



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

Cambridge Bay
Ikalututiak
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Kelli Gillard
Manager Project Monitoring
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU
X0B 0C0

Kugluktuk
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June 15th, 2023

Re: Review of Sabina's 2023 Back River Renewable Energy Centre FEIS Addendum.

Bathurst Inlet
Kingaok
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Executive Summary

In November 2022, the KIA's wildlife consultant assessed the Back River Renewable Energy Centre submission in terms of:

- a. Whether the proposed modification constitutes a significant modification to the original project as previously assessed and subsequently modified and approved by the NIRB;
- b. Whether the proposed modification is consistent with the terms and conditions of the existing Project Certificate No. 007, or are changes to the Project Certificate necessary to reflect the modification; and

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KIA's wildlife consultant, Zoetica Environmental Consulting Services Ltd focused upon:

- Wildlife and habitat.

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KIA's consultant opinion on the first (a) of NIRB's requested two points of consideration (a & b) were that for some Valued Components (VCs) and effects the project will not be significant, but for specific VCs it may be considered significant. The identified impacted VCs were bird mortalities and impacts on caribou movement and habitat use.

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Concerning the effects on birds, the issues identified were (1) the number of turbines, (2) wind energy installation configuration, (3) relative height and elevation of turbines, (4) guy wires, (5) lights, (6) motion smear, (7) transmission lines, (8) ancillary habitat loss, (9) attraction of the site to birds, (10) Industrial and other waste, and (11) decommissioning of turbines.

Concerning the effect on caribou, the issue identified was (12) disruption of movement.

On the second point of consideration (b), consistency with the terms and conditions of the existing Project Certificate No. 007 it was found that Term and Conditions Numbers 37, 39, and 51 would have to be modified to accommodate the Renewable Energy Centre.



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Further, KIA requested an additional Term and Condition be adopted to Project Certificate No. 007 based on the Hope Bay Madrid-Boston Project Certificated No. 009, Term and Condition No. 28 which deals directly with approved wind turbines at the Hope Bay Project.

In March 2023, KIA along with our wildlife consultant had met virtually with Sabina and its wildlife consultant ERM to discuss the 12 identified issues and proposed modification of project Terms and Conditions and the additional new Term and Condition. Eleven (11) out of the (12) issues were resolved. The proposed modifications to TC 37, 39, and 51 and the new additional TC met KIA's requests.

The KIA notified the NIRB in March that several issues were resolved from the initial review and only issue five (5) concerning the number, location, and types of lights were unresolved.

The one IR submission to NIRB in April 2023 dealt with the remaining issue on lights and was directed to both Sabina and Transport Canada. Sabina's response to the IR indicated that they would be willing to use directional lighting in place of broad lighting to lessen the attraction of birds. Transport Canada's response was the colour of the lights must meet their established standards and could not be modified with other colours.

KIA's wildlife consultant has reviewed the 2023 Back River Energy Center FEIS Addendum and has raised 14 issues with the addendum. Four of the issues, Wind turbine height differences and implications (KIA-NIRB-01), Discussions with Transport Canada (KIA-NIRB-05), Sensory disturbance and disruption of movement for caribou (KIA-NIRB-06), and References for migratory birds and raptors (KIA-NIRB-09), our consultant explicitly disagrees with the FEIS Addendum conclusion. Our consultant has several caveats regarding the Back River Wind Turbine Wildlife Baseline Study 2019-2020 (KIA-NIRB-11) which is an implicit disagreement with the FEIS Addendum conclusion.

All other issues raised require clarification, revision, and improvements to either the FEIS addendum or WMMP.

The KIA believes that these fourteen (14) identified issues can be addressed either prior to or at the NIRB Technical Meeting in September 2023.



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Introduction

The Kitikmeot Inuit Association (KIA) is a Designated Inuit Organization (DIO) under Article 39 of the Nunavut Agreement and a Regional Inuit Association (RIA) incorporated as a non-profit society responsible for the management of Inuit Owned Lands (IOL) in the Kitikmeot region of western Nunavut. KIA specifically administers Article 19, Title to Inuit Owned Lands, Article 20, Inuit Water Rights, Article 21, Entry and Access, Article 25, Resource Royalty Sharing, and Article 26, Inuit Impact and Benefit Agreements of the Nunavut Agreement.

The KIA's mandate is to manage Kitikmeot Inuit lands and resources, and to protect and promote the social, cultural, political, environmental, and economic well-being of Kitikmeot Inuit.

KIA's vision is an organization that manages lands and resources that support traditional and cultural values and provides economic and social benefits to Kitikmeot Inuit. Through our efforts, Inuit have a strong sense of pride and identity, pursue higher education, and speak and write in our Inuit language.

The KIA has signed a comprehensive Framework Agreement (FA) and Inuit Impact and Benefits Agreement (IIBA) with Sabina Gold & Silver Corp. for land access and covers the terms and conditions of Project Certificate 007.

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

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

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



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Specific Comments and Recommendations

1.0 Back River 2023 FEIS Addendum Review – Wildlife and Vegetation

1.1 KIA-NIRB-01: Wind turbine height differences and implications.

Review Number	Comment	KIA-NIRB-01
Subject/Topic		Wind turbine height differences and implications
Importance		High
References		<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> • Executive Summary • Responses to Comments on Modification Package: GN-07 • Sections 1.1, 1.3, 2.1.1.5, 2.3.2.4, 2.3.4.4, 2.3.6.4 • Appendix B: Back River Wind Turbine Wildlife Baseline Study 2019-2020 (April 2022) • Appendix C: Sabina Wind, NU – Noise Report
Summary		<p>Sabina states that they completed the Energy Centre effects assessment using the largest WTG model (tower height and rotor diameter) being considered. However, there are discrepancies throughout the 2023 FEIS Addendum regarding the WTG hub height (81 m or 111 m, resulting in a combined height of 150 m or 180 m). Fall migration standwatch surveys assumed a 180 m tower height; if the shorter tower is selected, then low-flying birds may have been misclassified as being “safe” from turbine strikes. Noise modelling assumed a 150 m tower height; if the taller tower is selected, then the noise modelling results may be incorrect, which would render the Energy Centre effects assessments for sensory disturbance incorrect. Furthermore, even if the shorter tower is selected, the KIA disagrees that all noise above 45 dBA would fall within the Modification PDA.</p>
Detailed Review Comment		<p>There are discrepancies in the anticipated WTG hub height throughout the 2023 FEIS Addendum and associated Project documents. Sabina states in the Executive Summary and Section 1.3 (Detailed Project Description), p. 1-12, that each WTG will have a rotor diameter of approximately 138 m with a hub height of approximately 81 m, resulting in a combined height of approximately 150 m. However, the infographic/visual on pp. 1-8 and 1-9 and other parts of Section 1.3 (p. 1-14 and Figure 1.3-1)</p>



	<p>show that the WTGs will have a hub height of 111 m. Combined with a rotor length of 69 m, the total height would be 180 m.</p> <p>The 30-m hub height difference has implications for the Back River Wind Turbine Wildlife Baseline Study 2019-2020 (Appendix B of the 2023 FEIS Addendum) and the Noise Report (Appendix C). The former has assumed that a combined height of 180 m. For the bird migration standwatch surveys conducted in the fall of 2019, Sabina states that <i>“birds were very conservatively classified to be “at turbine height” if flying at heights over 30 m and under 200 m”</i> (Section 2.3) The lower threshold would be acceptable for a hub height of 111 m, as the lowest point of the turbine blades would be 111 m – 69 m (rotor length) = 42 m. However, if Sabina proceeds with the shorter WTG model, the lowest point of the turbine blades would be 81 m – 69 m = 12 m from the ground. Thus, birds flying at heights between 10 m (or even lower, to be conservative) and 30 m should also have been classified as “at turbine height”. The 2019 baseline survey data may need to be re-analyzed to correctly categorize birds at risk of turbine strikes. If re-analysis is not possible (e.g., if data collection consisted of “at turbine height” Yes/No rather than recording actual flight heights), Sabina should commit to completing additional fall migration standwatch surveys.</p> <p>The KIA understands that Sabina has made some commitments: in Section 2.3.6.4 (Migratory Birds, Mitigation for Direct Mortality), Sabina states that <i>“Additional baseline surveys for the spring migration period were conducted in May 2022 (data have not been included in this document) to provide additional context and data regarding spring migratory bird movements. Standwatch and standard area shoreline surveys are scheduled to be completed prior to any construction activities.”</i> However, since the 2022 spring migration surveys are not described in the 2023 FEIS Addendum or the 2022 Wildlife Mitigation and Monitoring Program (WMMP) Report (as part of the 2022 NIRB Annual Report), it is unclear if the same definition of “at turbine height” was used. Furthermore, the KIA requests that these additional baseline surveys be completed as part of the FEIS Addendum for the Energy Centre and not as pre-construction surveys. These baseline data are needed to increase confidence in the effects assessments for migratory birds and raptors.</p> <p>Conversely, noise modelling for the WTGs assumed a specific turbine model (Enercon E138 EP3 E2 4.2MW) with a hub height of 81 m (Section 3, Table 1). This contrasts with Sabina’s statement in Section 1.3 of the FEIS Addendum that <i>“The WTG model to be</i></p>
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	<p><i>used has not yet been selected as the final engineering is ongoing... To evaluate the potential impacts of the Modification, the largest WTG model (tower height and rotor diameter) in consideration was used for the assessment..."</i> The tallest tower height was <i>not</i> used for noise modelling, however, and it is possible that the final selected model may produce more noise than the one assessed. Nonetheless, Sabina refers to the Noise Report throughout the 2023 FEIS Addendum when assessing potential project effects on sensory disturbance to wildlife VECs. The following text is from Section 2.3.4.4 for muskox, but similar phrasing is used for other wildlife VECs: <i>"The results of the noise model (NexEra 2022) indicate that noise from the wind-towers will reach 45 dBA at approximately 500 m from the towers, and 40 dBA at approximately 800 m to 1 km. The areas where noise will exceed 45 dBA are within the Modification PDA and already considered lost in the Habitat Loss and Alteration section above, with the exception of 4 ha. In addition, the areas where noise will exceed 45 dBA are well within the 4 km ZOI evaluated in the Approved Project FEIS Cumulative Effects Assessment (Sabina 2015 Volume 5, Section 6.6.2.2) and no additional effects on muskox are anticipated due to noise."</i></p> <p>In Section 2.3.2.4 (Caribou, Habitat Loss, and Alteration), Sabina explains that the Modification PDA <i>"is a polygon stretching approximately 500 m surrounding the planned WTG locations"</i>, which is why Sabina claims that noise above 45 dBA would fall within the Modification PDA boundaries. However, if NextEra had used a hub height of 111 m, how would the noise modelling differ? Would noise above 45 dBA extend beyond Modification PDA and result in residual effects for sensory disturbance on wildlife VECs? Furthermore, parts of the Modification PDA shown on Figure 1.1-3 do not have a width of at least 500 m; for example, proposed turbine location #9 (as shown in Figure 1 of the Noise Report) at the northernmost point of the "West PDA" appears to have a width of approximately 250 m. Therefore, some noise effects should be expected outside the Modification PDA even with a WTG hub height of 81 m.</p> <p>In response to the Government of Nunavut's comment GN-07 on the Modification Package, Sabina has committed to updating the noise modeling to include the specific wind towers to be used once detailed engineering design has been completed (Section 2.1.1.5). When will detailed engineering design be completed? Like the additional bird baseline surveys, updated noise modelling needs be completed as part of the FEIS Addendum to produce accurate, high-confidence effects assessments.</p>
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P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

Recommendation/ Request	<ul style="list-style-type: none"> • Please clarify if the proposed WTG model has a hub height of 81 m or 111 m (for a total combined height of 150 m or 180 m). Please also ensure that WTG specifications are consistent within the 2023 FEIS Addendum and other relevant Project documents (e.g., management plans). • If the shorter tower height is proposed, please re-analyze data from the 2019 fall migration standwatch surveys to correctly categorize birds “at turbine height”. If this is not possible, please commit to completing additional standwatch surveys to ascertain migration flight heights. Please also confirm if the 2022 spring migration surveys used the correct “at turbine height” definition. • If the taller tower height is proposed, please complete noise modelling using the 111 m hub height. If the results for noise attenuation differ (e.g., noise will reach 45 dBA >500 m from the WTGs), potential effects of sensory disturbance to wildlife VECs will need to be re-analyzed for the FEIS. • Based on the current noise modelling (using 81 m hub height), please explain how the Modification PDA can ‘contain’ noises exceeding 45 dBA when the polygon does not appear to encompass a 500 m buffer around all WTGs. • Please provide information on when detailed engineering design for the WTGs will be completed.
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1.2 KIA-NIRB-02: Temporary shutdown of wind turbines (raptors).

Review Number	KIA-NIRB-02
Subject/Topic	Temporary shutdown of wind turbines (raptors)
Importance	Low
References	<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> • Responses to Comments on Modification Package: GN-14, KIA-02, KIA-03 • Sections 2.3.6.4, 2.3.7.4 <p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> • Sections 10.1.5, 10.1.9.4, 11.1.9.4, 12.1.9.4



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Summary	Sabina has committed to shutting down the wind farm during periods of fog, peak migration, and darkness. Leftover non-committal wording in the 2023 FEIS Addendum and WMMP Plan (V.12) needs to be updated.
Detailed Review Comment	<p>The KIA appreciates that Sabina committed to shutting down the wind farm during periods of fog, peak migration, and darkness in response to comments GN-14 and KIA-03 on the Modification Package. Sabina has included wording in Section 2.3.6.4 (Migratory Birds, Mitigation for Direct Mortality) of the 2023 FEIS Addendum that they <i>“will develop a detailed Migratory Birds Protection Plan prior to construction of the energy centre. This will include temporary halting operations of the WTGs during periods of dense, low fog during peak migration season.”</i> The KIA also appreciates that <i>“Sabina has committed to conducting additional studies using Autonomous Recording Units (ARUs) to refine the time of peak spring and fall migration prior to construction”</i> in response to KIA-02. This information should be used to help determine when temporary shutdowns are more likely to be needed. (Note: Sabina’s commitment to add ARU studies to the WMMP, in response to KIA-02, has not been completed; other revisions regarding the Energy Centre have been included in WMMP Plan V.12, but not ARUs.)</p> <p>However, the wording in Section 2.3.7.4 (Raptors, Mitigation for Direct Mortality) is still non-committal: <i>“Before committing to additional mitigation related to fog and the WTGs, Sabina will collect more detailed information on the timing, height, and density of fog at the turbine sites. Based on these data, Sabina may consider mitigation to temporarily halt operations of the WTGs during periods of dense, low fog during the peak migration season.”</i> We assume this is leftover wording that Sabina intended to revise (as was done for Migratory Birds).</p> <p>The KIA also notes that there is inconsistent wording in the updated WMMP Plan (V.12, April 2023) regarding Sabina’s commitments to shut down the wind farm. In some cases, such as the sections on Mitigation and Management for Direct Mortality and Injury to bird VECs (Raptors, Section 10.1.5; Waterbirds, Section 11.1.5; Upland Birds, Section 12.1.5), the text includes <i>“Sabina will temporarily halt operations of the WTGs”</i> statements. However, in the subsections for Mitigation, Management, and Monitoring for Direct Mortality for the Energy Centre specifically (Raptors, Section 10.1.9.4; Waterbirds, Section 11.1.9.4; Upland Birds, Section 12.1.9.4), the wording is <i>“Sabina may temporarily halt operations of the WTGs”</i>. The latter phrasing should be</p>



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Cambridge Bay, NU X0B 0C0
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	amended to the former demonstrate Sabina's commitment to address concerns from the KIA and GN.
Recommendation/ Request	<ul style="list-style-type: none"> • Please revise Section 2.3.7.4 (Mitigation for Direct Mortality to Raptors) of the 2023 FEIS Addendum to include the same commitment to temporary shutdown of the WTGs as was included for Migratory Birds (Section 2.3.6.4). • Please also revise the wording of "Sabina may temporarily halt operations of the WTGs" in Sections 10.1.9.4, 11.1.9.4, and 12.1.9.4 of WMMP Plan to be consistent with Sabina's commitments. • Please include ARU studies in the WMMP Plan, as per Sabina's response to comment KIA-02 on the Modification Package. • Please distribute the detailed Migratory Birds Protection Plan to the KIA and other interested parties for review when it has been developed.

1.3 KIA-NIRB-03: Meteorological tower not included in effects assessment.

Review Number	KIA-NIRB-03
Subject/Topic	Meteorological tower not included in effects assessment
Importance	High
References	<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> • Responses to Comments on Modification Package: KIA-04 • Sections 1.3, 1.8.1 <p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> • Sections 10.1.5, 10.1.9.4, 11.1.9.4, 12.1.9.4
Summary	Sabina plans to install a permanent meteorological tower, which may be up to 100 m tall and may include guy wires, to support the Energy Centre. It is unclear why the meteorological tower was not included in the effects assessment in a more fulsome way. As there are previous reports of bird collisions with guyed meteorological towers, the KIA requests that Sabina commit to installing a self-supporting structure instead.



P.O. Box 18
Cambridge Bay, NU X0B 0C0
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Detailed Comment	Review	<p>In Section 1.3 (Detailed Project Description), p. 1-15 of the 2023 FEIS Addendum, Sabina states that “A <i>permanent meteorological tower up to 100 m in height will be constructed within the footprint of the Modification to collect meteorological data, WTG power curve testing and forecasting conditions. The meteorological tower will be either a guyed metal tube structure or self-supported.</i>” Depending on the final design, this meteorological tower could present a danger to migrating birds and should have been included in the environmental effects assessment. Of note, Sabina acknowledges a potential adverse effect between meteorological towers and migratory birds and raptors in Table 1.8-1 (Screening of Interactions between 2022 Modification Package and VECs/VSECs from FEIS). Therefore, it is unclear why meteorological towers were not discussed in the 2023 FEIS Addendum in a more fulsome way.</p> <p>There are several reports of bird collisions with meteorological towers associated with wind turbine projects (reviewed in Erickson et al., 2005). At a single-turbine site in California, two of the five (40%) bird mortalities observed between September 1982 and January 1983 were attributed to the 350 ft (107 m) guyed meteorological tower (Byrne, 1983). At another site with two turbines, the Medicine Bow Wind Energy Project in Wyoming, 25 bird fatalities were found over a one-year period; most of which were attributed to collisions with the guy wires on the 198 ft (60 m) meteorological tower (Bailey, 2014; U.S. Bureau of Reclamation, 1984).</p> <p>More recent data come from the Foote Creek Rim Wind Plant in Wyoming, which included 69 wind turbines and five meteorological towers. The towers accounted for 36 of 122 (29.5%) bird fatalities, while 83 (68.0%) were attributed to the turbines (Young et al., 2003). Bird casualties were found at all five meteorological tower plots. For all years combined (1999-2002), the authors estimated an annual mortality of 8.09 birds/tower versus 1.50 birds/turbine. These meteorological towers were not very tall at 125 ft (38 m), but the towers were held up by three sets of three guy wires set at 120° angles around the tower (Young et al., 2003). Passerines (songbirds) comprised most tower-related bird casualties in all reports.</p> <p>Johnson et al. (2007) note that effective wind project siting, use of underground power lines, unguyed meteorological towers, and reduced lighting appear to be an effective way of reducing collision risk. The importance of unguyed towers was demonstrated at Nine Canyon Wind Power Project in Washington, which included 37</p>
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Cambridge Bay, NU X0B 0C0
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Fax: (867) 983-2701

	<p>turbines and one meteorological tower. None of the 38 bird fatalities observed between September 2002 and August 2003 were attributed to the 200 ft (60 m) lattice unguyed meteorological tower. The proponent, Energy Northwest, had agreed to use an unguyed tower in response to the results found by (Young et al., 2003), as described above. ECCC/CWS also mention the threat of guyed meteorological towers associated with wind energy installations in their “Wind Turbines and Birds: A Guidance Document for Environmental Assessment” document (EC and CWS, 2007b).</p> <p>In summary, the KIA appreciates that Sabina has committed to not using guy wires on the wind tower (in response to comment KIA-04 on the Modification Package). However, please also commit to not using a guyed meteorological tower. A self-supported lattice structure is preferable.</p>
Recommendation/Request	<ul style="list-style-type: none"> • Please include the permanent meteorological tower in the effects assessment (including mitigation and management measures) for direct mortality impacts on migratory birds and raptors. • Please commit to installing an unguyed meteorological tower and completing carcass monitoring at and around the tower (in addition to the WTGs).

1.4 KIA-NIRB-04: Alternatives assessment.

Review Number	KIA-NIRB-04
Subject/Topic	Alternatives assessment
Importance	Low
References	<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> • Table of Concordance of FEIS Addendum • Sections 1.3, 1.7 • Appendix B: Back River Wind Turbine Wildlife Baseline Study 2019-2020 (April 2022) • Appendix C: Sabina Wind, NU – Noise Report
Summary	Sabina’s Alternatives Assessment does not meet the Appendix A Requirements outlined in the Table of Concordance. The selection of alternative options for discussion is limited, and the assessment



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	results in relation to the methods are unclear. More details regarding the solar array/panels, design and location of WTGs, and service road route options would be useful.
Detailed Review Comment	<p>In the Table of Concordance of FEIS Addendum, p. xii, one of the Appendix A Requirements is to include an Alternatives Assessment <i>“that considers all alternative means of carrying out the project proposal, including “no-go” alternatives for the various components or Project Proposal as a whole, and the identification and application of criteria used to determine the technical feasibility and economic viability of the alternatives to the Project Proposal. The analysis must be done to a level of detail which allows parties to compare the Project Proposal with the alternatives in terms of the economic and environmental costs, as well as the social and economic impacts and/or benefits. In addition to these general requirements, the alternatives assessment should specifically include alternative options for:</i></p> <ul style="list-style-type: none"> • <i>Design of project components of wind turbines</i> • <i>Location of project components</i> • <i>Alternative road access to the wind turbines</i> • <i>Closure and reclamation alternatives</i> <p>Sabina provides an Alternative Assessment in Section 1.7 of the 2023 FEIS Addendum; however, the assessment does not appear to comply with some of the aforementioned requirements. For example, Section 1.7.2 (Project “Go/No Go” Decision) is discussed for the Back River Project as a whole, and not just the Energy Centre or components of the Energy Centre. Sabina focuses on the technical and economic feasibility of the mine and its expected socio-economic benefits; however, the mine can still proceed even if the Energy Centre is not built (i.e., the mine can continue to run on diesel power generation).</p> <p>In Section 1.7.3.1, Sabina discusses diesel, hydroelectric, geothermal, and liquefied natural gas as alternative sources for power generation. The KIA notes that the solar panels proposed for the Energy Centre seem to be more of an afterthought. Section 1.3 (Detailed Project Description) does not describe how many solar panels might be set up or how much power they can generate; the only information provided is that the solar array will be located with the Battery Energy Storage System (BESS) on the 400 x 400 m aggregate pad, and that additional solar panels “may also be added on top of existing buildings if feasible”. Part of the alternatives assessment for power generation could be to discuss why there cannot be more solar panels in favour of fewer WTGs,</p>



	<p>especially if the new disturbance footprint can be minimized by installing solar panel on existing buildings.</p> <p>Overall, the organization of Section 1.7.3 is challenging to follow as the alternatives discussed are not well-linked to the six key criteria for assessing alternatives outlined in Section 1.7.1: namely, technical feasibility, economic viability, environmental acceptability, ease of reclamation and closure, social acceptability, and socio-economic effects. A table(s) showing comparisons between the Project Proposal and alternatives would be clearer.</p> <p>Furthermore, although Sabina discusses Closure and Reclamation Alternatives well (Section 1.7.3.3), the other Appendix A requirements (noted above) are either not addressed or incompletely addressed. Alternative options for the design and location of project components (i.e., WTGs) are not discussed in Section 1.7.3. The KIA recommends, at minimum, providing rationale for why the 19 WTGs originally planned (as shown in the Back River Wind Turbine Wildlife Baseline Study 2019-2020 [Appendix B] and the Noise Report [Appendix C]) were reduced to 13 WTGs in the final proposed design. In addition, with respect to Access and Transportation within the Project Locations (Section 1.7.3.2), Sabina discusses why all-weather roads are preferred instead of winter ice roads but does not discuss alternative options for road routes. For example, Figure 1.1-3 shows proposed service roads for the WTGs that run in parallel to proposed transmission lines toward the Goose site. However, there are two additional service roads north of the Llama Pit, including one segment on top of a water diversion berm between the Llama Pit and a waterbody (Llama Lake). Despite mostly being located within the boundaries of the original FEIS Goose PDA, the need for these additional roads (and new disturbance) could be discussed in the alternatives assessment.</p>
<p>Recommendation/ Request</p>	<ul style="list-style-type: none"> • Please consider presenting the Alternatives Assessment in a table format that clearly assesses the six key criteria for each alternative option. • Please include a discussion of solar energy in Section 1.7.3.1 (power generation) and provide more information about the proposed solar array and additional solar panels that may be added to existing buildings. • Please explain how Sabina decided to reduce the Energy Centre from 19 to 13 WTGs. • Please explain why additional service roads around the Llama Pit and Llama Lake are necessary or preferred (i.e., in an assessment against the six key criteria), as there are



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	other proposed road options that already connect to the Goose site.
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1.5 KIA-NIRB-05: Discussions with Transport Canada (completed and pending).

Review Number	KIA-NIRB-05
Subject/Topic	Discussions with Transport Canada (completed and pending)
Importance	Moderate
References	<p>B2Gold Nunavut, Back River Energy Centre FEIS Addendum: Responses to Information Requests</p> <ul style="list-style-type: none"> KIA-IR-1: Use of lighting deterrence measures <p>Transport Canada's Response to Information Request for the Back River Energy Centre Project Proposal (NIRB File No. 12MN036)</p> <ul style="list-style-type: none"> KIA-IR-1: Use of lighting deterrence measures <p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> Responses to Comments on Modification Package: KIA-05 Sections 1.10.1, 2.3.6.4 <p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> Sections 10.1.5, 10.1.9.4, 11.1.5, 11.1.9.4, 12.1.9.4
Summary	<p>Transport Canada and B2Gold Nunavut confirmed the aviation lighting requirements for the Back River WTGs, including prohibition of blue or green lights as an alternative to red and white lights, the latter of which are known to be a hazard to nocturnal migrating birds. Thus, Sabina's conclusions in the 2023 FEIS Addendum that no residual effects of direct mortality to migratory birds and raptors should be re-evaluated. In addition, if Transport Canada / Nav Canada has not yet reviewed Sabina's proposed WTG placement, it is unclear what the implications for the 2023 FEIS Addendum would be if the placement is unacceptable.</p>
Detailed Review Comment	<p>In response to KIA-IR-1 (Use of lighting deterrence measures) for the 2023 FEIS Addendum, Transport Canada confirmed that <i>"aeronautical obstruction lights must be either red or white depending on their usage; blue or green lights are not acceptable. For a windfarm, C864 medium intensity red flashing lights shall be</i></p>



	<p><i>used. The flash rate can be between 20 to 40 flashes per minute (fpm)."</i> B2Gold Nunavut confirmed that they will use the lowest flashing rate allowable and confirmed that directed lighting can be used rather than broad lighting. They provided an example of <i>"installing shields on the bottom half of lights which will mitigate and reduce potential effects to caribou or birds migrating at an elevation lower than the lights, but still allow the lights to meet their aviation requirements."</i></p> <p>Thus, some of the mitigation by design proposed by Sabina for Mitigation for Direct Mortality to migratory birds (Section 2.3.6.4) and raptors (Section 2.3.7.4) in the 2023 FEIS Addendum and in the WMMP Plan (V.12, April 2023) cannot be fully applied as written. Specifically, Sabina's statement that "red lit infrastructure" is not present at the Approved Project will no longer be true if the Modification is approved; the WTGs will require red flashing lights, which would increase collision risk. As such, the KIA disagrees with Sabina's conclusion that residual effects of disruption of movement and direct mortality are not predicted for migratory birds and raptors. Some residual effects are expected, even if they are not predicted to be significant once assessed.</p> <p>In addition to lighting, Sabina indicates in Section 1.10.1 (Additional Regulatory Processes) that Transport Canada / Nav Canada will also review the placement of the turbine in relation to the airstrip (presumably, the "Proposed Airstrip" shown on Figure 1.1-3; is this different from the existing airstrip at the Goose site?). This is an important consideration that should have been discussed earlier – what are the alternatives if Transport Canada / Nav Canada disapprove of the proposed WTG placement? Would the 2023 FEIS Addendum using the current Modification PDA be rendered moot?</p>
<p>Recommendation/ Request</p>	<ul style="list-style-type: none"> • Please repeat the effects assessment for the Energy Centre's potential effects on direct mortality of migratory birds and raptors, considering that some mitigation by design measures proposed by Sabina have now been confirmed to not be allowed by Transport Canada. • Please confirm whether Transport Canada / Nav Canada has reviewed and approved the WTG placement in relation to the Goose airstrip.



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

1.6 KIA-NIRB-06: Sensory disturbance and disruption of movement for caribou.

Review Number	KIA-NIRB-06
Subject/Topic	Sensory disturbance and disruption of movement for caribou
Importance	High
References	<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> • Responses to Comments on Modification Package: GN-04, KIA-12 • Sections 2.3.2.2, 2.3.2.3, 2.3.2.4 • Appendix A: Wind Project Permitting Summary Memo (21 March 2022) <p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> • Sections 7.1.11.2, 7.2.1.3, 7.2.2.2, 7.2.1.5
Summary	<p>The KIA disagrees with Sabina's assessment of no residual effects of sensory disturbance and disruption of movement for caribou due to 1) uncertainty about how caribou will react to the presence of WTGs, and 2) Sabina's planned mitigation and monitoring for caribou. The KIA recommends stronger wording around commitments to temporarily shut down the WTGs when groups of caribou are close by and earlier (greater distance) triggers to conduct caribou behaviour monitoring. Clarity is needed regarding the WMMP Plan's active caribou monitoring program (with human wildlife monitors and tower cameras) and the potential use of remote cameras for behaviour monitoring.</p>
Detailed Review Comment	<p>The KIA appreciates that Sabina added a new section (within 2.3.2.4) for disruption of movement of caribou in the 2023 FEIS Addendum, in response to comments GN-04 and KIA-12 on the Modification Package. In this new section, Sabina explains that "<i>It is not anticipated that the addition of the wind turbines will change the results of the FEIS, and a residual effect of disruption of movement is not anticipated. ... Due to the uncertainty associated with the effect of disruption of movement on caribou due to the presence of turbines, Sabina will take a precautionary approach and include mitigation and monitoring for the effect on caribou.</i>" Sabina further explains that the monitoring programs for caribou outlined in the WMMP Plan include the Energy Centre and</p>



	<p>mentions temporary shutdown of turbines as an example of adaptive management.</p> <p>The KIA has some concerns about the mitigation and management actions that will be triggered by ongoing monitoring, as described in Section 7.1.11.2 of the WMMP Plan (V.12):</p> <ul style="list-style-type: none"> • <i>“Primarily the wildlife monitors will determine the presence of caribou near the Project site. Incidental observations of caribou by pilots, drivers and on-site personnel can also trigger management actions.”</i> <p>Further information about wildlife monitors and active caribou monitoring is provided in Section 7.2.1.3 of the WMMP Plan. There are three options for monitoring: observation blinds, tower cameras, and vehicle-based monitoring. The KIA understands that Sabina’s objective is to use tower cameras, but it is unclear if these cameras have been installed and tested yet. Nevertheless, the WMMP Plan indicates that human wildlife monitors would visit the observation blinds between 2-4 times a day during daylight hours. What if caribou come into proximity of the WTGs at night? The WMMP Plan also does not specify whether control room operators for the tower cameras would be working 24 hours a day.</p> <ul style="list-style-type: none"> • <i>“During the calving, post-calving, and early summer seasons (June 5 to July 31), if large groups of caribou (more than 250) are observed by wildlife monitors within 1 km of the activity, then the wind turbines will be stopped until caribou move through the area.</i> • <i>During the calving, post-calving, and early summer seasons (June 5 to July 31), if groups of caribou (25 or more) are observed within 1.4 km of the activity, then caribou behaviour will be monitored as per Section 7.2.2.2. If caribou exhibit disturbance behaviours, the wind turbines may be stopped for one day, or until caribou move through the area. The distance of 1.4 km was chosen because it is larger than the distance at which noise of 40 dBA is emitted from the wind turbines (1 km).</i> • <i>During all seasons, if groups of caribou (25 or more) are observed within 500 m of the wind turbines, then they will be stopped until caribou move through the area.”</i> <p>The KIA notes that Sabina uses the wording of “the wind turbines may be stopped” instead of “will be stopped” for groups of ≥25 caribou during sensitive periods. It is unclear why Sabina does not commit to temporary shutdown in this situation. If Sabina intends</p>
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	<p>on waiting until caribou reach the 500 m trigger distance before stopping the WTGs, then behaviour monitoring is not being used to inform adaptive management.</p> <p>The 1.4 km trigger distance for caribou behaviour monitoring is based on noise modelling but may also be based on Sabina's assessment of the potential for visual disturbances to caribou, which was evaluated by examining shadow flicker. Sabina states that <i>"It is generally accepted that the possible effects of shadow flicker are not perceived beyond 10 times the rotor diameter (~1.4 km)."</i> It is unclear why shadow flicker is the only visual cue being considered, as the presence of 150-180 m tall structures (see KIA-NIRB-01: Wind turbine height differences and implications) on the tundra and their rotating blades may also result in visual disturbances to caribou. As summarized by Sabina in Appendix A (Wind Project Permitting Summary), the only wind energy projects operating in the Canadian Arctic to date are at the Diavik Diamond Mine (NWT) and Raglan Mine (Québec). Wind turbines will be a new and unusual feature on the landscape in the Bathurst Inlet area of Nunavut, and it is unknown how caribou will react to their presence.</p> <p>Due to this uncertainty, KIA disagrees with Sabina's conclusion that no residual effects for sensory disturbance and disruption of movement to caribou are anticipated after the planned mitigation. The KIA recommends taking a more conservative, proactive approach; it would be helpful to establish behavioural effects beyond 1.4 km, such as beginning behaviour monitoring as soon as active caribou monitoring is triggered at the 4 km Zone of Influence (ZOI). However, we recognize that this may be logistically difficult. Sabina mentioned the use of long-range infrared devices to monitor caribou at a greater distance during the Project FEIS; has this technology (or other options) been tested to facilitate visibility of caribou behaviours from 1.4 km to 4 km?</p> <p>The trigger distance can be reduced in the future if this is supported by the monitoring data. The purpose of collecting additional behaviour monitoring data is to demonstrate that caribou are not being disturbed beyond 1.4 km (i.e., to ensure that the predictions made in the 2023 FEIS Addendum are correct) and that the 1 km and 500 m shutdown trigger distances (for groups of >250 during sensitive periods and groups of ≥25 all year, respectively) are sufficient to protect caribou. The monitoring data may show that temporary WTG shutdowns need to be triggered earlier if caribou exhibit disturbance or avoidance behaviours at a greater distance than anticipated. Since Sabina is planning to</p>
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	<p>conduct behaviour monitoring of animals within 1.4 km as a Before-After-Control-Impact (BACI) study (Section 2.3.2.4, p. 2-41), behaviour monitoring out to the 4 km ZOI (if possible) should also be conducted before construction of the wind farm. The KIA notes that this BACI study design mentioned in the 2023 FEIS Addendum is not explicitly noted in the WMMP Plan V.12.</p> <p>Furthermore, Sabina states on p. 2-41 that “<i>A remote camera program to evaluate avoidance by caribou and other animals</i>” will be among the mitigation and monitoring methods for caribou related to the Energy Centre. Does this statement refer to the On-site Camera Monitoring program in Section 7.2.1.5 of the WMMP Plan V.12, which states that motion-triggered cameras will be placed at the Modification PDA to assess disruption of movement due to WTGs? Please clarify how study design, including camera setup (e.g., number, location, direction of cameras at the WTGs) and image analysis, will enable determination of caribou avoidance behaviours and disruption of movement. For other proposed camera locations for this program, Sabina states that the cameras will be used to assess activity around Project facilities, without further interpretation of behaviour. Sabina states that “<i>All methods will follow those reported in the 2015 Back River Camera Report</i>”; however, the methods in this report focus on evaluating the number of caribou (and other wildlife) triggers recorded at remote cameras and evaluating temporal trends in caribou abundance and distribution. Caribou behaviour “(e.g., resting, foraging, travelling)” was recorded to help identify caribou groups and there was no objective at the time (since these were baseline studies) to analyze avoidance behaviours. Further, previous discussions about the existing project have noted the difficulty in using motion-triggered cameras for establishing avoidance of an area, as sufficient statistical power is difficult to obtain with the camera design. More detail must be provided on the design and statistical plan (including the likely number of years of monitoring data that would be needed to determine whether avoidance was likely occurring using the design) to evaluate it for effectiveness. Allowing for migratory deflections to occur for several years before data are sufficient to test for avoidance may not represent a sufficiently conservative approach given the trajectory and resilience level of caribou herds potentially affected, and a more proactive approach may be required.</p> <p>Minor comments: Although Table 2.3-4 (Potential Effects to Caribou Associated with the 2015 FEIS) has been updated to include Disruption of Movement as a potential effect assessed further for the Modification Package, other text in the Caribou</p>
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P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<p>sections needs to be updated accordingly. For example, Sabina still states on p. 2-36 of Section 2.3.2.2 (Summary of FEIS for Caribou) that six of the potential effects that were assessed in the FEIS were excluded from the Modification and that disruption of movement was excluded from this assessment; Table 2.3-5 in Section 2.3.2.3 (Methods) is missing Disruption of Movement as a potential effect; and the Description of Potential Effects in Section 2.3.2.4 (Environmental Effects Assessment) indicates that two potential effects were evaluated for the Modification package.</p>
Recommendation/ Request	<ul style="list-style-type: none"> • Please clarify if and how active caribou monitoring (to determine presence, group size, and composition) will be conducted at night-time. • Please commit to temporarily shutting down the WTGs when groups of 25 or more caribou exhibit disturbance behaviours within 1.4 km of the activity between June 5 and July 31. • Please consider increasing the trigger distance for behaviour monitoring from 1.4 km to the 4 km ZOI, if logistically feasible, for the monitoring period before construction of the wind farm and after construction and operations (BACI study). A variety of methods could be explored to determine if this distance extension is possible, including long range infrared scopes. A more conservative approach is recommended for initial monitoring due to the high uncertainty of the effects assessment for sensory disturbance and disruption of movement for caribou. • Please include the BACI study design for caribou behaviour monitoring in the WMMP Plan. • Please provide more details about the on-site camera monitoring program for the WTGs and clarify how the study design and planned statistical analysis will allow for determination of caribou avoidance behaviours and/or disruption of migration movements due to the WTGs. • Please explain how many years of data collection using the camera monitoring program would likely be needed to determine whether caribou were avoiding the WTGs using analyses of camera monitoring data and consider, given the current resiliency of the caribou herds potentially affected, whether it is acceptable to allow for the potential avoidance of the area or migratory deflections for that length of time prior to adaptively managing. • Consider presenting more proactive, conservative approaches that could be used under the precautionary principle instead? For example, could Sabina assume a



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<p>larger ZOI around the WTGs and plan for monitoring for presence and adaptive management at that distance?</p> <ul style="list-style-type: none"> • Please update text throughout the caribou section of the 2023 FEIS Addendum to reflect the inclusion of Disruption of Movement as a potential project effect.
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1.7 KIA-NIRB-07: Potential attraction of scavengers to turbine and meteorological tower fatalities.

Review Number	KIA-NIRB-07
Subject/Topic	Potential attraction of scavengers to turbine and meteorological tower fatalities
Importance	Moderate
References	<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> • Sections 2.3.4.4, 2.3.5.4 <p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> • Sections 7.1.7, 10.1.5, 10.1.9.4 <p>Sabina, Back River Project, 2022 Annual Report (March 31, 2023)</p> <ul style="list-style-type: none"> • Appendix G, 2022 Pre-Construction Wildlife Mitigation and Monitoring Program Report
Summary	<p>Sabina states that the Modification will not create new wildlife attractants and concluded that there will be no residual effects for attraction of grizzly bear and furbearers; other wildlife VECs were not assessed. However, scavenging of carcasses from turbine strikes is a known confounding factor for estimating mortality. There are several mammalian and avian species known to occur at the Project that may scavenge for food; therefore, potential attraction to the WTGs should be evaluated in the effects assessment.</p>
Detailed Review Comment	<p>Sabina concludes in the 2023 FEIS Addendum that attraction due to the Modification is not predicted to result in a residual effect to grizzly bears (Section 2.3.4.4) or furbearers (Section 2.3.5.4). Attraction is not included as a potential effect for other wildlife VECs, including raptors and migratory birds. Despite including mortality/carcass monitoring in the WMMP Plan V.12, Sabina states that there is an “absence of new attractants to the</p>



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<p>Modification PDA” and has not considered the potential for mammalian and avian scavenger species to be attracted to carcasses from turbine and/or meteorological tower strikes.</p> <p>Recommended protocols for wind turbine carcass searches require estimating scavenging rate (e.g., through carcass removal trials) to calculate mortality estimates (EC and CWS, 2007a). Of the wildlife species that occur at the Project, as described in the Existing/Baseline Conditions sections of the 2023 FEIS Addendum, grizzly bear, furbearers (e.g., wolverine, fox, wolf), raptors (e.g., common raven, golden eagle, rough-legged hawk, bald eagle), and migratory birds (e.g., pomarine jaeger, parasitic jaeger, herring gull) are known to scavenge for food. Attraction of scavenging birds to the WTGs could increase their own collision/mortality risk; and attraction and potential habituation of scavenging mammals could increase the risk of human-wildlife conflicts and incidents. In the WMMP Plan, Sabina includes measures to remove roadkill “as quickly as possible” to mitigate direct mortality/injury to raptors being struck by vehicles while trying to prey on carcasses (Sections 10.1.5, 10.1.9.4), to protect carnivores from increased risk of vehicular collisions, and we presume to allow caribou to pass through the area as needed without being subjected to additional predation risk (via attraction of predators; Section 7.1.7). Removal of carcasses found during WTG mortality monitoring should also be explicitly included in the WMMP Plan (see also KIA-NIRB-08: Level of concern category for the Energy Centre for recommendations to increase the initial frequency of carcass searches).</p> <p>In Section 2.3.5.4 (Furbearers, Description of Potential Effects, Attraction), Sabina also downplays furbearer – especially wolverine – attraction issues that have occurred at the Back River Project, stating that “<i>Over four years of monitoring, there have been no reports of repeated sightings of animals over multiple days, animals accessing wastes, or other signs of wolverine or wolf being attracted to the camp or habituated near the camp.</i>” However, in the 2022 WMMP Report, Sabina states in Section 5.5.2.2 that “<i>There were 13 reports of aggressive or habituated wolverines, all occurring between November 20 and December 20. Of these instances, deterrent measures were deployed in seven cases (bear bangers in four, rubber bullets in one, and a combination of both in two). Nine of these occurred from November 21 to November 24, and are believed to have been the same wolverine. This wolverine was found within the incinerator building on November 21, and deterred using rubber bullets and bear bangers.</i>” Thus, there are ongoing wildlife attraction issues at the Project site that remain</p>
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P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	unresolved, and the WTGs will add another potential attractant that should have been included in the effects assessment for the Energy Centre.
Recommendation/Request	<ul style="list-style-type: none"> • Please repeat the effects assessments for the Energy Centre's potential attraction of grizzly bear, furbearers, raptors, and select migratory birds to carcasses resulting from collisions with the WTGs and/or meteorological tower. • Please include removal of carcasses found during WTG mortality monitoring, as mitigation for direct mortality and injury of raptors, in the next iteration of the WMMP Plan.

1.8 KIA-NIRB-08: Level of concern category for the Energy Centre.

Review Number	KIA-NIRB-08
Subject/Topic	Level of concern category for the Energy Centre
Importance	High
References	<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> • Sections 2.3.6.1, 2.3.6.2, 2.3.6.4, 2.3.2.2 • Appendix A: Wind Project Permitting Summary Memo (21 March 2022) • Appendix B: Back River Wind Turbine Wildlife Baseline Study 2019-2020 (April 2022) <p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> • Table 6.2-1, Table 4.1-1, Section 11.1.3.3 <p>Sabina, Back River Project, 2022 Annual Report (March 31, 2023)</p> <ul style="list-style-type: none"> • Appendix G, 2022 Pre-Construction Wildlife Mitigation and Monitoring Program Report
Summary	Sabina categorized the Energy Centre as the lowest (Category 1) level of concern without considering or discussing site sensitivity. Based on the known occurrence of migratory bird species at risk, relative proximity to two important bird areas, and presence of nearby waterbird staging areas south of the Modification PDA, the Project could be argued as having Very High potential sensitivity.



	Therefore, the Energy Centre could be classified as the highest level of concern (Category 4). Modifications to the Sabina's WTG monitoring program are needed regardless of category, as it does not currently meet the requirements outlined in EC/CWS' guidance.
Detailed Review Comment	<p>In Section 2.3.6.1 (Migratory Birds, Rationale for Inclusion) of the 2023 FEIS Addendum, Sabina briefly explains how CWS classifies wind farms, emphasizes that the planned 13 WTGs represents "<i>the small end of the medium range of 11-40 turbines</i>", and states that their plan/work for the Energy Centre has exceeded the level of baseline studies and follow-up monitoring required for small and medium-sized wind farms. Sabina's rationale for their exceedance of effort is provided in Section 2.3.6.2 (Existing/Baseline Conditions) and Appendix A (Wind Project Permitting Summary Memo). However, despite accurately summarizing that "<i>A matrix approach based on site sensitivity and facility size is used to categorize projects into levels of concern</i>" (EC and CWS, 2007b), Sabina does not discuss site sensitivity of the Project area and appears to base their Category 1 level of concern solely on the "small end of medium" facility size.</p> <p>Table 3 in EC and CWS (2007b) shows that a Medium facility size could vary from Category 1 to Category 4 if the site has Low to Very High sensitivity, respectively. Based on the criteria for site sensitivity in Table 1, the Back River Energy Centre could be argued as having higher potential sensitivity:</p> <p><i>Determining factor for Very High sensitivity:</i></p> <ul style="list-style-type: none"> <i>The presence of a bird species listed as "at risk" by the SARA, COSEWIC or provincial/territorial threat ranking, or the presence of the residence(s) of individuals of that species if listed under the SARA, or of its critical habitat. To be of concern, either the bird or its residence or critical habitat must be considered to be potentially affected by the project.</i> <p>As shown in Table 4.1-1 of the WMMP Plan V.12 and Table 8-1 of the 2022 WMMP Report, there are bird species confirmed to occur in the Project area that are of conservation concern. Furthermore, Harris' sparrow and red-necked phalarope (both Special Concern under SARA and by COSEWIC, Vulnerable in NU) and hoary redpoll (Vulnerable in NU) were observed during summer breeding surveys conducted in and around the Modification PDA in 2019 (Appendix B, Table 3-1). Surveyors found evidence of breeding (young and territories) for red-necked phalarope (Table 3.1-2). Peregrine falcon was also observed during fall migration surveys</p>



	<p>in 2019; this species was considered Special Concern under SARA at the time but was recently delisted (Not At Risk) in February 2023.</p> <p><i>Determining factor for High sensitivity:</i></p> <ul style="list-style-type: none"> • <i>Site is located between habitats where large local bird movements occur or is close to significant migration staging or wintering area for waterfowl or shorebirds.</i> <p>Although the Energy Centre does not contain significant staging or concentration areas (which would make it Very High sensitivity), Sabina states in Section 11.1.3.3 of the WMMP Plan that “<i>The two waterbird staging areas closest to the Project are on Beechey Lake, approximately 35 km south of the Goose site, and at an unnamed lake approximately 15 km north of the George site.</i>” Sabina also states in Section 2.3.6.2 (Existing/Baseline Conditions, Waterbirds) of the 2023 FEIS Addendum that “<i>Migrating waterbirds near the Goose PDA were concentrated to the south of the PDA, approximately 10 to 15 km from the Modification PDA.</i>” It is unclear why the 2023 FEIS Addendum and WMMP Plan descriptions of waterbird staging areas are different. Nevertheless, birds resting at Beechey Lake, or the closer staging area may fly past the WTGs on their northward and southward migrations. Indeed, large flocks of geese have been observed flying over the Goose site in the spring and/or fall of 2019, 2020, and 2022 (Section 6.3, 2022 WMMP Report).</p> <p><i>Determining factor for Special considerations required:</i></p> <ul style="list-style-type: none"> • <i>Presence of a SARA listed species (not just birds), or the residence(s) or critical habitat of a SARA listed species that might be affected by the project.</i> <p>Barren-ground caribou, including the Beverly/Ahiak and Bathurst herds, have been designated as Threatened by COSEWIC (since November 2016) and are currently under consideration for addition to Schedule 1 of the SARA. As shown in Figures 2.3-2 and 2.3-3 in Section 2.3.2.2 of the 2023 FEIS Addendum, both herds may interact with the Modification at certain times of the year: spring migration, summer (especially), fall migration, and winter for Beverly/Ahiak caribou; and spring migration for Bathurst caribou. If barren-ground caribou become SARA-listed, Sabina will need to ensure that mitigation and management measures, consistent with any applicable recovery strategies and action plans, are taken to avoid or lessen the potential adverse effects of</p>
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P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<p>the project on caribou and to monitor the effectiveness of these measures.</p> <p>For clarity, Section 5.0 of EC and CWS (2007b) states that <i>“The presence of any one factor identified in each category will result in a sensitivity rating within that category.”</i> Therefore, the presence of species at risk (red-necked phalarope and Harris’ sparrow) should place the Project within the Very High potential sensitivity ranking; combined with a Medium facility size, this would result in a Category 4 level of concern. However, the KIA recognizes that the Modification PDA does not encompass critical habitat for these species and loss of suitable waterbird and upland bird habitat due to the Modification PDA will be low compared to the prevalence of suitable habitat in the LSA and RSA (Section 2.3.6.4 of the 2023 FEIS Addendum). The KIA also recognizes that the closest waterbird staging areas to the Modification PDA (10+ km away) may not be close enough to be of very great concern to ECCC/CWS. However, when the presence of various site sensitivities – including migratory bird species at risk and aggregations, caribou, and their habitats – are considered together, the KIA would argue that the Modification PDA has more than Low sensitivity and should therefore be designated as a Category 2, 3, or 4 project.</p> <p>Sabina summarizes the monitoring requirements for Category 1 to 4 projects in Section 2.1 (Regulatory Guidance, Canadian Wildlife Service) of Appendix A. Sabina’s proposed WTG monitoring program as described in the current WMMP Plan V.12 does not meet the EC and CWS (2007b) guidance, especially if the project should be re-assigned into a Category 3 or 4 level of concern. Table 6.2-1 in the WMMP Plan shows that Sabina intends on monitoring WTGs for migratory bird (raptors, waterbirds, upland birds) mortality, which will consist of carcass searches twice a week during spring and fall migration for two years of WTG operations. This plan for mortality/carcass monitoring meets (but does not exceed) the minimum requirements. However, carcass searching is a separate requirement and is not the same as post-construction surveys. EC and CWS (2007b) explains that, for any level of concern, post-construction follow-up surveys are supposed to use comparable protocols to pre-construction surveys. As such, Sabina needs to conduct post-construction migration standwatch surveys, standard area shoreline surveys, and ARU studies (as these are planned for pre-construction) for at least 1-3 years (depending on the level of concern) and include these in the WMMP Plan.</p>
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P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<p>Furthermore, although Sabina is following EC and CWS (2007a) guidance for twice-weekly carcass searches (as required “in most cases”), the KIA recommends increasing the frequency (e.g., daily or every two days) at the beginning of monitoring (e.g., at least the first migration season) due to the uncertainty about scavenging rate, unless Sabina intends to conduct carcass removal trials to estimate scavenging rate. Carcass searches can be reduced to twice a week (or less frequent) when it is demonstrated that carcasses persist for longer than a few days (EC and CWS, 2007a).</p> <p>Finally, Sabina describes the four wind turbines installed at the Diavik Diamond Mine in Section 3.2 of Appendix A. After their 1-year mortality monitoring program in 2013, Diavik continues to conduct monitoring for bird mortalities as part of overall site compliance monitoring inspections. Sabina should consider including a similar or more rigorous approach after the formal 2+ years’ monitoring of WTGs for bird mortality is completed. Greater relative monitoring effort would be expected to be applied for the medium-sized wind farm at Back River compared to the small-sized wind farm at Diavik.</p>
Recommendation/ Request	<ul style="list-style-type: none"> • Please provide rationale for why the Back River Energy Centre should have a Category 1 level of concern, considering the known site sensitivities that could place it in Category 2, 3, or 4. • Please include post-construction migration standwatch surveys, standard area shoreline surveys, and ARU studies in the WMMP Plan. For a Category 4 project, these post-construction surveys should be conducted for at least 2-3 years. • Please increase the frequency of carcass searches from twice weekly to daily or every two days until it has been determined that carcasses persist for longer than a few days. • Please consider continuing mortality monitoring after two years of WTG operations, such as during regular site inspections.

1.9 KIA-NIRB-09: References for migratory birds and raptors.

Review Number	Comment	KIA-NIRB-09
Subject/Topic		References for migratory birds and raptors



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

Importance	Moderate
References	<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> Sections 2.3.6, 2.3.7 Appendix B: Back River Wind Turbine Wildlife Baseline Study 2019-2020 (April 2022) <p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> Sections 10.1.9.4, 10.2.1.3, 11.1.9.4, 11.2.1.3, 12.1.9.4, 12.2.1.2
Summary	<p>Cited references in the Migratory Birds and Raptors sections (at minimum) are missing from the References list of the 2023 FEIS Addendum, making it difficult to complete a thorough technical review. The KIA requests clarification on selected references regarding disruption of movement and direct mortality on migratory birds and raptors. The KIA also disagrees with the use of Ontario guidelines to set mortality thresholds, especially for upland birds and waterbirds, to trigger adaptive management.</p>
Detailed Review Comment	<p>In the Description of Potential Effects sections for migratory birds (Section 2.3.6.4) and raptors (Section 2.3.7.4), the referenced reports supporting Sabina's assumptions are missing from Section 4 (References) of the 2023 FEIS Addendum. References from other sections may also be missing and Sabina should complete a thorough check of the entire document. Nonetheless, the KIA managed to track down most of the cited references for bird studies and requests additional information and clarification.</p> <p><i>Disruption of Movement</i></p> <p>Sabina references two reports to support their argument that disruption to movement of migratory birds will be negligible. It is unclear how applicable a study of large offshore wind farms (>50 turbines) on migrating sea ducks (Masden et al., 2009) is to the Energy Centre, an onshore wind farm with 13 WTGs. Sea ducks are not included among the potentially affected wildlife VECs in the 2023 FEIS Addendum.</p> <p><i>Direct Mortality</i></p> <p>Sabina references a Bird Studies Canada (2017) report that we could not find. However, Zimmerling et al. (2013), which Sabina also cites, found higher annual mortality rates than those presented in the 2023 FEIS Addendum (see Table 1 below). The</p>



KIA requests clarification on the differences between the mortality estimates calculated by the two studies; one discernible reason is the separation of non-raptor and raptor estimates in Bird Studies Canada (2017). Of note, Zimmerling et al. (2013) reported on mortality species composition and found that horned lark had the highest reported mortality at wind farms. Horned lark is one of the most common upland bird species in the Project area (Section 2.3.6.2, Existing/Baseline Conditions, Upland Birds) and may be more susceptible to collisions with the WTGs than other species.

Table 1. Estimated annual mortality rates (max and min) from turbine collisions.

	Section 2.3.6.4, from Bird Studies Canada (2017)	Zimmerling et al. (2013)
Canada	-	8.2
Ontario	5.70 (max)	10.8
Atlantic Canada	1.81 (min)	15.2 (max; PEI) 2.4 (min; NB)

Mitigation for Direct Mortality

Sabina refers to the Ontario Ministry of Natural Resources' 2011 "Birds and Bird Habitats: Guidelines for Wind Power Projects" for mortality thresholds to trigger adaptive management in the 2023 FEIS Addendum and the WMMP Plan V.12. Ontario's guidelines include:

- 14 birds/turbine/year at individual turbines or turbine groups;
- 0.2 raptors/turbine/year (all raptors) across a wind power project;
- 0.1 raptors/turbine/year (provincially tracked raptors) across a wind power project; or
- 2 raptors/wind power project (<10 turbines)

Sabina has adopted the first and last mortality threshold for migratory birds and raptors, respectively. Given that the estimated mortality rate in Ontario is higher than for other provinces in Canada (as discussed above), and there are currently no data for the Canadian Arctic, a threshold of 14 birds/turbine/year may be too lenient for the Back River Energy Project. Since the OMNR (2011) guidance also suggests 'turbine groups', an annual mortality threshold of 14 birds for all 13 WTGs, or potentially for each of the "West" and "East" Modification PDAs, may be more



	<p>appropriate. Regardless, a more conservative mortality threshold, informed by initial mortality monitoring data and through discussions with the GN, ECCC/CWS, and KIA, should be applied for migratory birds.</p> <p>With a planned 13 WTGs, the raptor mortality threshold that Sabina selected is more conservative than what Ontario applies for 'all raptors' ($0.2 \times 13 = 2.6$) but is less conservative than Ontario's guidelines for raptor species of conservation concern ($0.1 \times 13 = 1.3$). Sabina should consider a more stringent mortality threshold for raptors such as golden eagle (Vulnerable in NU) and short-eared owl (Threatened by COSEWIC, Special Concern under SARA, Vulnerable in NU).</p> <p>Ultimately, it will be important for Sabina to accurately estimate annual mortality of migratory birds and raptors through frequent carcass searches (see recommendations in KIA-NIRB-08: Level of concern category for the Energy Centre). The mortality thresholds can then be adjusted proportionally to reflect local conditions, rather than applying thresholds from Ontario that may not be appropriate for the Canadian Arctic.</p>
Recommendation/ Request	<ul style="list-style-type: none"> • Please include all cited reports in the Reference list of the 2023 FEIS Addendum. • Please provide more relevant studies on potential disruption of movement to migratory birds from wind farms, where possible. • Please provide the Bird Studies Canada (2017) report on non-raptor and raptor mortality estimates in Canadian provinces. Without access to this report, it is unclear why the mortality estimates presented in the 2023 FEIS Addendum are much lower than those in other publications. • Please apply a more conservative mortality threshold for migratory birds (upland birds and waterbirds). The threshold should be developed after some initial mortality data are collected from the area and in consultation with the GN, ECCC/CWS, and KIA. • Please consider applying a more restrictive mortality threshold for raptor species of conservation concern if Sabina intends to follow OMNR (2011) guidelines. • Please undertake more frequent carcass searches such that mortality rates can be accurately estimated for the Modification and used to adjust mortality thresholds later, if needed.



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

1.10 KIA-NIRB-10: Raptor nests, suitable habitat, and buffer distances.

Review Number	Comment	KIA-NIRB-10
Subject/Topic		Raptor nests, suitable habitat, and buffer distances
Importance		Low
References		<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> Sections 2.3.7.2, 2.3.7.4 <p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> Sections 10.1.9.2, 10.1.3.3, 11.1.3.2, 12.1.3
Summary		The 2023 FEIS Addendum appears to downplay the occurrence of breeding cliff-nesting raptors and suitable habitat for ground-nesting raptors in and around the Modification PDA. The WMMP Plan includes mitigation for nesting raptors, if any are found during pre-construction surveys; however, mitigation for sensory disturbance could be improved for all nesting bird VECs.
Detailed Review Comment		<p>In Section 2.3.7.2 (Existing/Baseline Conditions, Cliff-nesting Raptors), Sabina states that <i>“There are no cliffs suitable for nesting in the Modification PDA; however, there is a small area of cliff to the northeast of the Modification PDA (Figure 2.3-6).”</i> In this section, Sabina does not mention that a peregrine falcon nest was found within this small area of cliff less than 5 km away from the Modification PDA; it is visible on the main map but not the inset map of Figure 2.3-6. Furthermore, the main map shows two other suitable cliff-nesting habitat areas within the Goose PDA southeast of the Modification PDA. Gyrfalcon and common raven nests have been observed in the area closer to the Modification PDA (approximately 5 km away), and a peregrine falcon was incidentally observed in the habitat farther east.</p> <p>With respect to ground-nesting raptors, Sabina states that <i>“One short-eared owl nest was found in the wildlife RSA in 2011, south of the Goose Property and Modification PDAs by several kilometres (Figure 2.3-7).”</i> Sabina later clarifies in Section 2.3.7.4 that the short-eared owl nest in 2011 was located more than 5 km south of the Modification PDA; however, it is not shown (or labelled) on Figure 2.3-7. Do the red triangles on this map indicate nests? The legend shows diamonds as “ground nester nest” but none appear</p>



	<p>on the map; nor is red symbology included in the legend. Sabina also explains habitat suitability mapping for short-eared owl; suitable nesting habitats “<i>contain tall or dense shrubby areas, which typically occur at low elevation where soil is wet- and not on the ridges w[h]ere wind towers are placed.</i>” However, the inset of Figure 2.3-7 shows that most of the “East Modification PDA” contains suitable habitat for short-eared owl, which contradicts Sabina’s statement.</p> <p>Overall, it appears that Sabina is downplaying the occurrence of breeding raptors and suitable habitat for ground-nesting raptors in and around the Modification PDA. Despite the prevalence of suitable ground-nesting habitat throughout the wildlife LSA and RSA (as shown in Figure 2.3-7), there is also suitable habitat in the Modification PDA and short-eared owls could potentially nest near the WTGs in the future. However, the KIA appreciates that Sabina plans on conducting aerial surveys to confirm current cliff-nesting raptor nest locations and occupancy status prior to construction (Section 2.3.7.4, p. 2-92). Raptor nesting sites not only provide information about risks to nesting area, but also about the likelihood of raptor foraging territories overlapping the Modification PDA containing the WTGs, and the risk of them being attracted to the turbines, where they may be at greater strike risk, to feed on carcasses. The WMMP Plan V.12, Section 10.1.9.2, also presents mitigation, management, and monitoring for sensory disturbance to raptors associated with the Energy Centre:</p> <ul style="list-style-type: none"> • Pre-clearing surveys will be conducted to ensure all nests in the area are located (e.g., in case of new nest construction) and occupancy status is confirmed. • If any new nests are located within 1.5 km of planned construction activities, avoid construction during the raptor nesting period, if possible (April 15 – August 15), or establish appropriate avoidance buffers and follow-up monitoring. • Raptors can become acclimated to human activities and will build nests on infrastructure. If a raptor builds a nest on Modification or Approved Project infrastructure (including transmission lines or towers) then normal operations at that site can continue. No new activities will be conducted within 100 m of the active raptor nest, but existing activities can continue. The nest will be reported to the GN and monitored to determine the nest success.
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P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<p>The KIA understands that the 1.5 km ZOI for sensory disturbance to raptors is a conservative value derived from a literature review of flight initiation distances (Section 2.3.7.4, p. 2-88); however, it is unclear how the 100 m setback distance from an active raptor nest was designated (third bullet; also specified in Section 10.1.3.3, Operations Management, of the WMMP Plan). The WMMP Plan V.12 also refers to recommended buffer distances for nesting waterbirds (ranging from 150-1,000 m depending on the waterbird species/group; Table 11.1-1) and upland birds (songbirds = 100 m, shorebirds = 100-300 m) in Sections 11.1.3.2 and 12.1.3, respectively. Sabina refers to guidance from ECCC (2016), when “Avoidance Guidelines” and prescribed setback distances used to be available. However, ECCC’s current “Guidelines to avoid harm to migratory birds” does not include prescriptive buffers; rather, buffer zones and setback distances need to be determined on a case-by-case basis (ECCC, 2023). If Sabina’s listed buffer distances are conservative enough and do not cause nesting birds to flush or exhibit alert behaviours, then the planned mitigation should be effective. However, Sabina should also commit to increasing the buffer distances if nesting birds appear to be disturbed, to ensure compliance under the federal <i>Migratory Birds Convention Act</i> and Nunavut <i>Wildlife Act</i>.</p>
Recommendation/ Request	<ul style="list-style-type: none"> • Please update the maps in Figures 2.3-6 and 2.3-7 to include all symbology and clearly display the raptor nests found within 5 km of the Modification PDA in the inset maps. • Please commit to increasing the buffer distances for nesting waterbirds, upland birds, and raptors if birds exhibit disturbance behaviours at the current distances listed in the WMMP Plan V.12.

1.11 KIA-NIRB-11: Back River Wind Turbine Wildlife Baseline Study 2019-2020.

Review Number	KIA-NIRB-11
Subject/Topic	Back River Wind Turbine Wildlife Baseline Study 2019-2020
Importance	Moderate



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

References	<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> • Section 2.3.6.2, 2.3.6.4 • Appendix B: Back River Wind Turbine Wildlife Baseline Study 2019-2020 (April 2022) • Appendix C: Sabina Wind, NU – Noise Report
Summary	<p>Sabina's standwatch and standard area surveys in 2019 did not closely follow ECCC/CWS' recommended protocols, which resulted in challenges with data interpretation. Fall standwatch surveys and ARU deployment appeared to miss or incompletely capture the peak migration period, and ARU data were lacking for spring migration (already noted by the KIA, and a commitment was made by Sabina within the updated March 2023 version of the FEIS Addendum to conduct additional spring ARU surveys). These data gaps must be rectified through additional, well-designed baseline studies to increase confidence in Sabina's effects assessments for migratory birds and raptors in the 2023 FEIS Addendum.</p>
Detailed Review Comment	<p>There are methodology limitations from the 2019-2020 Back River Wind Turbine Wildlife Baseline Study that were hopefully addressed during the spring migration studies conducted in May 2022 (Section 2.3.6.4 of the 2023 FEIS Addendum; no information reported) or will be addressed during future pre-construction surveys that Sabina has committed to completing, including standwatch surveys, standard area shoreline surveys, and ARU studies. These methodological issues and potential solutions are discussed below:</p> <p><i>Standwatch Surveys</i> (Sections 2.3, 3.3)</p> <p>Fall migration standwatch surveys were conducted at five sites across five days from September 7 to 11, 2019 for a total survey effort of 33.7 hr. As each site was surveyed during a 3-hr morning block and a 3-hr afternoon block (not necessarily on the same day), it is implied that each site was surveyed for the equivalent of one day over the 5-day period. Since the sample size per site and per day-block was essentially one, Sabina's presentation of results by site (Table 3.3-1) and date (Table 3.3-2) is difficult to interpret as the two variables are confounding. That is, analysis by site is not possible due to date effects, and analysis by date is less certain due to site effects. Nonetheless, Sabina was able to conclude that the migration passage rate was highest on September 7, likely due to favourable southerly winds.</p>



	<p>ECCC/CWS' recommended protocols for passage migration counts recommends surveying for 6 continuous hours (i.e., 9:00am to 3:00pm) for at least 10 days spread over the peak migration period (EC and CWS, 2007a). Sabina's surveys did not follow the recommended protocols in terms of daily duration at each site (since the morning and afternoon blocks appeared to have been conducted on separate days) or overall duration. Furthermore, although it is not explicitly stated in EC and CWS (2007a), a proper study design would also include repeated surveys at the same site. Future standwatch surveys for the Energy Centre should strive to follow the federal guidance for wind projects.</p> <p>One of the biggest issues with the 2019 fall standwatch surveys was that the surveys did not capture the peak migration period, as suggested by ARU monitoring (discussed below). The KIA understands that Sabina determined the timing for surveys through TK by speaking to Elders and land users who harvest waterfowl in Cambridge Bay and Kugluktuk (Section 2.3.6.2 of the 2023 FEIS Addendum). While the sources utilized are great local sources, more data sources should have also been considered to adequately capture the range of migration timing – not just waterfowl but other waterbirds, upland birds (songbirds and shorebirds), and raptors – since Sabina intended to survey for various bird VECs in 2019-2020. This is particularly important as so many migratory birds migrate at night, when local observers may be less active. The KIA recommends using existing ARU data and referring to the Audubon's <i>Bird Migration Explorer</i> (Smith et al., 2022). These interactive maps provide migration data from various technologies, including GPS and Doppler satellite telemetry, light-level geolocators, automated radio telemetry, banding, and genetic markers.</p> <p>In addition, Sabina states in the Methods section that a <i>"conservative approach was used to determine the number of birds observed within the potential zone of interaction with the wind turbine"</i>, which included recording birds <i>"flying laterally within 1 km of the observer"</i>. This could be a conservative approach if the standwatch stations were located where the WTGs will be and covered the extent of the Modification PDA. However, as shown in Figure 1-1 – assuming the mapped wind turbine locations are realistic – four standwatch locations (W2, W8, N2, E4) were at or close to a proposed turbine and one standwatch location (W5) was in between two proposed turbines. Not all proposed WTGs are within 1 km of standwatch locations; for example, E4 cannot see the westernmost turbine in this polygon (#15 as shown in Figure 1 of the Noise Report), nor can N2 compensate for the distance</p>
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	<p>from the north. N2 also cannot see the northernmost turbine in the Modification PDA (#14 as shown in Figure 1 of the Noise Report). Sabina should confirm if the proposed turbine locations shown in Figure 1-1 without adequate baseline data have been eliminated from selection for the 2023 FEIS Addendum.</p> <p><i>Autonomous Recording Units</i> (Sections 2.4, 3.4)</p> <p>Four ARUs were deployed to record acoustic data during fall migration (September 1 to October 15, 2019) and spring migration (May 15 to July 1, 2020). One unit was lost, one was partially destroyed after 12 days, and the remaining two functioned for the fall season but ran out of batteries during the spring. These difficulties resulted in complete fall datasets only for BAC-001 and BAC-004, which represent the western and eastern portions of the study area, leaving a big gap in the middle of the Modification PDA. It is difficult to wildlife-proof the ARUs; however, batteries could be checked before the spring migration season or by taking down the ARUs at the end of the fall migration season and re-deploying in the spring. If regular checks of batteries and memory cards are possible, the ARUs could also be programmed to record more than 10 min at 40-min intervals.</p> <p>Although ARUs were deployed one week earlier than commencement of fall standwatch surveys in the fall of 2019, the ARUs may have still missed the beginning of peak migration (Section 3.4.1, Figure 3.4-1). Sabina has committed to conducting additional ARU studies to refine the time of peak spring and fall migration prior to construction (Section 2.3.6.4, p. 2-79 of the 2023 FEIS Addendum). How many units will be deployed? Will there be enough units to cover the area extent of the Modification PDA? Sabina could also consider deploying and programming ARUs to record data for an entire year, provided that regular checks can be made. This would prevent the need to guess when migration will begin and end and would also collect valuable data during the summer breeding season.</p> <p><i>Standard Area Surveys</i> (Sections 2.2, 3.2)</p> <p>Sabina does not provide much detail about the standard area surveys conducted during the summer bird breeding season (July 19-23) and fall migration (September 7-11) in 2019. These 20-min surveys within a 200-m radius circle appear to be modified point counts. According to EC and CWS (2007a), projects with >10 turbines would normally require at least 20-point counts spaced at least 500 m apart. The KIA understands that the purpose of standard area surveys was to assess the use of waterbodies for</p>
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	<p>breeding and as migratory staging areas. The abundance of waterbodies and wetlands and larger size of some waterbodies in the study area (Figure 1-1) should have been able to support more than the 12 survey locations completed in 2019. EC and CWS (2007a) also recommends that point counts be conducted from 0.5 hr before sunrise to 4 hr after sunrise and repeated twice over the course of the season (at least 10 days apart). Sabina does not provide the daily timing when standard area surveys or PRISM plots (Sections 2.1, 3.1) were conducted. Seven standard area survey sites were repeated between summer breeding and fall migration, but not within each season. Future standard area shoreline surveys for the Energy Centre should strive to follow the federal guidance for wind projects.</p> <p>Due to the use of stationary shoreline point counts (i.e., areas beyond 200 m on larger waterbodies would not have been surveyed), relatively low coverage of the study area (i.e., many smaller waterbodies shown on Figure 1-1 were not surveyed), and lack of repeated surveys, it is unclear how Sabina can conclude in Section 3.2.2 that there is “<i>minimal use of waterbodies by migrating waterbirds in the proposed wind turbine area</i>”. Sabina also states in Section 4.2 (Discussion, Fall Migration) that “<i>Raptors were noted during fall migration standwatch surveys but not during other surveys in 2019</i>” and appears to imply that there are few raptors in the area. However, Sabina’s study design for PRISM plots (targeting breeding shorebirds and upland breeding birds) and standard area surveys (targeting waterbirds) is not necessarily conducive to detecting raptors.</p> <p>In summary, there are multiple caveats for the Back River Wind Turbine Wildlife Baseline Study 2019-2020 that reduce confidence in the conclusions of the 2023 FEIS Addendum with respect to potential effects of disruption of movement and direct mortality on migratory birds and raptors. In turn, a high uncertainty must be assumed in the FEIS and monitoring efforts must be planned for accordingly. The KIA appreciates that Sabina has committed to completing additional baseline studies prior to construction; these studies should incorporate ‘lessons learned’ from the 2019-2020 surveys.</p>
<p>Recommendation/ Request</p>	<ul style="list-style-type: none"> • Please follow EC and CWS (2007a) guidance for future standwatch surveys (passage migration counts) and standard area shoreline surveys (point counts), including adequate coverage of the study area/Modification PDA. • Please use multiple data sources to estimate spring and fall migration timing in addition to TK and local knowledge,



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<p>such as the Audubon's <i>Bird Migration Explorer</i>. Sabina would need to request the contributing datasets included in the <i>Bird Migration Explorer</i> to complete data analyses.</p> <ul style="list-style-type: none"> • Please consider year-round deployment for future ARU studies, with regular battery checks, to avoid uncertainties around migration timing and collect data during the summer breeding season.
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1.12 KIA-NIRB-12: Separate analyses needed for WTG monitoring.

Review Number	KIA-NIRB-12
Subject/Topic	Separate analyses needed for WTG monitoring
Importance	Moderate
References	<p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> • Section 1.6 <p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> • Sections 7.2.2.4, 7.1.11.2, 7.2.1.1, 7.2.1.2
Summary	<p>It is unclear in the WMMP Plan V.12 whether wildlife monitoring for the WTGs will be analyzed and reported separately in annual reports. The KIA requests that WTG monitoring be analyzed separately to evaluate predicted effects from the 2023 FEIS Addendum, at least where it is possible to disentangle effects (e.g., mortality and attraction caused by the WTGs versus other parts of the Back River mine).</p>
Detailed Review Comment	<p>Sabina updated the WMMP Plan to V.12 (April 2023) in response to requests from NIRB to ensure the Modification PDA and details from the Energy Centre Addendum are included in all sections and maps of the WMMP Plan.</p> <p>Throughout the updated WMMP Plan V.12, Sabina has added the Modification PDA when discussing the Goose site. For monitoring programs that can apply to various Project components/activities, it is unclear whether the Energy Centre and WTGs will be analyzed separately. For example, the spatial scale is often not explicitly mentioned or is stated generically (e.g., "<i>The results of the behaviour monitoring program will be reported in the annual WEMP report</i>").</p>



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<p>With respect to regional caribou collar monitoring for ZOI, Sabina states in Sections 7.2.2.4 and 7.1.11.2 that the Modification PDA will be included in the Goose site analysis. Since the purpose of this monitoring program is to investigate whether caribou alter their regional distribution following construction of the Project, it would be informative to better understand the possible causes for regional distribution changes. The WTGs are not planned for installation until the Back River Mine has entered Operations (Section 1.6, Table 1.6-1 of the 2023 FEIS Addendum); therefore, there should be at least one monitoring period (every 3 years starting at Construction) with data prior to WTG installation.</p> <p>It is important that monitoring data are analyzed and reported separately for the WTGs to allow for comparison to predictions made in the 2023 FEIS Addendum, at least where it is possible to disentangle effects (e.g., mortality and attraction caused by the WTGs versus other parts of the Back River mine). It would be especially informative to identify changes in caribou movement patterns due to the WTGs using collar data, such as through Sabina's plan for Monitoring Seasonal Ranges of Caribou (Section 7.2.1.1) and/or Near Real-time Collar Monitoring (Section 7.2.1.2).</p>
Recommendation/ Request	<ul style="list-style-type: none"> • Please state explicitly in the WMMP Plan that WTG monitoring data will be analyzed and reported separately. • Please complete analysis of regional collar monitoring for ZOI separately for the Goose site and the Modification PDA or provide rationale for why this would not be possible. • Please report on any changes in migration pathways and time that migratory caribou spend clearing the area around the WTGs before and after they are operating. Please consider including these objectives in the WMMP Plan for Monitoring for Seasonal Ranges of Caribou and/or Near Real-time Collar Monitoring.

1.13 KIA-NIRB-13: WMMP Plan V.12 – Caribou Protection Measures (appendices).

Review Number	KIA-NIRB-13
Subject/Topic	WMMP Plan V.12 – Caribou Protection Measures (appendices)
Importance	Moderate
References	Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)



	<ul style="list-style-type: none"> Sections 7.1.5.8, 7.1.5.9, 7.1.5.7, 7.1.11.2, 7.1.6 Appendix 1: The Caribou Decision Tree Appendix 2: Caribou Mitigation, Monitoring, and Management Infographic
Summary	<p>Sabina has developed The Caribou Decision Tree and caribou management infographics as supporting documents for the WMMP Plan, presumably to be used by Project staff on a day-to-day basis. Some critical information (e.g., heightened mitigation during sensitive periods, caribou group size thresholds, minimum flight altitude) in these appendices are missing or do not match the main body of the WMMP Plan and will need to be revised.</p>
Detailed Review Comment	<p>Sabina's Caribou Decision Tree and Caribou Mitigation, Monitoring, and Management Infographic in Appendices 1 and 2 of the WMMP Plan V.12, respectively, contain inconsistent information from the main body of the WMMP Plan. Since Project staff likely use the more succinct appendices on a day-to-day basis, it is important to provide accurate information. The following discrepancies need to be corrected:</p> <p><u>The Caribou Decision Tree</u></p> <ul style="list-style-type: none"> Open Pit Mine Blasting Operations – missing heightened mitigation during the calving period (June 5–15), when blasting will be stopped for a group of 10 breeding females within 5 km. Number of caribou should be ≥ 25 rather than ≥ 30. Also missing management when < 25 caribou are observed during calving, post-calving, and early summer (June 5–July 31): alert the Environment Department, conduct behaviour monitoring, apply adaptive management if needed (Section 7.1.5.8). Heavy Equipment Operations – missing heightened mitigation during the summer (August 1–30) for when ≥ 25 caribou are observed < 750 m. Number of caribou should be ≥ 25 rather than ≥ 30 for both occurrences in the tree (Section 7.1.5.9). Helicopter Operations – the top branch of this tree needs to be revised with respect to time of year, number of caribou, and procedure. Section 7.1.5.7 states that “<i>during all seasons, pilots will avoid groups of less than 25 caribou vertically (610 m) or horizontally (1 km).</i>” A minimum altitude of 300 m is only allowed for muskox (Section 8.1.3.3) and grizzly bear and wolverine (Section 9.1.3.5),



	<p>not for caribou; this height also needs to be edited in the Mitigation/Monitoring notes below the tree. Number of caribou should also be ≥ 25 rather than ≥ 30 in the bottom branch.</p> <ul style="list-style-type: none"> • Wind Turbine Operations – number of caribou should be ≥ 25 rather than > 25 in the tree and Mitigation/Monitoring notes below (Section 7.1.11.2). <p><u>Caribou Mitigation, Monitoring, and Management Infographic</u></p> <ul style="list-style-type: none"> • Bathurst Caribou – Sabina states that the Bathurst herd calves approximately 210 km to the northwest of the Project site, and that the winter ice road is only active when the Bathurst caribou are more than 300 km away. In the timeline at the bottom of the infographic, Sabina shows that the WIR is/could be in operation from the beginning of December to mid-May (though the goal is to complete trucking on the WIR by April 15; Section 7.1.6). However, The WIR Operations decision tree in Appendix 1 shows that the WIR could be operational until June 4, which is the end of spring migration. As such, the WIR could be active when Bathurst caribou arrive at their calving grounds 210 km away (i.e., < 300 km). The KIA understands that this is still a fair distance but would like to ensure that Sabina's statements are accurate (see also KIA-NIRB-14: Changes to caribou seasonal distribution and timing). • Wildlife Monitoring – Sabina states that "<i>Caribou monitors will be on site at all times</i>". Please refer to our questions about active caribou monitoring in KIA-NIRB-06: Sensory disturbance and disruption of movement for caribou. Number of caribou should be ≥ 25 rather than 25-250. • Staged Reductions in Project Activities – under 3. Heavy Mobile Equipment, missing heightened mitigation during the calving and post-calving periods (June 5–July 31), when equipment will stop for > 250 caribou within 4 km. Similarly, under 4. Helicopters, missing heightened mitigation for calving and post-calving (June 5–July 31), when helicopters will avoid > 250 caribou by 610 m vertically or 4 km horizontally. The minimum 300 m altitude and group size needs to be revised, as discussed above for the Caribou Decision Tree.
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P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

Recommendation/ Request	<ul style="list-style-type: none"> Please make the requested revisions in Appendix 1 and 2 of the WMMP Plan V.12, as described in the Detailed Review Comment.
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1.14 KIA-NIRB-14: Changes to caribou seasonal distribution and timing.

Review Number	KIA-NIRB-14
Subject/Topic	Changes to caribou seasonal distribution and timing
Importance	Moderate
References	<p>Sabina, Back River Project, Wildlife Mitigation and Monitoring Program Plan (Version 12, April 2023)</p> <ul style="list-style-type: none"> Section 7.2.1.1 Appendix 2: Caribou Mitigation, Monitoring, and Management Infographic <p>Sabina, Back River Project, 2023 FEIS Addendum (March 2023)</p> <ul style="list-style-type: none"> Section 2.3.2.2, Figures 2.3-2 and 2.3-3
Summary	<p>An analysis of Bathurst caribou collar data from 1997 to 2019 found spatial and temporal trends in range use that may have implications for caribou mitigation and management at the Back River Project. Sabina should consider analyzing collar data up to 2021 (or 2022, if available) to confirm these trends and adjusting the dates of caribou sensitive periods (including calving, post-calving, and early summer; currently defined as June 5 to July 31) if needed.</p>
Detailed Review Comment	<p>In the Caribou Mitigation, Monitoring and Management Infographic (Appendix 2 of the WMMP Plan V.12), Sabina presents Bathurst caribou collar data collected by the GNWT from 1998-2015. It is unclear why the range maps shown in the infographic for both Bathurst and Beverly/Ahiak caribou (including calving and post-calving core ranges and herd total range) have not been updated with more recent data, since Sabina presents seasonal utilization distributions from satellite collar data 2012-2021 in Figures 2.3-2 and 2.3-3 of the 2023 FEIS Addendum.</p> <p>Mennell (2021) recently completed an analysis of Bathurst caribou collar data from 1997-2019 and found that the annual and seasonal ranges contracted in size and moved northward as the population declined. Figures 4.9 and 4.3 show that Brownian</p>



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Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<p>Bridge distribution maps of the Bathurst caribou herd in 2018 and 2019, respectively, may have overlapped with the Back River Project. Mennell (2021) also found trends in the timing and duration of annual range occupancy over the study period: the duration of spring migration significantly decreased, with caribou reaching their calving range eight days earlier; and the duration of the post-calving/early summer period significantly increased and ended 13 days later. Sabina should consider completing trend analyses for collar data up to 2021 (or 2022, if available) to confirm Mennell's (2021) results, as there will be implications for caribou mitigation and management.</p> <p>The KIA understands that Sabina intends to monitor seasonal ranges of caribou on a yearly basis starting at the Construction phase (Section 7.2.1.1 of the WMMP Plan). This monitoring program has two objectives:</p> <ul style="list-style-type: none"> • Identify when caribou may interact with the Project site so that monitoring and mitigation activities can be planned for caribou, e.g., wildlife monitors can be on-site to conduct active caribou monitoring and mitigation. • Identify if the calving ground of the Bathurst or Beverly/Ahiak caribou herd has moved to overlap the Project site. <p>The triggers for adaptive management include analyzing the spatial and temporal degree of overlap of the Bathurst herd calving and post-calving ranges with the Project to plan for operational shutdowns. However, changes to seasonal timing are not explicitly noted. Trends from existing collar data and future monitoring data should be used to inform the transition dates between Bathurst caribou spring migration and calving (currently assumed to be June 5), and between post-calving/early summer and late summer (currently assumed to be July 31). These dates define the most sensitive periods for caribou and dictate many mitigation and management measures in the WMMP Plan; therefore, if caribou range phenology changes are occurring – for both Bathurst and Beverly/Ahiak caribou herds – adaptive management also needs to occur.</p>
Recommendation/ Request	<ul style="list-style-type: none"> • Please update caribou range maps in Project documents to include the most up-to-date collar data (2021 or later). • Please consider analyzing caribou collar data up to 2021 (or 2022, if available) to identify/confirm annual trends in caribou seasonal distribution and phenology, as was found for the Bathurst herd by Mennell (2021).



P.O. Box 18
Cambridge Bay, NU X0B 0C0
Telephone: (867) 983-2458
Fax: (867) 983-2701

	<ul style="list-style-type: none">• Please include changes to caribou range phenology as a trigger for adaptive management and adjust the definition of caribou sensitive periods (i.e., transition dates) as needed in the WMMP Plan and other Project documents.
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Concluding Comments

Fourteen issues have been raised, four of which disagree with the conclusions presented and one in which there is implicit disagreement with the conclusion given the caveats presented. These five issues are:

- KIA-NIRB-01 - Wind turbine height differences and implications;
- KIA-NIRB-05 - Discussions with Transport Canada;
- KIA-NIRB-06 - Sensory disturbance and disruption of movement for caribou;
- KIA-NIRB-09 - References for migratory birds and raptors; and
- KIA-NIRB-11 - Back River Wind Turbine Wildlife Baseline Study 2019-2020.

These issues will require new evidence, reanalysis, and revision by B2 Gold Nunavut (formally Sabina Gold & Silver Corp.) to achieve resolution. The remaining ten (10) issues identified in the review require clarification and revision only to achieve resolution.

For the most part, appropriate methodology was utilized in the FEIS Addendum to develop the conclusions presented. The quality of the presentation of information was fair with identified areas of improvement for the specific issues presented.

Proposed modifications to Terms and Conditions have been presented by B2 Gold Nunavut (Sabina) and are acceptable to KIA.

Thank you.

John Roesch, P.Eng.

Senior Hope Bay Project Officer
Kitikmeot Inuit Association, Department of Lands and Environment
Cc Wynter Kuliktana, Acting Director, KIA, Department of Lands and Environment