection, documentation, recording, and verification of TK throughout the life of the Ekati Mine. These activities will provide opportunities to integrate TK into the Project (and Ekati Mine) on a continual basis.

## **2.2 Zone of Influence**

### **2.2.1 Recommendation 2**

To better understand and minimize the area and magnitude of the Zone of Influence:

- Regional research program to better understand the Zone of Influence (with Aboriginal involvement). (IEMA (2015) Section 3.0 Measure 2)
- Use of aerial survey data to estimate ZOI distance and Magnitude. (IEMA (2015) Section 3.0 Measure 3)
- Input from Tłıchq Elders be used to develop a caribou monitoring strategy as part of the Developer's Wildlife Management Plan

### **2.2.2 Response 2**

#### **2.2.2.1 Zone of Influence Research**

The Zone of Influence (ZOI) represents a combination of direct (physical footprint) and indirect (noise, dust, viewscape, and other sensory disturbances) effects around the Project that changes the behaviour and occurrence of caribou. A formal research program as proposed would likely not be effective. To identify proportional effects attributable to specific factors (mechanisms) would require an experimental process with the reduction of some but not other factors, a problematic solution when many of the factors have the same cause. Mining activities and traffic along the haul roads each generate noise, dust, light, vibration, and changes to the viewscape simultaneously. These factors are collectively and effectively accounted for through use of a ZOI.

In Recommended Measure 2, Tłıchq recommends a collaboration among mine operators and Government of the Northwest Territories (GNWT). Dominion Diamond does not agree that it is our responsibility to develop such a collaboration of independent research on ZOIs. Such a group already exists (i.e., ZOI Technical Task Group) and ZOI monitoring at the Ekati Mine (inclusive of the Jay Project) will be guided by the recommendations of the ZOI Technical Task Group, which is led by the GNWT, Environment and Natural Resources. This is the appropriate group to provide such recommendations. Dominion Diamond will also consider feedback from communities, monitoring agencies and other people affected by the Project through ongoing engagement activities and participation in wildlife monitoring workshops. Dominion Diamond has partnered with the Canada Centre for Remote Sensing (Natural Resources Canada) on their SMART program on the effects of development on the Bathurst caribou herd, which includes ZOI assessment. Monitoring and mitigation are described in the WEMP (Dominion Diamond 2015b) and the (CRMP) for the Jay Project (Dominion Diamond 2015a). The WEMP and CRMP

are in accordance with the measures on collaboration and ZOI-related actions of Recommendations #7 and #8 of the Government of the Northwest Territories (2015).

### **2.2.2.2 Zone of Influence Aerial Surveys**

To assist in evaluating alternative methods for refining assessments of the Zones of Influence (ZOIs) of developments on barren-ground caribou, Dominion Diamond agrees with the recommendation and will analyze the ZOI distance and magnitude from the 2009 and 2012 aerial survey data as requested and will present the results in its 2015 Wildlife Effects Monitoring Program report. Dominion Diamond will work with the ZOI Technical Task Group to evaluate the survey, analytical methods and results. Dominion Diamond has also partnered with the Canada Centre for Remote Sensing (Natural Resources Canada) on their SMART program on the effects of development on the Bathurst caribou herd, which includes ZOI assessment.

### **2.2.2.3 Input from Tłıchq Elders**

As noted in the WEMP, Dominion Diamond incorporates TK in the monitoring of caribou and welcomes the input of Tłıchq Elders. Elders and holders of TK are regularly invited to site to participate in monitoring programs and to share their knowledge about caribou behaviour, diet, health and body condition, and migration movements. Since 2011, all the community engagement programs have included youth participants, which was recommended in previous meetings. These programs have provided opportunities for Elders to pass on their TK to youth and for youth to provide support to their Elders (Rescan 2011).

## **2.3 TATAÀ - Land Bridges**

### **2.3.1 Recommendation 3**

In order to minimize impacts on caribou migration:

- Developer to conduct a project specific study concerning factors contributing to the distance and magnitude of the ZOI and the subsequent impacts on caribou migration patterns.

### **2.3.2 Response 3**

The ZOI represents a combination of direct (physical footprint) and indirect (noise, dust, viewscape, and other sensory disturbances) effects around the Project that changes the behaviour and occurrence of caribou. A formal research program as proposed would likely not be effective. To identify proportional effects attributable to specific factors (mechanisms) would require an experimental process with the reduction of some but not other factors, a problematic solution when many of the factors have the same cause. Mining activities and traffic along the haul roads each generate noise, dust, light, vibration, and changes to the viewscape simultaneously. These factors are collectively and effectively accounted for through use of a ZOI. As it is derived from data on caribou distribution, the ZOI also reflects effects on migration through the region.

## **2.4 Jay Road Design**

### **2.4.1 Recommendation 4**

In order to minimize impacts from the Jay road to caribou:

- Developer to work with the Tłıchq Government and Tłıchq Elders on siting the location of the Jay road prior to finalization of the design plans.
- Developer to include the Tłıchq in determining caribou road crossing areas.
- Developer to work with Tłıchq Elders to determine the location of the cut- through of the esker.

### **2.4.2 Response 4**

Dominion Diamond continues to be open to having discussions with and receiving input from the Tłıchq Government, Tłıchq Elders, and representatives of other IBA communities. Dominion Diamond recognizes that the area between the Misery Road and Lac du Sauvage is culturally important to IBA communities and for wildlife, and of particular interest for the migration of caribou. Fall caribou migration pathways in the Project area may include movement of animals from the northwest to the southeast to cross at the Narrows (outlet of Lac du Sauvage into Lac de Gras). Dominion Diamond recognizes that traffic on the Jay Road and Misery Road associated with transport of kimberlite from the Jay Pit to the Ekati Mine processing plant is a potential barrier for caribou movement. To reduce this impact, Dominion Diamond have committed to temporarily closing the road(s) (Jay Road and/or Misery Road) to haul vehicles depending on the season and group composition of caribou approaching the roads. The implementation of road closures to reduce impacts to caribou have been specifically detailed in the draft CRMP for the Jay Project (Dominion Diamond 2015a). This plan was developed and a workshop was held with regulators, community representatives, and other parties on June 25, 2016 to discuss the proposed plan and to obtain feedback that was incorporated into a subsequent version of the plan. Changes to the CRMP will occur as monitoring results are analyzed and assessed over time. Mitigation and monitoring efforts related to the CRMP will be documented and analyzed in the Ekati Mine annual Wildlife Effects Monitoring Program (WEMP) report.

At the Ekati Mine, wildlife has the right-of-way, and therefore, if wildlife are on the roadways, vehicles are required to stop, to allow wildlife to move off the road.

Dominion Diamond has sought input and discussed potential road locations for the Project, including options of how and where to cross the esker, from Tłıchq representatives and Tłıchq Elders during:

- Workshop held in Yellowknife in March 2014 as part of the original proposed Jay-Cardinal Project;
- Workshop held in Behchokq in June 2014 presenting the revised Jay only Project. Road alignment options were discussed along with options of how and where to cross the esker (location and cut or fill over the esker);
- Esker Workshop held with Tłıchq Elders at the Ekati site in August 2014. Dominion Diamond provided a helicopter tour of the Project area to provide an overview and Elders visited the proposed Jay Road crossing of the esker. Discussions were held regarding the selection of this location, and at that time, the Elders present did indicate their general agreement with the

selected location being most optimal as it was a natural low area and narrow part of the esker;  
and,

- Workshop and visit to the Ekati Mine to review particle size distribution of granular materials used to construct existing caribou crossings and to discuss materials to be used to construct caribou crossings along the Lynx Road and for the Jay Project.

Note, similar workshops, site visits to the esker and to review materials for the construction of caribou crossings have been held with representatives of other IBA communities as well.

The Alternatives Assessment within the DAR (Section 2) presented and evaluated three potential road alignments. This was further augmented with an evaluation of a fourth road alignment (per the suggestion by Dr. Anne Gunn during the Jay Project Technical Sessions on April 21, 2015) that was presented in the technical session Undertaking response DAR-MVEIRB-UT-02). A single optimal corridor for the road, powerline and three pipelines was sought taking into account various factors:

The following types of information have been considered in the evaluation:

- length of road (shorter road length is positive in terms of economic and environmental factors);
- length of pipeline (shorter length is positive in terms of economic factors);
- length and height of esker crossing;
- area of esker disturbed;
- road grades (flatter route is positive in terms of economic and environmental factors, and results in fewer areas that require berms be constructed along the roadway, and therefore, less of a potential physical barrier to wildlife movement; where berms are required, caribou crossings will not be constructed);
- footprint of the mine and proximity to disturbed areas;
- fragmentation of habitat;
- location of waterbodies, stream, and drainage crossings and potential to affect fish and/or fish habitat;
- proximity to archaeological sites;
- visual impact to the esker;
- ability to reclaim the esker during closure;
- input from the IBA community members during engagement meetings and site visits to the esker conducted during the summer of 2014;
- amount of fill material required for construction;
- caribou migration routes (information gathered from TK, mapped historic caribou trails in 2013 (Map 12.2-5 of the DAR; and Map 4.2-4 of Dominion Diamond [2014a]);
- relation to high, medium, and low historic caribou trail distribution trail mapping;

- closure and reclamation; and,
- diesel fuel usage and associated greenhouse gas emissions.

All four road alternatives are in an approximately east-west direction to connect the Misery Road to the Jay Pit, and as such, each alternative will intersect the main caribou migration path with all caribou migrating through the area to the Narrows needing to cross whatever road alternative is selected. Consequently, each Alternative alignment is predicted to have similar effects on caribou movement due to the same amount of traffic that will operate on the road, irrespective of which alternative is selected.

During the Jay Project Technical Sessions held in April 2015, in numerous responses to various IRs, and as provided in the technical session Undertaking response DAR-MVEIRB-UT-01, Dominion Diamond has indicated that the main portion of the Jay Road (i.e., roughly between King Pond Dam and the junction with the Jay North Road, a distance of 2.8 km) will be constructed with caribou crossings. However, no caribou crossings will be constructed where raised safety berms are required for compliance with WCB NWT and NU Mine Health and Safety Regulations (1995). According to the regulations, safety berms are required where fill thickness exceeds 3 m. Where possible, the roads for the Project will minimize the use of fill material. Fill thickness is based on various factors, including topography, road geometry, and thaw sensitive soils. Approximately 75% of the road alignment is estimated to not require berms. Portions of the pipeline will require visual inspection (i.e., joints, valves, vents, and drains); at these specific locations, caribou crossings will also not be constructed. The pipeline will be strategically designed to reduce the number of locations that cannot be constructed as caribou crossings.

Dominion Diamond will continue to hold discussions and receive input from IBA community members regarding the design of the caribou crossings for the Jay Road. This input will be incorporated into the detailed design of the Jay Road. Once roads are constructed, it is anticipated that as part of annual visits of community members to the Ekati Mine and for wildlife monitoring the effectiveness of the caribou crossings will be reviewed, and if necessary, modifications can be implemented. This procedure is currently in place for the Ekati Mine and would continue for the Project.

## **2.5 Waste Rock Storage Area Location**

### **2.5.1 Recommendation 5**

To minimize impacts from the Waste Rock Storage Area:

- Developer to include Tłıchq Elders in the location and design of all caribou emergency egress ramps, and application of the findings from the Tłıchq Study on eskers.
- Develop a revised Waste Rock and Ore Storage Management Plan and submission to the Wek'eezhii Land and Water Board for approval. (IEMA (2015) Section 5.0 Measure 13)

### **2.5.2 Response 5**

The preliminary design for the waste rock storage area (WRSA) includes three caribou emergency egress ramps, in addition to the primary haul truck access road. These ramps will progressively be built as the pile is developed. Dominion Diamond will seek input from Tłıchq Elders and representatives of other IBA

communities related to the location and design of these ramps, as was indicated in the Round 1 IR response DAR-Tłıchq-IR-29.

Dominion Diamond appreciates the input provided by the Tłıchq Study on eskers and is grateful to the Tłıchq Elders for their participation and for the knowledge they shared and information and opinions provided in the report. Dominion Diamond acknowledges that the interviews and report findings are the property of the Tłıchq. It is recognized that the waste rock pile more closely resembles the rough, irregular, rock and boulder covered type of natural eskers, rather than the smooth, sandy eskers. As such, they are difficult to travel on, and in general, become areas that people and many animals, such as caribou, would naturally avoid. Due to the rocky nature, they are less suitable for the establishment of vegetation. Although caribou are not anticipated to regularly use the rock pile, they may occasionally be present; therefore, the egress ramps will be constructed, to provide multiple routes off the pile for caribou or other wildlife. The rough boulder surface of the rock pile may still provide areas for dens, for wolves and foxes, and burrowing areas for animals, such as, ground squirrels and hares. Dominion Diamond will continue to work with the Tłıchq and other IBA community members on aspects of facility design, construction, monitoring and closure, and to incorporate traditional knowledge.

As part of the future permitting work for the Project (i.e., water licencing) Dominion Diamond will provide a Design Report for the Jay WRSA to the Wek'èezhì Land and Water Board (WLWB). This document will contain:

- relevant information on the design, construction, monitoring and management of the facility, including the egress ramps;
- information on setback distances from the esker and surface water;
- information on the visual inspections, monitoring of instrumentation, and sampling of any seepage/runoff that is identified, consistent with the existing Ekati Mine Waste Rock and Ore Storage Management Plan (WROMP) Vers. 4.1 (Dominion Diamond 2014b); and,
- an adaptive management approach to describe responses to seepage water quality issues, if they were to develop.

As indicated previously, Dominion Diamond plans to extend the existing Ekati Mine WROMP Vers. 4.1 to include the Project WRSA infrastructure. Under the Ekati Mine WROMP, seepage/runoff surveys of all WRSAs and ore stockpiles at the Ekati Mine are conducted twice a year (during spring freshet and again in later summer or fall, before freeze-up), in accordance with the requirement of the Water Licence. The testing of seepage chemistry is designed to detect changes that may affect the receiving environment. The Jay WRSA would be included in these seepage surveys. Seepage monitoring will continue through the operation phase of the project, and for 10 years following the completion of mining of the Jay Pit, until closure objectives are met. The results of the seepage program are reported annually to the WLWB.

A draft conceptual Jay Project amendment to the Ekati Mine WROMP was submitted to the MVEIRB on June 1, 2016 for feedback (Dominion Diamond 2015d), and an engagement workshop was held on June 26, 2015. However, the WROMP is directly regulated under the Ekati Mine Water Licence by the WLWB. Therefore, Dominion Diamond will provide the WLWB with an updated amendment to the WROMP to incorporate the Jay Project during the permitting process and will work with the WLWB on the timing and

details of the submission. The established WLWB processes will also be followed for review and engagement.

## **2.6 Dust**

### **2.6.1 Recommendation 6**

To minimize impacts from mine dust to vegetation important to caribou and Tłıchq:

- Develop a revised Air Quality and Emission Monitoring and Management Plan (AQEMMP) - IEMA (2015) Section 6.0 Measure 14
- In addition to the details provided by IEMA to include in the AQEMMP:
  - The Developer to work with Tłıchq Elders to identify sampling sites and plant species to sample.
  - Include the Tłıchq Government and Tłıchq Elders in development of the plan as a whole and monitoring of critical caribou habitat.

### **2.6.2 Response 6**

The suggestions made by IEMA were first articulated in an engagement workshop on the Air Quality and Emission Monitoring and Management Plan (AQEMMP) in Yellowknife on July 20, 2015, and will be considered in future versions of the document. As described in the Dominion Diamond's July 24, 2015 letter posted to the MVEIRB public registry regarding the Draft Engagement Program for Amendments to the Ekati Mine Wildlife and Air Monitoring and Management Plans to Incorporate the Jay Project, additional engagement on the AQEMMP will occur following the Environmental Assessment approval and prior to construction of the Project.

Dominion Diamond will continue to engage with Tłıchq Government and Tłıchq Elders along with all of the IBA groups on the design and implementation of the air quality programs. As described above, additional engagement on the AQEMMP will occur following the Environmental Assessment approval and prior to construction of the Project.

## **2.7 Tłıchq Access to Caribou**

### **2.7.1 Recommendation 7**

To minimize a degradation of Tłıchq access to caribou and compensate for irreparable losses of access to caribou:

- Compensatory Mitigation Plan for caribou (with the Tłıchq Government collaboratively developing the plan). (IEMA (2015) Section 3.0 Measure 5)

### **2.7.2 Response 7**

This request for a Compensatory Mitigation Plan cites IEMA (2015) Recommended Measure 5. The recommendation from IEMA was that:

*"...DDEC shall prepare a Compensatory Mitigation (Off-Setting) Plan for caribou. The purpose of the Plan is to enhance the ability of the Bathurst caribou herd to recover to its previous*

*abundance as measured through reductions in energy loss, positive changes in calf production and survival. To the extent possible, the Plan should be developed collaboratively with interested parties, and shall be a condition of a land use permit for the Jay Project. The Plan should be prepared and circulated by DDEC to the Wek'eezhii Renewable Resources Board, GNWT and affected Aboriginal governments within one year of the acceptance of the Report of Environmental Assessment and shall be in place before construction commences on the Jay Project.” (IEMA, 2015, p.12)*

Dominion Diamond does not agree that there is a need for offsetting. As presented in the response to the Round 1 information request to DAR-MVEIRB-IR-90 adverse effects from a project should be mitigated following a standard mitigation hierarchy (IFC 2012; BBOP 2015). The hierarchy is, in order of priority:

- avoidance;
- minimization;
- reclamation; and
- offsetting.

Effects that are avoided entirely or are minimized yield a reduction in the residual effects of a Project prior to implementing reclamation or offsetting. The Jay Project will use mitigation to avoid, minimize, and reclaim adverse effects associated with the effects pathways (see WEMP, Appendix D). The results presented in the DAR indicate that there are no significant adverse effects from the Project, and no offset mitigation has been proposed. Further, there is no regulatory requirement, guideline or precedent in the NWT for offsetting residual adverse effects to caribou and other wildlife, and any changes to the parameters of interest to IEMA from offsetting the effects from the Jay Project will not be measurable.

The offsetting plan requested by IEMA is to provide measurable reductions in energy loss and positive changes in calf production and survival. The residual effects from the Jay Project are expected to contribute little to the cumulative effects on barren-ground caribou energy loss, calf production and survival. The incremental decrease in fecundity from the Project is predicted to be 0.3% (Section 12.4.2.3.2 of the DAR). The cumulative effects analysis shows that natural factors (such as population cycles and insect harassment) remain the determining factors in caribou energetics, abundance and distribution. Direct habitat loss from the residual physical footprint of the Jay Project (e.g., Waste Rock Storage Areas) is less than 0.1% of the seasonal ranges of the Bathurst herd. Physical disturbance from previous and existing developments has had little, if any, ecologically measurable influence on the carrying capacity of the seasonal ranges (less than 2% cumulative direct habitat loss). The population modelling completed for MVEIRB-IR-15 (Adequacy Review Item 8.8) demonstrates that the Bathurst herd's ability to increase is dependent on caribou vital rates and is not prevented by cumulative effects of development disturbance.

Importantly, all of the analyses used a precautionary approach to predict maximum effects and manage uncertainty; hence, most ecological effects are likely to be considerably smaller than those presented in the assessment making them less likely to be measurable. The ability to measure change in an ecological effect is determined by natural variance in the parameter of interest, desired confidence level, desired power of the test, effect size, and sample size. The natural variances in calf production and survival are



large and the ecological effect sizes of those parameters associated with the Project are small. No offset mitigation is likely to yield changes that can be confidently and powerfully measured as different from natural variation in energetics, survival, and productivity.

In their Technical Report, IEMA cites the Caribou Mitigation and Monitoring Plan for Peace River Coal's Roman Mine (Stantec 2012). The effect of concern with the Roman Mine is the amount and condition of habitat in the range of a caribou herd where 24% to 27% of seasonal ranges have been affected by development and where linear corridors are 30% above threshold values (Stantec 2012, p. 6). Offsetting for the Roman Mine Project consists of securing habitat against future development and a cash payment for other activities (Stantec 2012, p. 25). Despite assertions by IEMA (2015, p. 11), there is no evidence of success of this offsetting program, only that it has been implemented. The importance of habitat loss in the Roman Mine Project, and the associated ease of measurement of offset habitat create the possibility of offsetting in the Roman Mine example. The importance of habitat loss and ease of measurement are not the case for the Jay Project where the concerns are difficult to measure energetic costs and the related survival and productivity effects of the Project. The Roman Mine is not a good comparison for the Jay Project.

Effective mitigation through avoidance, minimization, and reclamation removes the need for offsetting the effects of the Jay Project.

### 3 REFERENCES

- Adamczewski J, Boulanger J, Croft B, Cluff D, Elkin B, Nishi J, Kelly A, D'Hont A, Nicholson C. 2009. Decline in the Bathurst Caribou Herd 2006-2009: A Technical Evaluation of Field Data and Modeling. DRAFT Technical Report December 2009. Government of the Northwest Territories.
- BBOP (Business and Biodiversity Offset Programme). 2015. Mitigation Hierarchy. Available at: [http://bbop.forest-trends.org/pages/mitigation\\_hierarchy](http://bbop.forest-trends.org/pages/mitigation_hierarchy). Accessed February 4, 2015.
- Berger R, Martinez I, Wisener M. 2000. Analysis of GPS Relocation Data (1995-1999) for the Owl Lake Woodland Caribou – Report to Manitoba Hydro, Manitoba Conservation, Pine Falls Paper Company, Manitoba Model Forest and Time to Respect Earth's Ecosystems. 88 pp + appendices.
- Dominion Diamond (Dominion Diamond Ekati Corporation). 2014a. Jay Project Developer's Assessment Report Sable Addendum. Prepared by Golder Associates Ltd., December 2014. Yellowknife, NWT, Canada.
- Dominion Diamond. 2014b. Jay Project and the Ekati Diamond Mine Waste Rock and Ore Storage Management Plan (WROMP): Version 4.1. Yellowknife, NWT, Canada.
- Dominion Diamond. 2015a. Caribou Road Mitigation Plan for the Jay Project Draft Version 3. Submitted to the Mackenzie Valley Environmental Impact Review Board, Yellowknife, NWT, July 31, 2015.
- Dominion Diamond. 2015b. Conceptual Wildlife Effects Monitoring Plan for the Jay Project Draft Version 2. Submitted to the Mackenzie Valley Environmental Impact Review Board, Yellowknife, NWT, July 31, 2015.
- Dominion Diamond. 2015c. Conceptual Air Quality and Emissions Monitoring and Management Plan for the Jay Project Draft Version 1. Submitted to the Mackenzie Valley Environmental Impact Review Board, Yellowknife, NWT, June 1, 2015. GNWT (Government of the Northwest Territories). 2015. Technical Report, Jay Project, EA1314-01. Submitted to the Mackenzie Valley Environmental Impact Review Board, July 2015. Yellowknife, NWT, Canada.
- Dominion Diamond. 2015d. Ekati Diamond Mine Waste Rock and Ore Storage Management Plan Conceptual Jay Project Amendment. Submitted to the Mackenzie Valley Environmental Impact Review Board, Yellowknife, NWT, June 1, 2015.
- ERM (ERM Consultants Ltd). 2015. Ekati Diamond Mine: 2014 Air Quality Monitoring Program. Prepared for Dominion Diamond Ekati Corporation by ERM Consultants Canada Ltd.: Yellowknife, Northwest Territories.
- IEMA (Independent Environmental Monitoring Agency). 2015. Technical Report, Jay Project, EA1314-001. Submitted to the Mackenzie valley Environmental Impact Review Board, July 2015. Yellowknife, NWT, Canada.
- IFC (International Finance Corporation). 2012. Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. January 12, 2012.



- Reimers E, Dahle B, Eftestøl S, Colman JE, Gaare E. 2007. Effects of a power line on migration and range use of wild reindeer. *Biol Conserv* 134: 484-494.
- Reimers E, Flydal K, Stenseth R. 2000. High Voltage Power Lines and Their Effect on Reindeer: A Research Programme in Progress. *Polar Res*:75-82.
- Rescan (Rescan Environmental Services Ltd.). 2011. Ekati Diamond Mine 2010 Wildlife Effects Monitoring Program. Prepared for BHP Billiton Diamonds Inc., Yellowknife, NWT, Canada.
- Stantec. 2012. Caribou Mitigation and Monitoring Plan. Roman Mine. Prepared for Peace River Coal Inc. 71 pp. July 16, 2012.
- Tłıchq (Tłıchq Government). 2015. Tłıchq Government Intervention - Re: Dominion Diamond Corporation-Jay Project EA1314-001. Submitted to the Mackenzie Valley Environmental Impact Review Board, August 2015. Yellowknife, NWT, Canada.
- Vistnes I, Nellemann C. 2008. The matter of spatial and temporal scales: a review of reindeer and caribou response to human activity. *Polar Biology* 31:399-407.