



**BACK RIVER PROJECT**  
**Responses to 2021 Annual Report Comments**

**August 5, 2022**

# BACK RIVER PROJECT

## Responses to 2021 Annual Report Comments

### Table of Contents

---

Table of Contents .....	i
1. Introduction .....	1
2. Responses to Comments.....	1
2.1 Response to Kitikmeot Inuit Association .....	1
KIA-NIRB-1: Surveys for wildlife prior to construction.....	1
KIA-NIRB-2: Terrestrial Environment -Sensitive Landform Mitigation and Monitoring .....	3
KIA-NIRB-3: Wildlife and Wildlife Habitat -Wildlife Mitigation Measures .....	5
KIA-NIRB-4: Reporting of trends for valued ecosystem components .....	7
KIA-NIRB-5: Incidental wildlife observations .....	9
KIA-NIRB-6: SOP for wildlife (carnivore) interactions and deterrents .....	11
KIA-NIRB-7: Wildlife monitoring with cameras.....	13
KIA-NIRB-8: Caribou collar data analysis and range shifts .....	14
KIA-NIRB-9: Marine mammal monitoring during Project shipping .....	15
KIA-NIRB-10: Aircraft incidental sightings reports .....	17
KIA-NIRB-11: Ecosystem/vegetation losses in 2021 and lack of trend analyses. ....	19
KIA-NIRB-12: Vegetation Monitoring Plan -triggers for adaptive management .....	21
KIA-NIRB-13: Progressive revegetation program and studies .....	22
KIA-NIRB-14: Pre-Construction vs. Construction activities and monitoring .....	23
KIA-NIRB-15: Vegetation monitoring -missing results from planned methods .....	25
KIA-NIRB-16: Vegetation species of conservation concern.....	27
KIA-NIRB-17: Non-native plant species in the Tundra .....	29
KIA-NIRB-18: Lichen monitoring data collection, analysis and discussion .....	30
KIA-NIRB-19: Area of suitable habitat lost for wildlife VECs .....	32
KIA-NIRB-20: Lack of incidental observations of birds by pilots and Project staff .....	34
KIA-NIRB-21: Inconsistent guidelines for aircraft setbacks .....	37
KIA-NIRB-22: Locations of marine mammal and (sea)bird observations .....	38
KIA-NIRB-23: Bird species known or potentially occurring along shipping route .....	41
KIA-NIRB-24: Marine Shipping SOP data forms need space for mitigation.....	43
KIA-NIRB-25: Marine Shipping SOP vs. Shipping Management Guidelines brochure .....	45
KIA-NIRB-26: Wildlife protection measures in OPPP & OPEP .....	47

	KIA-NIRB-27: Waterbird staging areas maps in OPPP & OPEP vs. Fixed-Wing and Helicopter Operations SOP .....	50
	KIA-NIRB-28: Terrestrial Environment -Permafrost Monitoring.....	51
	KIA-NIRB-29: Climate and Meteorology / Greenhouse Gas Reduction Plan .....	53
	KIA-NIRB-30: Climate and Meteorology / Weather Monitoring and Adaptive Management.....	54
	KIA-NIRB-31: Terrestrial Environment / Permafrost Mapping and Monitoring .....	55
	KIA-NIRB-32: Terrestrial Environment / Permafrost Monitoring .....	56
	KIA-NIRB-33: Aquatic Effects Monitoring Plan (AEMP) .....	57
	KIA-NIRB-34: Mine Site Inspection Results. ....	59
	KIA-NIRB-35: Waste Management Plan .....	60
	KIA-NIRB-36: Effluent discharge from TSF .....	61
	KIA-NIRB-37: HADDs .....	62
	KIA-NIRB-38: Outstanding Operational Management and Monitoring Plans .....	63
	KIA-NIRB-39: 2021 monitoring program starts .....	65
	KIA-NIRB-40: Goose Property Groundwater Inflows.....	66
	KIA-NIRB-41: Throughout the Water Management Plan Appendix D is referred to as the Water and Load Balance Report. ....	67
	KIA-NIRB-42: Water consumption from Goose Lake.....	68
	KIA-NIRB-43: Inflows to Primary Pond.....	69
	KIA-NIRB-44: Saline Water Pond storage capacity.....	70
	KIA-NIRB-45: Guidance criteria for general site runoff.....	71
	KIA-NIRB-46: Treatment of water within Llama and Umwelt Lakes. ....	72
	KIA-NIRB-47: Groundwater inflows from active layer or taliks below Llama and Umwelt Lakes. ....	73
	KIA-NIRB-48: Sequence of dewatering of Llama and Umwelt Lakes.....	74
	KIA-NIRB-49(a): Diversion berms around Saline Water Pond (SWP).....	75
	KIA-NIRB-49(b): Runoff water contact with Waste Rock Storage Area.....	76
2.2	Response to Crown-Indigenous Relations and Northern Affairs Canada .....	77
	CIRNAC-#1: Permafrost Mapping and Monitoring .....	77
	References:.....	77
	CIRNAC-#2: Permafrost Monitoring .....	78
	CIRNAC-#3: Sensitive Landform Mitigation and Monitoring .....	79
	CIRNAC-#4: Waste Management Plan.....	80
	CIRNAC-#5: Management Pre-construction, Construction and Operations Standard Operating Procedures (SOP) .....	81
	CIRNAC-#6: Hydrogeology and Groundwater Quantity and Quality - Geotechnical Characterization Program .....	82
	CIRNAC-#7: Hydrological Features and Hydrogeology -Thermal Monitoring.....	83
	CIRNAC-#8: Aquatic Effects Monitoring Plan .....	85
	CIRNAC-#9: Vegetation Monitoring Plan .....	86
	CIRNAC-#10: Revegetation and Reclamation.....	87

	CIRNAC-#11: Marine Environment - General .....	88
	CIRNAC-#12: Spills .....	90
	CIRNAC-#13: Tailings Management Plan .....	91
	CIRNAC-#14: Tailings Management Plan - Seepage Risks .....	92
	CIRNAC-#15: Tailings Management Plan - Tailings Deposition Timelines, Management of Parameters of Concern and Wildlife Entrapment in Reflooded Pits .....	93
	CIRNAC-#16: Tailings Management Plan - Discharge Water Quality Objectives .....	94
	CIRNAC-#17: Definition of a Project Production Decision .....	95
	CIRNAC-#18: Transferrable Skills and Certification .....	97
	CIRNAC-#19: Consultation with Outfitting and Guiding Businesses .....	99
2.3	Response to Government of Nunavut .....	101
	GN AR-#01: Dust Generation and Suppression .....	101
	GN AR-#02: Spills / Unauthorized Discharges .....	102
	GN AR-#03: Transportation and Storage of Fuel .....	103
	GN AR-#04: Inconsistent use of Caribou Management System Mitigation .....	104
	GN AR-#05: Inconsistency in Reporting on Blasting Activities .....	105
	GN AR-#06: Standard Operating Procedure for Waste Management .....	106
	GN AR-#XX: Wildlife Safety Site Audit Report .....	107
	GN AR-#07: Helicopter Flights and Tracking .....	109
	GN AR-#08: Vegetation Monitoring .....	111
2.4	Response to Transport Canada .....	112
	TC-1: Marine Safety and Security .....	112
	TC-2: Navigation Protection .....	113
	TC-3: Transportation of Dangerous Goods .....	114
2.5	Response to Fisheries and Oceans Canada .....	115
	DFO-1: .....	115
	DFO-2: .....	116
	DFO-3: .....	117
	DFO-4: .....	118
	DFO-5: .....	119
	DFO-6: .....	121
	DFO-7: Compliance Monitoring .....	122
2.6	Response to Environment and Climate Change Canada .....	123
	ECCC-1: Air Quality .....	123
	ECCC-2: Climate and Meteorology .....	124

**FIGURES**

Figure 1: Setback Distance for the Overpressure Guideline (50kPA) to Protect Fish.....	40
Figure 2: Setback Distance for the Peak Particle Velocity Guideline (13mm/s) to Protect Fish Habitat .....	120

**APPENDICES**

**Appendix A**

On Site Monitoring Wildlife Deterrence

**Appendix B**

Interim Closure and Reclamation Plan - Appendix E

**Appendix C**

On Site Monitoring Preblasting Surveys

# 1. Introduction

---

Sabina Gold & Silver Corp. (Sabina), submitted its 2021 Annual Report to the Nunavut Impact Review Board (NIRB) on 4 April 2022, as required by the Back River Gold Mine Project Certificate No. 007. Interested Parties were then requested by the NIRB to provide comments on the 2021 Annual Report

On or 30 June 2022, the NIRB received comments from the following interested parties:

- Kitikmeot Inuit Association (KIA) = 49 comments
- Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) = 19 comments
- Government of Nunavut (GN) = 9 comments
- Environment and Climate Change Canada = 2 comment
- Fisheries and Oceans Canada (DFO) = 7 comments
- Transport Canada (TC) = 3 comments

Section 2 provides responses to the comments received.

## 2. Responses to Comments

---

### 2.1 RESPONSE TO KITIKMEOT INUIT ASSOCIATION

#### KIA-NIRB-1: Surveys for wildlife prior to construction

##### References:

Sabina, Back River Project 2021 Annual Report (March 31, 2022)

Project Certificate Condition No. 45• Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022)

##### Summary:

Project Condition 45 of the Project Certificate 007 states that “The proponent shall ensure that safety barriers, berms, and designed crossings associated with project infrastructure, including site roads and the winter ice road, are constructed as necessary to allow for the safe passage of caribou and other terrestrial wildlife and do not interfere with wildlife denning sites” However, there is not any discussion of the measures taken with regards to wildlife crossings or denning sites for the construction of site infrastructure in 2021.

##### Detailed Review Comment

Within the 2021 Annual Report, pages 4-91 and 4-92, Sabina describes their compliance activity in 2018-2020 as it pertains to the winter ice road (WIR), including surveys for denning sites prior to road construction and comparing caribou movement via collar data during 2019, when the WIR was constructed, to 2017 and 2018 collar data, when a WIR was not constructed. Sabina then states that the WIR was not constructed in 2021, concluding their statement. However, there is no discussion of surveys undertaken for expansion of the road network to the northwest of the Goose site, which according to Sabina in the Annual Report (page 3-1, and Appendix F Figure 3.2-1) includes watercourse crossings. There is no discussion of potential denning sites or safe wildlife crossings in the footprint of 2021 construction of project infrastructure.

##### Recommendation/Request:

The KIA requests the following:

- Please describe the efforts undertaken to avoid, mitigate, restore, or offset effects of 2021 construction on wildlife and wildlife denning sites.
- Please clarify whether wildlife surveys (including caribou collar monitoring and den surveys) were conducted prior to road network expansion at the Goose site or provide rationale as to why surveys were not needed.
- If no wildlife surveys were conducted, please explain how the road network expansion was constructed to allow for the safe passage of caribou and other terrestrial wildlife, and to avoid interfering with wildlife denning sites.

**Importance of Issue:**

Low

**Sabina Response:**

During 2020, a section of single-lane road was installed to connect the Goose Camp with the Portal at the head of Goose Lake. Mitigation for wildlife included:

- The road was installed during winter to protect the permafrost. This timing is outside of the sensitive period for most wildlife species such as birds and caribou.
- Habitat suitability modeling for denning grizzly bear indicates that the road route represents Nil quality denning habitat, without features that typically support denning such as eskers or riverbank vegetation.
- The closest wolverine den is located in the goose neck and the road does not interact with the den.
- Mitigation to allow wildlife to cross the road include the low height of the road (less than 1 m in most areas) and road-side slope of 3:1 or higher to allow wildlife to cross. The Wildlife Mitigation and Monitoring Program Plan (WMMP Plan, Version 10, 2019) indicates that crossing structures may be installed at locations identified by Inuit Elders. Sabina intends to conduct a site visit by the Inuit Advisory Committee and has initiated preliminary discussion with the KIA regarding this.



## KIA-NIRB-2: Terrestrial Environment -Sensitive Landform Mitigation and Monitoring

### References:

Sabina, Back River Project, 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 13  
 Sabina, Back River Project, 2020 Annual Report (March 31, 2021)•Project Certificate Condition No. 13

### Summary:

Project Condition 13 of the Project Certificate 007 states that “Proponent shall undertake additional geotechnical investigations as required to identify sensitive landforms, modify engineering design for project infrastructure (e.g., tailings storage facilities, waste rock piles, and landfill), and develop and implement mitigation and monitoring measures to prevent or minimize the impacts of the Project’s activities and infrastructure on sensitive landforms. Plans for the investigations, mitigation, and monitoring measures are to be included within appropriate management plans.”

Reporting requirements for Project Condition 13 of the Project Certificate 007 states that “During construction, the Proponent shall, on an annual basis, provide information regarding the results of additional geotechnical investigations undertaken and any associated mitigation and monitoring measures implemented by the Proponent in the Proponent’s annual report to the Nunavut Impact Review Board.” However, there is not any discussion of the results of identifying sensitive landforms, modifying engineering design for project infrastructure, or development / implementation of mitigation or monitoring measures regarding the impacts of project activities and development on sensitive landforms.

### Detailed Review Comment

Within Sabina’s 2020 Annual Report, page 4-31, Sabina makes the statement, “Sabina is required to have an annual geotechnical inspection completed by a Geotechnical Engineer of all major earthworks, between July and September. The inspection must be conducted in accordance with the Canadian Dam Safety Guidelines where applicable. This is a requirement of the Back River Project Type A Water License 2AM-BRP1831 (Part I, Item 10). “Sabina will be completing this annual geotechnical inspection in 2021.”

In Sabina’s 2021 Annual Report for Project Condition 13 (page 4-34), Sabina states that the inspection was completed in 2021. The results of the geotechnical inspection are not a part of Sabina’s 2020 or 2021 Annual Reports to the NIRB, nor is there a discussion of results, monitoring, or mitigation measures. According to statements by Sabina as noted above, geotechnical inspections appear to be limited to major earthworks. However, it is not clear as to the definition of “major earthworks.” Project infrastructure is likely not exclusive to major earthworks, and PC 13 applies to identifying sensitive landforms prior to construction as well as monitoring project impacts on sensitive landforms. Sabina has not reported results of monitoring sensitive landform conditions for any Project infrastructure. If geotechnical inspections are limited to major earthworks, there must be other monitoring techniques in place for other aspects of project infrastructure.

In addition, Sabina’s 2021 Annual Report (page 4-34) includes the statement “Currently, Sabina has not constructed any waste or waste managed infrastructure where permafrost monitoring thermistors can be installed to assess thermal conditions,” and further discussion of thermal monitoring. However, Project Condition 13 applies to all sensitive landforms, not exclusively permafrost. There is no discussion of monitoring or mitigation for non-permafrost sensitive landforms.

**Recommendation/Request:**

The KIA requests the following:

- Please provide the results of the geotechnical inspection(s), including how the inspection relates to fulfilling PCs 11-13 and specifically to sensitive landforms, along with the results of monitoring and identifying mitigation measures.
- Please describe investigations, monitoring, and mitigation for non-permafrost sensitive landforms relative to all project infrastructure.

**Importance of Issue:**

Moderate

**Sabina Response:**

- a) It is a direct requirement of the NWB Water Licence to provide the third party geotechnical inspections in the NWB annual report; it is not a direct requirement of the NIRB Project Certificate. The KIA reviews the NWB annual report and subsequently the third party geotechnical inspection report, therefore Sabina does not feel it is necessary to include it within the NIRB annual report.
- b) Sabina has not constructed the waste rock storage areas and their landfills, or the tailings storage facility as outlined in Project Certificate Term and Condition No. 13.
- c) The FEIS identified several non-permafrost sensitive landforms, including cliffs, eskers, bedrock-lichen outcrops, riparian ecosystems, wetlands and marine beaches. Mitigation for sensitive landforms was conducted as part of project design to avoid these features where possible. Furthermore, and in advance of construction, Sabina surveys the immediate construction front for non-sensitive landforms because they are not areas suitable for construction; i.e., placing an aggregate pad in a low-lying wet area is not conducive to establishing a structurally sound foundation that will allow permafrost to aggrade back up into the pad. For example, at the MLA, Sabina completed this survey in advance of construction and ultimately decided to shift the location of the accommodation complex as it was originally located in a low-lying wet riparian area. This information was relayed to KIA and other stakeholders in advance of completing the relocation. Other non-permafrost sensitive landforms such as eskers, cliffs, wetlands, etc. within our Project Development Area have been identified during EA baseline surveys, are extremely limited within the Potential Development Area, and will be avoided by Project design. Monitoring for the area of habitat loss each is reported in the WMMP Plan (2019).

**KIA-NIRB-3: Wildlife and Wildlife Habitat -Wildlife Mitigation Measures****References:**

Sabina, Back River Project, 2021 Annual Report (March 31, 2022)• Project Certificate Condition No. 48• Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022)o Appendix 5C. Wildlife Safety Site Audit Report, August 2021 (March 2022)o Appendix 5D. Waste Management SOP -Pre-Construction, Construction, and Operations: ENVIRO-08 (Version C.1, 14 March 2022)

**Summary:**

Project Condition 48 of the Project Certificate 007 states that “The Proponent shall develop and implement mitigation measures and monitoring programs to limit the attraction of predators and scavengers to project facilities, and to limit impacts from specific project activities.”

Reporting Requirements for Project Condition 48 of Project Certificate 007 states that “Information regarding mitigation measures implemented and / or updated by the Proponent in fulfillment of this Term and Condition shall be included in Wildlife Mitigation and Monitoring Program Plan (WMMPP) and in the Proponent’s annual report to the Nunavut Impact Review Board.”

However, mitigation measures implemented after deficiencies were found during a 2021 site audit have not been reported.

**Detailed Review Comment**

The Waste Management SOP includes preventative measures to, “...prevent wildlife from becoming food conditioned and habituated to the site”(page 3, Appendix 5D of Appendix F of the Back River 2021 Annual Report). These preventative measures include:• No littering (page 3 of Appendix 5D of Appendix F of the Back River 2021 Annual Report)• Bear-proof containers must be tightly secured at all times (page 3 of Appendix 5D of Appendix F of the Back River 2021 Annual Report)• Buildings and facilities are designed to exclude wildlife, with skirting under the building, screens over vents and doors sufficient to exclude inquisitive wildlife (Page 4 of Appendix 5D of Appendix F of the Back River 2021 Annual Report)•If wildlife is able to access buildings through damaged skirting, then skirting will be repaired immediately (Page 4 of Appendix 5D of Appendix F of the Back River 2021 Annual Report)In addition, the Waste Management SOP also includes waste storage requirements for project-generated waste (page 5 of Appendix 5D of Appendix F of the Back River 2021 Annual Report), including:•All food-related or food-contaminated waste must be stored indoors.

The Waste Management SOP also includes a section on waste management audits and reporting:

- The Environment department will report the incidental wildlife observations, wildlife-waste interactions, and any implemented mitigation in the annual Wildlife Mitigation and Monitoring Program (WMMP) report (page 10 of Appendix 5D of Appendix F of the Back River 2021 Annual Report).

In August of 2021, a safety site audit revealed several potential wildlife attractants, including:

- Several buildings with missing or damaged skirting
- Food items left unattended outside after meals

## RESPONSES TO 2021 ANNUAL REPORT COMMENTS

- Doors propped open and/or unable to close (Appendix 5C. Wildlife Safety Site Audit Report, August 2021 (part of Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Plan of Back River Project 2021 Annual Report))

The results of this site safety audit were briefly discussed in the WMMPP report (page 5-10), but responses to the deficiencies and mitigation measures to prevent recurrence of deficiencies have not been reported.

### **Recommendation/Request:**

The KIA requests the following:

- Please provide description of mitigation measures taken in response to the deficiencies found during the 2021 site audit report, including measures to prevent recurrence of deficiencies.
- Please clarify if the recommendations in the Wildlife Safety Audit Report were implemented.

### **Importance of Issue:**

Low

### **Sabina Response:**

In response to the camp audit conducted in August 2021, the Sabina environment lead met with camp managers to discuss the results of the audit. The primary take-aways of the audit is that the camp is very clean and well-managed, but that there is always an area for improvement. The missing skirting was added to a maintenance task and was updated in summer 2022. Camp personnel were praised for the clean status of the camp, and reminded about leaving doors open and the importance of not leaving food scraps or garbage outdoors. Onboarding training and refresher training is supplied to all personnel as they enter camp and reminders are provided about not feeding wildlife and leaving doors open.

**KIA-NIRB-4: Reporting of trends for valued ecosystem components****References:**

Sabina, Back River Project, 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 50  
 Sabina, Back River Project, 2020 Annual Report (March 31, 2021)•Project Certificate Condition No. 50  
 Sabina, Back River Project, 2019 Annual Report (March 31, 2020)•Project Certificate Condition No. 50  
 Sabina, Back River Project 2018 Annual Report (April 30, 2019)•Project Certificate Condition No. 50  
 Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 10), October 2019

**Summary:**

Project Condition 50 of the Project Certificate 007 states, in part, that “Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes:

- a) An examination for trends in the measured natural variability of Valued Ecosystem Components in the region relative to the baseline reporting...”

Reporting requirements for Project Condition 50 of the Project Condition 50 states that “Information regarding the Proponent’s efforts in fulfillment of this Term and Condition shall be included in the Proponent’s annual report to the Nunavut Impact Review Board.” However, there is incomplete discussion of trends for Valued Ecosystem Components (VECs).

**Detailed Review Comment**

In the 2021 Annual Report for PC 50, Sabina included the statement, “Sabina is developing an initial Pre-Construction Wildlife Effects Monitoring Report to report on the pre-construction activities conducted in 2018”(page 4-99). This statement is repeated verbatim in the 2020 Annual Report section for PC 50 (Page 4-90). This may be an editing error, as there is no reason that the 2018 report should still be in development. Upon further inspection, this statement also appears verbatim in the 2019 Annual Report (page 4-82) and the 2018 Annual Report (Page 4-78). However, a more concerning repeated statement between the 2018, 2019, 2020, and 2021 annual reports occurs under the heading “Trends:”

“Not Applicable. This is the first year of monitoring”(page 4-100, Back River Project 2021 Annual Report; page 4-91, Back River Project 2020 Annual Report; page 4-83, Back River Project 2019 Annual Report; page 4-79, Back River Project 2018 Annual Report).As it is unlikely that the first year of wildlife monitoring occurred in 2018, 2019, 2020, and 2021, this statement may also be an editing/copy and paste error between reports. However, since it is also unlikely that 2021 is the first year of monitoring given statements in previous Annual Reports, then an analysis and discussion of trends is appropriate. With regards to reporting trends, the 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report includes a presentation of habitat loss due to project activities prior to 2021 and in 2021, a discussion of the differences in number of caribou sightings by season from 2018-2021, and wildlife mortalities from 2018-2021. There is no presentation of trends information for other VECs.

**Recommendation/Request:**

The KIA requests the following:

- Please provide an analysis of trends as required by this Project Condition. Valued Ecosystem Components (VECs) include caribou, grizzly bear, muskox, wolverine / furbearers, migratory birds (waterbirds, upland birds), raptors (e.g., falcons, eagles, hawks, ravens, and owls), seabirds and seaducks, and marine mammals (Back River Project Wildlife Mitigation and Monitoring Program Plan (Version 10), page 2-1).

- If Sabina believes that there are currently insufficient data to analyze trends, please clarify the number of years of data collection necessary to analyze trends as well as a discussion of how adaptive management will proceed if trends cannot be analyzed.

**Importance of Issue:**

High

**Sabina Response:**

Sabina believes that there are currently insufficient data to analyze trends for specific Wildlife VECs at this time. Sabina is currently in pre-construction, thus the wildlife effects monitoring program for pre-construction follows Tables 6.2-1 and 6.2-2 in the WMMP Plan. In order to analyze trends for wildlife VECs, a minimum of three years of local species specific monitoring data would be required. Table 6.2-2 (“Overview of Proposed Focal Species Monitoring Programs to Test Predictions of FEIS”) in the WMMP Plan summarize what programs are applicable during the various phases of the project. All focal species surveys were completed during the baseline phase of the Back River Project. Species specific monitoring will commence for the Site-prep/Construction phase when construction is scheduled to begin.

**KIA-NIRB-5: Incidental wildlife observations****References:**

Sabina, Back River Project, 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 49•Project Certificate Condition No. 43•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Appendix 4A. Incidental Caribou Observations, 2021

**Summary:**

Project Condition 49 of the Project Certificate 007 states, in part, that “The Proponent shall report to the Nunavut Impact Review Board (NIRB) regarding its terrestrial wildlife monitoring efforts, with inclusion of the following information: a....b....c. A detailed presentation and analysis of the distribution relative to Project infrastructure and activities for caribou and other terrestrial mammals observed during surveys and incidental sightings... “

However, detailed presentation of the locations of incidental wildlife sightings has not been provided.

**Detailed Review Comment**

In Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report, part of the Back River Project 2021 Annual Report, Sabina describes incidental sightings (or lack thereof) of caribou (page 5-15), other terrestrial wildlife (page 5-16), birds (page 6-2), marine mammals (pages 7-2 and 7-11), and seabirds (pages 7-7 and 7-8). In the terrestrial mammal sections, Sabina also refers to several specific places within the Goose site or Marine Laydown Area (MLA), such as Plant Site Pad (where blasting occurred in 2021, page 5-6), accommodation buildings and “the pond near the drilling laydown (page 5-10), and the George exploration camp (page 1-1). From the report, and the maps and included information, it is frequently not clear where incidental wildlife sightings occurred in the Goose area, and it is not clear if any incidental wildlife sightings occurred at the George site.

Specifically, in the 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report, there are summary tables of caribou (Table 5.7-2, page 5-15) and other terrestrial animal (Table 5.7-4, page 5-16) observations over the course of 2021. The caribou table includes seasons when the observations were made, but the other terrestrial mammal table does not include dates. Both tables and the accompanying discussion include “Goose” site as the location where the observation occurred. More details regarding locations of caribou sightings are included in Appendix 4A to the 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report. It would be helpful to provide terrestrial animal sightings in map form to help determine if areas of the project or certain infrastructure have more frequent wildlife sightings. In the marine mammal section, there is a map depicting the locations where different species of marine wildlife were spotted during shipping in 2021 (Figure 7.1-3: Incidental Marine Mammal Observations During Shipping, August and September 2021, part of Appendix F. of the Back River Project 2021 Annual Report). This type of map could be prepared to show the incidental sightings of terrestrial wildlife from workers, aircraft pilots, vehicles, etc. to consolidate all sightings, color-coded by species and year. In addition, a fine-scale map of the MLA, Goose site, and other future project sites, showing buildings and other project infrastructure, would show areas of human use that may be inadvertently serving as animal attractants and would meet the terms of PC 49. In addition, the incidental caribou observations report (Appendix 4A to Appendix F. of the Back River Project 2021 Annual report, no page number) includes 10 dated and one undated observations of caribou, all stated as occurring at Goose site. However, in the Performance on Ecosystemic Terms and Conditions section, in regard to Project Certificate Condition No. 43, Sabina states, “During 2021, a lone male caribou continued to be observed at the MLA (page 4-89).” This suggests that the incidental observations tables may not be complete as to observations occurring at the MLA or other Project sites.

**Recommendation/Request:**

The KIA requests the following:

- Please prepare a map to provide a clear detailed distribution of terrestrial wildlife sightings in relation to project infrastructure and activities.
- Please ensure that all incidental observations of caribou and other wildlife are included in the annual report.
- Please explain why the observation of a lone male caribou at the MLA reported on page 4-89 was not included in the WMMPP report.

**Importance of Issue:**

Low

**Sabina Response:**

- a) Sabina is unable to provide a map of incidental sightings, as coordinates were not recorded for each incidental sighting. Rather a description of the location of the sightings was provided, as included in the report. Sabina will encourage employees to record coordinates of sightings when possible.
- b) Sabina confirmed that all incidental sightings, with the exception of the lone male caribou, were all included.
- c) The lone male caribou observed at the MLA was the habituated caribou that has been observed on site regularly over the years. Because this caribou is consistently at the MLA, it is not regularly recorded on the incidental sheets. In future WMMP reports Sabina will ensure that information regarding the lone habituated caribou on site is included (such as range of dates it's present on site, etc.). Sabina did contact the KIA and the GN in 2021 regarding the caribou's regularly presence.



**KIA-NIRB-6: SOP for wildlife (carnivore) interactions and deterrents****References:**

Sabina, Back River Project, 2021 Annual Report (March 31, 2022) •Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022)•Project Certificate Condition No. 48 Sabina, Back River Project, Responses to 2020 Annual Report Comments (July 6, 2021) •Response to Kitikmeot Inuit Association, KIA-21

**Summary:**

KIA has previously requested the inclusion of the Wildlife Interaction and Deterrent SOP in response to the Back River 2019 Pre-Construction Wildlife Mitigation and Monitoring Program Report, and again in response to the Back River Project 2020 Pre-Construction Wildlife Mitigation and Monitoring Program Report (Version B.1), However, this SOP has not been provided.

**Detailed Review Comment**

The 2019, 2020, and 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Reports did not include the SOP for Wildlife Interaction and Deterrents. The KIA made the initial request for this SOP in response to the Back River Project 2019 Annual Report because this SOP was used in response to an observed grizzly sow and two cubs near the MLA quarry and camp. In the Back River Project Responses to 2020 Annual Report Comments, Sabina responded to this comment and request (KIA-21, page 24), “Sabina will include the SOP for carnivore interactions and deterrents in future annual reports.”

A similar sighting of a grizzly sow and two cubs was repeated near the Goose site in 2021 (Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report, part of the Back River Project 2021 Annual Report, page 5-16). In addition, one wolverine was reported within the camp perimeter in 2021 (it is unclear from the report if the sighting was in the Goose or MLA site), and that this wolverine had to be deterred from the site (Back River Project 2021 Annual Report, page 4-96). If carnivores are in proximity to the site and being deterred, then reviewing this SOP is imperative.

In Appendix 5E: Incidental Terrestrial Mammal Observations, 2021, there is a report of a wolverine at Goose site “on shore between medic and kitchen,” and that it was “scared off.” It is unclear if this the same wolverine reported as within the camp perimeter on page 4-96. In addition, it is not reported how the wolverine was “scared off,” if it required human actions, and if personnel followed the SOP.

Due to the repeated sightings of carnivores in proximity to both Goose site and MLA, this SOP remains highly relevant for future years into construction, operations, and subsequent phases. The KIA would like to review procedures followed for deterrence, prevention, and responses to wildlife interactions.

**Recommendation/Request:**

The KIA requests the following:

- Please provide the SOP for wildlife (carnivore) interactions and deterrents as requested previously and acknowledged.
- Please provide a discussion regarding the wolverine detected on 19 December 2021 that was “scared off,” including whether methods used for deterrence followed the SOP, still yet to be provided.

**Importance of Issue:**

Moderate

**Sabina Response:**

The Wildlife Deterrence for Environmental Staff SOP is included as Appendix A

Observations of a wolverine at the Goose Camp have been ongoing for almost a decade. A wolverine has dened at roughly the same location on the shore of Goose Lake, approximately 2.5 km from the camp in most winters and the wolverine passes camp relatively frequently. Observations of wolverine in or near camp follow the Management Response to Grizzly Bears, Wolverine and Wolves listed in the Wildlife Deterrence SOP, with a warning call on the radio, followed by hazing using bear bangers or helicopter if required.

**KIA-NIRB-7: Wildlife monitoring with cameras****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022)•Project Certificate Condition No. 49 Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 10), October 2019

**Summary:**

Project Condition 49 of the Project Certificate 007 states, in part, that “The Proponent shall report to the Nunavut Impact Review Board (NIRB) regarding its terrestrial wildlife monitoring efforts, with inclusion of the following information: a. Description of all updates to terrestrial wildlife baseline data;b....c.....d. Results of the annual monitoring programs, including methodologies and statistical approaches used to support conclusions drawn.”

However, there is no discussion of the results of the pre-construction ongoing camera monitoring program.

**Detailed Review Comment**

According to the Back River Project Wildlife Mitigation and Monitoring Program Plan (Version 10) (Table 6.2-1, pages 6-6 to 6-8), the Pre-Construction phase of the project includes ongoing on-site camera monitoring to track caribou, grizzly bear, and muskox. Appendix 2A to Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report, part of the Back River Project 2021 Annual Report, states that the Pre-Construction phase of the project includes ongoing on-site camera monitoring to track caribou and muskox interactions with Project infrastructure. However, there is no discussion of camera deployment, data collection, discussion of results, or analysis. The KIA also notes that Appendix 2A does not include the complete wildlife monitoring table as presented in Table 6.2- 1 of the WMMP. Appendix 2A only presents the first page that includes the monitoring program for caribou and some components for muskox.

**Recommendation/Request:**

The KIA requests the following:

- Please provide a discussion of the ongoing camera monitoring program, including mitigation and management activities undertaken in response to the findings of the camera monitoring program.
- For ease of reference, please include the full overview table of wildlife monitoring programs that trigger management actions as an appendix in future WMMP reports.

**Importance of Issue:**

Low

**Sabina Response:**

- Sabina has placed cameras for monitoring at site in 2022. Results from this monitoring program will be presented in the 2022 Annual Report.
- Sabina will consider including the full overview table of wildlife monitoring programs from the WMMP Plan as an appendix in the annual report.

## **KIA-NIRB-8: Caribou collar data analysis and range shifts**

### **References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022)•Project Certificate Condition No. 50 Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 10), October 2019

### **Summary:**

Project Condition 50 of the Project Certificate 007 states, in part, that “Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes: a. An examination for trends in the measured natural variability of Valued Ecosystem Components in the region relative to the baseline reporting...”

However, possible variability in space use and/or range shifts for caribou have not been fully explored.

### **Detailed Review Comment**

Appendix F (2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report) to the Back River Project 2021 Annual Report discusses an attempted aerial survey for caribou at the Nose Lake -Contwoyo Lake area in August 2021 (pages 5-11 to 5-13; Figure 5.6-1). The survey crew was unsuccessful, as the majority of caribou had left the survey area by 14 August (page 5-12). The report includes the statement, “Inuit land-users familiar with harvesting at Contwoyo Lake suggested that this southerly movement was atypical, since historically late August has been a good time to harvest caribou at that lake.”

This Traditional Knowledge suggests that caribou range shifted, at least temporally.

According to the Back River Project Wildlife Mitigation and Monitoring Program Plan (Version 10), “Ongoing monitoring for caribou will include re-analyzing collar data each year to investigate if a shift in seasonal distribution is occurring”(page 7-12). As there have now been several years of on-site monitoring, analysis of the collar data could reveal critical information about temporal changes in distribution and space use of caribou herds in proximity to the Back River Project.

### **Recommendation/Request:**

Please report the results of re-analysis of collar data with a discussion of any potential temporal or spatial range shifts.

### **Importance of Issue:**

Moderate

### **Sabina Response:**

Sabina will complete a re-analysis of collar data, with a discussion of any potential temporal or spatial range shifts, commencing in 2023.

**KIA-NIRB-9: Marine mammal monitoring during Project shipping****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Appendix 7A. Marine Shipping SOP - Wildlife Mitigation and Monitoring: ENVIRO-02 (Version E.1, 18 March 2022)•Project Certificate Condition No. 64 Sabina, Back River Project, Responses to 2020 Annual Report Comments (July 6, 2021)•Response to Kitikmeot Inuit Association, KIA-24•Response to Kitikmeot Inuit Association, KIA-22Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 10), October 2019

**Summary:**

Project Condition 64 of the Project Certificate 007 states, “The Proponent shall ensure that shipping companies contracted for the Project have in place appropriate ship-based marine mammal monitoring programs and protocols developed through consultation with Fisheries and Oceans Canada, communities, and other interested parties. Consideration should be provided for utilizing trained observers for full-time marine monitoring with established data collection and recording protocols.”

However, some shipping trips did not include monitoring.

**Detailed Review Comment**

Appendix F (2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report) to the Back River Project 2021 Annual Report reports details on the marine mammal surveys conducted during the 2021 shipping seasons (Section 7, pages 7-1 to 7-11). This report outlines that mammals and seabirds were recorded by crew members on vessels travelling on the eastern shipping route, but that, “(t)hree additional sailings occurred in September 2021 along the western shipping route travelling from Hay River through Tuktoyaktuk and to the MLA; no surveys were conducted during these three sailings in 2021” (page 7-1).

The KIA notes that Section 13.2.2.3 and 14.2.2 of the 2019 WMMPP states that marine bird and marine mammal monitoring “will be conducted by all Project ships in each Project stage when shipping is occurring, including Construction, Operations, Care and Maintenance, and Reclamation/Closure.”

While the Pre-Construction phase is not listed (or defined), it is still Project-related shipping and thus marine wildlife monitoring needs to be conducted as planned and as part of Sabina’s commitments for PC Conditions No. 58 and 64. Sabina indicated in their response to a previous technical comment that, in lieu of hiring a dedicated marine monitor, they committed to using the vessels’ bridge crew to conduct wildlife monitoring, and that the size of tugs used for transit precluded inclusion of additional personnel to be housed and work on the vessel (Back River Project Responses to 2020 Annual Report Comments, page 27). The SOP states that dedicated marine mammal and seabird surveys should occur, “for a dedicated 30-minute survey period, two to four times per day...”

As stated in 2019 and reiterated in 2020, there may be a need for a contingency plan if it is not feasible for regular bridge staff to perform wildlife monitoring for the required amount of time. Consideration also needs to occur regarding how absence of surveys will be accounted for analytically, and if it will affect data analysis.

In addition, we note that within the Marine Shipping SOP, Figure 2.1-1: Sensitive Habitat and Setbacks for Seabirds and Seaducks along the Shipping Route (page 5) and Figure 2.1-2: Sensitive Habitat for Marine Mammals along the Shipping Route (page 6) depict primarily the eastern shipping route, and the majority of the western shipping route as depicted in the 2021 Pre-Construction Wildlife Mitigation and Monitoring

Program Report (Figure 7.1-1: The Kelly Ovayuak and Henry Christoffersen Vessel Shipping Route between Hay River and the Marine Laydown Area, September 2021, page 7-3) is not included in the SOP. Is it possible that the SOP was not properly emphasized for vessels on the western shipping route, or gives the impression that only the areas within the map boundaries should be surveyed? The KIA recognizes the jurisdictional limitations of the NIRB to Nunavut that may have fed into the mapping decisions. However, adding sites within the NWT would likely provide clarity and awareness for captains. Sabina previously provided a comment in response to the KIA's 2020 Annual Report review (KIA-22) stating that they would include migratory bird habitat sites in the NWT in the Shipping Management Plan, the Shipping SOP, and Shipping Management Guidelines to ensure that captains are aware of these areas. Therefore, the KIA expected to see these areas on maps in the 2021 Annual Report.

### **Recommendation/Request:**

The KIA requests the following:

- Please address how the lack of marine mammal and seabird surveys will affect the marine mammal monitoring program and subsequent data analysis.
- Please address a contingency plan if it is not feasible to rely on regular bridge staff to have time to perform wildlife monitoring.
- Please consider including maps of both the eastern and western route in the Marine Shipping SOP.

### **Importance of Issue:**

Moderate

### **Sabina Response:**

- Data collection in 2021 for the marine mammal and seabird monitoring program was much improved in 2021 compared to previous years. Sabina reinforced the importance of recording marine mammal and seabird sightings to the vessel companies, and provided each vessel with updated guidance documents (brochure and SOP). This effort by Sabina did improve data collection and will be reinforced again for the 2022 shipping season. Sabina will continue to ensure that the shipping companies' data collection improves by reiterating the requirement and distributing the training documentation again in 2022.
- As recognized by the KIA, the focus of the shipping management plan is within Nunavut waters. Therefore the maps in the SOP and booklet focus on this area. However, the migratory bird habitat sites in NWT requested in previous reports were included in the map depicting the western shipping route (see Figure 7.1-1 in the Annual Report). Sabina will consider KIA's suggestion to include maps of both the eastern shipping route within Nunavut waters, and the western route within NWT waters in the Marine Shipping SOP.

**KIA-NIRB-10: Aircraft incidental sightings reports****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022)Sabina, Back River Project, Responses to 2020 Annual Report Comments (July 6, 2021)•Response to Kitikmeot Inuit Association, KIA-17

**Summary:**

Aircraft pilots were instructed to report all incidental wildlife sightings. However, there were no reported wildlife sightings by fixed wing or helicopter pilots in 2021.

**Detailed Review Comment**

In 2021, aircraft reported zero wildlife sightings (Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report, part of the Back River Project 2021 Annual Report, pages 5-2 and 5-3), despite helicopters being active at the Goose site from May -October 2021 (Figure 5.1-1: Frequency of Helicopter Flights Below 610 m, May to October, 2021, page 5-4) and fixed-wing aircraft operating at least once a week from Spring-Fall 2021 (page 1-1) (however, as in previous years, the number of helicopter and fixed wing flights could not be determined from the presented information in the annual report). In 2020, aircraft reporting protocols resulted in three observations, an improvement over zero aircraft-based wildlife observations in 2019 (Back River Project Responses to 2020 Annual Report Comments, KIA-17, pages 18-19). There were also wildlife sightings from non-aircraft Project personnel over the same time period in 2021, with nine reported caribou sightings (page5-14) from May -October 2021 and 11 reported sightings of other terrestrial mammals during September and October 2021 (Appendix 5E: Incidental Terrestrial Mammal Observations, 2021). The pilot reporting program is an important aspect of monitoring, especially in context of any staged mitigation responses for caribou. There is almost certainly still an issue of wildlife underreporting by pilots that should be improved.

**Recommendation/Request:**

To reiterate recommendations made in response to the 2020 Annual Report, the KIA recommends:

- Ensure that pilot wildlife reporting training is thorough and emphasized regularly, such as during daily safety meetings.
- Emphasize the value of wildlife reporting to both safety and the project's compliance to monitor wildlife in the project area as an important trigger for mitigation and work stoppages.
- Work to identify any obstacles to pilot reporting and ways to remove reporting barriers
- Consider testing reporting compliance by cross-referencing flight paths with caribou collar data or incidental report(s) of large numbers of animals.

**Importance of Issue:**

Moderate-High

**Sabina Response:**

Sabina recognizes and understands the importance of aircraft management for wildlife management. Helicopter management is described in the Wildlife Mitigation and Monitoring Program Plan (WMMP Plan) for wildlife, particularly caribou.

Sabina has acted on this management objective through four methods:

- 1) Reporting wildlife observations is a condition of the contracts established with helicopter operators.
- 2) Sabina produced a Fixed Wing and Helicopter Operations SOP (SOP # ENVIRO-3) that is delivered to helicopter operators.
- 3) Sabina produced a Fixed Wing and Helicopter Operations Guidance and Wildlife Log that is delivered to pilots who are instructed to read and complete the forms to ensure all sightings are logged.
- 4) The camp manager instructs pilots in the importance of wildlife mitigation and monitoring when they arrive on site, and are reminded daily.

Sabina will actively continue to encourage pilots to record sightings. It is uncertain whether pilots only say caribou on three occasions to report, or if they failed to report all animals that they saw.

Sabina will increase efforts in 2022 to communicate monitoring expectations for helicopter pilots through:

- 1) Delivering a letter to helicopter companies reminding them of their responsibility and including:
  - a. the aircraft SOP; and
  - b. the brochure on pilot responsibilities;
- 2) Signage and brochures will be available at site and posted in prominent locations and the helicopter shack.

Sabina receives near real-time collar information from the Government of Northwest Territories. Information on the approach of collared caribou will be delivered to the camp manager and helicopter pilots. Note that maps of these data cannot be freely distributed.

Note that pilots are typically conducting one of two types of flights: 1) moving drills at low elevation by long line within or immediately adjacent to the Project Development Area - where pilots are moving very short distances repeatedly, and 2) flying between Goose Camp, George Camp and the MLA - generally at high elevation. These types of flying may simply be poor platforms for observing wildlife and so expectations on how often pilots report wildlife may need to be altered.



**KIA-NIRB-11: Ecosystem/vegetation losses in 2021 and lack of trend analyses.****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 32 Table 4.5.9-1, Figure 4.5.9-1•Appendix D. Vegetation Monitoring Program -Technical Memorandum (March 31, 2022) o Section 4.1, Section 3.0, Section 2.0Sabina, Back River Vegetation Monitoring Plan (January 2020)•Section 5.2.3; Table 5-1Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 10), October 2019•Section 3.2.1Sabina, Back River Project, Responses to 2020 Annual Report Comments (July 6, 2021)•Response to Kitikmeot Inuit Association, KIA-27

**Summary:**

Habitat loss due to expansion of the Project footprint in 2021 has not been compared to 2020 data. One of the dominant vegetation associations (undifferentiated tundra) is missing from the summary table showing cumulative habitat loss in 2021. Sabina still considers analysis of trends “not applicable” despite multiple years of vegetation monitoring data available.

**Detailed Review Comment**

PC Condition No. 32 requires annual reporting of the current Project footprint, including the loss or alteration of vegetation associated with Project activities. Table 4.5.9-1 and Figure 4.5.9-1 show the cumulative habitat loss at the Goose Property and MLA Property as of 2021. It would be informative to also show, numerically and graphically/spatially, the difference in habitat loss between 2020 and 2021, such that specific areas of new disturbance can be identified. Based on the 2020 Vegetation Monitoring Plan (VMP), Table 5-1, one of the objectives of footprint monitoring is to show a “spatial comparison of the previous footprint to the current year’s footprint.”

It is also unclear why footprint monitoring results are directly discussed under PC Condition No. 32 rather than as part of the Vegetation Monitoring Program report (Appendix D of the 2021 Annual Report), which excluded footprint monitoring as an activity conducted in 2021 (Section 3.0).In addition, the KIA notes that ‘Undifferentiated Tundra’ (TEM code TU) is not included in Table 4.5.9-1, despite being one of the dominant vegetation associations in the LSA, and within which vegetation monitoring plots have been established (Section 4.1, Vegetation Monitoring Program Report, Appendix D of the 2021 Annual Report). It is unclear whether the ecosystem classification changed in 2021. There are additional discrepancies between Table 4.5.9-1 and results presented for both vegetation and wildlife monitoring: •2021 Vegetation Monitoring Program report, Section 2.0, Page 2 -Sabina states that wetland ecosystems comprise 8% of the LSA. However, the sum of W(x) TEM codes in Table 4.5.9-1 adds up to 9.1%, and there would be an even greater proportion of wetlands if marine wetland ecosystems were included. •2021 Pre-Construction WMMP Report, Section 3.2.1 -Table 3.2-1 shows that, including 2021 construction, the total footprint development at the MLA site is 25 ha, representing 3.8% of the total MLA PDA. However, Table 4.5.9-1 shows that MLA habitat loss is 30.7 ha total, and thus would represent 4.7% of the total MLA PDA. In addition, if the 2021 habitat loss was in fact 12.7 ha (30.7 ha total minus 18.0 ha in pre-2021) rather than 7.0 ha, as shown in Table 3.2-1, then the MLA site has increased by 71% from pre-2021. Under PC Condition No. 32, Sabina states that [analysis of] trends are not applicable, and on-going annual vegetation monitoring will continue. Although 2021 represents the first year of implementation of the updated 2020 VMP, information in the VMP implies that vegetation monitoring for the Project began in 2018. Section 5.2.3 (Data Analysis) of the VMP states that “data analysis will focus on evaluating trends and determining if there are statistical differences in plant species composition and abundance as a function of distance from the Mine and from construction through closures.” How many years of monitoring data are needed before trends can be evaluated? Sabina could conduct a power analysis to determine these values based on their monitoring plan (sample sizes and strata). The KIA has made a similar comment about the lack of trend analysis in review comment

KIA-TC-04. The KIA also previously submitted a comment on the low sample sizes and distance bins for each site (especially MLA) during review of the 2020 Annual Report (KIA-27). It is unclear how Sabina will meet their statistical objectives for the Vegetation Monitoring Program with their limited plot selection.

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please present ecosystem/vegetation loss in 2021 compared to 2020, as specified in the 2020 VMP. Please update Table 4.5.9-1 and Figure 4.5.9-1 to show the quantitative and spatial data, respectively.
- Please explain why the 'undifferentiated tundra' vegetation association is missing from Table 4.5.9-1. Please also explain and correct the inconsistencies noted between Table 4.5.9-1 and habitat loss information within the Vegetation Monitoring Program and WMMP reports.
- Please complete a trend analysis for vegetation monitoring data from 2018 to 2021 or provide science-or statistics-based rationale for when trend analyses will be possible.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-12: Vegetation Monitoring Plan -triggers for adaptive management****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 34•Appendix D. Vegetation Monitoring Program -Technical Memorandum (March 31, 2022)Sabina, Back River Vegetation Monitoring Plan (January 2020)•Tables 5.1-1, 5.2-2, 5.3-1, 5.4-1, 5.5-1

**Summary:**

Details on the triggers for implementing adaptive management (e.g., EIS predictions) should be directly included in the VMP and referred to during annual reporting. There is no discussion of how the 2021 vegetation monitoring results should/could inform adaptive management in the Vegetation Monitoring Program report.

**Detailed Review Comment**

The Terms or Conditions (TCs) of PC Condition No. 34 include: c. Details on the triggers for implementing adaptive management options if effects to vegetation are observed, including potential impacts from dust deposition; and, d. Discussion of how the findings from monitoring efforts would be used to inform reclamation planning.

However, the 2020 VMP does not outline the quantitative thresholds for triggering adaptive management. Rather, the “Criteria” for each vegetation monitoring component (Footprint, Vegetation, Non-native Plant, Lichen, Winter Ice Road [WIR]) refer to exceeding the predictions of the EIS. It would be much easier to track performance and effectiveness of mitigation measures if the EIS predictions and trigger thresholds were provided in the VMP and reiterated during annual reporting of the monitoring results. The 2021 Vegetation Monitoring Program report (Appendix D of the 2021 Annual Report) does not refer to the EIS predictions at all.

Furthermore, despite Sabina’s assertion in the ‘Next Steps’ section under PC Condition No. 34, the Vegetation Monitoring Program report does not provide a discussion about how the 2021 monitoring results will inform adaptive management strategies and reclamation planning, despite some results of lichen monitoring showing “undesirable change” since baseline (see review comment KIA-NIRB-18). Sabina needs to provide a more fulsome discussion of the vegetation monitoring results and potential mitigation and management options.

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please include the monitoring trigger thresholds (e.g., EIS predictions) in the VMP and other VEC monitoring plans, as applicable, such that exceedances can be readily identified.
- Please provide a more fulsome discussion of the 2021 vegetation monitoring results and how the results will inform adaptive management strategies (see also KIA-NIRB-19).

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

### **KIA-NIRB-13: Progressive revegetation program and studies**

#### **References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 35, No. 36Sabina, Back River Project, Interim Closure and Reclamation Plan (July 2021)•Section 6.3, Appendix E

#### **Summary:**

The Back River progressive vegetation program has not been fully developed since research studies are continuing to be conducted. The Revegetation Studies review is missing from Appendix E of the ICRP.

#### **Detailed Review Comment**

Sabina refers to the progressive vegetation program described in their 2021 Interim Closure and Reclamation Plan (ICRP) to demonstrate compliance with PC Conditions No. 35 and No. 36. Section 6.3 of the ICRP consists of three paragraphs about Progressive Revegetation Studies and is not a “program” that would typically include detailed objectives, methods, monitoring, mitigation and adaptive Sabina refers to the progressive vegetation program described in their 2021 Interim Closure and Reclamation Plan (ICRP) to demonstrate compliance with PC Conditions No. 35 and No. 36. Section 6.3 of the ICRP consists of three paragraphs about Progressive Revegetation Studies and is not a “program” that would typically include detailed objectives, methods, monitoring, mitigation and adaptive

#### **Recommendation/Request:**

The KIA recommends/requests the following:

- Please provide the Reclamation Studies conducted by Sabina in 2021 (Appendix E of the ICRP) for review.
- Please amend the annual reporting for PC Condition No. 35 to be more transparent that a progressive revegetation program has not been fully developed.

#### **Importance of Issue:**

Low-Moderate

#### **Sabina Response:**

Please find attached Sabina’s 2021 Reclamation Studies which was accidentally omitted from Appendix E of the ICRP (Appendix B). This is also being provided to the NWB for inclusion in their registry.

Sabina will ensure that it is clearly communicated that the progressive revegetation program is not fully developed at this early phase of project construction. Sabian notes that, for both T&C’s 35 and 36, the 2021 Annual Report stated that information regarding revegetation studies developed would be submitted within 3 years of the commencement of construction as required by T&C 36.

**KIA-NIRB-14: Pre-Construction vs. Construction activities and monitoring****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)• Project Certificate Conditions No. 34, No. 54, No. 56• Appendix D. Vegetation Monitoring Program -Technical Memorandum (March 31, 2022)Sabina, Back River Vegetation Monitoring Plan (January 2020)• Section 5, Table 5-1Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 10), October 2019• Table 6.2-1Sabina, Back River Project, Final Environmental Impact Statement, Volume 1: Main Volume• Executive Summary, Table 1 • Section 1.4.1Sabina, Back River Project, Responses to 2018 Annual Report Comments• Response to Kitikmeot Inuit Association, KIA-1

**Summary:**

The Proponent still considers the Back River Project to be in the Pre-Construction phase, which was not defined. However, in 2021, Sabina completed drilling and blasting activities, methods that will likely be used during the Construction phase. In addition, Sabina conducted monitoring activities for vegetation and birds that are planned for the Construction phase as per the VMP and WMMP, respectively. As a result of the Project being categorized as being in Pre-Construction, fewer monitoring and reporting commitments are being upheld.

**Detailed Review Comment**

Sabina considers the Back River Project to still be in the Pre-Construction phase (and thus fewer monitoring and reporting requirements from the Project Certificate No. 007 apply). It remained unclear as to what is defined as occurring within the Pre-Construction phase, as this phase was not referred to during project certification.

However, there are examples in the 2021 Annual Report where Sabina is already undertaking monitoring that is planned for the Construction phase, including:

- Vegetation monitoring (2020 VMP, Table 5-1) –the monitoring schedule/sampling frequency for all components of the vegetation monitoring program (footprint, WIR, vegetation, non-native plants, lichen) is either annually or every three years “during Construction and Operation”.
- Pre-clearing nest surveys (2019 WMMP, Table 6.2-1) –for all bird VECs (raptors, waterbirds, upland birds, marine birds), pre-clearing surveys for nests would be conducted in the spring if triggered during the “Mobilization and Construction” phase, and not the “Baseline/Pre-Construction” phase.

Although no ground clearing was required during the bird breeding season in 2021, and therefore no pre-clearing surveys were required (2021 Annual Report for PC Conditions No. 54 and No. 56), pre-clearing nest surveys were conducted in 2020. In Section 1.2 of the 2021 Pre-Construction WMMP Report, Sabina explains that the 2021 Goose Site Earthworks included drilling and blasting at the portal box cut and development of the bulk-sample underground workings; and drilling, blasting and pad construction at the new permanent fuel tank pad. It is unclear how drilling and blasting activities can still be considered Pre-Construction rather than Construction.

During review of the Back River 2018 Annual Report, the KIA previously submitted a technical comment critiquing Sabina’s argument that the Project is still in the Pre-Construction phase (KIA-1). Comment KIA-1 was focused on sensitive landform mitigation and monitoring, and the issues still apply for this 2021 Annual Report (see review comment KIA-NIRB-02).

Sabina's response to the 2018 Annual Report comment KIA-1 defined the contentious Project phases as: •Construction -full mobilization of all materials and personnel on site wherein the site is occupied year-round to initiate construction of all core mine infrastructure. • Mobilization -the time period where some mobilization and development works [i.e., Pre-Construction including site preparation and staging of materials and equipment in advance of construction (NIRB Decision S. 3.4] can be undertaken consistent with the appropriate permits/licenses on a seasonal basis. Regardless of the semantics and technicalities of these definitions (e.g., year-round vs. seasonal occupation) for identifying the Project phase, the construction activities that occurred in 2021 could impact terrestrial environment VECs in the same way.

In addition, by claiming that the Project is still within the Pre-Construction phase, despite undertaking activities that are similar to those that will be used during Construction (e.g., drilling and blasting), Sabina does not appear to be following the precautionary principle that they claim to subscribe to in Section 1.4.1 of Vol. 1 of the FEIS.

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please provide a definition of "Pre-Construction", how the activities conducted at the site during "Pre-Construction" differ from activities to be conducted during "Mobilization" and "Construction," and a timeline for when the "Mobilization and Construction" phase will begin. In the previous response supplied, the term Pre-Construction was used to provide an example of something that could occur during Mobilization, but still no clear definition was provided for where Pre-Construction activities end, and Construction activities begin.
- A clear list of activities that would be considered to fall within Pre-Construction, the extent of those activities, and how NIRB Project Certificate conditions do or do not apply to each (e.g., in a table format) would help provide clarity for all parties involved and would provide a clear means by which to compare Project activities to compliance requirements of the Project Certificate.

**Importance of Issue:**

Low

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-15: Vegetation monitoring -missing results from planned methods****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 34•Appendix D. Vegetation Monitoring Program -Technical Memorandum (March 31, 2022)o Section 4.1, Section 5.1, Appendix D, Appendix C Sabina, Back River Vegetation Monitoring Plan (January 2020)•Section 5, Table 5-1Sabina, Back River Project, Responses to 2019 Annual Report Comments (June 29, 2020)•Response to Kitikmeot Inuit Association, KIA-27

**Summary:**

The vegetation monitoring program appears to not be collecting or reporting on 70% of the planned monitoring parameters, including relative abundance of vascular and non-vascular species; plant vigour/health; dominant structural stage, moisture regime, and nutrient regime; wildlife sign; and disturbance class.

**Detailed Review Comment**

Within the Methods proposed for Vegetation Monitoring (Section 4.1 in the 2021 Vegetation Monitoring Program report), information to be collected at each plot includes:•Plant species composition (richness) and relative abundance (percent cover) of vascular plant and non-vascular species;•Average heights of plant species observed;•Vigour class or overall plant health of vascular plant species;•Relative abundance (percent cover) of surface substrate materials;

- Dominant structural stage, moisture regime, and nutrient regime;•Wildlife sign (e.g., fecal pellets, browsing/grazing, beds, digging) observations, if present; and
- Disturbance class (note: this parameter is not listed on p. 7 among the others, but the disturbance class scoring system is provided on p. 8).

However, the Results in Section 5.1 only describe three parameters (highlighted in bold in the list above): average vegetation height, average surface substrate percentage, and average species richness. As such, seven out of 10 (70%) of the proposed vegetation monitoring parameters are not accounted for. With respect to wildlife sign, there are very limited incidental observations in Appendix D of the Vegetation Monitoring Program report; however, these are “site conditions” notes for the lichen monitoring component, and the lichen sampling plots were specifically located adjacent to (rather than within) the vegetation monitoring plots (Section 4.3, p. 9). Furthermore, the results for average surface substrate percentage (Table 5) only shows seven “vegetation associations” and does not include three types listed in Section 4.1, pp. 7-8: fungi, water, and decaying wood. It is unclear whether none of these vegetation associations were found, or if they were not assessed as per the VMP.

In addition, Section 7 (Quality Assurance and Quality Control) of the 2020 VMP states that “photographs will be utilized to facilitate inter-annual comparisons through the qualitative examination of species vigour/health, species present, ground cover, and observable (anthropogenic) disturbance or general changes in vegetation cover.”

This statement implies that plant vigour, disturbance, and other monitoring parameters should be analyzed by comparing photos between years. There is no discussion of photo comparisons within the 2021 Vegetation Monitoring Program report; Appendix C simply shows representative plot photographs of vegetation types without further analysis.

In summary, although Sabina has developed a Vegetation Monitoring Plan to comply with PC Condition No. 34, they do not appear to be following their VMP as written.

Note that the KIA previously submitted a similar comment during review of the Back River 2019 Annual Report (KIA-27). Sabina's response about missing vigour class information was that "vegetation vigour... was only included in the monitoring results as part of the disturbance level." This rationale is inadequate for the 2021 Vegetation Monitoring Program report as there is no discussion of disturbance class either. In addition, Sabina's response to KIA-27 explained that moisture and nutrient regime information were collected but not discussed because "there were no apparent changes resulting from use of the WIR".

Similarly, decayed wood (as a surface substrate material) was not included in the summary tables as no observations were made of decayed wood while collecting plot data. As the "missing" data appear to be a recurring issue, it would be more transparent if Sabina presented all monitoring results (including not-detected and no-change data) in the annual report to demonstrate that the VMP was followed.

### **Recommendation/Request:**

The KIA recommends/requests the following:

- Please explain why the majority of the proposed vegetation monitoring parameters are not discussed in the results section of the 2021 Vegetation Monitoring Program report.
- Please clarify whether data have been collected for the missing parameters since the vegetation monitoring program began in 2018. If the data were collected but not reported in annual reports because Sabina deemed that no apparent changes have occurred, please present the 3-year monitoring results (2018-2021) to support this claim for monitoring/reporting transparency.
- Please include not-detected and no-change monitoring results in future Vegetation Monitoring Program reports to allow for greater transparency in Sabina's methods and analyses; this is a request that has been repeated among reviews by the KIA to date and is still not being done.
- Please explain how Sabina considers themselves compliant with Project Certificate Condition No. 34 if the vegetation monitoring program is not following the approved VMP (e.g., lack of inter-annual comparisons via photo analysis).

### **Importance of Issue:**

Moderate

### **Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.



**KIA-NIRB-16: Vegetation species of conservation concern****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022) • Project Certificate Condition No. 55 • Appendix D. Vegetation Monitoring Program – Technical Memorandum (March 31, 2022) o Section 5.1, Appendix B • Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Section 5.7.2, Section 8 Sabina, Back River Vegetation Monitoring Plan (January 2020) • Section 5.2.2 Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 10), October 2019

**Summary:**

Vegetation monitoring currently only considers species listed on Schedule 1 of the federal SARA, whereas wildlife species of conservation concern include species at risk under SARA or as designated by COSEWIC, and species listed in Nunavut by the CESSC. The KIA recommends that a broader definition of vegetation species of concern be used, and that rare plant surveys be conducted prior to clearing activities.

**Detailed Review Comment**

Section 5.2.2 of the 2020 VMP (sampling methods for vegetation monitoring) defines rare plants as “vascular and non-vascular species listed under SARA Schedule 1 and species with “Endangered”, “Threatened”, or “Special Concern” status.” It is unclear whether this is a Project-or Proponent-specific definition –and approved by stakeholders –since listings under SARA Schedule 1 are typically considered “species at risk”, whereas “rare species” are often defined based on national (N) or subnational (S) conservation rankings between Vulnerable (N/S3) and Critically Imperiled (N/S1). Based on the Canadian Endangered Species Conservation Council (CESSC)’s Wild Species 2015: The General Status of Species in Canada data, some of the vegetation species observed in 2021 (Appendix B of the 2021 Vegetation Monitoring Program report) constitute species of conservation concern, including:

- Critically Imperiled/Imperiled (S1S2) –Schreber’s moss, *Pleurozium schreberi*
- Vulnerable (S3) –beautiful sedge, *Carex concinna* • 3 moss and lichen species considered Vulnerable/Apparently Secure (S3S4)
- 16 lichen species considered Vulnerable/Secure (S3S5) The KIA notes that Sabina considers CESSC rankings for wildlife VECs.

Section 8 of the 2021 WMPP Report states that “species of conservation concern include those listed in Nunavut by the CESSC or those listed as Endangered, Threatened, or Special Concern on Schedule 1 of the SARA”, and COSEWIC conservation rankings are also noted for wildlife species at risk. It is unclear why vegetation species of conservation concern are not considered in the same way by Sabina. For example, PC Condition No. 55, related to Species at Risk, is not included within the Vegetation Section 4.5.9 of the 2021 Annual Report. Although the KIA understands that PC Condition No. 55 originally pertained to birds and bird habitat, Sabina has already expanded the scope of this condition to other terrestrial and marine wildlife. As the definition of “wildlife species” under the federal SARA includes an animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is native or naturalized to Canada, the KIA feels that it is reasonable to include all vegetation species of conservation concern as part of the Project monitoring programs.

If Sabina is amenable to the KIA’s request, it would also be useful to present observations of vegetation species of conservation concern spatially in future annual reports. Currently, it is unknown to the reader within which plots the CESSC-listed plants were found. Furthermore, it is unclear whether rare plant surveys are conducted prior to Project clearing activities. Since CESSC-listed plants have been found

within monitoring plots, it is reasonable to assume that rare plants may occur elsewhere within the Project Development Area (PDA). To avoid project-related impacts to vegetation species of conservation concern, rare plant surveys should be conducted prior to clearing and mitigation applied as needed (e.g., avoidance if possible, or salvage performed by a Qualified Professional).

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please expand the definition of “rare plants” to include those listed in Nunavut by the CESSC, similar to how wildlife species of conservation concern are defined in the WMMPP.
- Please show the spatial locations of vegetation species of conservation concern (including CESSC-listed species) in future annual reports.
- Please clarify whether rare plant surveys are conducted prior to Project clearing activities. If not, please include rare plant surveys and salvage (if needed) in the VMP to avoid impacting vegetation species of conservation concern.

**Importance of Issue:**

High

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-17: Non-native plant species in the Tundra****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 55•Appendix D. Vegetation Monitoring Program -Technical Memorandum (March 31, 2022) o Section 5.2

**Summary:**

Information about vegetation species that are considered native in the territory as a whole, but may be considered locally or regionally non-native, should be included in the VMP and annual report for non-native plant monitoring.

**Detailed Review Comment**

In Section 5.2 of the 2021 Vegetation Monitoring Program report, Sabina states that “Common fireweed (Chamerion angustifolium) although not an invasive weed, can be considered non-native in the Tundra...”

There is no source reference for this information. According to the CESSC’s Wild Species 2015 data, common fireweed is considered Native but Unrankable (SU) in Nunavut. If Sabina has gathered TK or local knowledge about common fireweed and other species that could be considered regionally or locally non-native, it would be useful to include this information in the VMP and annual report.

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please provide the source(s) of information for why common fireweed may be considered non-native in the Tundra.
- If additional local/regional information is available for non-native species, please include another list of species within the VMP and annual vegetation monitoring report.

**Importance of Issue:**

Low

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

## KIA-NIRB-18: Lichen monitoring data collection, analysis and discussion

### References:

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 34•Appendix D. Vegetation Monitoring Program -Technical Memorandum (March 31, 2022) o Appendix D, Appendix E; Section 4.3.2; Section 5.3Sabina, Back River Vegetation Monitoring Plan (January 2020)•Table 5.4-1

### Summary:

The results of lichen monitoring are briefly outlined in Section 5.3 of the 2021 Vegetation Monitoring Program report. There are cross-references to three appendices of the report showing field and laboratory data, but limited discussion about the results themselves. There are some monitoring results that may be concerning; therefore, Sabina needs to provide a more detailed analysis and discussion in comparison to the predictions of the EIS.

### Detailed Review Comment

Appendix E shows the Lichen Chemistry Graphs for parameters considered toxic to caribou, compared to baseline results. From a visual review of the figures, 9/19 elements analyzed were found to have potentially significantly higher levels at 0 m from the Goose Property in 2021 than the baseline data, including arsenic, barium, cadmium, chromium, lead, molybdenum, strontium, vanadium, and zinc. At the MLA site, 5/19 elements analyzed were found to have potentially significantly higher levels at 0 m from the Project in 2021 compared to baseline, including cadmium, manganese, mercury, uranium, and zinc. (Note: boron was also detected at both sites but there are no baseline data for comparison.) It is unknown whether the 2021 levels are statistically significantly higher than baseline, as there are no statistics presented. It is also unclear whether the 2021 levels are biologically significant (e.g., acutely or chronically harmful to caribou if they forage on the lichen) because Sabina does not provide further analysis or discussion. Table 5.4-1 in the VMP provides an overview for the lichen monitoring program, including:

- Goal–The Mine will not result in a significant increase in contaminant uptake in vegetation.
- Criteria –Increase in metal concentration in lichen within the LSA and concentrations beyond the predictions of the EIS.As discussed in review comment KIA-TC-12, the EIS predictions are not included in either the VMP or the 2021 Vegetation Monitoring Program report.

Without more detailed reporting, it is unclear whether the lichen sampling results in 2021 constituted “a significant increase in contaminant uptake” and a need for mitigation measures to be undertaken. The omission of a more fulsome discussion of the monitoring results may imply that Sabina is not in full compliance with PC Condition No. 34 (regarding the VMP).

As part of the data analyses (Section 4.3.2), Sabina calculated the relative percent difference (RPD) for each analyzed parameter for duplicate lichen samples to assess homogeneity. A lower RPD indicates higher sample homogeneity, while a RPD of 30% or greater was “considered notable”. The results in Section 5.3 show that the incidence of RPDs greater than 30% was generally high in the lichen duplicates. However, Sabina does not provide an explanation for the implications of these results. Why would duplicate lichen samples be so heterogeneous? What does this mean with respect to evaluating monitoring results and comparing with EIS predictions? Are there field collection and/or lab analysis issues? Furthermore, Sabina states in Section 5.3 that weather conditions at time of sampling and surface substrate percentages were recorded, shown in Appendix D. However, while Table 9 (Lichen Sampling Plot Information) in Appendix D has a column for weather and site conditions, the information was incompletely and non-systematically recorded -there is some weather information (e.g., rain, wind,

qualitative temperature, dryness), some incidental observations and comments, and some location notes, while other plots are missing information entirely. It would be better if Sabina provides their field staff with more detailed instructions about the data to record at each lichen monitoring plot.

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please provide a statistical analysis of the 2021 lichen sampling results and a discussion of the biological implications for caribou that may ingest lichen containing these levels of metals.
- Please provide a comparison of the 2021 lichen sampling results with the predictions of the EIS and provide rationale for whether mitigation measures are needed.
- Please explain the implications of the RPDs found for duplicate lichen samples in 2021 with respect to interpretation of monitoring results. Please also indicate if corrective actions need to be taken for field and/or lab work.
- Please provide more specific instructions to field staff such that environmental data are collected systematically and allow for future analyses.

**Importance of Issue:**

HIGH

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-19: Area of suitable habitat lost for wildlife VECs****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 37•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Table 3.2-3; Table 3.2-2, Section 3.2.1, Section 3.1.2Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 10), October 2019•Definitions of Project Areas (Page xi) •Section 7.2.2.1

**Summary:**

The area of suitable habitat lost for wildlife VECs due to the Project are presented overall rather than by site, which does not allow for direct comparison with the FEIS predictions. In addition, over 200 ha of the PDA appears to be missing for the caribou winter habitat suitability model results.

**Detailed Review Comment**

Table 3.2-3 of the 2021 Pre-Construction WMMP Report presents the area of suitable habitat lost for wildlife VECs due to the Project. While Sabina shows the Total FEIS predicted loss in the PDA overall and in the MLA and Goose PDAs separately, the actual habitat losses in 2021, Pre-2021, and Total are only presented overall and not by site. It would be more transparent to separate out habitat loss by site such that the FEIS predictions can be directly compared. For example, it is currently unclear how much of the 15-ha total loss of raptor cliff-nesting habitat has occurred at Goose vs. MLA. The FEIS predicted only 5 ha loss at the MLA; thus, it is important to know whether habitat loss exceedances have occurred at the MLA.

Note that Section 7.2.2.1 (Footprint Monitoring) of the 2019 WMMP states that the trigger for adaptive mitigation is “if the constructed footprint exceeds the planned PDA area”. As the Goose Site PDA and MLA PDA are defined separately in the “Definitions of Project Areas” on Page xi of the 2019 WMMP, footprint monitoring should also be presented separately for the two sites. Without this analysis, Sabina is not fully compliant with PC Condition No. 37 (regarding the WMMP).

With respect to area of suitable winter habitat for caribou, there are some discrepancies between the sum of High, Moderate, Low, and Nil area sizes in Table 3.2-2 and the information presented in Section 3.2.1 of the 2021 Pre-Construction WMMP Report:

	Section 3.2.1	Table 3.2-2 (sums)	Difference
<b>Goose PDA</b>	5427 ha	5231 ha	196 ha
<b>MLA PDA</b>	653	639 ha	14 ha
<b>Combined PDAs</b>	6080 ha (sum)	5869 ha	211 ha

Overall, 211 ha appears to be missing from the caribou winter habitat suitability model produced by Sabina, with the majority (93%) from the Goose site. Section 3.2.1 describing the model development does not explicitly state that any areas were excluded from the model. If the areas of High and Moderate suitable winter habitat require correction, then Table 3.2-3 will also need to be adjusted for the area of suitable caribou winter habitat lost due to the Project.

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please present the 2021, Pre-2021, and Total Habitat Loss separated into Goose and MLA sites to allow for direct comparisons with the FEIS predictions. Please clarify if any constructed footprint exceedances have occurred when the two sites are analyzed separately, and if adaptive mitigation should have been triggered.
- Please explain why 211 ha of the combined PDAs (including 196 ha for Goose and 14 ha for MLA) appear to be missing from the caribou winter habitat suitability model.
- If corrections need to be made to the caribou winter habitat suitability model, please update the habitat loss table accordingly.

**Importance of Issue:**

Moderate

**Sabina Response:**

- Total habitat loss for each wildlife VC will be calculated separately for Goose and MLA sites in the 2022 annual report.
- 211 ha of habitat is missing from the caribou winter habitat suitability model due to exclusions of certain features from the models and this will be corrected in the 2022 model. Within the model, there were some blank values for the Ice and Snow ELC class rather than rated as nil quality habitat. This was an error in the model and we thank the reviewer for commenting on this. All of the missing area for the winter model in each of the three PDAs will be added to the Nil quality habitat for the 2022 Annual Report.
- Because all of the missing habitat is considered “Nil quality”, the habitat loss tables do not require updating and the results of habitat loss calculations remain unchanged.

## **KIA-NIRB-20: Lack of incidental observations of birds by pilots and Project staff**

### **References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)

•Project Certificate Condition No. 53•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Section 6.1, Section 6.3 o Section 7.1.2.3, Appendix 7Do Appendix 5A.

Fixed-Wing and Helicopter Operations SOP -ENVIRO-03oAppendix 5C.

Wildlife Safety Site Audit Report, August 2021

Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 10), October 2019 •Table 4.1-1, Table6.2-1

Sabina, Back River Project, Final Environmental Impact Statement Supporting Volume 5: Terrestrial Environment • Chapter 9. Migratory Birds (Upland Birds and Waterfowl)•Chapter 10. Raptors

Sabina, Back River Project, Final Environmental Impact Statement Supporting Volume 7: Marine Environment • Chapter 6. Seabirds / Seaducks

### **Summary:**

There were no incidental observations of birds made by pilots or other Project staff in 2021. The KIA suspects that the lack of observations is partly due to unclear instructions on the Incidental Wildlife Observations Datasheet. The KIA also disagrees that raptors and large groups of waterbirds are the only notable birds worth recording.

### **Detailed Review Comment**

Section 6.1 (Aircraft Management) of the 2021 Pre-Construction WMMP Report states that no incidental observations of birds were reported by pilots in 2021. Similarly, Section 6.3 states that there were no incidental observations of birds recorded by Sabina employees while on site, and that few incidental sightings of birds were recorded in previous years. Examples of incidental records in 2020 and 2019 include large flocks (approx. 200) of geese flying overhead; Sabina suggests that these observations may indicate general timing of spring migration for geese around the Goose site, and “illustrates the importance of recording incidental observations of notable bird sightings.” The lack of incidental bird observations in 2021 (and sparseness of observations in previous years) is surprising, given that many bird species and individuals were observed during baseline studies (FEIS Supporting Vol. 5, Ch. 9-10; Vol. 7, Ch. 6); marine shipping in 2021 (Appendix 7D of the 2021 Pre-Construction WMMP Report), which included an observation of an eastern phoebe on land near the MLA (Figure 7.1-4); and during the Wildlife Safety Audit in August 2021 (Appendix 5C). Rather, the KIA suspects that unclear or insufficient instructions have been provided to pilots and Project staff.

Section 5.1 of the Fixed-Wing and Helicopter Operations SOP indicates that “Pilots will record observations of wildlife during any flights at the Project on the Incidental Wildlife Observations Datasheet (Attachment A), including observations of large mammals, raptors, and waterbirds.”



However, the instructions at the top of the Incidental Wildlife Observation Datasheet (vA.1) only require completing the form for the following:

- You observe wildlife (caribou, grizzly bear, wolf, wolverine, muskox, or fox) on the Project Site, including while flying, on-site roads and the winter ice road;
- There is a project-related wildlife fatality or injury; or
- You observe dead or injured wildlife, even if the fatality was not project related. There are no explicit instructions for recording bird observations.

The Species options to circle include the mammals listed above (excluding fox but including “Other (describe)”). Only the notes in Animal Behaviour suggest that birds might be included (e.g., flying, nesting). Furthermore, it is unclear if this Incidental Wildlife Observation Datasheet is meant for pilot use only or if it is for everyone (aside from marine shipping). If this form is general purpose, then the unclear instructions could explain the lack of incidental bird observations made by other Project staff. Additional training and SOP and datasheet amendments are likely needed.

The KIA also disagrees with Sabina’s wording in the SOP to record only raptors and waterbirds (among bird VECs) as “notable”. Any incidental sightings of birds should be noted, especially as there are species at risk and those listed as Vulnerable in Nunavut by the CESSC among upland breeding birds (including shorebirds) that could potentially occur in the PDA, including American golden-plover, Harris’s sparrow, hoary redpoll, least sandpiper, red-necked phalarope, and semipalmated sandpiper (Table 4.1-1 in the 2019 WMMPP). Arctic/hoary redpoll and least sandpiper were recorded in the Project area during marine shipping and the wildlife site safety audit in 2021, respectively.

Incidental wildlife reporting is one of the monitoring programs for raptors, waterbirds, and upland birds (Table 6.2-1 in the 2019 WMMPP); however, this program may not be being implemented as intended to comply with PC Condition No. 53 (Mitigation, Monitoring, and Adaptive Management for Birds and Bird Habitat). For activities in 2022, the KIA suggests that a qualified person conduct periodic bird surveys while staff are on site could be combined with site monitoring to determine if the presence of species of conservation concern may have been overlooked in previous years.

#### **Recommendation/Request:**

The KIA recommends/requests the following:

- Please amend the Fixed-Wing and Helicopter Operations SOP and the Incidental Wildlife Observations Datasheet to explicitly include all bird VECs, including raptors, waterbirds, and upland breeding birds and shorebirds (individuals and groups).
- Please consider assigning a qualified person to conduct periodic bird surveys during Project activities in 2022. This would serve to either 1) confirm that there are few birds at/around the Project sites (consistent with the lack of incidental bird observations in 2021) or 2) provide additional information about bird use of the area that was not previously captured or recorded by Project staff.

#### **Importance of Issue:**

High

**Sabina Response:**

Sabina notes that the WMMP Plan (Version 10, 2019) includes incidental observations of birds, that are intended to trigger mitigation - e.g., if birds are observed entering buildings, building nests on structures or interacting with the Project. Incidental observations are listed in Sections 10.2.1, 11.2.1, 12.2.1 in the sections titled Monitoring to Trigger Mitigation. Incidental observations by pilots and camp personnel is not meant to be a long term effects monitoring program.

Sabina will update the incidental observation card as suggested to put additional emphasis on collecting bird observations.

The WMMP Plan (Version 10, 2019) includes long-term monitoring of Project effects on raptors, upland birds and waterbirds. These programs are scheduled to begin during Construction and continue through Operations. At this time, during pre-construction, there is no plan to conduct additional formal bird surveys.

**KIA-NIRB-21: Inconsistent guidelines for aircraft setbacks****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Appendix 5A. Fixed-Wing and Helicopter Operations SOP -ENVIRO-03•Sections 2, 3, 5oAppendix 5B. Helicopter Operations Guidance and Wildlife Log; Fixed-Wing Operations Guidance and Wildlife Log

**Summary:**

Aircraft setback guidelines are inconsistent within the Fixed-Wing and Helicopter Operations SOP, and between the SOP and the Operations Guidance and Wildlife Log brochures provided to pilots during training.

**Detailed Review Comment**

Sections 2 and 3 of the Fixed-Wing and Helicopter Operations SOP outlines the setback distances for fixed-wing aircraft and helicopters, respectively. Fixed-wing aircraft are to maintain 610 m above ground level at all times, except when waterbird staging areas are actively used, at which point aircraft are to maintain a horizontal distance of 3,000 m and vertical distance of 650 m.

However, Page 3 of the Infographic in Section 5, and Page 3 of the Fixed-Wing Operations Guidance and Wildlife Log, show that fixed-wing aircraft are to maintain 650 m at all times as well. If possible, the more conservative altitude shown in the infographic should be adopted, and the text fixed in Section 2.1.

Guidelines for helicopters are also inconsistent between Section 3.2 and Pages 1-2 of the Infographic in Section 5 of the SOP, and on Page 4 of the Helicopter Operations Guidance and Wildlife Log. Section 3.2 states that helicopters should maintain a 650 m horizontal distance and 300 m vertical distance from known raptor nest sites when nests may be active. However, the Infographic shows that helicopters should maintain 650 m distance both vertically and horizontally. In addition, the brochure shows inconsistent information on the same page -both 650 m and 610 m horizontal and vertical distances are depicted, and the 610 m distance is presented as horizontal or vertical rather than and. Both the text in Section 3.2 of the SOP and the brochure needs to be updated, preferably to the most conservative setbacks of 650 m horizontal and vertical distances. As Sabina is providing the brochures as part of pilot training, it is important that the information is clear and accurate.

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please correct the inconsistencies for fixed-wing and helicopter setback guidelines noted for active waterbird staging areas and raptor nests. Please apply the most conservative distances.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina will update the Fixed-Wing and Helicopter Operations SOP so it is consistent with the WMMP Plan (Version 10, 2019).

## **KIA-NIRB-22: Locations of marine mammal and (sea)bird observations**

### **References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Section 7.1.2.2, Section 7.1.2.3oAppendix 7A. Marine Shipping SOP -Wildlife Mitigation and Monitoring: ENVIRO-02

### **Summary:**

There are some discrepancies between the incidental observations of marine mammals and birds noted in Tables 7.1-2 and 7.1-3 versus Figures 7.1-3 and 7.1-4. It is unclear if geographic coordinates were inaccurate or missing.

### **Detailed Review Comment**

Table 7.1-2 and Figure 7.1-3 in the 2021 Pre-Construction WMMP Report present the incidental observations of marine mammals recorded during shipping activities in 2021 (for which marine wildlife monitoring was conducted; see the KIA's critique in review comment KIA-NIRB-09). In Table 7.1-2, Sabina indicates that a bowhead whale was observed swimming 250 m from the vessel. However, the bowhead whale observation on Figure 7.1-3 is located west of Young Island, over 100 km away from the proposed shipping line.

It is unclear whether geographic coordinates for the observation were inaccurate, or if the ship needed to divert from the proposed shipping route. Both of these hypotheses require further explanation and/or corrective actions (e.g., GPS equipment malfunction, rationale for route change).

Incidental observations of (sea)birds during 2021 shipping are presented in Table 7.1-3 and Figure 7.1-4. However, there appear to be data missing from the map figure as there are no points for peregrine falcon, cackling goose, Lapland longspur, and greater white-fronted goose. Were the geographic coordinates not recorded for these observations?

Overall, the KIA appreciates that the marine bird surveyors recorded not only seabirds but other bird species/group as well, including raptors, waterbirds, and upland breeding birds. By doing so, the monitors recorded a species at risk (peregrine falcon), a species considered Vulnerable in Nunavut by the CESSC (Arctic/hoary redpoll), and a species considered 'accidental' and unusual in the area (eastern phoebe). Documentation of these 'notable' species forms the basis of the KIA's recommendation for improved incidental bird observation recording by other Project staff in review comment KIA-NIRB-20.

### **Recommendation/Request:**

The KIA recommends/requests the following:

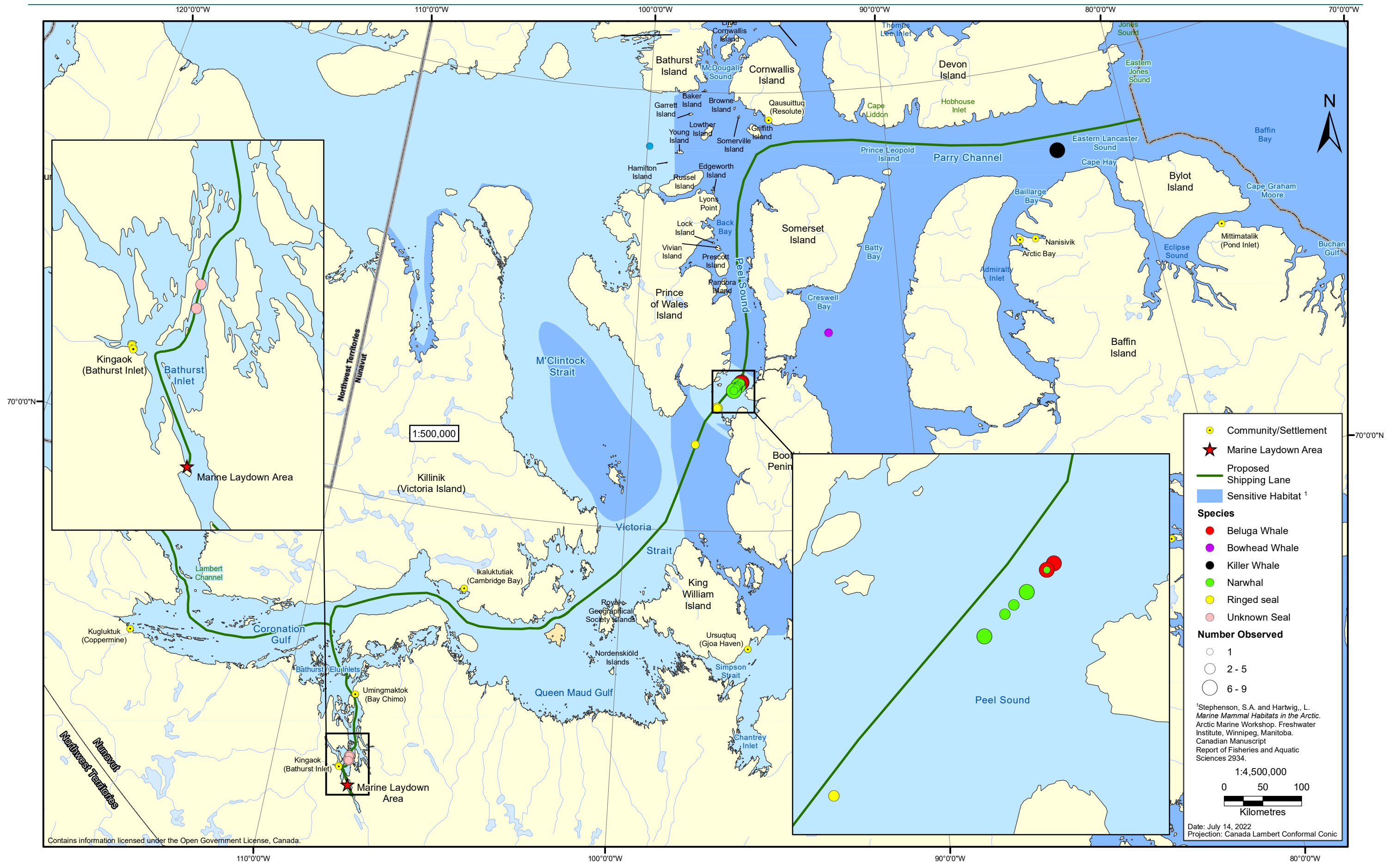
- Please clarify whether the coordinates for the bowhead whale observation are inaccurate (and if corrective actions need to/have been taken) or if the ship went off course from the proposed shipping route (and why).
- Please add the missing incidental bird observation data to the map Figure 7.1-4. If location data are not available, please explain why the data are missing, and ensure that locations are collected during future marine seabird monitoring surveys.

### **Importance of Issue:**

Low

**Sabina Response:**

- The locations of observations are those provided by the vessels. Sabina provides a Marine Shipping – Wildlife Mitigation and Monitoring SOP to shipping companies and they provide the SOP to ship captains. The SOP includes a “Proposed shipping lane” that takes in to account setbacks from wildlife sites and shows where a route passes through Key Habitat Sites, such as Eastern Lancaster Sound. The vessel captain is responsible for the safe operation of the ship and can alter the vessels course in response to weather, sea conditions ice, and other factors. On the return voyage from Bathurst Inlet, one of the vessels took the passage between the Boothia Peninsula and Somerset Island rather than transiting all of Peel Sound. Alternate routes are taken at the captain’s discretion for the safe operation of the vessel and as long as they meet the requirements of the WMMP and Marine Shipping SOP, such as setbacks from Key Habitat Sites. Future versions of the annual WMMP Report will include a vessel track, where these data are available.
- Attached to these responses is an updated map showing the incidental bird observations (BAC-23-553c). These observations were not missing from the map, but were difficult to see due to scale. An inset has been added to the map to show the sightings of peregrine falcon and the geese in Bathurst Inlet. The Lapland longspur was observed perched on the vessel while it was travelling through Hudson Strait. The sighting is now visible on the map, as it was previously hidden behind another icon.



**Figure 7.1-3: Incidental Marine Mammal Observations During Shipping, August and September 2021**

**KIA-NIRB-23: Bird species known or potentially occurring along shipping route****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 54•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Section 8, Table 8-1oAppendix 7A. Marine Shipping SOP -Wildlife Mitigation and Monitoring: ENVIRO-02

**Summary:**

There are additional bird species of conservation concern that could be added to Table 8-1 in the 2021 Pre-Construction WMMP Report. Cliff-nesting raptors and species of conservation concern from other bird VECs, aside from seabirds, could also be added to the bird list in the Marine Shipping SOP to assist the marine wildlife monitor.

**Detailed Review Comment**

Table 8-1 of the 2021 Pre-Construction WMMP Report shows the species of conservation concern known or potentially occurring at the Project, updated for 2021. Two more species could be added to the “Species that Could Be Encountered along the Project Shipping Route” section: purple sandpiper (Vulnerable in Nunavut) and barn swallow (listed as Threatened on Schedule 1 of the SARA, assessed as Special Concern by COSEWIC). There are eBird observations of these two species near Cambridge Bay. In the Marine Shipping SOP, Table 3.2-2 lists the species of seabirds most likely observed along shipping routes in Eastern Canada and the Arctic.

The KIA recommends adding a list of species of conservation concern among the other bird VECs to the SOP, such as those listed in Table 8-1 as mentioned above. In addition, it would be useful to include a list of cliff-nesting raptors (e.g., peregrine falcon, golden eagle, gyrfalcon), which may be more visible during shipping than on land. Given that the marine bird surveyors are already recording incidental observations of other bird species (see review comment KIA-NIRB-22), an expanded bird list should not be onerous to the surveyor; rather, it may be more helpful for them to understand additional species of interest with respect to mitigating Project impacts.

Finally, there is a terminology error in Section 8, Page 8-1, with respect to changes to federal conservation statuses for species at risk. Sabina states that short-eared owl and Ross’s gull were “down-listed” from Special Concern to Threatened and from Threatened to Endangered, respectively. The opposite term should actually be used -‘Up listed’ means moving to a higher risk category, while ‘Downlisted’ means moving to a lower risk category.

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please add purple sandpiper and barn swallow to the list of species of conservation concern that could be encountered along the project shipping route.
- Please consider adding bird species of conservation concern from other bird VECs (i.e., raptors, waterbirds, upland birds) and cliff-nesting raptors to the Marine Shipping SOP.
- Please correct the terminology error in Section 8 of the 2021 Pre-Construction WMMP Report for up listing/down listing species at risk.

**Importance of Issue:**

Low

**Sabina Response:**

- Purple sandpiper and barn swallow will be added to the list of potential species of conservation concern that could be encountered along the project shipping route in the 2022 Annual Report. Both these species are very unlikely to be encountered along the shipping route in the marine environment, as the vessel is offshore; however, they will be added to the list.
- The Marine Shipping SOP will be reviewed and updated on an as-need basis to ensure complete and accurate data are collected by the vessel companies. Sabina will consider adding additional birds to Table 3.2-2 of the SOP. It is important to note that the list provided in the SOP is not an exhaustive list of bird species that could be observed, but rather a list of the most likely species to be observed. This can be made more clear in future iterations of the SOP.
- The terminology is indeed incorrect in Section 8. Thank you for catching that typo and this will be corrected.



**KIA-NIRB-24: Marine Shipping SOP data forms need space for mitigation****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Conditions No. 58, No. 64•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Appendix 7A. Marine Shipping SOP -Wildlife Mitigation and Monitoring: ENVIRO-02oAppendix 7C. Mammal Observations During Shipping, 2021oAppendix 7D. Bird Observations During Shipping, 2021

**Summary:**

The marine mammal and seabird survey sightings forms are not set up to encourage users to document management responses, which may result in the reporting sections of the Marine Shipping SOP not being followed correctly.

**Detailed Review Comment**

The Marine Shipping SOP includes three data forms as attachments: Incidental Marine Wildlife Sightings Form, Marine Mammal Survey Sightings Form, and Seabird Survey Sightings Form. In Section 3.5 of the SOP, Sabina states that management responses will be documented on the appropriate form. In addition, Section 4 outlines the End of Trip Reporting Requirements, including records of mitigation measures taken and ship strikes if they occur.

However, the three data forms differ in the fields/spaces available for documenting mitigation required and actions taken:•Incidental sightings -there is a dedicated section at the bottom of the form for Mitigation Action Taken, including instructions for describing the mitigation action and result.

- Marine mammal survey –there is a column in the Sighting Information table for “Mitigation Required?” and then a general Comments/Notes column at the end.
- Seabird survey –there is no dedicated space for recording mitigation actions, only a general Comments field at the end of the Sighting Information table.

The marine mammal and seabird survey forms should be amended, similar to the fields on the incidental wildlife sightings form, to provide the space needed to document mitigation/management responses when marine wildlife is observed and could potentially be impacted during shipping activities. Without this documentation, Sabina is not fully compliant with PC Conditions No. 58 and No. 64, related to mitigation and monitoring for seabirds and marine mammals, respectively.

The lack of dedicated space and unclear instructions may partially explain why the “Mitigation Action (Y/N)?” column could not be filled out for the summary tables of marine mammal and bird observations in 2021 (Appendices 7C and 7D, respectively, of the 2021 Pre-Construction WMMP Report). In addition, the summary tables should not simply be a Yes/No question, as the specific mitigation actions should have been described. The single “Y” entry in these tables, for a killer whale observation, is missing these details. Finally, there is a field for Photo Number on the marine mammal survey form that could be added to the other two data forms. In general, without dedicated data fields, users may forget to collect or record the necessary information for effective monitoring.

**Recommendation/Request:**

The KIA recommends/requests the following:

- Please amend the Marine Mammal Survey Sightings Form and Seabird Survey Sightings Form to include dedicated spaces to record management responses and mitigation measures.
- Please provide additional training for the shipping crew and marine wildlife monitors to clarify that any mitigation measures taken need to be described on the forms.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina will update the survey sightings forms for marine mammals and seabirds as requested and include guidance in the marine observer SOP to fill in this field.

## KIA-NIRB-25: Marine Shipping SOP vs. Shipping Management Guidelines brochure

### References:

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Conditions No. 58, No. 64•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Appendix 7A. Marine Shipping SOP -Wildlife Mitigation and Monitoring: ENVIRO-02oAppendix 7B. Shipping Management Guidelines

### Summary:

There are some discrepancies or unclear information between details in the Marine Shipping SOP and the Shipping Management Guidelines brochure, including seabird colony setback requirements, marine wildlife survey effort, and seabird ship strike reporting requirements.

### Detailed Review Comment

Sabina has produced a Shipping Management Guidelines brochure as part of Project training for shipping companies. There are some details in the brochure that are less clear than the information provided in the Marine Shipping SOP: Sensitive Habitat for Seabirds (p. 4) -Compared to Table 3.5-1 in the SOP, the setbacks shown in the brochure are ambiguous. Table 3.5-1 specifies that the setbacks are for any large group (10+) of seabirds on ocean surface OR any colony of seabirds on land while traversing the sensitive habitat areas identified in Figure 2.1-1. The brochure does not mention seabird colonies explicitly. Furthermore, the KIA recommends that any seabird aggregations (10+ individuals) observed whether within the “highly risk intolerant” sites indicated (i.e., Bathurst Inlet/Elu Inlet, Lambert Channel, Eastern Lancaster Sound, Eastern Jones Sound) or the “moderately risk intolerant” sites, or even outside these mapped areas, should also have the 500 m setback applied.

Marine Mammal and Seabird Survey Effort (p. 5) -The brochure states that at least 1 dedicated marine mammal survey should be conducted per day, lasting 1.5 to 2 hours; and that 1-3 dedicated seabird surveys should be conducted per day, lasting 30 min each. These instructions are inconsistent with Section 3.4.2 of the SOP, which specifies a dedicated 30 min survey period, 2-4 times per day, for both marine mammals and seabirds. Although the overall timing is generally in agreement, the instructions should be presented in a consistent manner between documents. Wildlife Collision Reporting (p. 7) - Section 3.6 of the SOP states that for all ship strikes, an Incidental Marine Wildlife Sightings Form must be filled out. If the ship strike is a marine mammal, the ship’s captain must report the strike to Sabina as soon as practical and within 24 hours and must also report the strike to the DFO.

There are no additional reporting requirements for seabird strikes in the SOP, although it is implied that Sabina would be informed of seabird strikes when they receive the completed forms within 2-3 weeks of completion of voyage. (Note: the timeline for submitting forms and ship tracks is noted on p. 6 of the brochure; these details are also not included in the SOP.) However, the brochure has more stringent reporting requirements for seabirds -all collisions must be reported to Sabina, and seabird collisions also need to be reported to CWS and ECCC Wildlife Enforcement. These reporting guidelines should be added to the Marine Shipping SOP.

### Recommendation/Request:

The KIA recommends/requests the following:

- Please clarify the instructions for setback distances for seabird colonies in the Shipping Management Guidelines brochure. Please also consider not limiting the setback requirements to the “highly risk intolerant” sites for seabird colonies.

## RESPONSES TO 2021 ANNUAL REPORT COMMENTS

- Please resolve the discrepancies for marine mammal and seabird survey effort between the Marine Shipping SOP and the brochure.
- Please include the additional seabird collision reporting to CWS and ECCC Wildlife Enforcement in the Marine Shipping SOP.

### **Importance of Issue:**

Low

### **Sabina Response:**

- The Shipping Management Guidelines brochure is meant to be a quick document for vessel captains to read to ensure they are following the shipping mitigation, and to ensure they can quickly see the areas along the shipping routes that require additional caution and mitigation. The SOP is meant to provide additional details to outline the specific steps to take for the surveys. These documents are given together to the shipping companies and are not meant to be copies of the same information. Therefore, the setback distances in the brochure will remain unchanged, as these present specific areas the captain must always avoid. The SOP outlines details for mitigation that must be implemented when seabirds are observed. The observer will inform the captain if groups are seen and if mitigation is required.
- As the reviewer pointed out, that although the survey effort presented in the brochure and SOP are the same, the information in the brochure is a summary of what will be required. It is not meant to provide a detailed methodology. However, Sabina will ensure this is more clear and consistent in the next iteration of the SOP and brochure.
- Sabina will include seabird collision details to the Marine Shipping SOP, as in the brochure.

**KIA-NIRB-26: Wildlife protection measures in OPMP & OPEP****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Conditions No. 89•Appendix G. Marine Laydown Area Oil Handling Facility: Oil Pollution Prevention Plan & Oil Pollution Emergency Plan (September 2021) o Sections 7.3, 7.4, 7.5, 8.4, 9.1, 10.1; Annex 4

**Summary:**

Further details and clarification are needed regarding the wildlife protection measures outlined in Sabina's OPMP & OPEP to allow for confidence in their implementation and success. The roles and responsibilities, including requirements to be on-site, are unclear for the Technical Specialists and Emergency Contacts in case of spills affecting wildlife. Specific wildlife hazing techniques and equipment are not fully listed in the OPMP & OPEP, which raises the question of how staff can be appropriately trained, and how prepared Sabina is for implementing wildlife protection measures if/when a spill occurs.

**Detailed Review Comment**

Sabina's Oil Pollution Prevention Plan & Oil Pollution Emergency Plan (OPMP & OPEP) does not have sufficient details regarding mitigation measures and emergency management response for wildlife protection. As such, it is difficult to determine whether Sabina's plans will ensure compliance with PC Condition No. 89 (related to protection of marine wildlife, migratory birds, and the marine environment during spills). The KIA requests clarification on the following: Roles and Responsibilities Section 7.5 outlines the "selected Sabina Incident Command System (ICS) positions to be initially staffed, if applicable."

Section 7.5.10 is about the Environmental Unit Lead but refers to Technical Specialists who would perform many of the functions needed (e.g., strategic assessment, modeling, surveillance, environmental monitoring and permitting). There is also a list of "possible assignments" in the ICS Organizational Structure shown in Figure 7.3-1, including Scientific Support Coordinator, Sampling Specialist, Response Technologies Specialist, Trajectory Analysis Specialist, Resources at Risk Specialist, Shoreline Cleanup Assessment Specialist, Historical/Cultural Resources Specialist, and Disposal Specialist. It is unclear whether Sabina has proposed persons in mind for these positions, and whether Sabina has retained these Technical Specialists on site or on call.

Sabina also provides a list of "Emergency Contacts in Case of Spills Affecting Wildlife" in Table 8-1. Would any of these contacts take on one or some of Technical Specialist roles?

Regardless, only the Nunavut Emergency Management contact is based in the territory (but in Iqaluit), while other emergency contacts are located in BC, Nova Scotia, California and Alaska. Can Sabina ensure that these emergency contacts can aid and/or advice in a timely manner in case of spills?

Bird Hazing and Other Deterrents Section 8.4 describes Sabina's wildlife protection procedures in response to a spill event. A combination of audible and visual devices will be used as wildlife deterrents, including but not limited to pyrotechnics, visual scare tactics, broadcast sounds, and exclusion. The KIA recommends that Sabina review the Bird Hazing Manual: Techniques and Strategies for Dispersing Birds from Spill Sites published by the University of California (Gorenzel & Salmon, 2008). Section G of this manual outlines the suggested hazing techniques for different bird groups and locations/conditions. Sabina should ensure that different deterrent options are available on site in case some techniques are shown to be less effective than others. Wildlife protection (hazing) equipment is not included in the "Resources Required" column of Tables 9-1, 9-2, and 9-3, which present different bulk fuel transfer spill scenarios. While the KIA recognizes that these tables focus on spill containment and cleanup, it is also

important to bear in mind that additional mitigation measures will be needed if wildlife are present in the area and could be impacted by the spill. Furthermore, wildlife hazing equipment is not listed in Annex 4: Spill Response Equipment of the OPPP & OPEP. The only item listed that is explicitly for wildlife is “large nets (bird recovery)”, which would presumably be used after birds have already been impacted by the spill. Hazing equipment should be included to demonstrate that Sabina understands which techniques would be the most effective in different scenarios, and that Sabina is prepared to implement wildlife protection response in a timely manner.

In addition to equipment, wildlife hazing requires trained personnel. In Section 8.4, Sabina states that “Only workers trained in the safe and proper use of certain hazing equipment will be permitted to haze wildlife” and “To ensure alive oiled wildlife be dealt with humanely, capture and handling of wildlife shall only be done by trained and permitted individuals.” However, training for wildlife hazing techniques and animal retrieval are not included in Section 10.1 (Training -General) of the OPPP & OPEP. Will Sabina ensure that there will always be trained individuals available for emergency response? Furthermore, how will workers be trained in hazing equipment if the specific types of equipment do not appear to have been decided upon?

### **Recommendation/Request:**

The KIA recommends/requests the following:

- Please clarify if there is a proposed staff list for the Technical Specialist positions that could possibly be assigned, as described in the OPPP & OPEP. Please also clarify if these are on-site staff or on-call from remote locations.
- Please clarify the roles of the Emergency Contacts in case of spills affecting wildlife. If their assistance is required on site, please explain how the contacts located in different provinces and countries will be able to respond in a timely manner.
- Please refer to Gorenzel & Salmon (2008) for bird group and location-specific hazing techniques that are known to be effective. Please incorporate these techniques and equipment into the lists of required equipment in the OPPP & OPEP.
- Please clarify whether Sabina is providing training for wildlife hazing techniques and animal retrieval in case of spills, and whether there will always be trained staff on site.

### **Importance of Issue:**

Moderate

### **Sabina Response:**

Due to the comparative rarity of fuel spills in recent decades, technical expertise in the areas of wildlife rescue and rehabilitation has become concentrated in a small handful of companies in North America who specialize in wildlife spill response. These companies provide technical specialists and equipment, and are prepared to mobilize to any site in North America to lead wildlife response activities. In consultation with the Canadian Wildlife Service, Department of Fisheries and Oceans and Nunavut DOE Wildlife Management Division, Sabina will take guidance from, and make use of, trained technical specialists from one of these companies in the event a wildlife response is required. Any hazing or live animal retrieval will be undertaken under the guidance of a technical specialist from one of these companies, or as required by the Canadian Wildlife Service (for migratory birds) or Fisheries and Oceans Canada (for marine mammals).

Sabina is currently updating the OPPP & OPEP to reflect 2022 offload activities, and will verify the availability and capabilities of the wildlife spill response organizations included in the plan and will clarify their role. Sabian will also seek their input on whether additional gear should be positioned at the MLA to facilitate their potential wildlife response.

## **KIA-NIRB-27: Waterbird staging areas maps in OPMP & OPEP vs. Fixed-Wing and Helicopter Operations SOP**

### **References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Conditions No. 60•Appendix F. 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report (March 2022) o Appendix 5A. Fixed-Wing and Helicopter Operations SOP -ENVIRO-03•Appendix G. Marine Laydown Area Oil Handling Facility: Oil Pollution Prevention Plan & Oil Pollution Emergency Plan (September 2021)

### **Summary:**

Maps in the OPMP & OPEP and the Fixed-Wing and Helicopter Operations SOP show different waterbird staging areas. Important areas identified for spill response should also be considered during aircraft operations.

### **Detailed Review Comment**

Figure 3-2 in the OPMP & OPEP shows the “5 ML Spill Sensitivity in Relation to Migratory Bird Staging Areas in Bathurst Inlet”. On this map, there are many locations considered as staging areas, with groups of waterfowl and waterbirds binned into 11-25, 26-100, and >100 individuals.

It is unclear how the OPMP & OPEP sensitivity map relates to Figure 2 (Back River Project: Wildlife Features in the Project Area) in the Fixed-Wing and Helicopter Operations SOP, where only three waterbird staging areas are identified: one in “MLA South Bay”, one in “Duckpot (George Staging)”, and the entirety of Beechey Lake. Based on Figure 3-2 of the OPMP & OPEP, there are many more waterbird staging areas that pilots should be aware of, and mitigation actions taken when large groups of birds are present. By considering these additional areas, Sabina would demonstrate greater compliance with PC Condition No. 60.

### **Recommendation/Request:**

The KIA recommends/requests the following:

- Please explain why there are many more waterbird staging areas identified for spill response as opposed to aircraft operations.

If Figure 3-2 in the OPMP & OPEP shows known areas of concentration of waterfowl and other waterbirds, then pilots should be applying the same setbacks as described for waterbird staging areas in the Fixed-Wing and Helicopter Operations SOP.

### **Importance of Issue:**

Moderate

### **Sabina Response:**

Figure 3-2 in the OPMP and OPEP shows historical sightings of waterfowl and waterbirds in Bathurst Inlet over several years (3+ years), including sightings during dedicated surveys and incidental observations. Staging areas are traditional points where flocks of waterbirds aggregate during migration. The sightings on Figure 3-2 are historical observations of all birds observed during all seasons (including July and August) and do not indicate staging areas. The title on Figure 3-2 will be updated to ensure it is more accurate.



**KIA-NIRB-28: Terrestrial Environment -Permafrost Monitoring****References:**

Sabina, Back River Project 2021 Annual Report (March 31, 2022)•Project Certificate Condition No. 12  
 Sabina, Back River Project, 2020 Annual Report (March 31, 2021)•Project Certificate Condition No. 12  
 Sabina, Back River Project, Responses to 2020 Annual Report Comments (July 6, 2021)•Response to Kitikmeot Inuit Association, KIA-14

**Summary:**

There is not any discussion of the results of monitoring permafrost conditions in response to site infrastructure.

**Detailed Review Comment**

Project Condition 12 of the Project Certificate 007 states that “The Proponent shall monitor the effects of the Project on permafrost conditions relative to project infrastructure, including associated roads, waste rock stockpiles, trails, and quarries.”

Reporting requirements for Project Condition 12 of the Project Certificate 007 states that “During construction, the Proponent shall, on an annual basis, provide information regarding the results of monitoring and identifying any mitigation measures undertaken in fulfillment of this Term and Condition in the Proponent’s annual report to the Nunavut Impact Review Board.”

However, there is no reporting on results of permafrost monitoring.

**Recommendation/Request:**

The KIA requests the following:

- Please provide the results of the geotechnical inspection(s), including applicable pictures, with an interpretation as to how the inspection relates to fulfilling PCs 11-13, along with the results of monitoring and identifying mitigation measures.
- Please describe monitoring to identify project effects on permafrost conditions relative to all project infrastructure, including identifying any mitigation measures.
- Please provide a definition of “major earthworks” as opposed to other sorts of earthworks.

**Importance of Issue:**

Moderate

**Sabina Response:**

- a) It is a direct requirement of the NWB Water Licence to provide the third party geotechnical inspection in the NWB annual report; it is not a direct requirement of the NIRB Project Certificate. The KIA reviews the NWB annual report and subsequently the third party geotechnical inspection report, therefore Sabina does not feel it is necessary to include it within the NIRB annual report.
- b) Sabina has a network of thermistors that were installed during the permitting phase of the Back River Project. Although Sabina has not constructed any water or waste management infrastructure where permafrost monitoring thermistors can be installed to assess thermal

## RESPONSES TO 2021 ANNUAL REPORT COMMENTS

conditions, Sabina commits to completing a download of the data from the permitting phase thermistors in 2023 and will provide a summary of the results in the following annual report.

- c) Sabina cannot find any use “major earthworks” in any of its annual report comments for PCs 11-13.

**KIA-NIRB-29: Climate and Meteorology / Greenhouse Gas Reduction Plan****References:**

Project Certificate Condition No. 6

**Summary:**

Under this condition, Sabina will have to monitor and reduce greenhouse gas emissions produced by the Project. It is understood that Sabina is continuing to implement their Greenhouse Gas (GHG) Reduction Plan mitigative and adaptive strategies.

**Detailed Review Comment**

Sabina is providing estimates for GHG emission as per the guidance document developed by Environment Canada in 2004. It is important to note that emissions from permafrost thaw are not included in this guideline and the magnitude of GHG emission from thawing permafrost is only slowly being researched and understood (Natali et al. 2021; Turetsky et al., 2020). It is possible that the GHG emission reported underestimate total emissions for the Project developing from permafrost disturbance. Susan M. Natali, et al., “Permafrost carbon feedbacks threaten global climate goals” Proceedings of the National Academy of Sciences, May 2021. Merritt R. Turetsky, et al., “Carbon release through abrupt permafrost thaw,” Nature Geoscience, February 2020.

**Recommendation/Request:**

It is recommended that Sabina consider and monitor how permafrost thaw within the project area may impact project-related emission of GHG over the Project’s life, and to measure carbon fluxes using the eddy covariance technique.

**Importance of Issue:**

Moderate

**Sabina Response:**

“...unlike most project-related environmental effects, the contribution of an individual project to climate change cannot be measured” (ECCC 2003). It is understood that permafrost thaw as a global phenomenon has the potential to accelerate climate change through a positive feedback mechanism. It is Sabina’s understanding that the scale of permafrost thaw required to contribute meaningfully to positive feedback loop is well beyond the scale of a local mining project and the limited permafrost disturbance that could result from the construction and operation of the mine. Establishing an eddy-covariance based-carbon flux monitoring program would represent a very expensive program, unlikely to yield helpful results. Sabina will continue to monitor the emerging science of permafrost thaw and its potential application at the project, and has committed to completing a review of ground temperature monitoring devices in 2023.

**KIA-NIRB-30: Climate and Meteorology / Weather Monitoring and Adaptive Management**

**References:**

Project Certificate Condition No. 8

**Summary:**

Some weather parameters that should be reported under this condition appear to be missing and changes to the assessment are recommended

**Detailed Review Comment**

Sabina provides weather data for the Goose Station and compares those data with data from the Environment and Climate Change Canada (ECCC) Bathurst Inlet station and the climate normal (1981-2010) that had been generated by ECCC for Lupin. In addition, power failure resulted in data loss in November 2021. Only some of the data that are requested to be reported under PCC No.8 are presented, for example and as stated in PCC No. 8: the onset of seasonal freeze and thaw cycles, as well as a highlighting of weather extrema or outlying weather events were missing.

**Recommendation/Request:**

It is recommended that the weather station at MLA be rehabilitated to obtain a better understanding of the regional climate conditions.

It is requested that Sabina provides the missing information as per PCC No.8 in future reports.

It is further recommended that comparison is made using satellite-derived weather data, for example those provided by NASA, in addition to the comparison to Lupin. Not only is the station at Lupin located ~224 km to the East from the project, but it is also affected by local conditions (Contwoyto Lake / large water body) and the climate normal data (1981 -2010) are outdated, specifically considering the changes that have occurred over the last decade in the Arctic. As such, a comparison of the project weather data with the climate normal from Lupin does not provide information on evaluating extrema and abnormal weather conditions, which is the purpose of this condition.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina understands the importance of monitoring climate and weather. Future reporting will provide any data that are available to fill data gaps. Power failure on remote, unattended weather stations can sometimes not be avoided and it results in gaps that cannot be filled with local data. Sabina will consider further comparison of the locally collected data with satellite-observations.

**KIA-NIRB-31: Terrestrial Environment / Permafrost Mapping and Monitoring****References:**

Project Certificate Condition No. 11

**Summary:**

Sabina provided the 2021 Annual Geotechnical Report for the Goose Project Site. However, no recent information has been provided regarding the permafrost condition even though such data should be made available during pre-construction to inform the detailed design of project infrastructure.

**Detailed Review Comment**

Sabina did not provide any new information regarding permafrost temperature, thickness of seasonal thaw and amount of ground ice in the project development area to improve the permafrost characterization. Sabina states that “Currently, Sabina has not constructed any waste or waste management infrastructure where permafrost monitoring thermistors can be installed to assess thermal conditions.” However, a monitoring program has been performed as part of the project development and any associated data should be collected and provided as they would provide ongoing baseline information. This condition not only refers to the thermal behaviour of new infrastructure, but also the existing environment. Sabina’s proposed next step, i.e., “During Construction, Sabina shall, on an annual basis, provide any additional permafrost mapping information documented in fulfillment of this T&C in Sabina’s annual report to the NIRB.” is not considered sufficient in the context of this condition as it would be limited to the construction project phase and new infrastructure.

**Recommendation/Request:**

It is requested that Sabina collect and provide updated information on the permafrost characteristics annually, regardless of project phase and/or construction activities.

**Importance of Issue:**

High

**Sabina Response:**

- a) Sabina has a network of thermistors that were installed during the permitting phase of the Back River Project. Although Sabina has not constructed any water or waste management infrastructure where permafrost monitoring thermistors can be installed to assess thermal conditions, Sabina commits to completing a download of the data from the permitting phase thermistors in 2023 and will provide a summary of the results in the following annual report.

**KIA-NIRB-32: Terrestrial Environment / Permafrost Monitoring**

**References:**

Project Certificate Condition No. 12

**Summary:**

Similar to PCC No. 11 (KIA-NIRB-31), no new information has been provided.

**Detailed Review Comment**

The condition is not limited to the construction phase. Similar to PCC No. 11, recent data from existing permafrost monitoring is expected to be included in the annual geotechnical report as it provides ongoing baseline information and helps with improving the understanding of the local permafrost conditions. Together with the assessment of the weather conditions, it provides data that can be used to evaluate natural vs. project related environmental impacts.

**Recommendation/Request:**

It is requested that Sabina provide updated information on the permafrost characteristics within the project area.

**Importance of Issue:**

High

**Sabina Response:**

- a) Sabina has a network of thermistors that were installed during the permitting phase of the Back River Project. Although Sabina has not constructed any water or waste management infrastructure where permafrost monitoring thermistors can be installed to assess thermal conditions, Sabina commits to completing a download of the data from the permitting phase thermistors in 2023 and will provide a summary of the results in the following annual report.

**KIA-NIRB-33: Aquatic Effects Monitoring Plan (AEMP)****References:**

Annual Report Section 4.5.7 Groundwater and Surface Water Quality

**Summary:**

AEMP was not included in the annual report.

**Detailed Review Comment**

“The Proponent shall, reflecting any direction from the Nunavut Water Board, maintain an Aquatic Effects Monitoring Plan (AEMP) designed to: determine the short and long-term effects in the aquatic environment resulting from the Project; evaluate the accuracy of Project effect predictions; assess the effectiveness of mitigation and management measures on Project effects; identify additional mitigation measures to avert or reduce environmental effects due to Project activities; and comply with Metal Mining Effluent Regulations requirements, should an Environmental Effects Monitoring program be triggered.”

The AEMP Report was not included within the Annual Report and therefore does not allow a determination as to whether project pre-development activities have had an impact on the aquatic environment (i.e., baseline water quality data from 2021 has not been disclosed). While we appreciate the Annual Report includes a summary of what field programs have occurred, an AEMP data report would permit an evaluation as to whether the existing Plan (dated October 2017) continues to meet the objective of the Project Certificate Condition.

**Recommendation/Request:**

Annual AEMP reports should be completed and appended to the project Annual Report in future years. Monitoring programs and associated results for all VECs should be summarized within the body of the Annual Reports in future years. This was also recommended in the 2020 report review but was not implemented. We note that without this information, this reviewer is unable to determine whether the existing AEMP continues to meet the objectives of the associated Project Certificate Condition.

**Importance of Issue:**

High

**Sabina Response:**

Annual AEMP reports will be completed and appended to the project Annual Report in future years after implementation of the AEMP. The AEMP will be implemented when dewatering is initiated, which is expected in Year -1 (2024). Thus it is anticipated that the 2024 Annual Report will include the 2024 AEMP Annual Report as an appendix.

In 2021, additional aquatic baseline data were collected to address the commitments made by Sabina in response to technical review comments on the Aquatic Baseline Synthesis Report and to support the next update to the AEMP, which will be submitted to NWB on August 30, 2022. The following information was collected:

- Water quality during the ice-cover season in four areas in Goose Lake (i.e., West Bay, Central Basin, Southeast Basin, and Goose Lake Tail), one area in Reference B Lake, and one area in Propeller Lake (near centre).

## RESPONSES TO 2021 ANNUAL REPORT COMMENTS

- Water quality during the open-water season in four areas in Goose Lake (i.e., West Bay, Central Basin, Southeast Basin, and Goose Lake Tail) and two areas within Propeller Lake (i.e., north and south basins).
- Water quality during the open-water season, including during freshet, at several inflows and outflows of Goose Lake.
- Sediment quality and benthic invertebrate community in two areas in Propeller Lake (i.e., north and south basins).
- Fish health and tissue chemistry (mercury) in Lake Trout from Goose Lake and Propeller Lake.
- Fish health and tissue chemistry (metals) in Slimy Sculpin from two areas in Propeller Lake.

Collection of these data fulfil the commitments made by Sabina for additional baseline data collection to support the AEMP. These data will be used to support interpretation of future AEMPs, including the calculation of normal ranges. A copy of the 2021 Aquatic Baseline Report will be provided under separate cover, by August 19.



**KIA-NIRB-34: Mine Site Inspection Results.****References:**

Annual Report Section 4.4.1 Agency Inspections and Site Visits

**Summary:**

Results of site inspection not included in annual report.

**Detailed Review Comment**

Sabina notes that the following inspections occurred in 2021: -“KIA (July 22 to 24): inspection of Goose Lake Camp, Marine Laydown Area, and George Lake Camp was conducted as per the KIA established inspection schedule.-CIRNAC (September 4): inspection of the Goose Lake Camp.”

No outcomes of these inspections were discussed in the annual report nor within the appendices.

**Recommendation/Request:**

Please include a summary of issues highlighted during project inspections and Sabina’s response to them in future Annual Reports. This was also recommended in the 2020 review but was not implemented. It continues to be unclear whether issues have been identified by inspectors that remain unaddressed by the proponent.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina apologizes for not implementing this approach in previous reports and commits to including these summaries within future annual reports.

**KIA-NIRB-35: Waste Management Plan**

**References:**

Annual Report Project Certificate No. 14

**Summary:**

The Waste Management Plan was not fully included in the annual report.

**Detailed Review Comment**

“The Proponent shall provide a Waste Management Plan that describes how the local environment, including permafrost integrity and water quality, will not be harmed by wastes at project landfills.”

The Waste Management Plan in full was not included in the Annual Report. The Tailings Management Plan is included in Appendix K, but it is unclear what other Management Plans are included in the licensing, as they are mentioned but not included in the Annual Report (i.e., Environmental Management and Protection Plan, Waste Rock Management Plan, Site Water Monitoring and Management Plan).

**Recommendation/Request:**

All monitoring programs and associated baseline results should be included/summarized in the Annual Reports in future years. For plans currently in development, we recommend Sabina indicate an estimated completion date for those plans.

**Importance of Issue:**

High

**Sabina Response:**

The most recent version of the Back River Project’s Landfill and Waste Management Plan (October 2017) is available on the NIRB’s and NWB’s public registries. This plan was included with the 2020 Annual Report to the NIRB and was not re-submitted in the 2021 report as it had not yet been revised. Once revised, the approved plan will be submitted with the Annual Report.

Sabina routinely includes any updated plans and monitoring results from the year prior in the Annual Report to the NIRB.

**KIA-NIRB-36: Effluent discharge from TSF****References:**

Appendix K Section 5.2.7 Tailings Storage Facility Operations

**Summary:**

No specific criteria for effluent discharges are provided for TSF.

**Detailed Review Comment**

“Tailings water from the TSF supernatant pond will be recycled and reused in the Process Plant as reclaim water, with no planned discharge from the TSF during Operations. Should a controlled discharge be required during Operations, all effluent will meet relevant regulations or site-specific water quality objectives.” No clarification is given regarding the specific criteria that effluent and discharges will need to comply with (this information may be included in missing Management Plans).

**Recommendation/Request:**

Provide clarification on which water quality criteria will be used to identify exceedances in discharges (i.e., MDMER or more stringent).

**Importance of Issue:**

High

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-37: HADDs**

**References:**

2.2.1.4 Fisheries and Oceans Canada

**Summary:**

DFO determined that the annual report does not indicate (sic) that any work resulted in harmful alteration or disruption or destruction of fish habitat beyond the scope of the Proponent's current Fisheries Act Authorization.

**Detailed Review Comment**

Does this mean a HADD occurred, but was covered under the current Authorization?

**Recommendation/Request:**

Please clarify whether any HADDs occurred to fish habitat.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina has not completed any work in 2021 that resulted in harmful alteration or disruption or destruction of fish habitat. Sabina is committed to follow conditions in their Fisheries Act Authorization for the Back River Project that was provided by DFO.

**KIA-NIRB-38: Outstanding Operational Management and Monitoring Plans****References:****4.0 Findings****Summary:**

Sabina was required to submit operational plans and commence monitoring programs which may address the majority of issues noted in the 2019-2020 and 2020-2021 reporting periods and which are required under the Project Certificate for activities in the Construction Phase.

**Detailed Review Comment**

Monitoring programs were to commence in 2021. No results from these programs are presented in this report.

**Recommendation/Request:**

The missing monitoring results should be reported as well as a comparison of the results with predicted results from the EIS. If the NIRB determined pre-construction had started, then monitoring for the activities that started should have been initiated. Appendix A only indicates active compliance for monitoring plans, but not actual monitoring.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina is unclear on which monitoring results are missing. Reports on all monitoring conducted under the Project Certificate in 2021 were included in the Annual Report. This monitoring reporting included:

1. Air quality and dustfall monitoring results (2021 Annual Report, Section 4.5.1)
2. Green House Gas monitoring estimation (2021 Annual Report, Section 4.5.2)
3. Meteorological monitoring results (2021 Annual Report, Section 4.5.2)
4. Stream flow monitoring results (2021 Annual Report, Section 4.5.8)
5. Vegetation monitoring results (2021 Annual Report, Section 4.5.9)
6. Archaeology monitoring overview (2021 Annual Report, Section 4.6.7)
7. 2021 Pre-Construction Wildlife Mitigation and Monitoring Plan (2021 Annual Report, Appendix F)
8. 2021 Socio-Economic Monitoring Report (2021 Annual Report, Appendix H) (which also reports relevant info from Sabina's Community Involvement Plan (2021 Annual Report, Appendix C) and Business development plan (2021 Annual Report, Appendix E)

Sabina also completed a geotechnical inspection of the Project which was included in the NWB annual report and will be completed again in 2022.

Some monitoring programs have not yet commenced. These programs will be initiated as outlined in the relevant plans and in association with infrastructure development (e.g., Tailings monitoring will be undertaken when tailings are produced, incinerator stack testing upon incinerator commissioning) or as otherwise triggered (e.g., by Project phase).

## RESPONSES TO 2021 ANNUAL REPORT COMMENTS

Sabina also conducts additional monitoring related to other requirements, e.g., monitoring under the Water Licence 2AM-BRP183 (these annual reports and monitoring results can be found on the NWB public registry); Grievance data is submitted using the Grievance Database maintained by the Director, Indigenous & Northern Affairs (this information is not publicly available) and archaeological monitoring results are submitted to the Government of Nunavut Department of Culture, Language, Elders and Youth (these reports are also not publicly available).

**KIA-NIRB-39: 2021 monitoring program starts****References:**

Appendix A

**Summary:**

12. Monitoring and annual geotechnical inspections will begin in 2021.<sup>13</sup> Monitoring and annual geotechnical inspections will begin in 2021.<sup>52</sup> To be provided within one (1) year of construction. Note: the NIRB expects reporting on this Term and Condition in the 2021 annual Nunavut Impact Review Board File No. 12MN036 2020 -2021 Monitoring Report 24 Back River Gold Mine Project report as the Project has been designated by the NIRB as being in construction as of 2020.

**Detailed Review Comment**

Several monitoring programs are listed as not yet active and beginning in 2021. This report was submitted in November 2021. Unless the programs were to start in December 2021, their planned start dates should be changed.

**Recommendation/Request:**

Update monitoring plan start dates.

**Importance of Issue:**

Low

**Sabina Response:**

Sabina is unclear on the references provided here, which don't appear to be referring to the 2021 Annual report, could KIA provide further clarification on the comment?

## **KIA-NIRB-40: Goose Property Groundwater Inflows**

### **References:**

Water Management Plan, Table 5.1-1, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

### **Summary:**

Ground water flows indicated in annual report do not correspond to SRK groundwater model.

### **Detailed Review Comment**

Table 5.1-1 indicates groundwater inflows ranging from 0 m<sup>3</sup>/day to 75 m<sup>3</sup>/day at Umwelt Underground, between 70 m<sup>3</sup>/day to 190 m<sup>3</sup>/day at Llama Open Pit, and between 0 m<sup>3</sup>/day to 410 m<sup>3</sup>/day at Llama Underground. The estimates above mentioned seem different from the results of the Groundwater model developed by SRK as part of the hydrogeological baseline study in support of the Back River Project. The Hydrogeological Characterization and Modelling Report for the Project (October 2015) indicates that:

- Umwelt Underground groundwater inflow ranges between 0 m<sup>3</sup>/day and 596 m<sup>3</sup>/day; •Llama underground groundwater inflow ranges between 0 m<sup>3</sup>/day and 350 m<sup>3</sup>/day;
- Llama open pit groundwater inflow ranges between 0 m<sup>3</sup>/day and 120 m<sup>3</sup>/day; inflow rates for the water balance model.

### **Recommendation/Request:**

KIA's consultant cannot comment on the updated groundwater inflow rates at this time. Once the updated groundwater model report will be made available, they will review the rationale of using different ground water inflow rates for the water balance model.

### **Importance of Issue:**

High

### **Sabina Response:**

Noted. We look forward to receiving any review comments you may have.



**KIA-NIRB-41: Throughout the Water Management Plan Appendix D is referred to as the Water and Load Balance Report.**

**References:**

Water Management Plan, Appendix D, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

**Summary:**

Is Appendix C or D the Water and Load Balance Report?

**Detailed Review Comment**

Appendix D is cited several times throughout the Water Management Plan. Appendix D is implied as being “Water and Load Balance Report”, which is referred as Appendix C in the Table of Contents section.

**Recommendation/Request:**

Please clarify.

**Importance of Issue:**

Moderate

**Sabina Response:**

Appendix C is the Water and Load Balance Report. The Table of Contents is correct. There is no Appendix B to the Water Management Plan.

## **KIA-NIRB-42: Water consumption from Goose Lake**

### **References:**

Water Management Plan, Table 7.3-1, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

### **Summary:**

Total amount of Goose Lake water consumption maybe inaccurate.

### **Detailed Review Comment**

Text: “During the life of the Project, water consumption requirements from Goose Lake include 1,500 m<sup>3</sup>/day of freshwater year-round and an additional 400 m<sup>3</sup>/day during the open water season for a total of 1,900 m<sup>3</sup>/day” Table: Total Water Use: Goose Lake: 608,700 m<sup>3</sup>/year. Table should indicate: 584,300 m<sup>3</sup>/year if open water season is from July until September.

### **Recommendation/Request:**

The total amount on the table is not consistent with the text. Please clarify how many days are considered during open water season (July-September) and what the correct total volume is.

### **Importance of Issue:**

Moderate

### **Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-43: Inflows to Primary Pond****References:**

Water Management Plan, Table 8.1-1, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

**Summary:**

Inflows to Primary Pond are not presented.

**Detailed Review Comment**

The Echo Open Pit will commence during the Construction Phase (-2). Inflows pumped to Primary Pond is not indicated.

**Recommendation/Request:**

Please add in Table 8.1-1: “, and inflows are pumped to the Primary Pond. “

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-44: Saline Water Pond storage capacity.**

**References:**

Water Management Plan, 8.2.7 Saline Water Pond, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

**Summary:**

Alternate Saline Water storage to SWP.

**Detailed Review Comment**

Text: “In the event of insufficient storage within the SWP before the Goose Main Reservoir is available, saline water can be transferred to the Llama TF once active in Year 6, or Umwelt Underground around Year 10 and Year 12, when the void spaces within the underground will be available.”

**Recommendation/Request:**

Please provide an alternative if there is insufficient storage within the SWP before Goose Main Reservoir is complete.

**Importance of Issue:**

High

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-45: Guidance criteria for general site runoff.****References:**

Water Management Plan, 9.4 General Site Runoff, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

**Summary:**

Details are required on water runoff guidance criteria.

**Detailed Review Comment**

Text: “Collected water or runoff that meets the criteria applicable water license criteria will be discharged to land, and where possible at a minimum setback of 31 m from a waterbody.”

**Recommendation/Request:**

Please provide more details about the applicable guidance criteria and how the surface water runoff be testing plan to ensure the water meets application criteria.

**Importance of Issue:**

Low

**Sabina Response:**

The sampling requirements and discharge criteria referred to in the WMP are those specified in Water Licence 2AM-BRP1831. Once the Metal and Diamond Mining Effluent Regulations are triggered the additional testing and discharge criteria outlined in those regulations will additionally apply to all final discharge points.

**KIA-NIRB-46: Treatment of water within Llama and Umwelt Lakes.**

**References:**

Water Management Plan, 7.4.2 Goose Property Water Treatment Plant, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

**Summary:**

Basis of the assumption for water treatment of water within Llama and Umwelt Lakes.

**Detailed Review Comment**

Text: “it is assumed that 50% of the water within Llama and Umwelt Lakes will required to be treated for TSS before discharging to the Goose Lake”

**Recommendation/Request:**

Please provide the rationale for assuming that 50% of the water within Llama and Umwelt Lakes will require to be treated.

**Importance of Issue:**

Low

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-47: Groundwater inflows from active layer or taliks below Llama and Umwelt Lakes.**

**References:**

Water Management Plan, 8.1.1 Lake Dewatering, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

**Summary:**

Consideration of groundwater inflows from active layer or taliks below Llama and Umwelt Lakes into Llama during dewatering.

**Detailed Review Comment**

Text: “Llama Lake, which has a natural capacity of 0.96 M-m<sup>3</sup>, will be dewatered.....Umwelt Lake, which has a natural capacity of 0.24 M-m<sup>3</sup>, will be dewatered in Year -1.”

**Recommendation/Request:**

Please clarify if groundwater/water inflows from the shallow active layer or from taliks below Llama Lake and Umwelt Lake have been considered when considering dewatering volumes. To prevent groundwater/water inflow from the shallow active layer, the construction of diversion berms around Llama Lake during Phase 1 might be explored. Based on Figure A-06 and Figure A-07, diversion berms will be constructed around the Llama pit only during Phase 2.

**Importance of Issue:**

High

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-48: Sequence of dewatering of Llama and Umwelt Lakes**

**References:**

Water Management Plan, 8.1.1 Lake Dewatering, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE)

**Summary:**

Clarification on the sequence of dewatering of Llama and Umwelt Lakes.

**Detailed Review Comment**

Text: “Effluent will be discharged to Umwelt Lake and ultimately flow into Goose Lake.....Umwelt Lake, which has a natural capacity of 0.24 M-m<sup>3</sup>, will be dewatered in Year -1. Similar to Llama Lake, it is assumed that only 50% of the lake water volume will be suitable for direct discharge.”

**Recommendation/Request:**

Approximately 0.48 M-m<sup>3</sup> will be discharged from Llama Lake to Umwelt Lake. This will increase the volume of water to be dewatered from Umwelt Lake to 0.72 M-m<sup>3</sup>. Please clarify the development sequence for dewatering management activities at Llama and Umwelt Lakes to avoid duplicates intreating water at the Water Treatment Plan.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.



**KIA-NIRB-49(a): Diversion berms around Saline Water Pond (SWP)****References:**

Water Management Plan, 8.1.1 Lake Dewatering, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

**Summary:**

No diversion berms are around east side of SWP.

**Detailed Review Comment**

Text: “Saline Water Pond to be constructed around the existing extents of Umwelt Lake.”

**Recommendation/Request:**

Figure A-07 shows that the Saline Water Pond (SWP) will be completed with a SWP containment dam along the south portion. SWP Diversion Berms will be placed on the North and West side of the SWP to avoid freshwater inflow into the SWP.

No containment or diversion structures will be constructed on the East side of the SWP.

The potential of saline water seepage into the Umwelt Pit should be discussed and the risks quantified by the proponent. Should they be required, mitigation measures should be proposed.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**KIA-NIRB-49(b): Runoff water contact with Waste Rock Storage Area**

**References:**

Waste Rock Management Plan, 5.4.1.1 Umwelt Waste Rock Storage Area, Amendment Type A Water Licence Application for Sabina Gold & Silver Corp. Back River Project (NWB File No. 2AM-BRP1831 Attachment 2-Appendix B-WaterMgmtPlan-IMLE).

**Summary:**

Construction of diversion berms around WRSA.

**Detailed Review Comment**

Text: “One small stream and two ponds are located within the footprint, or immediately upstream, of the Umwelt WRSA and will be covered by the facility (2020 Modification Package Appendix A, Figure 3).”

**Recommendation/Request:**

Runoff water is expected to flow toward the former small stream and potentially come into contact with waste rocks (both PAG and non-PAG). The constructions of structures, such as diversion berms should be explored, to reduce the risk of surface runoff towards the WRSA.

**Importance of Issue:**

Moderate

**Sabina Response:**

Sabina thanks the KIA for their comment and will consider the construction of structures, such as diversion berms, to reduce the risk of surface runoff towards the WRSA.

## 2.2 RESPONSE TO CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA

### CIRNAC-#1: Permafrost Mapping and Monitoring

#### References:

- Back River Project Certificate (PC) Term and Condition (T&C) #11: Terrestrial Environment – Permafrost Mapping and Monitoring
- Back River Project 2021 Annual Report, Page 3-1 and 4-31
- Sabina's Responses to 2020 Annual Report Comments

#### Issue/Rationale:

T&C #11 states that “During construction, the Proponent shall, on an annual basis, provide additional permafrost mapping information documented in fulfillment of this Term and Condition in the Proponent’s annual report to the Nunavut Impact Review Board.”

Sabina's Responses to 2020 Annual Report Comments references a request from KIA “that Sabina provides updated information on the permafrost characteristics annually, regardless of construction activities.” It is noted that T&C #11 specifically requires reporting during and after construction. Sabina stated in the 2021 Annual Report, Section 3.1., that fuel tanks were constructed at the Goose site and Marine Laydown Area (MLA).

Based on this, it can be inferred that construction activities were carried out in 2021. T&C #11 requires annual reporting on the permafrost mapping, including during construction. No information was included in the 2021 Annual Report with regard to permafrost and ground temperature data during fuel tank construction at Goose site and at the MLA. The annual permafrost monitoring information is required for detailed and final design of other Back River Project infrastructure.

#### Recommendation:

CIRNAC recommends that Sabina:

- b) Provide ground temperature/permafrost monitoring data for the fuel tank construction and other construction-related activities.
- c) Provide permafrost monitoring and ground temperature data collected during construction, and any subsequent phases, in the annual reports.

#### Sabina Response:

- d) Sabina has a network of thermistors that were installed during the permitting phase of the Back River Project. Although Sabina has not constructed any water or waste management infrastructure where permafrost monitoring thermistors can be installed to assess thermal conditions, Sabina commits to completing a download of the data from the permitting phase thermistors in 2023 and will provide a summary of the results in the following annual report.
- e) Thermistors are not installed under the bulk tanks as they are directly resting on bedrock and therefore the structural integrity of the bulk tank bases is not affected by temperature variation. Sabina submitted the engineering design report for the bulk tanks as per the NWB licence conditions for review in advance of construction.

## **CIRNAC-#2: Permafrost Monitoring**

### **References:**

- Back River PC T&C #12: Terrestrial Environment – Permafrost Monitoring
- Back River Project 2021 Annual Report, Page 3-1 and 4-32
- Sabina's Responses to 2020 Annual Report Comments

### **Issue/Rationale:**

In a letter to the NIRB on the review of Sabina's 2020 Annual Report, the Kitikmeot Inuit Association (KIA) commented that T&C #12 "is not limited to the construction of tailings facility and/or waste storage facilities but it does include roads, trails, and quarries."

In response, Sabina stated that "...it is not feasible or practical to monitor permafrost conditions over the entire Back River Project Potential Development Area, which is greater than 60km<sup>2</sup>".

CIRNAC acknowledges that it may not be feasible to monitor permafrost conditions over the entire potential development area, but monitoring should take place in key areas that are or will be developed.

These include along existing roadways, quarries, and waste storage areas. In the 2021 Annual Report, Sabina stated that construction activities were underway in 2021, including roads and other Goose site and MLA infrastructure. But, no information was included in the 2021 Annual Report with regard to permafrost and ground temperature data.

The annual permafrost monitoring information is required to monitor changes in permafrost conditions and to monitor the effects of the Project on permafrost conditions.

### **Recommendation:**

CIRNAC recommends that Sabina:

- a) Begin permafrost monitoring in developed and planned areas throughout the Project to establish baseline information and supplement the data collected during the Environmental Impact Statement phase.
- b) Submit the updated data to the NIRB as part of the annual reporting.

### **Sabina Response:**

- a) Sabina has a network of thermistors that were installed during the permitting phase of the Back River Project. Although Sabina has not constructed any water or waste management infrastructure where permafrost monitoring thermistors can be installed to assess thermal conditions, Sabina commits to completing a download of the data from the permitting phase thermistors in 2023 and will provide a summary of the results in the following annual report.

**CIRNAC-#3: Sensitive Landform Mitigation and Monitoring****References:**

- Back River PC T&C #13: Terrestrial Environment – Sensitive Landform Mitigation and Monitoring
- Back River Project 2021 Annual Report, Page 3-1 and 4-33 to 4-34
- Sabina's Responses to 2020 Annual Report Comments

**Issue/Rationale:**

Reporting requirements for PC T&C #13 state that Sabina shall provide the results of additional geotechnical investigations, along with any associated mitigation and monitoring measures implemented by Sabina, in the annual report to the NIRB.

Sabina stated that geotechnical investigations were undertaken in 2021, but the results are not provided in the 2021 Annual Report to the NIRB.

**Recommendation:**

CIRNAC recommends that Sabina provide the results or status update of the geotechnical investigations undertaken in 2021 in the 2022 Annual Report.

**Sabina Response:**

- a) It is a direct requirement of the NWB Water Licence to provide the third party geotechnical inspections in the NWB annual report; it is not a direct requirement of the NIRB Project Certificate. CIRNAC reviews the NWB annual report and subsequently the third party geotechnical inspection report, therefore Sabina does not feel it is necessary to include it within the NIRB annual report.

#### **CIRNAC-#4: Waste Management Plan**

##### **References:**

- Back River PC T&C #14 : Terrestrial Environment – Waste Management Plan
- Back River Project 2021 Annual Report, Pages 4-32 and 4-35
- Sabina's Responses to 2020 Annual Report Comments

##### **Issue/Rationale:**

As per the 2020 Annual Report, Sabina submitted the Landfill and Waste Management Plan to the NIRB in 2017 and was expecting to update and submit again to the NIRB following approval of the amendment to the water licence. The 2021 Annual Report indicates that the plan was updated and approved by the Nunavut Water Board (NWB), but further updates are required to address current practices at the Project site. Sabina is currently updating the plan and will provide it to NWB and the NIRB. Sabina has not indicated when they plan on submitting the updated plan (third version).

Additionally, T&C#14 states “the Proponent shall provide a Waste Management Plan that describes how the local environment, including permafrost integrity and water quality, will not be harmed by wastes at project landfills”. The Landfill and Waste Management Plan (2017), which was included in the 2020 Annual Report, but not the 2021 Annual Report, appears to discuss how permafrost has influenced design methodology, but it does not thoroughly consider how the Project impacts permafrost integrity as intended in T&C #14. There are only three mentions of permafrost in this plan. To comply with T&C #14, impacts to permafrost integrity and appropriate mitigations should be considered and included in the Landfill and Waste Management Plan.

##### **Recommendation:**

CIRNAC recommends that Sabina:

- a) Provide a timeline for the anticipated submission of the updated Landfill and Waste Management Plan to the NIRB.
- b) Include a statement describing how permafrost integrity will be impacted, and how these impacts will be managed/mitigated, at the project landfill when completing updates to the Landfill and Waste Management Plan.

##### **Sabina Response:**

Sabina will include information in the Back River Project's Landfill and Waste Management Plan on how permafrost integrity will not be harmed by wastes in project landfills. With this addition, Sabina intends to submit this plan to the NWB in August of 2022 for review and approval. Once approved, this plan will be included in the next Annual Report to the NIRB along with any other plans updated during 2022.

## **CIRNAC-#5: Management Pre-construction, Construction and Operations Standard Operating Procedures (SOP)**

### **References:**

- Back River Project 2021 Annual Report – Part 2 - Appendix F, 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report Appendix 5D, Waste Management Preconstruction, Construction, and Operations SOP, Section 6
- FEIS Volume 10, Part 12 – Hazardous Materials Management Plan, Section 7.3.4
- FEIS Volume 10, Part 10 – Waste Management Plan, Section 7.3
- FEIS Volume 10, Part 10 – Waste Management Plan, Section 7.4

### **Issue/Rationale:**

Sabina stated under Section 5.4 of the Waste Management Preconstruction, Construction, and Operations SOP - submitted in Appendix F of the 2021 Annual Report - that “hazardous materials” with potential to attract wildlife must be securely stored indoors in labelled containers and that hazardous materials that pose no risk of attracting wildlife may be stored within lined containment facilities.

The term “hazardous materials” can include non-waste products and recyclable materials which are hazardous, which should be stored separately from hazardous waste. Additionally, it is unclear which of the waste materials listed in bullet point 4 of Section 5.4 must be stored indoors versus within the lined containment facilities.

Sabina also stated in Section 6 of the Waste Management Preconstruction, Construction, and Operations SOP that the “Camp Manager is responsible for coordinating waste consolidation, including designating responsible Personnel, where appropriate” and that “Waste will be consolidated from collection sites”.

While the FEIS Volume 10, Parts 10 and 12 describes how waste segregation based on waste stream compatibility will occur, the SOP does not provide this context. The Camp Manager and other designated site personnel (i.e., contractors, labourers, operators, etc.) will likely be referring to the SOP for direction over Volume 10 of the FEIS, and so the SOP should be consistent with statements on waste segregation in the FEIS, i.e., FEIS Vol 10, Part 10, Section 7.3.4:

“Hazardous materials will be segregated by chemical compatibility within the storage area to prevent contact of incompatible materials in the event of a release.” and FEIS Vol 10, Part 10: “Each site will have both indoor and outdoor storage, and waste will be segregated according to its susceptibility to exposure to the elements, etc.”

### **Recommendation:**

CIRNAC recommends that Sabina:

- a) Clarify which of the waste materials listed in bullet point 4 can be stored indoors as opposed to at the lined containment facilities.
- b) Replace references to “hazardous materials” with “hazardous waste materials” where appropriate.
- c) Update the SOP to clarify that hazardous waste materials or incompatible waste streams will be kept separate from nonhazardous wastes while the Camp Manager (or designated Personnel) performs the waste consolidation to align with the FEIS Volume 10, Part 10 and 12.

### **Sabina Response:**

Sabina is currently updating the Back River Project’s Landfill and Waste Management Plan and will ensure these concerns are addressed, as appropriate, in the revision, and that Sabina’s SOPs align with the approved plan.

**CIRNAC-#6: Hydrogeology and Groundwater Quantity and Quality - Geotechnical Characterization Program**

**References:**

- Back River PC T&C #18: Hydrogeology and Groundwater Quantity and Quality - Geotechnical Characterization Program
- Back River Project 2021 Annual Report, Pages 4-41 to 4-42

**Issue/Rationale:**

Reporting requirements for PC T&C #18 state that Sabina shall provide the results of an infill geotechnical characterization program, along with associated mitigation measures, in the annual report to the NIRB.

Sabina stated that geotechnical investigations were undertaken in 2021, but the results are not provided in the 2021 Annual Report to the NIRB.

**Recommendation:**

CIRNAC recommends that in the 2022 Annual Report Sabina:

- Provide the results of the geotechnical investigations undertaken in 2021, including a summary of all geotechnical work completed to date and any interpretations arising from the available data. Where available, this should include depth and extent of geologic units, stratigraphy, hydraulic head data, thermal data, duration/depth/direction of active flow zones, distribution of baseline chemical parameters such as arsenic.
- Provide a conceptual model of groundwater flow, including potential source zones and receptors.
- Provide results of continued (or resumed) monitoring work, including water levels/vibrating piezometer data, thermistor monitoring, data available from the Westbay monitoring well, and water samples from the active zone, in order to improve the monitoring dataset and demonstrate annual variability.

**Sabina Response:**

- It is a direct requirement of the NWB Water Licence to provide the third party geotechnical inspections in the NWB annual report; it is not a direct requirement of the NIRB Project Certificate. CIRNAC reviews the NWB annual report and subsequently the third party geotechnical inspection report, therefore Sabina does not feel it is necessary to include it within the NIRB annual report.
- Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.
- Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.



**CIRNAC-#7: Hydrological Features and Hydrogeology -Thermal Monitoring****References:**

- Back River PC T&C #20: Hydrological Features and Hydrogeology
- Back River Project 2021 Annual Report, Pages 4-40
- Back River Project 2020 Annual Report, Pages 4-45
- FEIS Addendum-Vol 6-Pt 1-IA2E Freshwater Environment, Pages 6-4 and 6-11
- NIRB Final Hearing Report Back River Gold Mine Project, Section 4.6 – Hydrological Features and Hydrogeology

**Issue/Rationale:**

In the 2021 Annual Report, Sabina indicated that a thermal monitoring plan is in preparation. CIRNAC notes that though the plan is in preparation, there are deficiencies in the thermal modelling that has been completed to date, and care should be taken to ensure the adequacy of the thermal baseline data.

Under Tailings Management Plan of the 2021 Annual Report, Sabina indicated that Tailings Storage Facility (TSF) Design is based on Sabina's 2017(a) submission, F-4.

Sabina's FEIS Addendum, Volume 6, Part 1 includes a discussion on the Hydrological features and hydrogeology in Section 6.1 Surface Hydrology page 8. This discussion highlights the NIRB's views:

"In considering the views of the Proponent and those of parties throughout the assessment of the Project and as outlined above, the Board has concluded that due to the limited baseline available in the FEIS [FHR-NIRB-4.6(A)] and the probability of taliks forming under the pits or the Tailings Impoundment Area [FHR-NIRB-4.6(B)], the Board is not confident that the proposed mitigation measures in conjunction with a commitment from Sabina to collect additional baseline data would sufficiently mitigate the project-specific impacts. The Board appreciates Sabina's commitments to collect additional baseline data, however, views this data as necessary at the environmental assessment stage to provide the required assurance that negative impacts to hydrogeology and hydrological features would be adequately mitigated [FHR-NIRB-4.6(A)]."

Sabina has highlighted two aspects to which it has responded: the limited baseline data, and the potential for Taliks to be formed under the pits or the Tailings Impoundment Area.

For the limited baseline data, Sabina indicated "Sabina believes a sufficient level of hydrological and hydrogeological baseline data was collected and provided during the environmental assessment phase."

CIRNAC notes that, though there seems to be baseline data between 2007 and 2014, hydrological and hydrogeological processes are not static and can vary widely from season to season, year to year, and decade to decade. For this reason, data collected between 2007 and 2014 is insufficient to adequately characterize the baseline hydrological characteristics.

For the potential to create taliks, Sabina stated "Sabina completed additional thermal modelling and submitted a Technical Comment to NRCAN regarding through taliks beneath open pits (F-INAC-TC-8), and Sabina has shown through thermal modelling that no through talik will exist under the TSF (FEIS Appendix V2-7G, Appendix G). Sabina believes this appropriately addresses the Board's concerns."

As noted in the FEIS Addendum (Volume 6, page 6-8), which refers to the FEIS Final Hearing document, NRCan's response to this modelling noted that "Natural Resources Canada is of the view that the results of this analysis support the development of appropriate groundwater models and assessments of the effects of the project on water quality and quantity". CIRNAC notes that even though the results of the analysis are adequate, it is expected that they are to be used to support the development of groundwater models for further assessment, including extension of the model domain to -900 metres, and work to model and evaluate total metals concentrations in groundwater prior to and during operations. The groundwater model results and further assessments appear to not have been completed, even though the comment is noted by Sabina as being addressed.

**Recommendation:**

CIRNAC recommends that Sabina:

- a) Explain the rationale for discontinuing Hydrology Baseline Reports beyond the year 2014.
- b) Resume the Hydrology Baseline Reports where construction has not started.
- c) Provide a discussion of hydrology data collection in future annual reports.
- d) Conduct further groundwater modelling based on the results of the analysis and discuss the preparation of a resulting plan to fully address NRCan's comment.

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**CIRNAC-#8: Aquatic Effects Monitoring Plan****References:**

- Back River PC T&C #21: Groundwater and Surface Water Quality, Sediment Quality and Freshwater Aquatic Environment Aquatic Effects Monitoring Plan
- Back River Project 2021 Annual Report, Pages 4-46 to 4-47
- Back River Project 2020 Annual Report, Pages 62 - 63
- Sabina's Responses to 2020 Annual Report Comments

**Issue/Rationale:**

Project Certificate T&C #21 requires an Aquatic Effects Monitoring Plan (AEMP) to include “sufficient sampling and monitoring programs to appropriately characterize the receiving environment to ensure that adequate data is available to assess impact predictions made within the Final Environmental Impact Statement.” Reporting requirements for Project Certificate T&C #21 state that Sabina should provide results of the AEMP program “annually thereafter or as may otherwise be required by the NIRB.”

In the 2021 Annual Report, Sabina notes that the status of the PC is compliant and makes the following statements:

- “Additional baseline data collection was conducted in 2021 to address commitments made in response to technical comments on the Aquatic Baseline Synthesis Report by Kitikmeot Inuit Association (KIA), Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), and Environment and Climate Change (ECCC), and to support the next update to the Aquatic Effects Management Plan.”
- “Sabina is currently updating the AEMP based on commitments made with respect to submissions received during the Technical and Public Hearing process for the Type A Water Licence Application and according to the terms and conditions of the Type A Water Licence. Updates were also made to re-align the AEMP with recent changes to the Metal and Diamond Mining Effluent Regulations (MDMER), to update the Project description according to the 2019 Modification Package, to incorporate recommendations from the aquatic baseline synthesis report, and to refine details of the sampling design and Response Framework.”

The results of the 2021 data were not included in the 2021 Annual Report. The AEMP was also not included in the 2021 Annual Report. CIRNAC notes that the updated plan, as well as the results of the AEMP, are required to evaluate whether the impact predictions in the FEIS are still valid.

**Recommendation:**

CIRNAC recommends that Sabina:

- a) Provide the summarized results of the 2021 data collection in the next annual report.
- b) Provide any updated AEMP reports in any future annual report.

**Sabina Response:**

Please see response to KIA-NIRB-33. A copy of the 2021 Aquatic Baseline Report will be provided under separate cover, by August 19.

## **CIRNAC-#9: Vegetation Monitoring Plan**

### **References:**

- Back River PC T&C #34: Vegetation – Vegetation Monitoring Plan
- Back River Project 2021 Annual Report, Pages 4-73 to 4-74
- Back River Project 2021 Annual Report, Appendix F
- Sabina's Responses to 2020 Annual Report Comments Pages 30-37
- Back River Project FEIS Addendum, Volume 5, Page 5-20

### **Issue/Rationale:**

In response to comments received on the Back River Project 2020 Annual Report, Sabina committed to amending the January 2020 Vegetation Monitoring Plan. An updated or amended Vegetation Monitoring Plan was not included in the 2021 Annual Report and the Vegetation Monitoring Program on the 2021 monitoring activities refers to the January 2020 Vegetation Monitoring Plan.

Further, in the Vegetation Monitoring Program (Appendix F of the 2021 Annual Report) results, "Totals" are reported in Table 4 and 5; however, it is unclear what these totals represent. For example, the totals for 150 m in Table 4 are the same as the numbers reported for Undifferentiated Tundra in the same table.

### **Recommendation:**

CIRNAC recommends that Sabina:

- a) Provide a timeline for submitting the updated Vegetation Monitoring Plan to the NIRB.
- b) Clarify what the "Totals" in Tables 4 and 5 of the Vegetation Monitoring Program represent and how they are being used in the vegetation monitoring.

### **Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**CIRNAC-#10: Revegetation and Reclamation****References:**

- Back River PC T&C #35: Vegetation - Revegetation and Reclamation
- Back River Project 2021 Annual Report, Page 4-75

**Issue/Rationale:**

Project Certificate T&C #35 requires Sabina develop a progressive revegetation program and submit the program and results in their annual report to the NIRB. In the 2021 Annual Report, Sabina state that the program was provided to the NIRB on December 13, 2021, but did not include the program or any results in the 2021 Annual Report.

**Recommendation:**

CIRNAC recommends that Sabina provide the progressive revegetation program and any results with future annual reports.

**Sabina Response:**

Sabina continues to develop the BRP's progressive revegetation program, and will include information on this and studies conducted in future Annual Reports, and within 3 years of the commencement of construction as required by T&C 36.

Sabina has also noted that Appendix E of the ICRP was accidentally omitted from the ICRP and is being included here (Appendix D).

## **CIRNAC-#11: Marine Environment - General**

### **References:**

- Back River PC T&C #62: Marine Environment – General
- Back River Project 2021 Annual Report, Pages 4-117 to 4-118
- Back River Project 2020 Annual Report, Pages 4-108 to 4-109
- Sabina's Responses to 2020 Annual Report Comments
- Back River Project FEIS, Supporting Volume 7, Page 2-33

### **Issue/Rationale:**

To ensure potential impacts to the marine environment are identified and appropriately mitigated, PC T&C #62 states that, "The Proponent shall maintain a marine monitoring program at the Marine Laydown Area to enable identification of potential impacts of the Project on the marine environment and to inform adaptive management actions. The monitoring program shall be in line with the proposed monitoring in the Aquatic Effects Monitoring Program, or as required by applicable regulatory authorities. At a minimum, water sampling should include end of pipe and control area samples, collected on a regular basis to confirm salinity levels of the discharge and the receiving environment."

The 2021 Annual Report states that Sabina collected control and discharge samples from the MLA desalination plant during desalination activities in 2021 to confirm salinity levels of the discharge and receiving environment. Specifically, "Sabina collected two paired samples from the desalination plan inflow (the Control) and outflow (the Discharge) during 2021 to confirm salinity levels. On July 30, 2021,

Control salinity was measured to be 7.5 psu and Discharge salinity was 8.6 psu (a 15% increase). On September 7, 2021, Control salinity was measured to be 13.9 psu and Discharge salinity was 13.6 psu (a 2% salinity decrease). The method detection limit was 1.0 psu. Results are within baseline water conditions in the absence of any desalination."

The Final EIS Supporting Volume 7: Marine Environment indicates that "Discharge of brine water from the desalination plant will meet the CCME salinity guideline for the protection of marine life and will not cause salinity of the receiving environment to fluctuate by more than 10% of the natural expected salinity (CCME 2015)."

Although there are many references to both baseline data collection and the 2021 sampling discussed above, the 2021 Monitoring Report did not present the data for analysis (i.e., mapping of sampling locations, sample collection notes, water quality data, analytical chemistry results, etc.).

In the 2021 Monitoring Report, Sabina states that "Analysis of the results of Sabina's full 2021 Marine Monitoring Plan sampling, including the evaluation of the comparability of the newly identified reference location, is still underway. A report on findings is expected to be submitted to the NIRB in April 2022 and will indicate whether the new reference location is suitable."

Also, in the 2021 Annual Report, Sabina states that they "will continue to routinely monitor desalination activity and will undertake the sampling outlined in the Marine Monitoring Plan when the MLA is in use."

**Recommendation:**

CIRNAC recommends that Sabina:

- a) Provide the summarized results of the 2021 data collection, including, where available, mapping of sampling locations, sample collection notes, water quality data, analytical chemistry results in the next annual report.
- b) Include the annual AEMP reports in any future annual reports.

**Sabina Response:**

At the time of submission of the 2021 Annual Report to the NIRB the 2021 Marine Sampling Report had not yet been completed. This report has since been filed with the NIRB and was posted on the NIRB public registry on June 2, 2022. This report includes information on locations sampled, summaries of analytical results, graphical depictions of water column structure, and information on sample collection.

Reports on both 2022 Marine Monitoring Program sampling and 2022 AEMP sampling will be included with the 2022 Annual Report to the NIRB.

## **CIRNAC-#12: Spills**

### **References:**

- Back River PC T&C #89: Accidents and Malfunctions - Spills
- Back River Project 2021 Annual Report, Section 4.4.2 – Unauthorized Discharges and Spills, Page 4-3
- Back River Project 2021 Annual Report, Appendix F: 2021 Pre- Construction Wildlife Mitigation and Monitoring Plan

### **Issue/Rationale:**

Section 4.4.2 of the 2021 Annual Report indicates that there were no unauthorized discharges or spills in 2021 that met or exceeded the reporting threshold as outlined in the Nunavut Spill Contingency Planning Regulations. The Pre-Construction Wildlife Mitigation and Monitoring Plan indicates that “there were 61 minor spills at the Project in 2021.” While there was a statement indicating that “all spills were managed following the Fuel and Spill Management Plans”, details pertaining to the volume of each spill, date the spills occurred, locations of the spills including whether any spills occurred over water bodies, material of each spill, and what mitigation measures were implemented at each spill site were not included in Section 4.4.2 of the 2021 Annual Report.

Therefore, the potential impacts of the spills, and validity of the statements related to spills, cannot be assessed based on the information provided.

### **Recommendation:**

CIRNAC recommends that Sabina provide detailed information on spills in future annual reports. This information should include, volume of each spill, date the spills occurred, locations of the spills including whether any spills occurred over water bodies, material of each spill, and what mitigation measures were implemented at each spill site, amongst others.

### **Sabina Response:**

Sabina will ensure that information on volume, spill date, locations and whether to water, material and mitigation measures for each reportable spill (i.e., those triggering NT/NU reporting thresholds) is included in the annual report. Sabina maintains a complete record of all spills, regardless of size, on site and available to the Inspector on request.



**CIRNAC-#13: Tailings Management Plan****References:**

- Back River Project 2021 Annual Report, Page 4-41
- Back River Project 2021 Annual Report, Appendix K

**Issue/Rationale:**

The Tailings Management Plan in Appendix K of the 2021 Annual Report is dated November 2020. It notes that tailings deposition will occur in the Tailings Storage Facility (TSF) for years 1 through 5. But, Page 4-41 of the 2021 Annual Monitoring Report notes that Sabina's currently approved mine plan no longer includes a TSF.

**Recommendation:**

CIRNAC recommends that Sabina provide an updated version of the Tailings Management Plan, reflecting the current approved practices to be used on site, in future annual reports.

**Sabina Response:**

Sabina submitted an updated version of the Tailings Management Plan to the NWB in April 2022. Once approved by the NWB, this plan will be included in the next annual report filed with the NIRB.

**CIRNAC-#14: Tailings Management Plan - Seepage Risks**

**References:**

- Back River Project 2021 Annual Report, Appendix K
- Project Certificate Term and Condition # 18

**Issue/Rationale:**

Project Certificate T&C #18 requires Sabina to implement an infill geotechnical program to determine the extent of the fractured bedrock contact zone and apply proposed mitigation measures, as necessary. The program should include permeability testing, seepage analysis, and planning for thermal monitoring of the western ridge, where appropriate. Page 4-41 of the 2021 Annual Monitoring Report only discusses the area of the TSF and not the open pits.

It is unclear if there are any plans to identify and mitigate seepage risks related to tailings deposition into the backfilled open pits. CIRNAC notes that this may be a potential concern for groundwater impacts and is also important from a safety perspective for the underground workings located directly below the pits.

**Recommendation:**

CIRNAC recommends that Sabina provide details on what measures are proposed to identify and mitigate seepage risks associated with geological discontinuities in the open pit prior to tailings disposition, and details on mitigation measures should seepage into the underground workings occur during operations.

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**CIRNAC-#15: Tailings Management Plan - Tailings Deposition Timelines, Management of Parameters of Concern and Wildlife Entrapment in Reflooded Pits.****References:**

- Back River Project 2021 Annual Report, Appendix K

**Issue/Rationale:**

Tailings are planned to be deposited in the mined out open pits. Preliminary timing is given for tailing deposition for each pit. Should resources be higher than expected, there may be delays with tailings deposition. Section 5.1.2 notes that Sabina commits to testing a mixture of tailings and water treatment plant sludge to evaluate the potential for remobilization of arsenic from this material. There is no reference to analysis of other parameters.

**Recommendation:**

CIRNAC recommends that Sabina provide clarification on the following items in the Tailings Management Plan:

- a) The sensitivity of timing of deposition of tailings into the mined out pits and plans should any pit have higher than anticipated mineral resources.
- b) Whether there are any other parameters of concern or justification on why only the potential for arsenic remobilization will be evaluated.

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**CIRNAC-#16: Tailings Management Plan - Discharge Water Quality Objectives**

**References:**

- Back River Project 2021 Annual Report, Appendix K, P5-11

**Issue/Rationale:**

Section 5.3.1 notes that water treatment is not required for the open pits in the closure phase to meet discharge water quality objectives (WQOs) and refers to the water management plan for more details.

The water management plan states that “Pit lake water quality monitoring will be conducted to ensure it meets discharge criteria prior to pit overtopping and passive discharge. In the unlikely event that the water in any of the pit lakes is not suitable for discharge, the pit lake would be batch-treated to address any remaining water quality impairments. Five years of post-closure water quality monitoring will continue for each open pit to ensure that WQOs are met.”

It is unclear what Sabina’s target WQOs are for Tailings management.

**Recommendation:**

CIRNAC recommends that Sabina provide clarification on the WQOs for discharge from the open pits where tailings have been deposited in the Tailings Management Plan.

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

**CIRNAC-#17: Definition of a Project Production Decision****References:**

- Back River PC T&C #'s 71, 72, 73, 75, 76, 77 and 84
- Back River Project 2021 Annual Report, Page 4-131

**Issue/Rationale:**

The 2021 Annual Report makes reference to a project production decision as a milestone that must be achieved before Sabina can provide information associated with a number of T&Cs (Page 4-131). Relevant T&Cs and their assigned categories are as follows:

- T&C #71: Staff Schedule
- T&C #72: Registration of Trades Workers
- T&C #73: Training Opportunities
- T&C #75: Educational Opportunities
- T&C #76: Inuktitut/Inuinnaqtun Training
- T&C #77: Monitoring Demographic Changes
- T&C #84: Employee Housing

In certain instances, project activities will not be initiated until a project production decision is made. For example, this applies to the administration of an Inuit Employee Survey to collect information in support of T&Cs 75 and 84. Having a clear definition for the term “project production decision” would facilitate the Annual Report review process. It would allow for a better understanding of Sabina’s rationale to not fully implement relevant Project Certificate T&Cs at the present time. The definition should be placed in context with the project phases identified in the project certificate, namely Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance and Post-Closure.

**Recommendation:**

CIRNAC recommends that Sabina define the term Project production decision referenced in its 2021 Annual Report. Sabina should also provide a rationale for why this milestone is needed before fully implementing certain Project Certificate T&Cs.

**Sabina Response:**

As discussed at the most recent Back River Socio-Economic Monitoring Working Group meeting held June 1, 2022, Sabina defines the term ‘Project Production Decision’ consistent with Article 1.1, Part JJJJ of its Inuit Impact and Benefit Agreement (IIBA) with the Kitikmeot Inuit Association:

*“Production Decision” means the earlier of: (i) a formal decision to proceed with the construction of a Mine on Inuit Owned Lands Parcel BB-13 at the Back River Project as evidenced by a public statement confirming such decision; or (ii) Sabina taking delivery in the Back River Project Area, of all, or substantially all, of the processing and milling equipment for the plant(s) at the Back River Project.*

Achieving this milestone is needed before fully implementing certain T&Cs because:

- Mining projects typically require substantial funding in order to begin full construction activities; without this funding, a mining company may lack certainty regarding Project timelines, infrastructure development, and the operational commitments it can carry out

(e.g., the hiring of a full construction workforce and when advanced training or monitoring programs may be offered).

- Specialized personnel (e.g., a well-staffed Human Resources department) are required to fully implement some of the T&Cs noted by CIRNAC. New policies, procedures, and management systems must also be developed in some cases. Similar to other mining projects at Sabina's stage, such personnel are typically not hired until after a Project Production Decision is made and/or anticipated.
- Many socio-economic effects from northern mining projects result, either directly or indirectly, from the size of the local mine-employed workforce. During Sabina's current pre-construction phase the size of the local workforce has remained small and business opportunities have been limited compared to what is expected during full scale construction and production. Only when a full construction workforce is in place will socio-economic effects begin approaching the levels predicted in the FEIS (and/or be measurable).

To be clear, achieving a Project Production Decision milestone has not prevented Sabina from advancing work on many of its socio-economic T&Cs. Sabina has now prepared four annual Socio-Economic Monitoring Reports describing progress in this area and/or has established placeholders for key data in future reports. Relevant updates are also provided to the Back River SEMWG and KSEMC, where appropriate. For example, design and implementation of a new Human Resource Information System (HRIS) is underway to enhance Sabina's internal data collection, management, and reporting. A revised Inuit Employee Survey was also issued to NIRB in March 2022 (T&C Nos. 75 and 84) and planning is underway to conduct this survey on-site in late 2022 or early 2023. In addition, a Second Language Training Plan (T&C No. 76) was developed and issued to NIRB in March 2022, and Sabina's Outfitting/Guiding Business Consultation Protocol began to be implemented in April 2022 (T&C No. 81; see also Sabina's response to CIRNAC #19, below). Sabina's NIRB Annual Reports will continue to provide updates on these and other socio-economic matters.

Sabina anticipates announcing a Project Production Decision in the near future. Significant Project financing was secured by Sabina in early 2022 and both corporate and on-site staffing increases have occurred throughout the year in anticipation of full construction activities commencing in the near future.

**CIRNAC-#18: Transferrable Skills and Certification****References:**

- Back River PC T&C #74
- Back River Project 2021 Annual Report, Page 4-134; Appendix H: 2021 Socio-Economic Monitoring Report, Section 7.1.1, Section 7.3.3

**Issue/Rationale:**

T&C #74 of the Project Certificate requires Sabina to “develop and maintain an easily referenced listing of formal certificates and licences that may be acquired via on-site training or training during Project employment. The listing shall indicate which of these certifications and licences would be transferable to a similar job site within Nunavut.”

The reporting requirements for this T&C state that “Updates to the list should be included in the annual Back River socio-economic monitoring reports submitted to the Nunavut Impact Review Board and shared with the wider Kitikmeot Socio-Economic Monitoring Committee throughout the life of the Project.”

The 2021 Annual Report confirms that Sabina provided an initial listing to the NIRB in November 2018. Sabina also commits to providing updates to this list in future Socio-Economic Monitoring Report submissions, as appropriate (Page 4-134). Section 7.1.1 of the 2021 Socio-Economic Monitoring Report provides a discussion of training programs that were offered in 2021 including certificate-based and job-related programs. The 2021 Socio-Economic Monitoring Report also makes reference to Table 7-2 for a summary of the training programs offered through project employment. Upon further review, Table 7-2, is specific to Inuit Apprenticeships. This table may have been mistakenly referenced instead of Table 7-1: Hours of Training (by Type) Completed (2021).

Section 7.3.3 of the 2021 Socio-Economic Monitoring Report states that updates to the November 2018 initial listing will be included in future report submissions. It is not clear how future Socio-Economic Monitoring Reports will provide information on training programs any differently from the information already provided in Section 7.1.1 of the 2021 Socio-Economic Monitoring Report. Clarification on how the listing will be presented going forward would be beneficial.

**Recommendation:**

CIRNAC recommends that Sabina:

- Ensure its 2022 Socio-Economic Monitoring Report provides an easily referenced listing of formal certificates and licences that may be acquired via on-site training or training during Project employment pursuant to Project Certificate T&C #74.
- Confirm that future Socio-Economic Monitoring Reports will provide updates to the initial listing submitted to the NIRB in November 2018, as communicated in the 2021 Annual Report and the 2021 Socio-Economic Monitoring Report.

**Sabina Response:**

Consistent with T&C No. 74, Sabina intends to include a revised listing of formal certificates and licences that may be acquired via on-site training or training during Project employment in its 2022 Socio-Economic Monitoring Report. To-date, Sabina has not revised its initial (i.e., November 2018) listing because on-site training offerings haven't changed significantly during the intervening years.

Sabina can also confirm future Socio-Economic Monitoring Reports will include updates to the listing, where appropriate, as discussed at the most recent Back River Socio-Economic Monitoring Working Group meeting held June 1, 2022.



**CIRNAC-#19: Consultation with Outfitting and Guiding Businesses****References:**

- Back River PC T&C #81
- NIRB 2020-2021 Annual Monitoring Report for the Back River Project and NIRB's Recommendations
- Back River Project 2021 Annual Report, Page 4-143; Appendix L: Socio-Economic Monitoring Plan

**Issue/Rationale:**

T&C #81 of the Project Certificate encourages Sabina to "...consult with outfitting and guiding businesses that operate in the regional study area regarding use of the land and marine areas in proximity to project infrastructure or activities and any noted project effects, particularly for effects in relation to the experience of the natural environment."

The reporting requirements for this T&C state: "Information regarding the consultations and monitoring undertaken by the Proponent in fulfillment of this Term and Condition should initially be provided within two (2) years of Project construction in the Proponent's annual report to the Nunavut Impact Review Board and any updated information should be provided in the annual report to the Nunavut Impact Review Board every year thereafter."

Sabina has developed an Outfitting/Guiding Business Consultation Protocol, attached as Appendix D to its Socio-Economic Monitoring Plan as a means to support the implementation of this T&C. In its 2021 Annual Report (Page 4-143), Sabina communicated that in 2021, it was not necessary to provide initial reporting on consultations with applicable outfitting and guiding businesses pursuant to T&C #81, because this is only applicable within two years of Project construction. The November 9, 2021 NIRB cover letter addressed to Sabina, which accompanies its 2020- 2021 Annual Monitoring Report for the Back River Project asserts that the project has entered its construction phase based on site activities conducted to date. This determination conflicts with Sabina's position and creates confusion on when initial reporting will be provided with respect to the implementation of T&C #81.

**Recommendation:**

CIRNAC recommends that Sabina work toward implementing its Outfitting/Guiding Business Consultation Protocol and report on consultation activities with outfitting and guiding businesses pursuant to Project Certificate T&C #81.

**Sabina Response:**

Consistent with T&C No. 81 and Sabina's own *Outfitting/Guiding Business Consultation Protocol*, Sabina issued its first informational letter (by email) to relevant outfitting and guiding businesses on April 12, 2022. This letter was issued to all companies in possession of a pending, current, or recent Outfitter Licence from the Government of Nunavut, whose community of operation includes either Cambridge Bay or Kugluktuk (i.e., seven companies). Hunters and Trappers Organizations (HTOs) in Cambridge Bay, Kugluktuk, Bathurst Inlet, and Bay Chimo also received copies of this letter.

As of July 2022, one organization (i.e., Bathurst Inlet Lodge) has responded to the letter and requested a follow-up meeting with Sabina. This meeting occurred on May 3, 2022, and included operational updates provided by both parties and inquiries into additional logistical support and information that may be provided by Sabina. Following this meeting, Sabina was able to successfully assist Bathurst Inlet Lodge with logistical support in July 2022 to move people and equipment through the Back River Project via aircraft for pickup and transport to the Lodge by non-Project staff.

## RESPONSES TO 2021 ANNUAL REPORT COMMENTS

Per Sabina's *Outfitting/Guiding Business Consultation Protocol*, informational letters will be issued biennially to relevant outfitting and guiding businesses moving forward. Opportunities for information sharing and for concerns/issues to be addressed will also continue to be provided. Updates on this matter will be provided in future NIRB Annual Reports.

## 2.3 RESPONSE TO GOVERNMENT OF NUNAVUT

### GN AR-#01: Dust Generation and Suppression

#### Terms and Conditions:

NIRB Project Certificate No. 007 Term and Condition # 03

#### References:

•GN (2021). Comments on Sabina Back River Project, submitted to NIRB • Sabina (2021). Back River Project Responses to 2020 Annual Report Comments July 6, 2021 • Sabina (2022). Sabina Back River Project 2021 Annual Report, Mar. 31, 2022 • NIRB (2017). NIRB Project Certificate No. 007

#### Concerns:

The 2021 Annual Report (2021 AR) mentions that the Air Quality Monitoring and Management Plan (AQMMP, 2019) contains a Fugitive Dust Reduction Plan. Dust suppression is also mentioned within the 2021 AR in the context of managing the environmental impact of the Tailings Storage Facility. Neither document addresses the GN's past comments about the development of basic thresholds for the initiation and timing of dust suppression activities, consistent with Project Certificate TC 3(b). S

Sabina's response to GN's past comments indicated that dust suppressants will be used to reduce dust generation, and stated that simple visual assessments for initiating dust suppression would be investigated and any changes to Project plans would be included in the 2021 AR.

No update appears to have been provided in the 2021 AR, and the topic of basic thresholds for the initiation of dust suppression activities has not been addressed. The GN recognizes that the Project is in the pre-construction phase, and as such, it is expected that vehicle traffic at the site, rather than a tailings pile, will be the primary source of dust, as has been the case at other mines (e.g., Baffinland Mary River Project).

#### Suggestions and Recommendation:

The GN reiterates its past concern that clear guidance is needed for site staff to inform the timing, application, and use of dust suppressants. Sabina should develop simple visual assessment guidelines/measurements for determining when dust suppression should be initiated, and re-applied. This step is increasingly important as site activity expands and the Project Development Area (PDA) is further developed.

#### Additional Comments:

N/A

#### Sabina Response:

Sabina has commissioned a review of the AQMMP to occur in 2022. The review will include specific recommendations regarding tangible triggers for the initiation of dust mitigation measures to be employed in future summer seasons. Currently, as soon as the wet season ends (freshtet) and dust begins to generate from vehicular or aircraft traffic, Sabina commences dust suppression.

**GN AR-#02: Spills / Unauthorized Discharges**

**Terms and Conditions:**

N/A

**References:**

Amstrup, S.C., Gardner, C., Myers, K.C., and Oehme, F.W. (1989) Ethylene glycol (antifreeze) poisoning in a free-ranging polar bear. *Veterinary and Human Toxicology*, 31(4):317-319. •LaKind, J.S., McKenna, E.A., Hubner, R.P., Tardiff, R.G. (1999). A review of the comparative mammalian toxicity of ethylene glycol and propylene glycol. *Critical Reviews in Toxicology* 29, 331-365. •Sabina (2017). Sabina Back River Project Spill Contingency Plan (Oct. 2017) •Sabina (2022) Sabina Back River Project 2021 Annual Report. Mar. 2022. •Sabina (2020) Sabina Back River Project 2019 Annual Report. Mar. 2020.

**Concerns:**

The 2021 Annual Report (2021 AR) cited 61 minor spills at the site in 2021. The GN acknowledges the Proponent's statement in the 2021 AR that none of these 61 spills at the Project in 2021 met or exceeded the reporting requirement, and thus there were no reported spills in 2021. In the past, Sabina has reported small spills, including a spill of 5 L of ethylene glycol in March of 2019 (Sabina 2020). This reporting offers valuable information about the types of contaminants entering the environment, as well as Sabina's efforts to prevent, contain, and clean up such incidents. The GN encourages the reporting of all spills and emphasizes that all spills on site should be cleaned up as described in the Spill Contingency Plan for the Project (Sabina 2017). This is particularly important for substances that are harmful to wildlife in small quantities, such as ethylene glycol.

**Suggestions and Recommendation:**

The GN encourages the reporting of all spills, and emphasizes the importance of cleaning up all spills, as the spilled materials may be hazardous or lethal to wildlife, even in small quantities.

**Additional Comments:**

N/A

**Sabina Response:**

Sabina maintains a complete record of all spills, regardless of size, and ensures spills are cleaned up promptly and fully in accordance with the Spill Contingency Plan to ensure they are not lingering in the environment. Sabina also confirms that Ethylene Glycol is no longer used on site and has been replaced by Propylene Glycol which is non-toxic to wildlife. Sabina reports all spills triggering NT/NU reporting thresholds to the NT/NU Spills Line and includes such spills in the Annual Report to both the NIRB and the NWB.

**GN AR-#03: Transportation and Storage of Fuel****Terms and Conditions:**

NIRB Project Certificate No. 007 Term and Condition # 94

**References:**

Sabina (2022). Sabina Back River Project 2021 Annual Report, Mar. 2022.

**Concerns:**

Term and Condition (TC) # 94 requires that “[t]he Proponent shall ensure fuel trucks meet industry design standards and receive regularly scheduled maintenance of fuel lines, nozzles and dust caps.” Sabina has again indicated that it has partially complied with TC 94 but does not offer details for why full compliance was not achieved.

**Suggestions and Recommendation:**

The GN suggests that the Proponent provide additional information about its efforts to comply with TC 94, particularly why its efforts were self-evaluated as only partially compliant. The GN also requests, as it has relative to previous annual reports for the Project, that the volumes and types of fuel transported to and within the site be provided within the Annual Report. Details provided in the 2021 AR are general: limited to describing weekly bulk fuel delivery by a variety of aircraft and that diesel fuel was delivered by sealift.

Information about the transport and storage of fuel is a valuable part of the description of Project activities for the year and supports Project monitoring and evaluation undertaken by stakeholders and regulators. The inclusion of this information would allow for a more complete review of the Annual Report.

**Additional Comments:**

N/A

**Sabina Response:**

Sabina erroneously recorded status of compliance with TC 94 as ‘partially compliant’; Sabina is fully in compliance with this TC.

As the GN notes, Term and Condition (TC) # 94 requires that “[t]he Proponent shall ensure fuel trucks meet industry design standards and receive regularly scheduled maintenance of fuel lines, nozzles and dust caps.” Sabina confirmed this to be the case in Section 4.7.1 of the Annual Report.

Further, the Project Certificate reporting requirement related to TC 94 indicates that “A summary of the results of the applicable maintenance schedules and a summary of inspections shall be included in the Proponent’s annual report to the Nunavut Impact Review Board.” Sabina included this maintenance summary in the 2021 Annual Report.

Although Sabina understands interest in additional and detailed information well beyond the scope of TC 94, this would both add significantly to Sabina’s reporting burden and be hard to track as it is not a requirement of any Project approvals, which explicitly outline a wide and extensive range of reporting requirements. Additionally, such information seems unnecessary, as 1) Sabina has outlined in numerous submissions how fuel will be stored, transported and used on site, and operates well within the parameters of what has been assessed, reviewed, and permitted, and 2) any and all spills are documented and cleaned on occurrence, and any significant spills (i.e., triggering requirements to report to the NT/NU spill line) are immediately reported to the NT/NU spill line and additionally reported in the annual reports to the both the NWB and NIRB.

## **GN AR-#04: Inconsistent use of Caribou Management System Mitigation**

### **Terms and Conditions:**

NIRB Project Certificate No. 007 Terms and Conditions # 39, 40, and 41

### **References:**

Sabina (2019). Sabina Back River Project Wildlife Mitigation and Monitoring Program Plan (Version 10). Oct. 2019•Sabina (2022) Sabina Back River Project 2021 Annual Report. Mar. 2022.

### **Concerns:**

Sabina's Wildlife Mitigation and Monitoring Program (WMMP) Plan (Version 10, 2019) states that "Trained wildlife monitors will conduct active monitoring for caribou on the Project site during all seasons. The purpose of active caribou monitoring is to trigger site alerts and a staged reduction in Project activities, including management of helicopters, blasting and heavy mobile equipment."

Within 5 km of the Project site, "[T]he Project site will be managed through four levels of response to caribou presence" ranging from normal operations (Level 1) to staged reduction in Project activities (Level 4). The 2021 AR describes 3 instances from July 28-29 where caribou numbers(150-200 animals) caused the Caribou Management System (CMS) to be implemented, peaking at Level 3. The GN is encouraged that the system is in use, and the additional detail provided in Table 4.1-1, as well as the compliance reporting under TC 39, address the GN's comment on this topic relative to the previous AR (2020). However, the 2021 AR also indicates that approximately 800 caribou were observed in September near the Echo Creek bridge, approximately 1 km from Goose Camp. September is reported as a time of high activity at the camp, with both peak personnel (85 -Table 5.7-1) and peak blasting activity (24 days/mo. -Table 5.4-2). The 2021 AR s.5.4.2.1 states that "Blasting at the Plant Site Pad occurred in 2021. Blasting was not conducted at any other sites in 2021." This blasting site (Plant Site Pad) is approximately 1 km from the Echo Creek bridge, where caribou were observed. It is unclear why such high numbers of caribou so close to the camp and blasting site did not initiate the CMS and accompanying mitigation measures. Both the numbers of caribou (800) and the proximity to areas of activity (~1 km) should have initiated a mitigation response, as was described in the compliance report for TC 39.

### **Suggestions and Recommendation:**

The GN recommends that Sabina provide an explanation of why no mitigation response was initiated in this instance, and how implementation and reporting of the CMS may be improved to address a similar instance in the future.

Dates of blasting activity are not provided in the AR, so it is not possible to confirm that blasts did or did not occur on the same day(s) that caribou were passing through the area. The inclusion of this information would allow for a more complete review of the Annual Report.

### **Additional Comments:**

N/A

### **Sabina Response:**

No mitigation response was initiated in this instance, as there were no fixed-wing, helicopter, or blasting activities being conducted at the time the caribou were passing through the area. Blasting did not occur on September 13. Sabina will include more information regarding timing of blasting activities in the Annual Report in future years.

The On-Site Monitoring Pre-Blasting Survey SOP is attached in Appendix C to show the data that will be collected for each blast.

**GN AR-#05: Inconsistency in Reporting on Blasting Activities****Terms and Conditions:**

NIRB Project Certificate No. 007 Term and Condition # 41

**References:**

Sabina (2019). Sabina Back River Project Wildlife Mitigation and Monitoring Program Plan (Version 10). Oct. 2019. •Golder (2021). Sabina Back River Blasting Plan for Plant Site and Portal Decline (Appendix B of 2021 AR) Apr. 2021. •Sabina (2022) Sabina Back River Project 2021 Annual Report. Mar. 2022.

**Concerns:**

There appears to be some inconsistency in how blasting activities are described and reported within the 2021 AR. S.1.2 of the AR, 2021 Project Activities, describes 2021 Goose Site Earthworks as including: "...drilling and blasting at the portal box cut and development of the bulk-sample underground workings;" and "...drilling, blasting and pad construction at the new permanent fuel tank pad". However, s.5.4.2.1 of the AR states that, "Blasting at the Plant Site Pad occurred in 2021. Blasting was not conducted at any other sites in 2021." Descriptions of these sites and maps of these cited Project areas are not sufficiently clear to assess where blasting occurred, and if the blasting described in the 2021 AR is the same described in the Blasting Plan for Plant Site and Portal Decline attached as Appendix B.

**Suggestions and Recommendation:**

The GN recommends clarifying where blasting activities have taken place and use consistent language when describing sites. The maps indicating blasting areas (pp. 191-192) are detailed and useful, but do not label sites where blasting is reported to have occurred. Likewise, the map provided on pg. 362 (Fig. 3.2-1: Infrastructure Development at the Back River Project as of 2021) does not make a distinction between earthworks and blasting activity, and does not label sites described elsewhere in the 2021 AR.

This information is valuable for linking observed wildlife locations, particularly caribou, to blasting activity, and any mitigation applied to reduce disturbance to animals within the Project area.

**Additional Comments:**

N/A

**Sabina Response:**

During 2021, blasting, movement of quarried rock and earthworks was focused on the quarry located adjacent to the airstrip and the Plant Site Pad near the head of Goose Lake. The Plant Site Pad includes several activities including the portal decline, fuel storage pad and building of shops and future camp pad. These locations and activities are grouped together at the same general location.

Sabina will include more information regarding the location and timing of blasting activities in the Annual Report in future years.

**GN AR-#06: Standard Operating Procedure for Waste Management**

**Terms and Conditions:**

NIRB Project Certificate No. 007 Term and Condition # 37 (Waste Management as part of the WMMP)

**References:**

ERM (2022). Waste Management Standard Operating Procedure [Enviro-08]. Included as Appendix 5D in Sabina 2021 Annual Report • Sabina (2021). Back River Project Responses to 2020 Annual Report Comments. Jul. 2021. • Sabina (2022) Sabina Back River Project 2021 Annual Report. Mar. 2022.

**Concerns:**

The GN recognizes and appreciates the update to the Waste Management Standard Operating Procedure (SOP) provided in the 2021 AR. Given the history and number of carnivore observations and interactions at the Project site, effective management of camp waste and wildlife attractants is important for the safety of site staff and wildlife.

**Suggestions and Recommendation:**

Additional guidance on appropriate steps for site staff when confronted with a carnivore at the site may be needed, as has been requested by the KIA in its comments on the 2020 Annual Report and committed to by Sabina. A separate SOP for carnivore interactions does not appear to be included in the 2021 AR.

**Additional Comments:**

**Sabina Response:**

The Wildlife Deterrence for Environmental Staff SOP is included as Appendix A.



**GN AR-#XX: Wildlife Safety Site Audit Report****Terms and Conditions:**

NIRB Project Certificate No. 007 Term and Condition # 37 (Waste Management as part of the WMMP)

**References:**

ERM (2022). Back River Project Wildlife Safety Site Audit Report. Aug. 2021. Included as Appendix 5C in Sabina 2021 Annual Report. •ERM (2022). Waste Management Standard Operating Procedure [Enviro-08]. Included as Appendix 5D in Sabina 2021 Annual Report • Government of Alberta (2022). Bears and industrial workers. Online. <https://www.alberta.ca/bears-and-industrial-workers.aspx> •Sabina (2019) Back River Project Wildlife Mitigation and Monitoring Program Plan. Oct. 2019. •Sabina (2021). Back River Project Responses to 2020 Annual Report Comments. Jul. 2021. •Sabina (2022) Sabina Back River Project 2021 Annual Report. Mar. 2022.

**Concerns:**

The GN appreciates the inclusion of the Wildlife Safety Site Audit Report in the 2021 AR and broadly agrees with its findings and recommendations, particularly that the site is generally clean and in good order.

As the GN has commented in the past, skirting around buildings is common practice and described as a design mitigation in the WMMP plan as well as within the Waste Management SOP, but the goal is to exclude wildlife. The GN notes Sabina's response to the GN's past comments and agrees there are multiple ways to achieve this goal. Gravel fill and hard-faced skirting are examples currently employed at the site; heavy gauge metal mesh or fencing (wind permeable) is another option. The site audit identified several instances where skirting should be repaired and noted that wildlife have been sheltering under site buildings as a result.

Site photos 3.1-5 of the report identify bulk storage and fuel tanks and barrels. It is not clear from the photos what is being stored (buckets on pallets), or if the fuel barrels are empty. Petroleum-based lubricants and grease can be a wildlife attractant, and any fuel should be stored within secondary containment.

**Suggestions and Recommendation:**

The GN has the following recommendations based on the Wildlife Safety Audit Report included in the 2021 Annual Report:

- Follow recommendations of the Report to remove wildlife attractants (e.g., clean BBQ).
- Repair damaged skirting and implement some form of wildlife exclusion for structures that do not yet have it (exclusion method to be determined by Sabina).
- Clarify what materials are stored in the bulk storage pictured in the Report.
- Place non-fuel petroleum products (e.g., lubricants and greases) in secure storage to prevent wildlife access.
- Confirm that all fuel storage is within secondary containment.

**Additional Comments:**

N/A

**Sabina Response:**

- a) In response to the camp audit conducted in August 2021, the Sabina environment lead met with camp managers to discuss the results of the audit. The primary take-aways of the audit is that the camp is very clean and well-managed, but that there is always an area for improvement. The missing skirting was added to a maintenance task and was updated in summer 2022.
- b) Camp personnel were praised for the clean status of the camp, and reminded about leaving doors open and the importance of not leaving food scraps or garbage outdoors. Onboarding training and refresher training is supplied to all personnel as they enter camp and reminders are provided about not feeding wildlife and leaving doors open.
- c) Photos 3.1-5 includes: Photo 3.1-5: North Camp: Vehicle parking (top left), core storage (top right), fuel tanks, bulk storage (bottom left) and recyclables awaiting backhaul offsite. Photos taken August 13th, 2021. Bulk storage is of NCH RockDrill, a synthetic lubricant for pneumatic drills. Note that this is a standard storage method for unopened buckets of lubricant. Opened buckets are stored indoors at the drilling site.
- d) Non-fuel petroleum products are sealed in drums or barrels that are resistant to wildlife. As such, it is standard practice to store these barrels outdoors, until they are required and opened, at which point they are generally stored indoors.
- e) All fuel storage is within secondary containment, as described in the Fuel Management Plan.

**GN AR-#07: Helicopter Flights and Tracking****Terms and Conditions:**

NIRB Project Certificate No. 007 Terms and Conditions # 60 and 61

**References:**

Sabina (2020). Back River Project Fixed-wing and Helicopter Operations SOP [Enviro-03]. Included as Appendix 5A in 2021 Back River Annual Report. •Sabina (2021). Back River Project Responses to 2020 Annual Report Comments. Jul. 2021. •Sabina (2022). Sabina Back River Project 2021 Annual Report. Mar. 2022. •Sabina (2022). Back River Project 2021 Pre-Construction Wildlife Mitigation and Monitoring Program Report. Mar. 2022.

**Concerns:**

The GN remains concerned about the frequency of helicopter flights below the recommended altitude of 610 m AGL (above ground level), the reporting format for helicopter flights, and Sabina's response to the GN's past comments. Regarding GN's past comments and Sabina's response, the GN fully recognizes the role helicopters fill in remote operations and has never suggested a general prohibition on flights below 610 m. The GN does recommend that flights are generally conducted at or above 610 m AGL, with exceptions for external loads, weather, and pilot discretion to maintain safe operations.

The goal is to reduce disturbance and negative impacts to wildlife while enabling safe and successful flight operations. The reporting of helicopter flights below 610 m, as presented in the Pre-Construction WMMP Report (Fig. 5.1-1), remains difficult to assess. Total operations are not reported, though it appears that flights below 610 m peaked at approximately 800 operations within the Goose Property Area. There is a clear pattern of low altitude flights radiating out from the Goose Property, particularly to the George Exploration Camp, but the colour stratification could indicate as many as 300 flights or as few as 30. The GN has previously recommended creating categories or bins to help illustrate flight frequency or include a table to describe the same. The timing of these flights is not clearly reported, but has distinct value, as wildlife species are more sensitive to disturbance (e.g., low altitude helicopter flights) at certain times of the year.

Additionally, Figure 5.1-1 (pg. 372), showing helicopter flights below 610 m from May to October 2021, depicts the "Winter Ice Road (As Built)", but Section 1.2 -2021 Project Activities (pg. 352) states, "No Winter Ice Road (WIR) was constructed between the MLA and the Goose Site during 2021". Clarification is needed to understand if the map and the text are in conflict, or if the map is using a past version of the WIR as a geographic reference.

**Suggestions and Recommendation:**

The GN's recommendation for the general application of flights at or above 610 m AGL reduces impacts to wildlife and does not require pilots to visually locate animals on the ground or constantly refer to flight navigation systems or maps to avoid specific wildlife features at specific times, as described in the Helicopter Operations SOP (S.3.2 and Fig. 2). Simplifying the guidance simplifies compliance. Flights below 610 m (e.g., external loads, weather (low ceilings), etc.) should still follow the guidance in Sabina's SOP while maintaining vertical and horizontal separation from wildlife and wildlife features as described in the SOP. The GN recognizes that low altitude flights are necessary to support site operations, particularly when hauling external loads. In an effort to understand the scale and intensity of low altitude operations, and concomitant impacts to wildlife, the GN again requests that Sabina provide clearer information on the frequency and timing of flight operations below 610 m. If the WIR is to be used as a reference on a map when no WIR was constructed in the reporting year, please make this clear either in the text, the map, or both.

**Additional Comments:**

**Sabina Response:**

The GN has requested that helicopters fly above 610 m on several occasions. Sabina's position at the FEIS hearing and in responses to comments on the NIRB annual report has remained consistent: that this is not required to protect wildlife.

Sabina will not be requiring helicopters to fly above 610 m for several reasons:

- a) Guidance on helicopter use from multiple jurisdictions includes vertical avoidance of "sensitive features" such as mineral licks and calving areas during sensitive periods. No sensitive areas for caribou occur in the Goose Lake area.
- b) For the majority of days when helicopters are used each year, there are no caribou present and so there is no purpose to fly higher than required.
- c) The primary use of helicopters on site is for drill moves in support of the continuing exploration program. Helicopters with external loads are generally flying between the Goose Camp and exploration targets within the Goose Potential Development Area (PDA), e.g., within 2-3 km of the Goose Camp, or between drill sites surrounding the camp.

Sabina will consider if there is a better way to display the flight data to make it clearer how many flights have occurred and at what elevation.

**GN AR-#08: Vegetation Monitoring****Terms and Conditions:****NIRB Project Certificate No. 007 Terms and Conditions # 32, 34, and 35****References:**

Sabina (2021). Back River Project Responses to 2020 Annual Report Comments. Jul. 2021. •Sabina (2022). Sabina Back River Project 2021 Annual Report. Mar. 2022. •Sabina (2020). Back River Project Vegetation Monitoring Program [Golder 2022]. Included as Appendix D in 2021 Back River Annual Report.

**Concerns:**

The GN has previously commented that Winter Ice Road (WIR) plot locations should be monitored in all years, even when no ice road has been constructed. WIR plot data collected for years where the WIR is not constructed would allow for year over year comparisons of impacts and would allow for an assessment of recovery rates for damaged areas within the different disturbance classifications described within the Sabina 2019 Vegetation Monitoring Program (Golder 2020). These data could also be used to support Sabina's conclusions for progressive remediation. Additionally, the maps in the vegetation monitoring report, Figures 1 & 2, (pp. 290-291), showing 2021 Vegetation Monitoring Locations depict the "Winter Ice Road As Built", but Section 1.2 of the Annual Report -2021 Project Activities (pg. 352) states, "No Winter Ice Road (WIR) was constructed between the MLA and the Goose Site during 2021". Clarification is needed to understand if the map and the text are in conflict, or if the map is using a past version of the WIR as a geographic reference.

**Suggestions and Recommendation:**

The GN again recommends that the basic photographic monitoring of the WIR should be included for all years, including those years where no WIR is constructed. This additional data creates a continuous data set, supports year-to-year comparison, and allows for assessment of regrowth and recovery of damaged vegetation along the WIR. If the WIR is to be used as a reference on a map when no WIR was constructed in the reporting year, please make this clear either in the text, the map, or both.

**Additional Comments:**

The GN notes that there have been general improvements in the reporting and format of the Vegetation Monitoring Program, as well with the reporting of vegetation losses per TC 32. The GN appreciates the additional clarity and detail.

**Sabina Response:**

Sabina thanks the reviewer for their comment. We are currently reviewing the request and will follow up with a response under separate cover by August 19.

## 2.4 RESPONSE TO TRANSPORT CANADA

### TC-1: Marine Safety and Security

#### Detailed Review Comment:

Compliance and Inspections: The Project's Oil Handling Facility (OHF) is in compliance with regulatory requirements as per part 8 of the Canada Shipping Act, 2001 (CSA 2001) and the Environmental Response Regulations. No physical inspection of the OHF was carried out in 2021.

Information regarding the Oil Pollution Emergency Plan (OPEP) and Oil Pollution Prevention Plan (OPPP) for the Project: For the information of the Board and the Proponent, under section 12 of the Environmental Response Regulations passed pursuant to CSA 2001, there is a requirement for the owner of an OHF to complete annual reviews and if necessary update the Project's Oil Pollution Emergency Plan (OPEP) and Oil Pollution Prevention Plan (OPPP). If plans are updated, they must be submitted to Transport Canada no later than one year after the update. As required under the CSA 2001, the facility will need to notify Transport Canada of proposed changes to the OHF's operations relating to the loading or unloading of oil to or from vessels (180 days in advance of the change). The facility is also required to submit a revised OPEP/OPPP 90 days before a change in operation.

Additional Information - Marine Safety and Security: Transport Canada would like to remind the Proponent of two particular pieces of information regarding marine safety and security: Before the facility interfaces with a foreign flagged vessel or a Canadian flagged vessel on an international voyage, Sabina Gold and Silver Corporation is required to comply with the Marine Transportation Security Act and Regulations. Marine shipping standard operating procedure: Vessel operators serving the Project should be made aware of the 2022 Annual Notice to Mariners, and in particular section A2 Marine Mammal Guidelines and Marine Protected Areas and section 7A Voyage Planning for Vessels Intending to Navigate in Canada's Northern Waters (see: Annual Notice to Mariners <https://www.notmar.gc.ca/publications/annual/annual-notice-to-mariners-eng.pdf>

#### Recommendation:

Transport Canada recommends to the Board and the Proponent that an up-to-date OPEP and OPPP continue to be included in future annual reports for the Sabina Gold Project.

#### Sabina Response:

Sabina will continue to include OPPP and OPEP updates in its submission of Annual Reports to the NIRB, and continues to work closely with Transport Canada in the development of this plan and our offload activities. Sabina notes that Transport Canada will additionally be observing Sabina's preparatory spill response exercise at the MLA in 2022, prior to 2022 fuel offload.

Sabina appreciates the reminder of the requirement that compliance with the Marine Transportation Security Act and Regulations is required is the facility will interface with a foreign flagged vessel or a Canadian flagged vessel on an international voyage, and notes that this will not be the case for 2022 but will keep this in mind for future. Sabina will also relay the information provided by Transport Canada on the 2022 Annual Notice to Mariners to our shippers.

**TC-2: Navigation Protection****Detailed Review Comment:**

As Sabina noted in its 2021 Annual Report for the Project, Transport Canada's Navigation Protection Program has issued authorizations for various works associated with the Project: 2012-600767-002 - Navigation Protection Act - MLA Discharge Pipeline Authorization 2012-600767-003 - Navigation Protection Act - MLA Intake Pipeline Authorization 2012-600767-006 - Navigation Protection Act - MLA Lightering Barge Authorization. No compliance issues with these authorizations were noted in 2021. No site visits of these works were conducted during this time. Transport Canada's Navigation Protection Program noted that Table 1.2-1 Permit Registry in the 2021 Annual Report lists the following as "authorizations" from Transport Canada: 2012-600767-004 N/A TC Navigation Protection Act - Umwelt Lake Dewatering Authorization 2012-600767-005 N/A TC Navigation Protection Act - Llama Lake Dewatering Authorization.

**Recommendation:**

Transport Canada recommends these be removed from Table 1.2-1 as the applications for these authorizations were not completed because Transport Canada concluded the two waterways were not navigable. As the waterways were not navigable, the Proponent was not required to obtain the exemption set out in section 24 of the former Navigation Protection Act from the prohibition against the dewatering of navigable waters.

**Sabina Response:**

Sabina will correct this information and note this distinction in future submissions.

### **TC-3: Transportation of Dangerous Goods**

#### **Detailed Review Comment:**

A Transportation of Dangerous Goods (TDG) inspection was not conducted by Transport Canada for the Project in 2021. II. Hazardous waste/materials information: Sabina's 2021 Annual Report does not provide any information regarding the shipping of dangerous/hazardous goods.

#### **Recommendation:**

In keeping with Transport Canada's comments for the 2020 Annual Report for the Project, the Department recommends: Future annual reports for the Back River Gold Mine Project provide information and copies of documents regarding the transportation of dangerous goods for the Project, including nil comments. Part of this information would be the inclusion of all hazardous waste manifests for the Project, if any. This information would support Transport Canada's reviews of future annual reports.

#### **Sabina Response:**

All waste generated and disposed of at site or backhauled for disposal by KBL Environmental is summarized in Sabina's annual report to the NWB and is available on their public registry.



## 2.5 RESPONSE TO FISHERIES AND OCEANS CANADA

### DFO-1:

#### Section/Document:

Condition No. 24, 29 & 31

#### Concern:

Clarity regarding timing of proposed crossing upgrade works on Rascal Stream West (culvert installation)

#### Request:

Provide clarity on expected construction and completion date. DFO submitted IRs to Sabina April 13, 2022 related to the original RFR but have not received a response to IRs.

#### Sabina Response:

WSP Golder submitted an amended Request for Review (RFR) application for the crossing structure upgrade on Rascal Stream West to Fisheries and Oceans Canada (DFO) on 20 June 2022. The submission addressed previously submitted Information Requests (IRs) from DFO, including the revised timeline for construction, additional details on the secondary channel, and additional details on Arctic Grayling passage criteria. DFO subsequently issued a letter of advice (i.e., approval) for the construction of the new crossing structure, dated 15 July 2022, under DFO file no. 22-HCAA-00586

**DFO-2:**

**Section/Document:**

Condition No. 25

**Concern:**

The use of explosives in aquatic environments can cause harm to fish by rupturing the swim bladder and/or damaging other internal organs, and damaging incubating eggs. It could also result in physical and/or chemical alterations to fish habitat. Minimize the effects of blasting on fish and fish habitat.

**Request:**

Blast Monitoring and Mitigation Program to be developed and implemented in consultation with DFO. The Proponent should, in addition, use a blasting threshold limit of 50 kPa for instantaneous pressure change in order to appropriately mitigate effects of blasting on fish as recommended in Cott and Hanna (2005)\*\*Cott P and Hanna B. 2005. Monitoring Explosive-based Winter Seismic Exploration in Waterbodies, NWT 2000-2002. Pages 473-490. In: Proceedings of the Offshore Oil and Gas Environmental Effects Monitoring Workshop: Approaches and Technologies. Battelle Press. Columbus. 601 p + index.

**Sabina Response:**

A blasting plan was developed for the Plant Site and Portal Decline, dated April 23, 2021 (Golder 2021). To determine appropriate setback distances to protect fish and fish habitat from blasting activities for the Plant Site and Portal Decline, calculations were derived from Fisheries and Oceans Canada (DFO) Guidelines for the Use of Explosives In or Near Canadian Fisheries (Wright and Hopky 1998), and other applicable guidelines in the literature. When using these calculations two pathway interactions for fish and fish habitat were considered:

- Direct effects to fish health caused by overpressure exceeding a site -specific limit of 50 kPa
- Effects to spawning habitat by peak particle velocity (PPV) exceeding 13 mm/s

The guideline for overpressure was applied to all fish species and to all habitats supporting fish either throughout the year or only on a seasonal basis. The guideline for peak particle velocity was applied only to areas of fish-bearing watercourses or waterbodies where spawning habitat may be present, and during appropriate spawning windows for the respective species. Site specific spawning windows for affected species were described under mitigation, if required.

**DFO-3:**

**Section/Document:**

Condition No. 93

**Concern:**

Ensure protection of the marine environment.

**Request:**

As per 2020 comments on the Back River Project 2020 Modification Package -DFO requires that the Proponent send a Request for Review for their shoreline pad expansion prior to construction to initiate the review of the impacts under DFO's regulatory regime. An update is necessary to the existing DFO Letter of Advice (18-HCAA-00971) to reflect planned in-water works related to the MLA Shoreline Pad Extension

**Sabina Response:**

Sabina is committed to submit a Request for Review application for the shoreline pad expansion. The application will be submitted with new design specifications at least 3 months in advance of construction. Construction of the shoreline pad expansion is planned for summer 2023.

**DFO-4:**

**Section/Document:**

Appendix B

**Concern:**

Blasting location exclusion zone for the Overpressure guideline, be revised to match with the blast location exclusion zone for the peak particle velocity for the Plant Site (Figure 2)

**Request:**

Blasting location exclusion zone for the Overpressure guideline, be revised to match with the blast location exclusion zone for the peak particle velocity for the Plant Site (Figure 2)

**Sabina Response:**

The recommended approach in the blasting plan is consistent with other mining projects in the North and other jurisdictions in North America (e.g., Alaska). There is no biological rationale to match the overpressure setback with PPV (peak particle velocity) setback distances. Overpressure setbacks will be implemented for all fish-bearing water to protect fish from injury, whereas the PPV setback distances will be specific for embryo stages for nearby fish species (all spring spawners, if present at all). The PPV setbacks are also based on very conservative guidelines for vibration criteria that should not exceed 13 mm/s. For context for the criteria that was used for the Back River Project, the review provided by Kolden and Aimone-Martin (2013) conclude that 147 mm/s is the minimum PPV that causes negative effects based on empirical studies examining tolerance of embryos to mechanical shock exposure. Sabina is very confident that the prepared blasting plan protects fish and fish habitat, as required under the Fisheries Act.

**Reference**

Kolden KD and C Aimone Martin (2013). Blasting Effects on Salmonids. Prepared for the Alaska Department of Fish and Game. June 2013. 35 pp.

**DFO-5:**

**Section/Document:**

Appendix B, Table 3

**Concern:**

Overwintering habitat of Fox Creek and any small ponds within the Fox Creek system

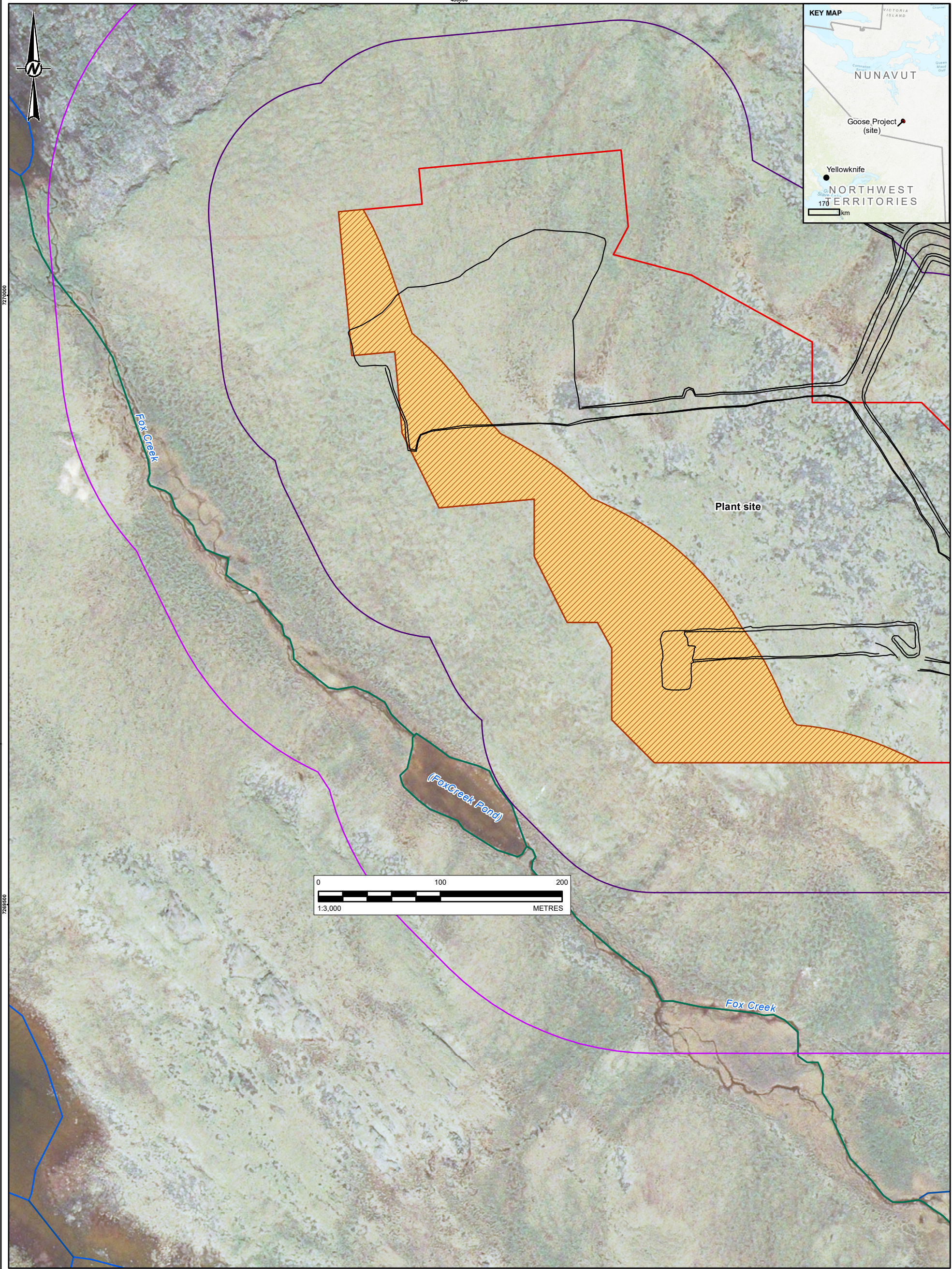
**Request:**

Confirm presence or absence of overwintering habitat in the Fox Creek system.

**Sabina Response:**

The likelihood of overwintering habitat (i.e., depths greater than 2 m) existing in the Fox Creek system is very low. The pool (small pond) in close vicinity to the Plant Site and Portal Decline is approximately 0.5 ha size, precluding a pond morphology that can provide depths for overwintering fish. Furthermore, a stream survey was completed at the Back River Project in 2012, including the Fox Creek outflow, and the results from that survey found that wetted depths were less than 1.0 m for all 20 streams that were surveyed (see FEIS Appendix V6-6C). Pool habitat within the Fox Creek outflow was also defined by a mean maximum depth of 0.6 m. Satellite imagery of the habitat under evaluation is provided in the attached figure (which is a modified version of the figure provided in the blasting plan), showing shallow conditions as delineated by the visible streambed.





LEGEND

- 2020 AS-BUILT
- BLASTING LOCATION
- BLASTING LOCATION EXCULSION ZONE
- FOX CREEK AND POND – POTENTIAL TO SUPPORT SPAWNING AND REARING HABITAT FOR ARGR
- POND ON FOX CREEK – POTENTIAL TO SUPPORT SPAWNING AND REARING HABITAT FOR ARGR
- WATERCOURSE
- WATERBODY

BLAST LOCATION SETBACK

- PLANT SITE 106.7 m SETBACK FOR 50 kg CHARGE WEIGHT BLAST IN ROCK OR FROZEN SOIL
- PLANT SITE 238.6 m SETBACK FOR 250 kg CHARGE WEIGHT BLAST IN ROCK OR FROZEN SOIL
- PORTAL DECLINE LOCATION 150.9 m SETBACK FOR 100 kg CHARGE WEIGHT BLAST IN ROCK

NOTE(S)

THIS IS A MODIFIED FIGURE FROM THE BLASTING PLAN.

REFERENCE(S)

HYDROLOGY LAYERS OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED, REVISED BY GOLDER ASSOCIATES LTD. PHOTOSAT IMAGERY OBTAINED FROM THE CLIENT. PROJECTION: UTM ZONE 13 DATUM: NAD 83

DRAFT

CLIENT  
SABINA GOLD & SILVER CORP.

PROJECT  
SABINA BACK RIVER ENVIRONMENTAL

TITLE  
SETBACK DISTANCE FOR THE PEAK PARTICLE VELOCITY  
GUIDELINE (13 mm/s) TO PROTECT FISH HABITAT

CONSULTANT	YYYY-MM-DD	2022-08-05
	DESIGNED	CS
	PREPARED	SK
	REVIEWED	
	APPROVED	

PROJECT NO. 21505757	CONTROL	REV. A	FIGURE 1
-------------------------	---------	-----------	-------------



**DFO-6:**

**Section/Document:**

Marine Monitoring Plan

**Concern:**

Shipping Details

**Request:**

Provide details on marine shipping (if any) for 2021

**Sabina Response:**

Shipping information is routinely coarsely summarized in the annual report, in update to T&C 58 and 64. In 2021, five vessels in total supplied the MLA; two from the east and three from the west. Further information on ship tracks, dates, and vessel names as well as related monitoring results for marine mammal and seabirds is provided in the WMMP Section 7.1.2.

**DFO-7: Compliance Monitoring**

**Section/Document:**

N/A

**Concern:**

No compliance monitoring or site visits/inspections were conducted by DFO in 2021. Furthermore, no amendments were made to the proponent's Fisheries Act Authorization (FAA) issued by DFO in 2019. In 2020, the proponents design and monitoring plan for the Rascal Stream Diversion was reviewed and approved by DFO as required under their FAA. Starting in 2021, monitoring reports for the diversion will be required under the FAA. To date DFO had not received a monitoring report for the Rascal Stream Diversion 2021 as the Rascal Stream Diversion has not been completed. All in all, the proponent is largely compliant with their FAA and is required to submit monitoring reports by March 31 of each year. To date, updates for offset monitoring have not been provided, however DFO recognizes that issues associated with the Covid-19 pandemic have affected ongoing projects everywhere. DFO will continue to work with the proponent to ensure compliance with the FAA, and that the conditions perform as intended to maintain and conserve fish and fish habitat.

**Request:**

**Sabina Response:**

Sabina appreciates DFO's understanding.



## 2.6 RESPONSE TO ENVIRONMENT AND CLIMATE CHANGE CANADA

### ECCC-1: Air Quality

#### References:

Sabina Gold & Silver Corp. Back River Project 2021 Annual Report, Section 4.5.1 Air Quality (PC TCs 1 through 5), Project Certificate Condition No. 2=Air Quality Monitoring and Management Plan (AQMMP) July 2019, Section 7 Monitoring Program

#### Comment:

The annual report states that "Dustfall jars and NO<sub>2</sub> passive cartridges were deployed at each station during the July installation and were retrieved October 3rd, 2021 and submitted to Bureau Veritas for laboratory analysis." The AQMMP states that the sample periods will be approximately 30 days. The reported long sample period exceeding 60 days impairs the detection of seasonal variability for the measured parameters.

#### Recommendation:

ECCC recommends that the Proponent explain the apparent discrepancy in the sample periods between the AQMMP and the monitoring report, and indicate whether future sample periods will be approximately 30 days.

#### Sabina Response:

It is understood that a longer exposure period for sampling dustfall and NO<sub>2</sub> using passive techniques impairs the ability to resolve concentrations over shorter time-periods. Future sampling campaigns will further endeavour to collect, replace and submit the passive samples for dustfall and NO<sub>2</sub> on an approximate 30-day rotation.

## **ECCC-2: Climate and Meteorology**

### **References:**

Sabina Gold & Silver Corp. Back River Project 2021 Annual Report, Section 4.5.2 Climate and Meteorology (PC TCs 6 through 8), Project Certificate Condition No. 8

### **Comment:**

There are discrepancies with the solar radiation figures. The caption for Figure TC8-5 is identical to that of Figure TC8-8 despite differences in the bar graphs for September through November. The zero solar radiation value for October in Figure TC8-8 is suspect given the non-zero values for November for both Figures TC8-5 and TC8-6.

### **Recommendation:**

ECCC recommends that the Proponent provide clarification regarding the apparent discrepancies in the figures.

### **Sabina Response:**

Figure TC8-5 and TC8-6 are representative of the solar radiation conditions present at the Goose site the site in 2020 and 2021 respectively. TC8-8 was included in error and should be disregarded.

## Appendix A

### On Site Monitoring Wildlife Deterrence



## Back River Project

### Wildlife Deterrence for Environment Staff Pre-construction, Construction, and Operations

STANDARD OPERATING PROCEDURE

ENVIRO-06

20 July 2020

Version B.1

**Scope of Work:** This SOP provides guidance for Environment staff, who will be responsible for implementation of deterrents to minimize adverse effects to wildlife and personnel.

<b>Contacts:</b>	Merle Keefe	<a href="mailto:mkeefe@sabinagoldsilver.com">mkeefe@sabinagoldsilver.com</a>
	Manager, Environmental Permitting	604-240-6619
	Greg Sharam	<a href="mailto:greg.sharam@erm.com">greg.sharam@erm.com</a>
	Technical Director, ERM	778-628-0974

## CONTENTS

<b>1.</b>	<b>BACKGROUND</b>	<b>3</b>
<b>2.</b>	<b>TRAINING</b>	<b>3</b>
<b>3.</b>	<b>EQUIPMENT</b>	<b>3</b>
<b>4.</b>	<b>COMMUNICATION</b>	<b>4</b>
<b>5.</b>	<b>DETERRENT PROTOCOLS FOR ENVIRONMENT STAFF</b>	<b>4</b>
5.1	Caribou	4
5.1.1	When to Deter Caribou	4
5.1.2	How to Deter Caribou	5
5.2	Muskox	6
5.2.1	When to Deter Muskox	6
5.2.2	How to Deter Muskox	6
5.3	Grizzly Bears, Wolverines and Wolves	6
5.3.1	Management Response to Grizzly Bears, Wolverines and Wolves	9
5.4	Raptors	10
5.4.1	When to Deter Raptors	10
5.4.2	How to Deter Raptors	10
<b>6.</b>	<b>REPORTING</b>	<b>11</b>
<b>7.</b>	<b>REFERENCES</b>	<b>11</b>
<b>8.</b>	<b>ATTACHMENTS</b>	<b>12</b>

List of Tables

Table 1: Passive and Active Deterrence Measures for Caribou .....5

Table 2: Protocol to Determine Appropriate Management Responses to Human-Animal Interactions .....8

Table 3: Response to Grizzly Bears, Wolverines or Wolves Observed on Site or near a Field Crew .....9

Table 4: Deterrence Measures for Raptors ..... 11

## 1. BACKGROUND

Sabina is committed to ensuring the health and safety of all wildlife and personnel. The focus on monitoring and the management of Project activities in response to wildlife presence is intended to maximize safety without direct interference in wildlife daily activities. In rare cases, however, wildlife may be deterred from the Project site should their immediate safety or the safety of personnel be in jeopardy.

This SOP is intended for use by the Environment team. It summarizes the mitigation actions in Sabina's Wildlife Mitigation and Monitoring Program Plan (WMMP Plan) required to deter wildlife to a safe distance away from the site to minimize any adverse effects. The objective of deterrence is to encourage wildlife to leave the area, while not startling them and causing them to exhibit defensive behaviours or to run away.

A second SOP is intended for use by field crews in the case of an aggressive or predatory animal.

## 2. TRAINING

All Environment staff will be trained on the implementation of this SOP, including the following:

- Recognizing the causes of human/wildlife conflicts and how they can be prevented;
- How to respond to wildlife sightings and encounters;
- How to determine whether wildlife deterrence is necessary or appropriate, and how to select an appropriate deterrence method;
- Proper use and safe application of deterrents;
- Communication requirements; and
- Reporting requirements.

## 3. EQUIPMENT

Environment staff will have access to the following equipment, at a minimum:

- Bear bangers (pen launcher and/or cap revolver);
- Air horn;
- Bear spray;
- Communication devices (2-way radios, satellite phone, inReach);
- Binoculars;
- GPS;
- Clipboard and pens/pencils;
- Forms (attached):
  - Incidental Wildlife Observation Datasheet; and
  - Wildlife Collision Datasheet.

The Bear Response Team and Bear Monitors will also have access to lethal deterrents, including firearms.

Additional equipment or supplies may be required to implement deterrence options for nesting raptors.

## 4. COMMUNICATION

**Prior to any wildlife deterrence, ensure the following communication has occurred:**

- Contact the KIA and GN DOE, unless the situation is rapidly evolving (e.g., a caribou on the runway and a plane approaching, immediate safety concern) or it is a repeat situation.
- Consult a GN Conservation Officer if wildlife is frequenting the camp and deterrence is planned. Inform the Conservation Officer following any deterrence or lethal response:
  - Kugluktuk: +1 (867) 982-7451
  - Cambridge Bay: +1 (867) 983-4164
- Alert on site personnel that wildlife deterrence is planned and provide instructions for evacuating and avoiding the affected area.

**Additional communication requirements for when grizzly bear or wolverine are observed on site are specified in Section 5.3.**

## 5. DETERRENT PROTOCOLS FOR ENVIRONMENT STAFF

**Prior to any wildlife deterrence actions, ensure the following:**

- Wildlife has a clear route to escape, and that all workers have evacuated the area prior to deterrent use.
- All workers are instructed to remain inside facilities, where possible, or away from the affected area until the situation has been cleared.

### 5.1 Caribou

#### 5.1.1 *When to Deter Caribou*

Caribou may be deterred from the Project site should their immediate safety be in jeopardy. Examples of situations when deterrence would be acceptable include the following:

- Caribou have become acclimated to the camp and are posing a safety risk to Project personnel and/or to themselves;
- Caribou are attracted to the Tailings Storage Facility (TSF) or other features as a salt source, but TSF water quality does not meet wildlife guidelines;
- An individual or small group of caribou are occupying the airstrip and have the potential to be alarmed and run into the airstrip during landing or takeoff (see Section 5.1.1.1); and
- A caribou has entered the open pit or other facility and has become disoriented.

##### 5.1.1.1 *Caribou Deterrence on Airstrip*

Prior to aircraft landing on the airstrip, pilots and on-site personnel will complete a visual inspection to identify the presence of any wildlife on the airstrip.

The appropriate management response to caribou on the airstrip depends on the size of the group as follows:

- **Group of > 25 caribou:**
  - No action will be taken

- Instruct flight crew to divert to another location

■ **Group of < 25 caribou:**

- Deterrence may proceed as described below

If deterrence proceeds, notify the flight crew that such action is taking place and aircraft will not be approved to land until the airstrip is clear.

If the wildlife cannot be escorted from the airstrip within a reasonable length of time, instruct the flight crew to divert to another location.

### 5.1.2 *How to Deter Caribou*

Deterring caribou from industrial sites can be done through a variety of passive and active measures (Agnico Eagle 2018; Golder Associates Ltd. 2017; TMAC Resources 2017). Potential passive and active deterrence measures are summarized in Table 1.

The selection of an appropriate deterrence measure (e.g., passive vs active) is the responsibility of Environment staff and will depend on the risk to personnel and wildlife safety.

**Some sub-lethal deterrence methods that may be appropriate for large carnivores (e.g. use of rubber bullets and pushing problem animals away from site using a helicopter), are not considered appropriate to use with caribou.**

**Table 1: Passive and Active Deterrence Measures for Caribou**

Circumstance	Passive Deterrence Measures	Active Deterrence Measures
Acclimated Animals	<ul style="list-style-type: none"> <li>■ Investigate and remove any potential attractants.</li> <li>■ Ongoing monitoring. Under no circumstance are Project personnel advised to approach caribou.</li> </ul>	<ul style="list-style-type: none"> <li>■ Truck presence – a vehicle can be used to slowly herd a caribou away from the camp.</li> <li>■ Human presence – a group of personnel form a line and make noise while slowly walking towards the animal.</li> <li>■ Noise deterrents (e.g., bear bangers, screamers, car horns, air horns). These should be used sparingly and only if other measures do not show results.</li> <li>■ In the rare case of a repeat offender, the Sabina Environmental Manager will engage with GN DOE on potential alternatives, which may include the following: <ul style="list-style-type: none"> <li>○ Live capture and transport away from site.</li> <li>○ Dispatching of the animal by a local hunter and distribute the meat to the communities.</li> </ul> </li> </ul>
Tailings Storage Facility or Airstrip	<ul style="list-style-type: none"> <li>■ Installation of Inuksuk/Inokhok (stone markers) near areas where avoidance is desired.</li> <li>■ Installation of fencing around the area (in the case of the airstrip).</li> </ul>	<ul style="list-style-type: none"> <li>■ Truck presence – a vehicle can be used to slowly herd a caribou away from the TSF or airstrip.</li> <li>■ Human presence – a group of personnel form a line and make noise while slowly walking towards the animal.</li> <li>■ Noise deterrents (e.g., bear bangers, screamers, car horns, air horns). These should be used sparingly and only if other measures do not show results.</li> </ul>



Circumstance	Passive Deterrence Measures	Active Deterrence Measures
Disoriented Animal in Open Pit or Other Infrastructure	<ul style="list-style-type: none"> <li>■ Installation of Inuksuk/Inokhok (stone markers) near areas where avoidance is desired.</li> <li>■ Installation of fencing around the area (in the case of exhausted pits).</li> </ul>	<ul style="list-style-type: none"> <li>■ A disoriented animal poses a heightened risk to itself and to Project personnel. Under no circumstance are Project personnel advised to approach caribou.</li> <li>■ Truck presence – a vehicle can be used to slowly herd a caribou away from the camp.</li> <li>■ Noise deterrents (e.g., bear bangers, screamers, car horns, air horns). These should be used sparingly and only if other measures do not show results.</li> </ul>

## 5.2 Muskox

### 5.2.1 When to Deter Muskox

Should muskox become acclimated to the Project site, and should their safety be at risk, then the Environment Department may deter muskox. Examples of acceptable reasons to deter muskox include:

- Muskox have become acclimated to the camp and are posing a safety risk to Project personnel;
- Muskox are attracted to the TSF or other feature as a salt source, but TSF water quality does not meet wildlife guidelines; and
- An individual or small group of muskox are occupying the airstrip and have the potential to be alarmed and run into the airstrip during landing or takeoff.

### 5.2.2 How to Deter Muskox

Experience at other Arctic projects indicates that the presence of a light pickup truck or person near the muskox is all that is required to encourage muskox to leave the area.

## 5.3 Grizzly Bears, Wolverines and Wolves

The philosophy of responding to grizzly bears, wolverines and wolves (referred to as “large predators” here) on the Project can be summarized as follows:

1. Reduce risk to Project personnel through training and immediate response to possible large predator interactions.
2. Dissuade large predators from the Project site through management activities (managing wastes, eliminating wildlife attractants, maintaining skirting and fencing, etc.) to make the site less appealing to wildlife.
3. Only if #2 above has been implemented and if large predators persistently approach the site, or Project personnel are at risk, should any action towards the animal be taken.

If a large predator is observed in camps, or repeatedly observed near camps (e.g., two or three times within a week), complete the following:

- Review waste management activities.
- Review food storage management and management for other possible attractants such as grey water, hydrocarbons, plastics, or food preparation equipment.

- Review camp facilities to ensure that skirting and fencing are in good condition, and repair any structures that may allow access for these animals.
- Consider if the animal is habituated.

The following management options are meant to ensure the safety of personnel, and dissuade habituated or aggressive large predators from visiting the site. Ideally, this list of options would be followed sequentially as a situation develops, but managers may choose to escalate the actions taken in response to an aggressive, predatory, or injured animal as described in Table 2:

1. Monitoring: report and record wildlife sightings and signs.
2. Post warnings: provide accurate and current information of all potentially dangerous wildlife in the area via radio.
3. Area closures: restrict worker access to areas with problem wildlife, pending suitable controls.
4. Adverse conditioning (AVCD): apply AVCD activities to problem wildlife to prevent or reverse habituation.
5. Destruction: undertake (with authorization from appropriate wildlife management authority) only when an animal is considered to pose an unacceptable hazard to human safety.

**Table 2: Protocol to Determine Appropriate Management Responses to Human-Animal Interactions**

Type of Human-Animal Interaction	Management Response Options				
	Monitor	Post Warning	Area Closure	AVCD*	Destroy
1. Incidental sighting or sign reported	X	X			
2. Animal showing normal feeding behaviour and avoids people	X	X			
3. Animal reacting defensively following surprise or provoked encounter (defensive aggression)	X	X	X		
4. Animal tolerates people but ignores them and their facilities (no threat present)	X	X	X	X	
5. Animal shows repeated interest in people and/or human facilities, which will likely result in food-conditioning or close approaches (habituated)	X	X	X	X	
6. Animal receives minimal or low-level reinforcement to unnatural food sources (mildly food-conditioned)	X	X	X	X	
7. Animal is heavily habituated to people and has repeatedly obtained unnatural foods (food-conditioned)	X	X	X	X	
8. Animal has previously been relocated and is unlikely to change its behaviour		X	X	X	X
9. Animal displays aggressive, offensive, or predatory behaviour and is an imminent threat to human safety		X	X	X	X

Avoid destruction of wildlife unless no other recourse is possible. Grizzly bears or other wild animals that cause injury to humans as a result of natural defensive or protective behaviour (e.g., protecting its young during a startling encounter) should not be destroyed or translocated. This should only occur if the animal has previously been relocated and is unlikely to change its behaviour or if the animal displays aggressive, offensive, or predatory behaviour and is an imminent threat to human safety.

### 5.3.1 *Management Response to Grizzly Bears, Wolverines and Wolves*

The distance of the animal to the Project site or field crew will determine the management response by Environment staff, including the potential use of deterrents, as outlined in Table 3.

**Table 3: Response to Grizzly Bears, Wolverines or Wolves Observed on Site or near a Field Crew**

Caution Level	Distance From Site or Field Crew	Response
Green	> 4 km from site	<ul style="list-style-type: none"> <li>■ Record wildlife.</li> <li>■ No management triggered.</li> </ul>
Yellow	< 4 km from site	<ul style="list-style-type: none"> <li>■ Issue a site-wide notice to alert personnel a bear or wolverine is in the area, if appropriate.</li> <li>■ Mobilize Bear Response Team to monitor the animal.</li> </ul>
Amber	<2 km from site	<ul style="list-style-type: none"> <li>■ Issue a site-wide notice to alert personnel a bear or wolverine is in the area, with instructions to actively monitor their radios.</li> <li>■ Mobilize Bear Response Team to monitor animal, prepared with appropriate deterrent options (as described below).</li> <li>■ Put helicopter on notice as a deterrent option.</li> </ul>
Red	< 2 km from field crew or <1 km from site	<ul style="list-style-type: none"> <li>■ Call "Code 1, Code 1, Code 1" on the camp radio.</li> <li>■ Instruct all personnel to seek shelter in buildings or vehicles.</li> <li>■ Dispatch helicopter to remove field crew.</li> <li>■ Deter the animal with a helicopter.</li> <li>■ Mobilize Bear Response Team to monitor wildlife, prepared with appropriate deterrent options.</li> <li>■ Prepare to deter the animal with non-lethal deterrents (e.g., bear bangers).</li> </ul>
Red	<500 m from field crew or <300 m from site	<ul style="list-style-type: none"> <li>■ Call "Code 1, Code 1, Code 1" on the camp radio.</li> <li>■ Instruct all personnel to seek shelter in buildings or vehicles.</li> <li>■ Helicopter to immediately remove field crew.</li> <li>■ Deter animal with non-lethal deterrents (e.g., bear bangers).</li> <li>■ Deploy lethal deterrents at the discretion of the Bear Monitor or Bear Response Team.</li> </ul>

## 5.4 Raptors

Cliff nesting raptors can be attracted to mining pits or quarries as nesting sites. Deterrence is the last line of defense to prevent mortality to raptors at these sites and should only be implemented if all prior mitigation measures have not been successful at preventing raptor nesting.

Prior to removal or deterrence of raptors, contact the GN to discuss mitigation options. A permit is required prior to undertaking any activity that can lead to the destruction of raptor nests or the deterrence of raptors from nesting sites.

### 5.4.1 *When to Deter Raptors*

The following mitigation measures must be implemented prior to the use of deterrents for raptors in mining pits or quarries:

- If a raptor nest is observed being constructed in a pit or quarry, but the raptor has not yet laid eggs, remove the nest.
- If locations in pits or quarries are found that are frequently used as nests, dissuade raptors from using the area with physical barriers (e.g., netting, fencing, bird spikes, streamers etc.).

**If a raptor persists in attempting to nest in a pit despite the mitigation listed above, then deterrence can be implemented.**

#### 5.4.1.1 *Raptors on Project Infrastructure*

Raptors can become acclimated to human activities and will build nests on infrastructure. If a raptor builds a nest on Project infrastructure (e.g., building, towers, etc.) then normal operations at that site can continue. Ensure no new activities are conducted within 100 m of the active raptor nest, but existing activities can continue. Report the nest to the GN and monitor to determine the nest success following guidance in the SOP for Pre-clearing Nest Surveys (SOP # ENVIRO-01).

### 5.4.2 *How to Deter Raptors*

Raptors may be deterred using a combination of methods outlined in Table 4.

Following the implementation of deterrents, monitoring is required to confirm that deterrents were successful and the raptor has left the pit or quarry, or to trigger additional deterrents. If the raptor continues to return to the pit or quarry and follow-up action is required, increase the monitoring intensity and deterrent response to several times per day.

**Table 4: Deterrence Measures for Raptors**

Deterrence Type	Methods
Audio	<ul style="list-style-type: none"> <li>■ Bear bangers</li> <li>■ Playback of raptor calls</li> <li>■ Air cannons</li> <li>■ Flares</li> <li>■ Propane cannons</li> </ul>
Visual Hazing	<ul style="list-style-type: none"> <li>■ Bright lights</li> <li>■ Flashers</li> <li>■ Models or decoys of other raptor species</li> </ul>

## 6. REPORTING

All wildlife observations must be recorded on an Incidental Wildlife Observation Datasheet (Attachment A). If a collision with a vehicle has occurred, the Wildlife Collision Datasheet on the back of the Incidental Wildlife Observation Datasheet must be completed.

Environment staff are responsible for ensuring an observation form is completed for any wildlife observation that involves deterrence action.

The Environment Manager will record all wildlife deterrence actions in a log. Records of wildlife deterrence actions must include the following details:

- Location
- Date and time
- Description of wildlife (species, number, sex and ages if possible)
- Description of wildlife behaviour
- Series of events, including critical decisions
- Type of deterrent(s) employed
- Effectiveness of deterrent(s) employed
- Communication with the KIA and GN DOE or Conservation Officers
- Final outcome

Wildlife deterrence events will be reported in the annual Wildlife Mitigation and Monitoring Program (WMMP) Report.

## 7. REFERENCES


Agnico Eagle. 2018. Meadowbank Division: Terrestrial Ecosystem Management Plan. Nunavut.

Golder Associates Ltd. 2017. Wildlife Effects Monitoring Plan for the Ekati Diamond Mine. Prepared for Dominion Diamond Ekati Corporation.

TMAC Resources. 2017. Madrid-Boston Project Final Environmental Impact Statement: Terrestrial Wildlife and Wildlife Habitat. Toronto, ON.

## 8. ATTACHMENTS

Attachment A: Incidental Wildlife Observation Datasheet and Wildlife Collision Datasheet

	Back River Project	July 2020
	INCIDENTAL WILDLIFE OBSERVATION DATASHEET	vA.1

- Complete this form if:
  - you observe wildlife (caribou, grizzly bear, wolf, wolverine, muskox, or fox) on the Project Site, including on-site roads and the winter ice road;
  - there is a project-related wildlife fatality or injury; or
  - you observe dead or injured wildlife, even if the fatality or injury was not project-related.
- Submit the completed form to the Environment Department at the end of your shift.

## GENERAL INFORMATION

Date of Sighting (yy mm dd)		Time First Sighted (24 hr)	
Observer Name		Time Last Sighted (24 hr)	
Job Activity During Observation			

## LOCATION INFORMATION

Location Description (e.g., Road KM or facility)				
Animal Location (if known)	UTM East		UTM North	
Observer Location	UTM East		UTM North	
Habitat Description (circle one)	Boulder Field   Tundra   Shrubs   Stream/River   Lake/Pond   Open Water Wetland   Un-vegetated   Shoreline   Esker   Other:			
Photos (record photo numbers)				


## WILDLIFE INFORMATION

Species (circle)	Caribou	Grizzly Bear	Wolf	Wolverine	Muskox	Other (describe):
Number of Animals	Adult Female:	Adult Male:	Young:	Unknown:	Total Number:	
Condition of Animals (circle one)	Alive	Dead	Injured	Animal Behaviour What was/were the animal(s) doing (e.g., walking, resting, eating, running, sleeping, playing, flying, nesting, or crossing the road)?		
Was there an Accident? If YES, complete back of form						
Other Notes	○ Did the animal(s) have a collar? ○ If the animal was deceased or injured please describe and report to Environment Department					

## For Office Use

These data were entered into the wildlife database by:		These data were entered into the wildlife database on:	
--	--	--	--



	Back River Project	July 2020
	<b>WILDLIFE COLLISION DATASHEET</b>	vA.1

- All wildlife collisions must be called in to the Environment Department ***immediately***.
- This form must be completed for any collision between light vehicles or heavy mobile operating equipment and wildlife (caribou, grizzly bear, wolf, wolverine, fox, or muskox).
- Submit the completed form to the Environment Department ***as soon as possible***, and no later than the end of your shift.

## GENERAL INFORMATION

Date of Collision (yy mm dd)		Time of Collision (24 hr)	
Vehicle or Equipment Operator			
Other Personnel Involved			

## WILDLIFE INFORMATION

Species Involved (circle one)	Caribou	Grizzly Bear	Wolf	Wolverine	Muskox	Other (describe):
Number of Animals Involved		Animal Fate (circle one, if known)	Fatality	Injury	Unknown	

## LOCATION INFORMATION

Location Description (if possible, mark on map and attach)			
UTM Coordinates (if known)	UTM East		UTM North

## COLLISION DESCRIPTION

- Provide a description of the collision, including answering the following:
  - What was the animal doing?
  - What factors contributed to the collision?
  - Who else was involved or observed the collision?
  - What did you do in response to the collision?

--	--	--	--

## For Office Use

These data were entered into the wildlife database by:		These data were entered into the wildlife database on:	
--	--	--	--

**Appendix B**

**Interim Closure and Reclamation Plan - Appendix E**

**Table 1: Comparison of Active Revegetation Planning at Northern Mine Sites**

Mine Site Owner Region	Current Phase of Project Mine Closure Projected Date	Revegetation Plan Summary Interim Closure Summary/Commitments	Restrictions Identified	References
Polaris Mine Teck Metals Ltd. Little Cornwallis Island, Qikiqtani Region, NU	Post-Closure September 2002	Donald (2005) provided a summary of the reclamation for Polaris Mine. The vegetation at Polaris was classified as Arctic Tundra and it was identified as located in a “bare” area with scarce vegetation, low biological sensitivity, and low potential for wildlife use. Teck claimed that there was little to no vegetation present prior to mine construction. The proposed reclamation programs included recontouring close to the original topography and restoration of natural drainage paths.	It was not possible to remove all traces of land disturbance due to permafrost.	Donald, B.J. (2005). Polaris Mine – A Case Study of Reclamation in the High Arctic. British Columbia Mine Reclamation Symposium <a href="https://open.library.ubc.ca/cIRcle/collections/59367/items/1.0042473">https://open.library.ubc.ca/cIRcle/collections/59367/items/1.0042473</a>
Nanisivik Breakwater Resources Baffin Island, NU	Post-Closure 2002	In the 2002 Closure and Reclamation Plan, Breakwater stated that 96.5% of the area was identified to have sparse vegetation prior to mining. Vegetation damage due to borrow source activity was identified as “not conspicuously different from their surroundings” and only recontouring was considered as a reclamation activity.  BGC presentation dated 2015, claimed that “Revegetation is not necessary” and post-closure disturbed areas will resemble natural surroundings.	N/A	CanZinco Lt. (2002). Nanisivik Mine-Closure and Reclamation Plan - Volume 1 of 2. <a href="ftp://ftp.nwb-oen.ca/registry/1%20INDUSTRIAL/1A/1AR%20-%20Remediation/1AR-NAN1419/3%20TECH/10%20A%20and%20R%20(J)/2002%20Renewal/020307NWB1NAN9702%20vol1text-ILAE.pdf">ftp://ftp.nwb-oen.ca/registry/1%20INDUSTRIAL/1A/1AR%20-%20Remediation/1AR-NAN1419/3%20TECH/10%20A%20and%20R%20(J)/2002%20Renewal/020307NWB1NAN9702%20vol1text-ILAE.pdf</a>  BGC (2015). Presentation Nanisivik Mine – Closure Design and Performance Monitoring. RPIC Federal Contaminated Site Regional Workshop. <a href="http://www.rpic-ibic.ca/documents/2015_FCS_RW/Presentations/4-Cassie_FINAL.pdf">http://www.rpic-ibic.ca/documents/2015_FCS_RW/Presentations/4-Cassie_FINAL.pdf</a>
Mary River Baffinland Baffin Island, NU	Operations 2040	In the 2016 Interim Closure and Reclamation Plan, Baffinland committed to develop a progressive revegetation program for disturbed areas that are no longer required for operations. The progressive revegetation program is planned to incorporate measures for the use of test plots, reseeding, and replanting of native plants, and management plans for erosion control established for the Project. The objective of the reclamation research program is to identify methods to successfully achieve a sustainable vegetation cover, and the ability of a vegetation cover to enhance physical stability and/or achieve the desired aesthetic conditions for the project site at closure. The research is planned to commence in 2018 and the objective is to determine the most effective substrates and the group and individual native species able to establish and survive. Baffinland also conducted a review of baseline revegetation data collection. The findings indicate that approximately 20 plots were historically established on old road surfaces, pads, and other disturbed sites in the past. In the 2014 Exploration Closure and Reclamation Plan, Baffinland committed to promote the growth of vegetation by ripping, grading, or scarifying disturbed surfaces to meet the natural topography.	Low capacity for soil to retain moisture. Abundant surface water ponding.	Baffinland (2017). Baffinland Iron Mines 2016 Annual Report to the Nunavut Impact Review Board. <a href="http://www.baffinland.com/downloadocs/2016-nirb-annual-report-for-the-mary-river-project_2017-11-01-55.pdf">http://www.baffinland.com/downloadocs/2016-nirb-annual-report-for-the-mary-river-project_2017-11-01-55.pdf</a>  Baffinland (2014). Exploration Closure and Reclamation Plan. Rev. 1 <a href="http://www.baffinland.com/downloadocs/baf-ph1-830-p16-0038-r1---exploration-closure-and-reclamation-plan_2017-01-29-17.pdf">http://www.baffinland.com/downloadocs/baf-ph1-830-p16-0038-r1---exploration-closure-and-reclamation-plan_2017-01-29-17.pdf</a>
Meliadine Agnico Eagle Kivalliq Region, NU	Construction 2035	Agnico Eagle committed in the 2015 Updated Technical Report to allow the waste rock storage facility to naturally revegetate and ditches and ponds to be scarified to allow revegetation and natural drainage.	Poor growth medium.	Agnico Eagle (2015). Updated Technical Report on Meliadine Gold Project. <a href="https://s21.q4cdn.com/374334112/files/doc_downloads/operations/meliadine/Feb-11-2015-Meliadine-Technical-Report.pdf">https://s21.q4cdn.com/374334112/files/doc_downloads/operations/meliadine/Feb-11-2015-Meliadine-Technical-Report.pdf</a>
Meadowbank Agnico Eagle Kivalliq Region, NU	Operations 2020	Agnico Eagle committed in the 2008 Closure and Reclamation Plan to consult with the Nunavut Water Board and the Kivalliq Inuit Association as well as other northern mine’s (e.g., Ekati and Diavik) revegetation strategies and experiences. Some of the revegetation strategies discussed throughout the report included scarifying surfaces, re-contouring, and seeding with native plant species to encourage a natural succession of indigenous plant species. A layer of ultramafic capping rock is also proposed to be placed on rock slopes to ensure long-term revegetation succession.	Lack of available local soils. Lack of a source of seed for native plants and Arctic growing conditions.	Agnico Eagle (2008). Meadowbank Water Licenses 8BC-TEH0809 and 2AM-MEA0815. <a href="ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MEA1525%20Agnico/3%20TECH/10%20A%20and%20R%20(J)/080904%202AM-MEA0815%20Closure%20and%20Reclamation%20Plan%20Development%20Phase-ILAE.pdf">ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MEA1525%20Agnico/3%20TECH/10%20A%20and%20R%20(J)/080904%202AM-MEA0815%20Closure%20and%20Reclamation%20Plan%20Development%20Phase-ILAE.pdf</a>

Mine Site Owner Region	Current Phase of Project Mine Closure Projected Date	Revegetation Plan Summary Interim Closure Summary/Commitments	Restrictions Identified	References
Whale Tail <i>Agnico Eagle</i> Kivalliq Region, NU	Pre-Development 2022	Agnico Eagle, committed in the 2017 Final Hearing Report to initiate design and implementation of revegetation studies to gain a better understanding of applicable reclamation strategies at similar northern mines. However, the duration of the Whale Tail project is too short for meaningful revegetation research to be accomplished for the specific site.	2017 Technical Report reported large scale revegetation considered unfeasible due to lack of seed material. Lack of available organic soil and short cold growing seasons make revegetation challenging.	Agnico Eagle (2018). Technical Report on the Mineral Resources and Mineral Reserves at Meadowbank Gold Complex including the Amaruq Satellite Mine Development. <a href="https://s21.q4cdn.com/374334112/files/doc_downloads/operations/meadowbank/Meadowbank-Technical-Report-Feb-14-2018-Final-poasted-on-Sedar.pdf">https://s21.q4cdn.com/374334112/files/doc_downloads/operations/meadowbank/Meadowbank-Technical-Report-Feb-14-2018-Final-poasted-on-Sedar.pdf</a>  Nunavut Impact Review Board (2017). Final Hearing Report. NIRB File No. 16MN056. <a href="https://www.scribd.com/document/363953331/NIRB-Whale-Tail-Pit-Project-Final-Hearing-Report">https://www.scribd.com/document/363953331/NIRB-Whale-Tail-Pit-Project-Final-Hearing-Report</a>
Doris North Mine <i>TMAC Resources</i> Kitikmeot Region, NU	Operation 2021	In the 2015 Interim Closure and Reclamation plan, TMAC committed to revegetate with active seeding in areas with suitable soil substrate. Active revegetation of rock fill pads was considered impractical because they cannot support vegetation however it was expected that lichen would naturally revegetate on a timescale of decades. TMAC also recommended in the post-closure monitoring and maintenance plan to hire an Arctic vegetation specialist to confirm suitability of the revegetation efforts at post-closure with subsequent inspections.	Improper growth medium at rock fill pads.	TMAC Resources (2015). Doris North Mine - Interim Closure and Reclamation Plan. <a href="ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-DOH1323%20TMAC/3%20TECH/10%20A%20and%20R%20(L)/2016/160211%202AM-DOH1323%20P5-2%20Interim%20Closure%20Plan%20June%202015%203%20of%204-ILAE%20(3).pdf">ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-DOH1323%20TMAC/3%20TECH/10%20A%20and%20R%20(L)/2016/160211%202AM-DOH1323%20P5-2%20Interim%20Closure%20Plan%20June%202015%203%20of%204-ILAE%20(3).pdf</a>
Lupin Mine <i>Lupin Mines Incorporated</i> Kitikmeot Region, NU	Inactive and in care and maintenance since February 2005 <i>Planning for final closure (FCRP) underway for 2021</i>	The 2017 Interim Abandonment and Restoration Plan discusses closure revegetation commitments for covered tailings and abandoned roadways. The esker deposit which is the major source of material planned to be used for the reclamation activities, lacks the organic/nutrient content for vegetation establishment. The procedure of scarifying reclaimed surfaces and contouring to provide proper drainage patterns and avoid ponding has successfully enhanced natural plant growth at Lupin (especially for native plants). It has been demonstrated that rough surfaces enhanced seed entrapment, moisture retention, and wind protection. Sod transplanting was discussed as a potential method of revegetation at Lupin, but it was concluded that placement of sod on a site with minimal growth medium does not justify removing it from its established area.	Lack of growth medium, unavailable soil amendments.	Lupin Mines Incorporated (2017). Interim Abandonment and Restoration Plan. <a href="ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-LUP1520%20LMI/3%20TECH/10%20A%20and%20R%20(I)/2017/170810%202AM-LUP1520-IARP_Updated-ILAE.pdf">ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-LUP1520%20LMI/3%20TECH/10%20A%20and%20R%20(I)/2017/170810%202AM-LUP1520-IARP_Updated-ILAE.pdf</a>
Kiggavik Project <i>AREVA Resources Canada Inc.</i> Kivalliq region, NU	Environmental Assessment <i>Suspended</i>	In the Preliminary Decommissioning Plan dated September 2014, AREVA committed to implement progressive reclamation at earliest possible and conduct studies on mine rock test plots during the operations phase to evaluate methods of revegetation. The results of test plots were planned to be used to determine an optimal seed/planting mix and optimal use of fertilizers to encourage natural succession. Field observations at former drill sites at the Kiggavik exploration project indicated that a small number of native plants (e.g., polar grass, dwarf birch, Bigelow's sedge, arctic willow, and tea leaf willow) tend to dominate during natural revegetation. AREVA has also gained valuable revegetation experience from its Cluff Lake Project, located in north-western Saskatchewan. The most successful planting method at Cluff Lake Project included drill seeding with subsequent fertilization.	Tundra soils are considerably nutrient poor (especially in nitrogen and phosphorous). Seeded areas failed.	AREVA (2014). Final Environmental Impact Statement - Tier 3 Technical Appendix 2R - Preliminary Decommissioning Plan. <a href="ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-KIG----%20Areva/1%20APPLICATION/Management%20Plans/2R%20-%20Preliminary%20Decommissioning%20Plan.pdf">ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-KIG----%20Areva/1%20APPLICATION/Management%20Plans/2R%20-%20Preliminary%20Decommissioning%20Plan.pdf</a>
Jericho Diamond Mine <i>Tahera Diamond Corporation</i> NU	Mining ceased 2008, abandoned, Care Custody Control INAC. <i>Remediation began in 2017</i>	The 2004 Abandonment and Restoration Plan included commitments to look for a cooperative approach with Ekati, Diavik, and Snap Lake diamond mines to exchange reclamation research results in Arctic environments and develop reclamation trials throughout the mine life. The main revegetation strategy proposed to use undisturbed islands as a seed sources for reclamation as demonstrated by Bittman (1995) and preliminary trials at Ekati Diamond Mine (Reid, 2002). Tahera proposed to provide soil conditions similar to pre-disturbance conditions to encourage revegetation with native species, retard wind and water erosion, and design rehabilitation covers to minimize negative effects to the active layer (permafrost) and prevent melting of ice lenses that can lead to slumping and erosion.	The availability of native Arctic vegetation, except for natural seed sources, is extremely limited. Caribou and arctic hares grazing and trampling could be problematic.	Tahera Diamond Corporation (2004). Abandonment and Restoration Plan. <a href="ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-JER1119%20Shear/1%20APPLICATION/2004%20New%20Application/040826NWB1JER----%20Appendix%20A%20AMEC%20A%20and%20R%20Plan.pdf">ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-JER1119%20Shear/1%20APPLICATION/2004%20New%20Application/040826NWB1JER----%20Appendix%20A%20AMEC%20A%20and%20R%20Plan.pdf</a>

Mine Site Owner Region	Current Phase of Project <i>Mine Closure Projected Date</i>	Revegetation Plan Summary Interim Closure Summary/Commitments	Restrictions Identified	References
Ekati Diamond Mine <i>BHP Diamonds Inc.</i> Lac de Gras, NT	Operations 2050	The 1998 Reclamation Plan included commitments to research the proposed revegetation programs during progressive reclamation activities. The proposed revegetation programs included revegetation of temporary or permanent stockpiled materials (i.e., lake sediment, till, and topsoil) generated during mining activities, revegetation of kimberlite tailings mine waste facilities, revegetation of contoured/closed laydown areas, and revegetation of engineered channels to improve establishment of fish habitat. The Ekati Reclamation Research Program started during the exploration phase of the Project in 1995. The revegetation research program includes testing of a variety of amendments (i.e., fertilizers, lake sediment, peat or sewage sludge) to promote growth on mine soil and kimberlite tailings, identifying the most successful plant species (i.e., graminoids, forbs, and shrubs) in establishing on mine disturbed areas and evaluating various planting techniques (i.e., cuttings, transplants, seeding, sprigging). Monitoring of substrate and vegetation has aided BHPB to identify the native species with higher potential for recovery after mine closure and the most favorable conditions for natural colonization.	Kimberlite's low capacity to retain soil moisture and plant nutrients. Grazing presents a limiting factor on the establishment and maintenance of seeded and native plant cover. Soils with high salinity. Species competition.	ABR Inc. - Environmental Research & Services. (2001 and 2002). Ekati Diamond Mine Revegetation Research Project. Report prepared for BHP Billiton Ltd.  Harvey Martens & Associates Inc. (2001). Ekati Diamond Mine Processed kimberlite tailings Reclamation Research Program. Report prepared for BHP Billiton Ltd.  Burton, Neil. (2001). Ekati Diamond Mine Processed kimberlite tailings vegetation research. Report prepared for BHP Billiton Ltd.
Giant Mine <i>Miramar Mining Corporation</i> Yellowknife, NT	Care Custody Control INAC <i>Abandoned in 2004 Permanent closure measures underway</i>	Forested site near Yellowknife - not analogous to Back River.		
Con Mine <i>Newmont Mining Corporation</i> NT	Post-Closure 2003	Forested site near Yellowknife - not analogous to Back River.		
Diavik Diamond Mine <i>Rio Tinto and Dominion</i> North Slave Region, NT	Operations 2030	The 2004 Revegetation of Disturbed Site at Diavik Mine Report provides details of the research plots established in the summer of 2004. The trials included assessing the revegetation effectiveness for various substrate treatments (i.e., glacial till, fine processed kimberlite, till mix with kimberlite, and no substrate addition), amendment treatments (i.e., inorganic fertilizer, topsoil or sewage sludge), seeding treatments, and plant species (i.e., grasses, forbs, bryophytes, and shrubs). Soil moisture and soil temperature sensors were installed at the centre of the plots and soil samples were collected at each plot for lab testing.	Kimberlite may have a negative effect on plant growth due to its physical and chemical properties. Till treatment was eliminated from the experimental design as it would not be an appropriate substrate capable of supporting plant growth.	Naeth et al. (2004). Revegetation of disturbed sites at Diavik Diamond Mine, NWT. - 2004 Annual Report. <a href="http://registry.mvlwb.ca/Documents/N7L2-1645/K-RegrowthResearch.pdf">http://registry.mvlwb.ca/Documents/N7L2-1645/K-RegrowthResearch.pdf</a>
Snap Lake <i>De Beers Canada Inc.</i> NT	Care and Maintenance 2015	The 2013 Interim Mine Closure & Reclamation Plan included commitments to conduct research focused on development of methods to successfully achieve a sustainable vegetation cover, and the ability of a vegetation cover to enhance physical stability and/or achieve the desired aesthetic conditions for the project site at closure. The research plan also included to carry out a literature review revegetation programs of the disturbed areas in northern climates and establishment of test plots for each ecological land classification units with the project area.	Slow rates or unsuccessful revegetation. Potential adverse impacts to physical stability of surficial soils, unacceptable concentrations of chemicals in vegetation at the North Pile.	Arktis Solutions (2013). Snap Lake Mine - Interim Mine Closure and Reclamation Plan. <a href="http://registry.mvlwb.ca/Documents/MV2011L2-0004/MV2011L2-0004%20-%20De%20Beers%20Snap%20Lake%20-%20Interim%20Closure%20and%20Reclamation%20Plan%20-%20Version%203.2%20-%20Jul11-13.pdf">http://registry.mvlwb.ca/Documents/MV2011L2-0004/MV2011L2-0004%20-%20De%20Beers%20Snap%20Lake%20-%20Interim%20Closure%20and%20Reclamation%20Plan%20-%20Version%203.2%20-%20Jul11-13.pdf</a>

## Appendix C

### On Site Monitoring Preblasting Surveys



## Back River Project

### Wildlife Monitoring and Mitigation for Blasting Pre-construction, Construction and Operations

STANDARD OPERATING PROCEDURE

ENVIRO-07

30 April 2021

Version B.1

#### Scope of Work:

This SOP provides guidance for Environment Staff to meet Sabina's existing environmental commitments during blasting, including quarrying, road building and open-pit blasting. The SOP applies to all blasting during pre-construction, construction and operations.

#### Contacts:

Merle Keefe  
Manager, Environmental Permitting

[mkeefe@sabinagoldsilver.com](mailto:mkeefe@sabinagoldsilver.com)  
604-240-6619

## CONTENTS

1.	BACKGROUND .....	2
2.	PRE-BLAST MONITORING .....	2
2.1	Training.....	2
2.2	Equipment.....	2
2.3	Large Mammal Survey.....	3
2.3.1	Review Collar Data .....	3
2.3.2	Ground-based Survey.....	3
2.4	Raptor Survey .....	3
2.5	Incidental Observations.....	4
3.	MITIGATION .....	5
3.1	Large Mammal Mitigation .....	5
3.2	Raptor Mitigation .....	6
4.	REPORTING .....	6
5.	ATTACHMENTS .....	7

#### List of Tables

Table 1: Management of Blasting in Open Pits when Wildlife are Observed .....	5
Table 2: Management of Blasting in Quarries and Other Blasts when Wildlife are Observed .....	6

#### List of Figures

Figure 1: Pre-blasting Mitigation, Monitoring, and Management for Caribou.....	6
--	---



## 1. BACKGROUND

Sabina is committed to ensuring wildlife and personnel remain safe while carrying out blasting activities. This program is designed to identify when wildlife are in the vicinity of Project blasting and trigger appropriate mitigation. Prior to blasting, Sabina personnel will conduct a survey for wildlife. Mitigation may be required if animals are detected during the survey.

This SOP summarizes how to conduct the pre-blast surveys, mitigation requirements if wildlife are observed within trigger distances, and reporting requirements.

**During the calving and post-calving periods, presence of calving caribou on the Project site can lead to a site shutdown, including blasting, heavy vehicles, helicopters, etc. For more information on site-wide shutdowns, please refer to the Caribou Shutdown SOP.**

## 2. PRE-BLAST MONITORING

Sabina employs several wildlife monitoring methods, including the following:

1. Tracking satellite collars on caribou (using GN data) to determine if caribou are approaching; and
2. Ground-based monitoring prior to blasts.

This SOP focuses on ground-based monitoring to be conducted by the Environment Department.

### 2.1 Training

Project personnel will be trained for the role of wildlife monitor. These personnel may come from any department, however efforts will be made to use members of the Environment Department. Sufficient staff with the appropriate training will be on-site at all times of year to conduct wildlife monitoring. Training will include the following:

- The roles and responsibilities of the wildlife monitor;
- Safety considerations for the role;
- Wildlife identification;
- Caribou behaviour to enable behavioural surveys of caribou;
- The triggers and management actions for blasting should caribou or other wildlife be observed on or near site; and
- Data entry and reporting.

### 2.2 Equipment

- Binoculars
- Rangefinder or markers
- Clipboard and pencil
- GPS
- Radio
- Forms (attached):
  - Pre-blasting Survey Datasheet



## 2.3 Large Mammal Survey

Prior to blasting, wildlife monitors will complete the following data reviews and surveys for large mammals:

1. Review of caribou collar data
2. Ground-based survey

**If wildlife are observed within the specified “trigger distances” specified in Section 3.2 immediately communicate the sighting and location to the blasting crew.**

### 2.3.1 Review Collar Data

Sabina receives maps of satellite collars on barren-ground caribou from the Government of Northwest Territories on a daily basis during calving and post-calving and weekly the rest of the year.

- Review these maps prior to the wildlife survey to determine whether caribou may be in the area.

### 2.3.2 Ground-based Survey

Two observers (wildlife monitor and one assistant, if possible) survey for wildlife from the height of land nearest to the blasting site. If a location with good visibility is accessible from vehicle, then the surveys may be conducted from the vehicle.

The protocol for the survey is as follows:

1. Using binoculars, scan the area (360 degrees) for any caribou, muskox, grizzly bear, or wolverine.
2. Estimate the distance to any wildlife observed using markers or a laser rangefinder.
3. Determine group size and composition, including the presence of calves or young animals.
4. Record all observations on the Pre-blasting Survey Datasheet.
5. Alert the Environment Manager and Blasting Manager if any wildlife are observed and indicate the recommended mitigation (Section 3).
6. Submit the completed form to the Environment Manager no later than the end of shift.

## 2.4 Raptor Survey

Prior to blasting during the bird breeding season (March-July), survey the walls of the open pit or quarry with binoculars to determine if there are any raptors nesting on the rock walls.

Indications of nesting include:

- Observations of birds
- Observations of nests
- Observations of nesting activity:
  - Nest construction
  - Copulation
  - Incubation
  - Perching

- Food deliveries
- Territorial displays

Record any wildlife observations on the Pre-blasting Survey Datasheet. Submit the completed form to the Environment Manager no later than the end of shift.

## **2.5 Incidental Observations**

On site personnel report incidental observations of wildlife to the Environment Department on the Incidental Wildlife Observation Datasheet. Incidental wildlife observations will be used to inform blasting mitigation, where applicable.

### 3. MITIGATION

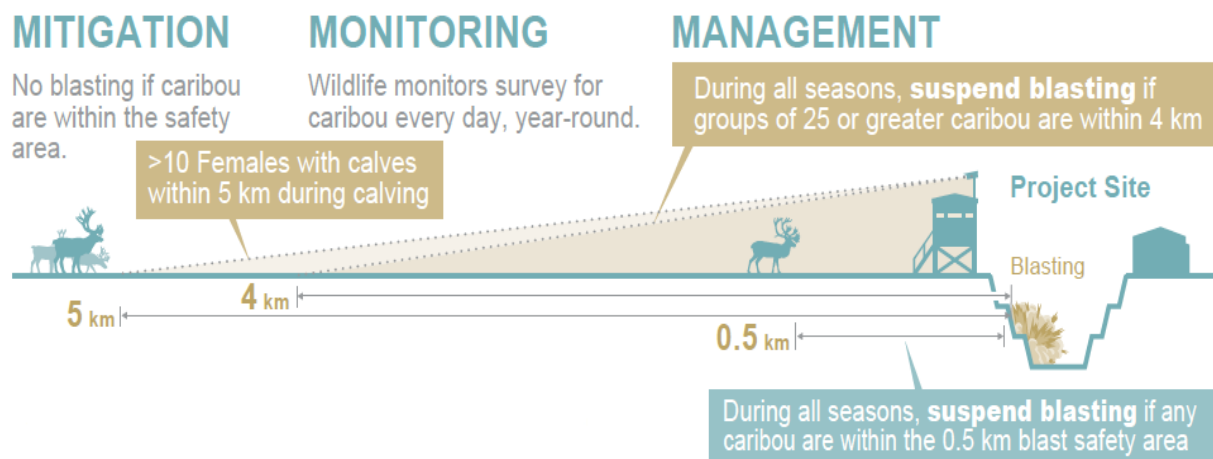
#### 3.1 Large Mammal Mitigation

If wildlife are observed during pre-blast surveys, follow the criteria outlined in Tables 1 and 2 to determine the appropriate mitigation for the open pits and quarries, respectively. Blasting mitigation for caribou around the open pits is depicted in Figure 1.

**Table 1: Management of Blasting in Open Pits when Wildlife are Observed**

Species	Timing Window	Number of Animals	Distance	Action
Caribou	Calving (June 5-15)	Group of $\geq 10$ breeding females	$\leq 5$ km	Stop blasting until animals leave.
Caribou	All year	Group of $\geq 25$ animals	$\leq 4$ km	Stop blasting until animals leave.
Caribou	All year	Group of 1-25 animals	$\leq 4$ km	Conduct behavioural monitoring. Blasting can proceed.
Caribou, muskox, grizzly bear or wolverine	All year	Any	Blast safety distance (~500 m)*	Stop blasting until animal(s) leave the blast safety distance.
Muskox	All year	$\geq 10$	$\leq 1$ km	Stop blasting. If animal is still there after 1 day, blasting may resume.
Grizzly bear	All year	$\geq 1$	$\leq 1$ km	Stop blasting. If animal is still there after 1 day, blasting may resume.

\*Note: the blast safety distance is often 500 m, but is determined on a case by case basis by the Blasting Manager.



**Figure 1: Pre-blasting Mitigation, Monitoring, and Management for Caribou at Open Pits**

Note that trigger distances are smaller for quarry blasts than for blasting in the pit, due to the much smaller blast sizes. Underground blasts are allowed at all times.

Where specified in Tables 1 or 2, behaviour monitoring will be conducted by wildlife monitors to evaluate caribou responses to blasting. See the SOP for Behaviour Monitoring.

The Environment Manager or designate is responsible for approving the resumption of blasting activities.

**Table 2: Management of Blasting in Quarries and Other Blasts when Wildlife are Observed**

Species	Timing Window	Number of Animals	Distance	Action
Caribou	Calving (June 5-15)	Group of ≥10 breeding females	≤2.5 km	Stop blasting until animals leave.
Caribou	All year	Group of ≥25 animals	≤2.5 km	Stop blasting until animals leave.
Caribou	All year	Group of 1-25 animals	≤2.5 km	Conduct behavioural monitoring. Blasting can proceed.
Caribou, Muskox, Grizzly Bear or Wolverine	All year	Any	Blast safety distance (~500 m)*	Stop blasting until animal(s) leave the blast safety distance.

*\*Note: the blast safety distance is often 500 m, but is determined on a case by case basis by the Blasting Manager.*

### 3.2 Raptor Mitigation

The following mitigation actions will be implemented by the Environment staff if a raptor is observed nesting in the pit before a blast:

1. If a raptor nest is observed being constructed in a pit, but the raptor has not yet laid eggs, then the nest will be removed.
2. If locations are found that are frequently used as nests, then appropriate mitigation will be used to dissuade raptors from using this area (e.g., netting, bird spikes, etc.).
3. If a raptor persists in attempting to nest in the pits despite the mitigation listed above, then raptors will be excluded from the pits using auditory or visual hazing methods (e.g., bear bangers, bright lights, playback of raptor calls, flashers, models of raptors, etc.). Procedures for deterring raptors are specified in the SOP for Wildlife Deterrence for Environment Staff (SOP # ENVIRO-06).

In some cases, raptors may attempt to nest in areas of the pit sufficiently removed from blasting locations that there is little chance of raptor injury or disturbance by blasting. In consultation with the GN DOE the raptors may be left to nest in the pit or quarry location. Nest monitoring is required until the chicks have fledged the nest to determine nest success. Follow guidance in the SOP for Pre-clearing Nest Surveys (SOP # ENVIRO-01) for nest monitoring.

## 4. REPORTING

The Environment Manager will record all blasting mitigation actions taken in response to wildlife observations in a log. Records must include the following details:

- Location
- Date and time
- Description of wildlife (species, number, sex and ages if possible)

- Location of wildlife relative to blasting location and specified trigger distances
- Management action(s) taken, including duration of any blast shutdowns and criteria used to approve resumption of activities
- Any communication with the KIA and GN DOE or Conservation Officers

Wildlife observations from the active monitoring program, incidental wildlife observations, and details of management actions taken or blast shutdowns will be reported in the annual Wildlife Management and Monitoring Program (WMMP) report.

## **5. ATTACHMENTS**

Attachment A: Pre-blasting Survey Datasheet

	Back River Project	July 2020
	<b>PRE-BLASTING SURVEY DATASHEET</b>	vA.1

GENERAL INFORMATION						
<b>Date of Survey</b> (yy mm dd)				<b>Time Start</b> (24 hr)		
<b>Observer Names</b>				<b>Time End</b> (24 hr)		
<b>Type of Monitoring</b> (circle one, can circle multiple)	Large Mammal:	Caribou Collar	Tower Camera	Height of Land		
	Raptor	Other (describe):				
<b>Wildlife Observed?</b> (If "No", proceed to Section 4)	Yes	No	<b>Wildlife Within Trigger Distances?</b>	Yes	No	
LOCATION INFORMATION						
<b>Observer/Camera Location</b>	UTM East	UTM North				
<b>Distance from Observer to Wildlife (m)</b>	Direction to Wildlife					
<b>Wildlife Location</b> (if known)	UTM East	UTM North				
<b>Location Description</b> (e.g., Road KM or facility)						
<b>Distance from Wildlife to Blast (m)</b>						
<b>Habitat Description</b> (circle one)	Boulder Field	Tundra	Shrubs	Stream/River	Lake/Pond	Open Water
	Wetland	Un-vegetated	Shoreline	Esker	Other:	
WILDLIFE INFORMATION						
<b>Species</b> (circle)	Caribou	Grizzly Bear	Wolf	Wolverine	Muskox	Raptor Other:
<b>Number of Animals</b>	Adult Female:	Adult Male:	Young:	Unknown:	Total Number:	
<b>Animal Behaviour</b> What was/were the animal(s) doing (e.g., walking, resting, eating, etc)						
OTHER INFORMATION						
<b>Photos</b> (record photo number)						
<b>Notes</b> o Any mitigation actions (was the blast postponed and for how long etc.)?						
For Office Use						
These data were entered into the wildlife database by:				These data were entered into the wildlife database on:		

