Sabina
GOLD & SILVER CORP.

Karén Kharatyan
A/Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

January 29, 2018

RE: Response to comments for Type B Water Licence for Initial Development Works related to the advancement of the Back River Project

Dear Mr. Kharatyan,

On September 13, 2017 Sabina Gold & Silver Corp. (Sabina) submitted a revised Type B Water Licence application and supporting documents (Application) for proposed development work, ongoing exploration mobilization and site preparation work related to the Back River Project (Project).

The Nunavut Water Board (NWB or Board) acknowledge receipt of the Application, the NPC conformity determination and Indigenous and Northern Affairs Canada decision on the Nunavut Impact Review Board (NIRB) Revised Final Hearing Report on December 7, 2017 and requested Interested Parties (Parties) review and provide comment on the Application by January 15, 2018. Following several requests for extension, Sabina received notification by the Board that comments were received from the following Parties:

- the Kitikmeot Inuit Association (KIA);
- Environment and Climate Change Canada (ECCC); and
- Department of Fisheries and Oceans Canada (DFO).

Sabina believes the scope of activities proposed for this Application are consistent with scope identified in the Project Proposal submitted to the NIRB for review and further, the scope of works proposed can be processed as a short interim approval consistent with Agreement Article 13.5.5, and the NWB can proceed with regulatory review of the Type B Application.

This being stated, Sabina notes that several of the comments received from the Parties do not appear to be within the jurisdiction or mandate of the NWB (i.e. Wildlife). Sabina acknowledges and respects that the final decision related to jurisdiction and mandate rests with the Board however to assist the Board in its review of the technical comments received on the Application, Sabina has separated their final response to comments into two attachments. Attachment A, reflects comments and responses related to the Application and Attachment B, reflects comments and responses related to other materials potentially outside the scope of the Application.

Sabina would like to highlight that the company remains focused on the responsible development of the Project and that Sabina commenced the Environmental Assessment of the Project back in 2012 and notes that the activity, mitigation or monitoring identified in many of the comments are not new for Sabina but rather a culmination of consideration by the Parties over many years of discussion related to the activities proposed under numerous NIRB, NWB, KIA, INAC and other authorizations and Sabina will continue to ensure best management practices are in place to minimize potential effect. Several of the comments and responses on the Application may be better suited to the Type A application for full mine

development however to provide the necessary clarification Sabina has endeavoured to provide a response to the Type B application where appropriate.

I trust the above and attached information meets the NWB requirements for response to the comments received on the Type B Water Licence for the Back River Project. Should you have any questions, please do not hesitate to contact me at the below.

Yours truly,

Matthew Pickard
Vice President, Environment and Sustainability
Sabina Gold & Silver Corp.
#1800 – 555 Burrard Street
Box 220
Vancouver, BC V7X 1M9

CC: David Hohnstein, NWB
Dave Baines, NWB

Attachments: A – Application Responses and Supporting
Attachment A1. Updated Figure 3.3-2 dated January 26, 2018 from 170913 8BC-BRP----D6EMPP-IMLE_Version2.0
Attachment A2. Update MAD, Appendix F, Table F-1
Attachment A3. 171002 2AM-BRP----SD24-QAQCPlan-IMLE
B – Other Matters

ATTACHMENT A:

Agency	TC No	Subject/Topic	Reference to Type B	Summary	Importance of issue to the Type B Water Licence review process	Detailed Review Comment	Recommendation/Request	SBB Response	Updated Attachment
KIA	KIA-NWB-1	Service Road Cross Section (BGC)	Road Management Plan (RMP), Section 4.1.2 Construction of All-weather Service Roads RMP, Section 4.1.6 Measures to Prevent Permafrost Degradation.	The proposed service road cross section has a minimum embankment thickness is 1.0 m and side slopes of 2H:1V. According to SRKs Memorandum "Thermal Modelling to Support Run-of-Quarry Pad Design – Final", October 14, 2015 (Appendix B of FEIS Appendix V2-7C), a thaw depth of 1.8 – 2.5 m is expected. SRK further recommended that "a ROQ pad with a design thickness of at least 1.90 m is required to maintain the 0˚C isotherm at the base of the pad for areas not thermally impacted by heated buildings and other surface infrastructure." Based on the proponent's studies, thaw may penetrate for more than 1 m, in other words into the permafrost foundation, thus affecting shallow water courses and resulting in lasting environmental impacts that cannot be reversed upon closure. Upon closure, new water courses may form in response to the disturbance caused by the service roads and change surface water flow. Sabina must demonstrate how this will be managed. 1. Gap/Issue Sabina indicates that a service road thickness of 1.0 m is acceptable without specifying what this means or how this is controlled in the long-term. Additional thaw penetration and permafrost degradation are expected beneath the embankment side slopes in response to snow	Upon closure, new water courses may form in response to the disturbance caused by the service roads and change surface water flow. Sabina must demonstrate how this will be managed.	1. Gap/Issue Sabina indicates that a service road thickness of 1.0 m is acceptable without specifying what this means or how this is controlled in the long-term. Additional thaw penetration and permafrost degradation are expected beneath the embankment side slopes in response to snow deposition. 2. Disagreement with WL information/ conclusion Impacts on the permafrost are considered non-reversible and non-manageable. 3. Reasons for disagreement Thaw penetration into the foundation is known to have lasting effects on surface water flow and permafrost degradation. The Transport Association of Canada (TAC) guideline on transportation infrastructure in permafrost regions (2010) recommends a minimum embankment thickness of 1.5 m to avoid permanent disturbance to the permafrost foundation.	It is requested that Sabina re-evaluate the cross-section design for the service roads and consider a higher embankment fill thickness.	All-weather secondary roads (e.g., service roads) are recommended at a thickness of 1 m as stated in Table 6 of the Site Wide Geotechnical Parameters Report (171002 2AM-BRP----MAD App F-2_GeotechDesignRpt-IMLE) as specified under the Type A water Licence. During initial development, Sabina may place thinner material thicknesses on roads as dictated by on-site conditions and in conjunction with the Geotechnical Engineer of record, as well as to reflect environmental conditions (e.g., proximity to water way). Under the current exploration development Type B Water Licence, 2BE-GOO1520, Sabina has successfully operated all-weather roads averaging 0.5 m in thickness (see Construction Summary Report as per 2BE-GOO1015 Amendment 3, Part E: Item 8. Submitted August 27, 2013) and no thaw penetration or permafrost degradation has been observed. Sabina also notes that 1.0 m road thickness is currently successfully utilized at similar development projects in the region (i.e., TMAC Doris North Project). Final as-built drawings will be provided 90 days following construction in accordance with NWB requirements.	
KIA	KIA-NWB-2	Service Road Culverts - Aufeis and Culvert Clogging (BGC)	Road Management Plan (RMP) Section 6.1.2 Watercourse Crossings Inspection and Maintenance. RMP, Section 6.3 Snow clearing.	Culverts are used to manage water crossings. According to the Road Management Plan, accumulated snow and ice will not be removed from within culverts. If culverts are filled with ice, runoff during freshet may not be able to drain as planned and result in erosion of the road embankment. In addition, changes in the thermal regime due to road construction may result in the formation of aufeis, which can also affect the planned drainage regime. However, the Road Management Plan does not address contingency plans for these scenarios.	The changes in the drainage regime in response to altered surface drainage can result in permafrost degradation and long-term impacts on the surface water drainage.	1. Gap/Issue The Road Management Plan lacks contingency plans for potential aufeis formation and impacts of clogged culverts. 2. Disagreement with WL information/ conclusion Impacts on the permafrost are considered non-reversible and non-manageable. 3. Reasons for disagreement Changes in the surface water regime have a major influence on the ground thermal regime. Those changes are typically non-reversible and may create a ripple effect.	It is requested that Sabina re-evaluate the water crossings inspection and maintenance procedures.	Roads have been designed, and will be constructed, to reduce the potential for permafrost degradation (Section 4.1.6 of the 8BC-BRP Road Management Plan) (170913 8BC-BRP----D1RoadMgmtPlan-IMLE_Version2.0). Monitoring of crossing performance will include, but not be limited to, observations of cracking, sloughing, ponding, aufeis (winter icings), and vegetation changes. Additionally, where permafrost is encountered and where practical, the thermal and hydrologic regime will be monitored to ensure that the crossings perform as expected. Section 6.1 of the Road Management Plan (170913 8BC-BRP----D1RoadMgmtPlan-IMLE_Version2.0) indicates that culverts and stream crossings will be inspected just prior to and during the spring freshet to ensure that the culverts and stream crossings are sufficiently clear to accommodate the rapid spring thaw and that action will be initiated (including removing accumulated ice) where required. Where culvert ice blockage is identified during inspection and if watercourse crossings can't accommodate the spring freshet, culvert thawing (steaming) will be considered as a maintenance measure. Section 6.3 of the Road Management Plan (170913 8BC-BRP----D1RoadMgmtPlan-IMLE_Version2.0) states that "with safety in mind, accumulated snow and ice within culverts will not be manually removed"; while safety is paramount, Sabina believes that culverts can be safely and successfully cleared to ensure adequate water flow in culverts in advance of freshet. Sabina is committed to updating the Road Management Plan as directed by the NWB and will include the necessary clarification provided herein.	
KIA	KIA-NWB-3	Defining "geochemically suitable" and "clean rock" (BGC)	Road Management Plan (RMP), Section 4.1.2 Construction of All-weather Service Roads. RMP, Section 4.1.5 Measures to Protect Fish and Fish Habitat. RMP, Section 6.1 All-weather Service Roads Inspection and Maintenance.	All-weather service roads are expected to be constructed with run-of-mine or run-of-quarry rock that is placed onto the tundra to preserve the permafrost. The Road Management Plan indicates these construction materials will consist of geochemically suitable rock, sourced from the existing Airstrip Quarry and/or the new Umwelt Quarry. As well, the Road Management Plan indicates clean rock will be used in the maintenance of watercourse crossings. In both respects, the Road Management Plan does not provide a definition of these terms nor the methods/criteria to be used in characterizing material as geochemically suitable or clean. The Mine Waste Rock Management Plan (Section 5.3) does delineate criteria for material management	The use of excavated material in road construction has the potential to leach metals and/or acidic conditions that can affect underlying sediments and/or permafrost and be detrimental to surface and ground water and downstream aquatic environments. Excavated materials should be appropriately characterized before placement to assess its suitability as construction fills.	1. Gap/Issue The Road Management Plan does not define the terms geochemically suitable or clean rock, or the methods to be used to assess material characteristics prior to its use as construction material. 2. Disagreement with WL information/ conclusion 3. Reasons for disagreement See above.	It is requested that Sabina revise the text to define the terms geochemically suitable and clean rock and indicate whether the geochemical criteria outlined in the Mine Waste Rock Management Plan can be consistently applied to the Road Management Plan.	Sabina defines the terms "geochemically suitable and clean rock" to be material to be non-potentially acid generating and non-metal leaching and free of contaminants. This definition is consistent with NWB typical terms and conditions for Type B Water Licenses. Sabina confirms that the criteria to delineate geochemically suitable material outlined in the below Table 5.3-1 of Section 5.3 of the Mine Waste Rock Management Plan of the Type A (171002 2AM-BRP----SD08-MineWasteMgmtPlan-IMLE) will be applied to the Road Management Plan. **Table 5.3-1: Site-specific Geochemical Classification Criteria** Acid Generation Potential / Criteria / Comments Non-Potentially Acid Generating / NP/AP > 3 or total S <0.15% / These samples are not expected to generate acidity Potentially Acid Generating / NP/AP < 3 / Potentially acid generating or uncertain acid generation potential owing to uncertainty in availability and reactivity of bulk NP	
KIA	KIA-NWB-4	Management/monitoring of potential stockpiles (BGC)	Road Management Plan (RMP), Section 4.1.5 Measures to Protect Fish and Fish Habitat.	The Road Management Plan provides details regarding the disposal of excavated material, for the purposes of protecting nearby fish and fish habitat areas. However, the Road Management Plan does not provide details as to the adaptive management strategies (e.g., capping, blending, etc.) to be used to suitably stockpile excess material on surface to protect down-gradient environments.	The use of excavated material in road construction has the potential to leach metals and/or acidic conditions. The stockpiling of these materials on surface has the potential to release runoff or seepage that may be detrimental to downstream fish and fish habitat areas.	1. Gap/Issue The Road Management Plan does not provide management or monitoring strategies to handle excess excavated material. 2. Disagreement with WL information/ conclusion 3. Reasons for disagreement See above.	It is requested that Sabina provide 1) details of its proposed management of potential excess material to be stockpiled at surface and, 2) details of possible monitoring programs of stockpiles located near sensitive, fish bearing habitats.	As per Section 4.1.6 of the Road Management Plan for the Back River Project Type B Water Licence Application (170913 8BC-BRP----D1RoadMgmtPlan-IMLE_Version2.0), disposal of excavated material will be positioned at least 31 m from the high water mark of a waterbody to prevent the release of sediment or sediment-laden water into water frequented by fish. Measures will be applied to intercept any sediment loading in runoff prior to reaching fish-bearing water. Sediment control measures may include the installation of synthetic permeable barriers, fibre rolls, and silt fences as required. Additional details on quarry surface water management can be found in Section 6.2 of the Quarry Management Plan (170913 8BC-BRP----D3QuarryMgmtPlan-IMLE_Version2.0). Proposed water quality monitoring (e.g., for turbidity) during initial development works, including that related to excavated or stockpiled material, is listed under Table 3.3-1 of the Environmental Management and Projection Plan (EMPP) (170913 8BC-BRP----D6EMPP-IMLE_Version2.0). For the purpose of the Type B EMPP, water quality monitoring will provide data to support on-site management decisions (e.g., capping).	

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KIA	KIA-NWB-5	Mitigative/management strategies to address predicted nitrite exceedances associated with road construction (BGC)	Road Management Plan (RMP), Section 6.1 All-weather Service Roads Inspection and Maintenance.	The Road Management Plan does not discuss monitoring or management/mitigation strategies related to the predicted nitrite exceedances (from road construction), as described in the Water and Load Balance Report (MASD Appendix E-2 Section 7.4).	Nitrite is a well-known toxicant for fish that disrupts several physiological functions. Nitrite is considered an intermediate species and oxidizes to nitrate over time. The use of explosives in road building and the location of all-weather service roads near fish habitat indicate monitoring for nitrogen species should be considered and included in the Road Management Plan.	1. Gap/Issue The Road Management Plan does not provide management or monitoring strategies to address potential nitrite exceedances, as noted with predictive water quality modeling. 2. Disagreement with WL information/ conclusion 3. Reasons for disagreement See above.	It is requested that Sabina include details of monitoring and management/mitigation strategies (as necessary) of exceedances related to explosive use in road construction.	Sabina will continue to implement blasting best management practices to minimize dust production and to minimize the quantity of explosives, which will result in lower concentrations of nitrogenous compounds as residue. The Airstrip Quarry was operational in 2013 for use under KIA Permit, KTP11Q001 and NWB Type B Water Licence 2BE-GOO1520 and used to construct existing all-weather service roads. Since 2013, Sabina has experienced minimal runoff from the all-weather service roads constructed; it is anticipated this will continue. Runoff from the roads will be discharged to the terrestrial environment as diffuse sheet flow and will infiltrate into the terrestrial environment prior to reaching the aquatic environment. It should also be noted that the minimum 31 m buffer distance intended to minimize surface flow impacts on water quality, will be applied to all-weather service roads. This 31 m buffer was identified based on guidance documents and commonly established riparian zone buffer widths used in many regions, including the Arctic. The water and load balance modelling (MASD Appendix E-2 Section 7.4) (171002 2AM-BRP‐‐‐MAD Spp E-2_WaterLoadBalanceRpt-IMLE) was completed for the Project's full mine development and not specific to the lesser scope and scale of initial development works under the Type B Application. The water and load balance model for the Type A Application applies constant source term concentrations to each land type, structure, or water use, including waste rock storage areas, ore stockpiles, slurry water, rock pads, etc. Sabina acknowledges that the initial development works proposed represent a much smaller percentage of material being moved; Sabina is confident that the levels of nitrogen will be lower than what is fully modelled for the Type A water and load balance. Furthermore, proposed water quality monitoring (e.g., for nitrite) during construction, for potential seepage or runoff from excavated and or stockpiled material (e.g., roads and pads), is listed under Table 3.3-1 of the Environmental Management and Projection Plan (EMPP) (170913 8BC-BRP‐‐‐D6EMPP-IMLE_Version2.0). Table 3.3-1 confirms that nitrite, as part of parameter group code C, will have a sampling frequency of monthly, with additional sampling when runoff is observed. If it is determined that nitrites are present (in concentrations higher than water quality guidelines or in concentrations higher than background concentrations) and that this runoff poses a concern to the aquatic environment, Sabina will implement best management practices and mitigations as outlined in Table 6-1 of the Type B Quarry Management Plan (170913 8BC-BRP‐‐‐D3QuarryMgmtPlan-IMLE_Version2.0).	
KIA	KIA-NWB-7	Notification for spill incidents (BGC)	Comprehensive Spill Contingency Plan (SCP), Section 3 Roles and Responsibilities. SCP, Section 6 Spill Response Procedures. SCP, Appendix B Procedure In The Event Of a Spill.	In the event of a spill, the SCP directs employees to "Notify direct supervisor or Site Superintendent" (Section 3), "Notify their supervisor or on-site management" (Section 6), and "Notify Operations Superintendent" (Appendix B). Consistency is important to ensure proper notification procedures are followed. A notification placard may be helpful to ensure that site personnel follow proper procedures. Included should be who to contact in the event that the Operations Superintendent is not available, so that the 48-hour period is not exceeded.	Nunavut's Spill Contingency Planning and Reporting Regulations require a SCP, including reporting procedures.	1. Gap/Issue: Spill reporting procedures for site personnel is important to ensure that proper notification procedures are followed. The SCP should use consistent terminology and clear reporting instructions regarding spill reporting. 2. Disagreement with WL information/ conclusion 3. Reasons for disagreement See above	Revise text in the SCP to ensure consistent terminology and notification procedures for employees to follow in the event of a reportable spill. A notification placard may be helpful to ensure that site personnel follow proper procedures. Included should be who to contact in the event that the Operations Superintendent is not available, so that the 48-hour reporting period is not exceeded. The placard could be included in the SCP as an appendix.	Sabina agrees with the recommendation made by the KIA and is committed to updating the Plan as directed by the NWB. Sabina agrees that consistency is important to ensure proper notification procedures are followed, and acknowledges that a notification placard might be helpful to ensure that site personnel follow proper procedures.	
KIA	KIA-NWB-8	Disposal of drill cuttings and core saw sludge in trenches (BGC)	Comprehensive Spill Contingency Plan (SCP), Section 2.3 Solid Wastes.	The Comprehensive Spill Contingency Plan states drill cuttings are to be disposed in a trench at the Goose Exploration Camp and sludge (from core saws) to be disposed in an exploration trench south of camp. Drill cuttings and core saw sludges are broken bits of solid material removed from the borehole or drill core, respectively. These materials are typically fine-grained and are comprised of the material removed with drilling. Therefore, it is suggested that drill cuttings and core saw sludges may be better classified as 'mine waste' and their handling/management be consistent with environmental protection measures outlined in the Mine Waste Rock Management Plan.	The disposal of fine-grained material (such as drill cuttings and sludges) has a greater potential to weather and release metals/acidity due to a higher surface area to volume ratio, relative to coarser grained waste. The disposal of these materials in a trench may not be adequate to appropriately manage the potential for future leaching.	1. Gap/Issue: The Comprehensive Spill Contingency Plan does not provide rationale for disposing drill cuttings and core saw sludges in trenches. The composition of drill cuttings and core saw sludges suggests it should be classified as mine waste and therefore managed with guidance from the Mine Waste Rock Management Plan. 2. Disagreement with WL information/ conclusion 3. Reasons for disagreement See above	It is requested that Sabina provide rationale for disposing drill cuttings and core saw sludges in trenches and not applying the environmental protection measures outlined in the Mine Waste Rock Management Plan to these materials.	The Comprehensive Spill Plan submitted with the development works application is based on the comprehensive spill plan approved by the NWB for operations at the Goose and MLA under the existing Type B Water Licenses, 2BE-GOO1520 and 2BE-GEO1520. Exploration drilling is not currently scoped as part of the initial development works application but rather is an already licenced activity under the exploration permits mentioned above; no new trenches will be constructed. Sabina approach to spill contingency planning is to have one, all-inclusive spill plan that addresses all Type B water licences for the Back River Project. Consistent with Type B exploration Water Licence 2BE-G001520, Sabina is authorized to "dispose of all drill waste including water, chips, muds and salts in any quantity or concentration from land based and or on-ice drilling, in a properly constructed sump or an appropriate natural depression located at a distance of at least thirty one (31) metres from the ordinary high water mark of any adjacent water body, where direct flow into a water body is not possible and no additional impacts are created." Sabina believes disposal of drill cuttings to a trench is consistent with existing approvals granted by the NWB for exploration drilling.	
KIA	KIA-NWB-9	Post-closure management of Umwelt Quarry ponds & cost estimate contingency. (BGC)	Interim Closure and Reclamation Plan (ICRP), Section 3.1.2 Quarries/Borrow Sources and Overburden.	The proposed Umwelt Quarry is anticipated to be excavated in two closed depressions which will accumulate water in ponds. The location of the quarry was selected to be entirely within the upper greywacke unit, in which sampling has resulted in the rock being classified as NPAG or low sulfide (S) material, with a limited potential for ARD. The plan concludes therefore that no special management measures are required at this location. This conclusion seems reasonable, but is based on limited geochemical data in one specific location. If there is a moderate degree of metal leaching in the Umwelt Quarry, even under neutral pH conditions, the resulting water quality could be such that some form of post-closure water management and/or treatment could become necessary. It is therefore recommended that the document discuss an adaptive management approach to this during development of the quarry, and to also consider adding additional contingency to the cost estimate.	For the NWB to be able to issue a licence, Sabina must satisfy the Board that the company has the financial ability to adequately implement mitigation measures and apply any costs associated with closing or abandonment of the undertaking.	1. Gap/Issue: The ICRP, and associated cost estimate, assumes no metal leaching in the Umwelt Quarry. Any metal leaching could result in the need for some form of active water management post-closure. 2. Disagreement with WL information/ conclusion 3. Reasons for disagreement See above	The ICRP should: 1) discuss the uncertainty with respect to the water quality of the post-closure ponds in the Umwelt Quarry; 2) discuss an adaptive management approach to addressing this should metal leaching occur in the quarry; and 3) consider adding additional contingency to the cost estimate, for a total contingency of ~20% instead of 10% as proposed. It is noted that a description of the geochemical characteristics of Umwelt Quarry rock is also included in Section 4.5.1 of the Quarry Management Plan. Similar to the above recommendation for the ICRP, the Quarry Management Plan should also include discussion of an adaptive management approach to address any water quality in the quarry's ponded areas.	1) The proposed closure activities for the Umwelt Quarry are based on the geochemical characterization carried out to date which indicated that the proposed quarry areas within the Umwelt Quarry are classified as either NPAG or low-sulphur material with a limited potential for ARD generation. Additionally, based on low solid phase arsenic concentration, metal leaching (ML) is unlikely. As a contingency, and to address any uncertainties, monitoring of the water quality will be carried out during quarry operations and quarry flooding to confirm that the water quality in the Umwelt Quarry meets discharge criteria as defined in the Type B Water Licence. Monitoring will continue in the flooded quarry and it will be discontinued after three years if discharge criteria are met. One small spillway will be excavated for each of the quarry depressions to control the location and elevation of water discharge. 2) If the water from the Umwelt Quarry does not meet the discharge criteria the water will be treated prior to discharge (likely in the quarry by adding lime or ferric sulphate). A notification of discharge will be submitted to appropriate regulatory parties under the land and water authorizations and also reported within annual reports. Water treatment will cease once the water quality meets the discharge criteria, only at this point will the water from the quarry be discharged directly to the environment. 3) Sabina agrees that an additional contingency to address any potential concerns associated with water quality in the quarry is protective of the natural environmental. Sabina commits increasing the cost estimate contingency from 10% to 20%, which amounts to an additional $91,000. Sabina will update the ICRP and the Quarry Management Plan to reflect the above prior to the commencement of activities in the Umwelt Quarry and will issue to the NWB.	

Agency	TC No	Subject/Topic	Reference to Type B	Summary	Importance of issue to the Type B Water Licence review process	Detailed Review Comment	Recommendation/Request	SBB Response	Updated Attachment
KIA	KIA-NWB-10	Quarry water management infrastructure (BGC)	Quarry Management Plan (QMP), Section 6.2 Surface Drainage and Water Management from Quarries and Borrow Pits.	The Quarry Management Plan describes quarry configurations as a "relatively flat surface graded such that water slopes to an area within, or adjacent to, the quarry boundaries". Flowing water will be sampled as part of the on-going monitoring and allowed to discharge to the environment if it meets discharge criteria, as defined in the Type B Water Licence. This is a reasonable management strategy; however, further details as to the expected volume and appropriately sized collection/contact ponds and diversion ditches are not included in drawings 4.2-1 and 4.2-2. Additionally, review of the Site-wide Water Management Report (MASD Appendix F-1) did not show related conveyance/containment infrastructure associated with quarries.	The ability to test flowing quarry waters and have time to review water quality data (to assess its compliance with Type B Water Licence discharge criteria) is dependent on appropriately sized water containment infrastructure. These details provide confidence that waters not meeting specific criteria will not be released to the environment and suitably managed.	1. Gap/Issue: The Quarry Management Plan describes the collection and testing of flowing water from quarries, but does not provide details of collection ponds on accompanying quarry drawings or text of the expected geometry or holding times. 2. Disagreement with WL information/ conclusion 3. Reasons for disagreement See above	It is understandable that specific water infrastructure details may not be available; however, if drainage/runoff from quarries is expected then these systems (i.e., collection ponds, diversion ditches) should be included on associated drawings. Sabina is requested to update relevant drawings with details of relevant water management infrastructure and provide details of geometry, holding times, etc. where possible.	The Airstrip Quarry was operational in 2013 for use during construction under KIA Permit, KTP11Q001 and NWB Type B Water Licence 2BE-GOO1520. Ongoing surface draingage and and surface wtaer mangament procedures have been, and continue to be, impletemed at the Airstrip Quarry. Since 2013, Sabina has experienced minimal contact water collecting in the Airstrip Quarry; it is anticipated that contact water in the quarry sites will continue to be minimal during initial development works. As stated in Table 7-1 of the Quarry Management Plan (170913 8BC-BRP-D3QuarryMgmtPlan-IMLE_Version2.0), Sabina has commited to undertake the spring seep surveys of all quarries. This spring seep survey is intended to be conducted once annually in spring. Routine visual inspections of quarry occur daily during active quarry operations, during freshet, and after any major rainfall event. Construction of diversion berms and containment structures are not scoped as an activity for initial development works, and should they be required for full mine development (i.e., scoped as part of Type A application), Sabina will provide the requested information to the KIA under the Type A Application.	
KIA	KIA-NWB-11	Road pad thickness and permafrost (Palmer)	Road Management Plan (RMP), Section 4.1.2, Page 4-4.	Discrepancy between the minimum pad thickness to prevent permafrost melt and the minimum thickness determined by modelling.		Section 4.1 of Appendix V2-7C of FEIS indicates that a minimum thickness of 1.9 m is required to maintain the 0˚C isotherm at the base of the pad. Fig 1 shows that required pad thickness ranges from 1.9 to 2.85 m to ensure that the -2C and - 0C isotherm is maintained at the base of the pad. The minimum thickness of 1 m indicated here is therefore lower than both these estimates.	Please explain why a minimum of 1 m for the pad thickness was selected, as opposed to thicker pads.	Please see Sabina Technical Comment Response, KIA-NWB-1.	
KIA	KIA-NWB-12	Water crossings (Palmer)	Road Management Plan, Section 4.1.5, Page 4-6.	Disposal of excavated material during culvert installation.			Please show on a map the proposed disposal location for the material that will be excavated during the installation of culverts at water course crossings.	Material that may be excavated during the culvert installation at water course crossings will be handled similar to overburden generated during quarry development. As stated in the Quarry Management Plan (170913 8BC-BRP-D3QuarryMgmtPlan-IMLE_Version2.0), any overburden generated and not used by the Project will be placed in stable stockpiles positioned on the upgradient side of the quarry. This configuration could be modified based on observations in the field. Also, it is anticipated, and consistent with Sabina's existing Type B water licence terms and conditions, Sabina will be required to maintain a material setback of at least 31 metres above the high water mark of any waterbody. Additional mitigation measures proposed for watercourse crossings provided in Section 4.1.5 of the Road Management Plan (170913 8BC-BRP---D1RoadMgmtPlan-IMLE_Version2.0).	
KIA	KIA-NWB-13	Stockpile water collection system (Palmer)	Road Management Plan (RMP), Section 4.1.5, Page 4-6.	Provide layout for stockpile water collection system		The Geotechnical Properties Report (App V2-7C, Section 4.2) mentions that high-TSS chloride-rich water may be generated from stockpiles. Please provide a proposed layout for the water collection system that will intercept this water, so to keep it separate from freshwater receptors.	Please provide a proposed layout for the water collection system that will intercept this water, so to keep it separate from freshwater receptors.	During initial development works under the Type B, Sabina anticipates minimal volumes of overburden material will require management as the existing quarry has minimal overburden. Any overburden generated and not used by the Project will be placed in stable stockpiles positioned on the upgradient side of the quarry so that the finished quarry can serve to collect runoff from the stockpile (Section 4.3.1. of 170913 8BC-BRP-D3QuarryMgmtPlan-IMLE_Version2.0). Alternatively, Sabina may place overburden material in the existing overburden stockpile authorized under the existing Type B Water Licence 2BE-G001520. Since 2013, Sabina has experienced minimal drainage/runoff water in the Airstrip Quarry and the overburden stockpile adjacent to the all-weather airstrip; it is anticipated that runoff water at these sites will continue to be minimal during initial development works. Routine visual inspections currently occur daily during active quarry operations, during freshet, and after any major rainfall event; this will continue during initial development works.	
KIA	KIA-NWB-14	Road pad thickness and permafrost (Palmer)	Road Management Plan (RMP), Section 4.1.6, Page 4-7.	Discrepancy between the minimum pad thickness to prevent permafrost melt and the minimum thickness determined by modelling.		This is inconsistent with result of thermal modelling presented in Appendix V2-7C, where minimum pad thickness required to avoid thawing is 1.9 m.	Please explain the discrepancy between the minimum road pad thickness of 1 m and the minimum pad thickness of 1.9 m resulting by modelling.	Please see Sabina Technical Comment Response, KIA-NWB-1.	
KIA	KIA-NWB-15	Water intakes (Palmer)	Road Management Plan (RMP), Section 4.2.2, Page 4-9.	Maximum number of water intakes to meet water withdrawal restriction.			Please provide the maximum number of water intakes that will be considered to meet this withdrawal restriction.	For the purpose of initial development works the expected water use for winter ice road (WIR) efforts is estimated to be up to a maximum of 297 m^3/day. The Nunavut Water Regulations (SOR2013-69) do not restrict an applicant on the number of intakes proposed but rather sets the upper limit of water use volume allowable for a Type B water licence at 300 m^3/day. In accordance with all water licenses issued for the use of water by the NWB, Sabina is committed to measure and record, in cubic metres, the daily quantities of water utilized for WIR construction and maintenance and report quantities to the NWB monthly and/or at least annually. Multiple water intakes may be required along the WIR route with at least one intake at a lake proximal to MLA and one intake at Goose Lake. As stipulated in Section 4.2.2 of the Road Management Plan (170913 8BC-BRP---D1RoadMgmtPlan-IMLE_Version2.0), Sabina has committed to adhere to DFO Protocol for Winter Water Withdrawal for Ice covered Waterbodies in the NWT and NU (2010). All water intake sources locations will be documented in GPS coordinates (in degrees, minutes and seconds of latitude and longitude) as required in typical NWB water licences and by the DFO Protocol.	
KIA	KIA-NWB-16	Water withdrawal (Palmer)	Road Management Plan (RMP) , Section 4.2.2, Page 4-9.	Maximum rate of withdrawal to prevent fish from becoming impinged on the screen.			Please provide the anticipated maximum rate of withdrawal to prevent fish from becoming impinged on the screen.	Sabina notes that existing Sabina NWB Water Licenses (2BE-GOO1520 & 2BE-GEO1520) and typical NWB Water Licence terms and conditions require all water intake hoses are equipped with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen. Water intake designs (and related water withdrawal rates) will be based on Fisheries and Oceans Canada's (DFO's) 'Freshwater Intake End-of-Pipe Fish Screen Guideline'. The guideline exclusively addresses the sizing and design of fixed screens that are placed at the end of a pipe used to extract water up to a maximum of 0.125 m3/s, or 125 litres per second (L/s). Sabina confirms water withdrawal rates are not expected to exceed 125 L/s. Regular maintenance and repair of cleaning apparatus, seals, and screens will be carried out to prevent debris-fouling and impingement of fish, as per DFO's guideline.	

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KIA	KIA-NWB-17	All-weather airstrip (Palmer)	Road Management Plan (RMP), Section 4.3.1, Page 4-9.	Examples of environmental considerations in the design and routing of all-weather airstrip	The proponent needs to demonstrate that environmental practices to reduce the potential impacts related to the construction of the all-weather airstrip have been considered.		Provide examples of what environmental considerations will be accounted for (provide examples) in the design and routing of the all-weather airstrip.	On June 14th, 2012 Sabina submitted the Back River Gold Mine Project Proposal (NIRB File No. 12MN036) to the Nunavut Impact Review Board (NIRB). The Back River Project Proposal submitted included the extension of the all-weather airstrip at the Goose Property Area. On April 30th, 2013 the NIRB issued the Final Guidelines for the Back River Project Final Environmental Impact Statement, including Valued Ecosystem Components (VECs) and Valued Socio-economic Components (VSECs). VECs and VSECs are the highest priority aspects for a particular region, community or to society as a whole. The assessment of potential Project effects looked at the potential effects over time and considered potential effects near to the Project, referred to as the local study area (LSA); a larger area around the Project, referred to as the regional study area (RSA); and even larger area within the region including potentially all of Nunavut. Through the review process, the interactions of the Project (including the airstrip extension) with the various VECs and VSECs were identified and key indicator species were identified and analysed. Scientific studies combined with Traditional knowledge (TK) were used to predict any potential effect. Below is the list of VECs and VSECs (excluding the marine environment): • Atmospheric Environment o Noise and Vibration; o Air Quality; o Climate and Meteorology • Terrestrial Environment o Geology and Permafrost; o Landforms and Soils; o Vegetation; o Caribou, Grizzly, Muskox, Wolverine and Furbearers; o Migratory Birds and Raptors • Freshwater Environment o Hydrology and Groundwater; o Water Quality; o Sediment Quality; o Fish and Fish Habitat • Human Environment o Archaeology; o Socio-economics; o Land Use; o Country Foods o Human Health/Environmental Risk Assessment	
								Overall, the Project is expected to result in no significant negative effects (residual, cumulative or transboundary) to the atmospheric, terrestrial, freshwater, marine, and human environments; this includes the airstrip extension. The Project will result in positive effects on various socio-economic aspects including local employment and skills development. On December 19th, 2017 the Nunavut Impact Review Board (NIRB or Board) issued the Project Certificate No. 007 for the Back River Gold Mine Project (NIRB File No. 12MN036) to Sabina Gold & Silver Corp. (Sabina).	
KIA	KIA-NWB-18	Dust suppression (Palmer)	Road Management Plan (RMP), Section 6.1.1, Page 6-2.	Clarify use of chemical for dust suppression in frost-free days		Chemicals used for dust suppression on roads may reach the water courses and adversely affect water quality.	Please clarify whether chemical will be sprayed for dust suppression in frost-free days	Dust suppression methods will be approved by the Government of Nunavut (GN) as outlined in the Nunavut Environmental Guideline for Dust Suppression (GN 2002). Prior to use of an approved chemical dust suppressant, notification will be provided to the GN (specifically, the Environmental Protection Service of the Department of Sustainable Development), the landowner, and the NIRB. As prescribed in the Nunavut Environmental Guideline for Dust Suppression (GN 2002), application rate will follow the manufacturer's specifications and will be limited to the road surface. This potential dust suppressant application will be monitored to ensure there is no pooling or runoff and that the product is incorporated into the road surface. *Reference:* *GN. 2002. Environmental Guideline for Dust Suppression. Government of Nunavut, Environmental Protection Service, Department of Sustainable Development: Iqaluit, NU.*	
KIA	KIA-NWB-19	Water crossings (Palmer)	Road Management Plan (RMP), Section 6.1.2, Page 6-2.	Sizing of culverts			Please indicate return period (if this is the criteria selected) will be considered to size culvert for heavy rainfall flows.	Culverts will be designed to a 1-in-100-year event as stated in Section 4.1.1 of the Type B Road Management Plan (170913 8BC-BRP----D1RoadMgmtPlan-IMLE_Version2.0) and in Section 6.1 of the Main Application Document (170913 8BC-BRP----MainApplicationDocument_Version2.0).	
KIA	KIA-NWB-20	Movement of fuel tanks (Palmer)	Fuel Management Plan (FMP), Section 6.1, Page 6-1.	Collision protection measures for moving tanks - clarify		It's not clear whether these collision protection measures based on concrete posts and barriers refer to moving tanks.	please clarify	Sabina clarifies that the bullet stating "Collision protection may include concrete filled steel posts placed more than 1 m from the outer edge of the tank shell and spaced less than 1.5 m apart. Concrete barriers, if used, will have a minimum height of 750 mm and be spaced at least 500 mm from the tank shell. Posts and barriers will be painted yellow and equipped with reflective stripes. Earthen materials may be used in similar manner to serve as traffic barriers." was intended to be in Design Features, not Moving Tanks, of Table 6.1-1 of the Type B Fuel Management Plan (170913 8BC-BRP----D2FuelMgmtPlan-IMLE_Version2.0).	
KIA	KIA-NWB-21	Fuel tank location (Palmer)	Fuel Management Plan (FMP), Section 6.2, Page 6-2.	Clarify what minimum distance between fuel tanks will be used.		This appears to be inconsistent with minimum distance of concrete posts from edge of a tank, which is of 1 m. Based on this minimum distance, the minimum separation between two adjacent tanks is 2 m, not 1 m.	please clarify	As stated in Table 6.1-1 of the Type B Fuel Management Plan (170913 8BC-BRP----D2FuelMgmtPlan-IMLE_Version2.0), the design and installation of fuel tanks will comply with the CCME Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products; this code conforms to the National Fire Code of Canada. The minimum distance between tanks will depend upon the type of tanks installed and Sabina is committed to providing detailed designs for construction of the fuel storage and fuel transfer facilities to the NWB at least 60 days prior to their construction. The 1 m distance provided in Table 6.2-1 of the Fuel Management Plan (170913 8BC-BRP----D2FuelMgmtPlan-IMLE_Version2.0) is a minimum separation distance.	
KIA	KIA-NWB-22	Fuel tank location (Palmer)	Fuel Management Plan (FMP), Section 6.2, Page 6-2.	Criteria for tank siting.	The fuel tanks will pose a different risk of contamination depending on their location.		Please provide a detailed description of the criteria used for tank siting.	In Table 6.2-1 of the Fuel Management Plan (170913 8BC-BRP----D2FuelMgmtPlan-IMLE_Version2.0), Sabina has provided tank siting considerations to include: considerations of site drainage and surface flow routes for fluids if spilled during tank filling or product transfers; Grading and drainage will be designed to prevent liquids from reaching waterways, drain systems, and potable water sources. In addition, design of fuel storage facilities will meet regulatory requires for design and operation including compliance with the *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* (SOR/2008/197) and will take into account the *Canadian Council of Ministers of Environment - Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products* (2003). Sabina is committed to providing detailed designs for construction of the 15 ML fuel storage and fuel transfer facilities at the MLA at least 60 days prior to construction of the fuel storage facilities and associated infrastructure. Location of proposed fuel storage infrastructure are provided in the Main Application Document (MAD) Appendix A - Base Figure 2 Goose Property Area and Base Figure 3 Marine Laydown Area (170913 8BC-BRP----MainApplicationDocument_Version2.0). Consistent with other Type B water licenses, Sabina shall ensure that all construction of engineered structures is supervised and checked by an appropriately qualified and experienced Engineer (i.e., 2BE-G00-1520; Part E, Item 14). In addition, Sabina will ensure for fuel storage facilities are located at a distance of at least thirty one (31) metres from the ordinary high water mark of any adjacent water body and inspected on a regular basis (i.e., 2BE-G001520; Part H, Item 2).	
KIA	KIA-NWB-23	Hydrocarbon removal from water (Palmer)	Fuel Management Plan (FMP), Section 6.2, Page 6-2.	Capacity of water/oil separators	The capacity of the water/oil separators is key to determine whether the expected volumes of water flowing through the water collection system will be adequate for hydrocarbon removal.		Please specify capacity of oil/water separators and provide rationale for selected capacity.	Water pooling within the secondary containment of fuel storage facilities cannot be discharged unless it conforms with discharge water quality criteria established by the NWB regardless of oil/water separator rates or expected treatment volumes. This is consistent with ongoing operations at Sabina's Back River Project and in conformance with the requirements of existing Sabina NWB Type B water licenses. As noted in the Fuel Management Plan (170913 8BC-BRP----D2FuelMgmtPlan-IMLE_Version2.0), Sabina is required to notify an Inspector at least 10 days prior to initiating any release of effluents. That notice shall include water quality results, an estimate of volume, and the proposed receiving location. As currently practiced, Sabina will not discharge until receiving approval from the Inspector and will ensure the sizing of equipment is appropriate.	
KIA	KIA-NWB-24	Geotechnical program at the MLA (Palmer)	Quarry Management Plan (QMP), Section 4.1.2, Page 4-1.				Please indicate whether a report detailing the outcome of this geotechnical program (which was supposed to be conducted in 2017) is available.	It is Sabina's belief that ongoing data collection to support the environmental assessment completed and the Project Certificate issues is standard practice for mine development operations. Sabina completed two geotechnical drill programs in 2017, one at each of the MLA and Goose properties; two reports were generated, and Sabina expects the geotechnical reports and updates to be a key factor in the review of the Type A water licence for mine development.	

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KIA	KIA-NWB-25	Stockpile design (Palmer)	Quarry Management Plan (QMP), Section 4.3.1.2, Page 4-3.	Visual impact of stockpile.			Please indicate whether a visual impact of the overburden stockpile maximum height of 6 m was conducted.	Sabina confirms visual impact of stockpiles were conducted. Volume 8 of the FEIS (NIRB File No. 12MN036) for the Back River Project included "Land Use" as a Valued Socio-economic Component (VSEC) of the Human Environment. One of the potential effects identified that could interact with the VSEC "Land Use" was changes to sensory experience and visual resources. The Back River Project Proposal submitted to, and assessed by, the Nunavut Impact Review Board (NIRB) included stockpile heights up to 36 m; much larger than the potential 6 m overburden stockpile. The Project is expected to result in no significant negative effects (residual, cumulative, or transboundary) to the Human Environment. On December 19th, 2017 the NIRB issued the Project Certificate No. 007 for the Back River Project to Sabina.	
KIA	KIA-NWB-26	Dust control during quarrying (Palmer)	Quarry Management Plan (QMP), Section 4.4.2, Page 4-4.		It is important to plan how the crusher will be shielded when it's not possible to place it in the quarry, so that the transport of wind-blown dust to water courses can be minimised at all times.		Please indicate how shielding of the crusher will be achieved when it's not possible to have the crusher in the quarry.	The stockpiles of crushed material generated by the crusher will be strategically placed to facilitate shielding from the prevailing winds and thereby reduce and restrict the quantity of dust generated. Sabina will also continue to use the enclosures, screening, and shrouding currently installed on the crusher to reduce the generation of airborne dust. Sabina notes the quarrying and crushing of material is not a new activity as Sabina has previously operated the crusher at Goose Lake and the same best management practices will continue to be applied.	
KIA	KIA-NWB-27	Assessment of PAG rock in the Airstrip Quarry (Palmer)	Quarry Management Plan (QMP), Section 4.5.1, Page 4-5.		It is important to adequately assess the acid generating potential of rock in the Airstrip Quarry.	Given the presence of PAG rock in the Airstrip Quarry and that further geochemical testing will be undertaken, a summary description of why the ABA criteria mentioned provide an adequate level of conservatism should be included.	Provide a summary description of why AB criteria are an adequate level of conservatism.	The Airstrip Quarry samples (40 samples) are a sub-set of the geochemical characterization dataset for the Back River Project, which includes 850 samples (total) of waste rock, overburden, and quarry rock (171002 2AM-BRP----MAD App E-3_GeochemCharactRpt-IMLE). The samples in the geochemical dataset underwent comprehensive geochemical testing, including static and kinetic tests, to evaluate the short-term and long-term acid generation potential of all rock types and material types that will be encountered during mining. The geochemical dataset was used to define the criteria for classifying acid rock drainage potential: samples containing 3 times more neutralization potential (NP) than acid potential (AP) were classified as non-potentially acid generating (NPAG) (NP/AP >3); samples with NP/AP <3, but containing less than 0.16% total sulphur were classified as "low-S"; samples with NP/AP between 1 and 3 were classified as "uncertain", and samples with NP/AP less than 1 are classified as potentially acid generating (PAG). Operationally, material with an "uncertain" acid generation potential will be treated as though it is PAG and low-S material will be classified as NPAG. The proposed classification criteria were verified using the results of long-term geochemical tests, which confirmed that material classified as PAG or "uncertain" generated acidity during laboratory testing; material classified as NPAG or low-S did not or were unlikely to generate acidity. Therefore, the proposed classification criteria is deemed adequate and is an appropriate tool for predicting whether rock will generate acidity in the long-term. The results of ongoing monitoring during Operations will be used to confirm the efficacy of the proposed classification criteria.	
KIA	KIA-NWB-28	ARD generation management - Airstrip Quarry (Palmer)	Quarry Management Plan (QMP), Section 4.5.1, Page 4-5.		It is important to plan and implement adequate measure for the effective management of ARD	Given the presence of PAG rock in the Airstrip Quarry, please indicate what management measure will be taken to minimize ARD generation.	Please indicate what management measure will be used to minimize ARD generation.	Management measures to minimize the potential for acid rock drainage (ARD) generation will include the following: - PAG and NPAG quarry rock will be delineated prior to quarry development by a pre-development sample and analysis program. Quarry rock will be classified according to the criteria outlined in KIA-NWB-27. - As stated in 171002 2AM-BRP----MAD App E-3_GeochemCharactRpt-IMLE, PAG and NPAG waste rock will be segregated during quarrying. Only NPAG rock will be used for construction. - Rock samples will be collected at a frequency of one sample per 100,000 tonnes of quarry rock to confirm that material is being excavated and used for construction appropriately. Sabina's understanding of the Airstrip Quarry and the Umwelt Quarry indicates that sufficient volumes of NPAG material are available for initial development works. This NPAG material for construction will selectively targeted during initial development works using the criteria outlined in KIA-NWB-27.	
KIA	KIA-NWB-29	Permafrost degradation during quarrying (Palmer)	Quarry Management Plan (QMP), Section 6, Page 6-1.		It is believed that the planned quarries will not be excavated to depths below the base of the permafrost in the project area. However, this is not worded clearly in the text, and a clarification is required.	Table 6-1 states that permafrost degradation will be minimized by limiting the pit or quarry depth to within the continuous permafrost zone. By This is not clear - does this mean avoid creating full taliks? Please clarify	Please clarify Table 6-1.	Table 6-1 Mitigation Measures to be Considered for Borrow Pits and Quarry Locations specifically identifies during Operations and Monitoring that to minimize impacts to permafrost degradation, Sabina will "limit pit or quarry depth to within the continuous permafrost zone." The continuous zone of permafrost extends to a depth ranging from 490 m to 570 m below ground surface (Section 4.5 of 171002 2AM-BRP----MAD App F-5_HydrogCharactModelRpt-IMLE). Sabina confirms that quarry depth will be limited to be within the zone of continuous permafrost.	
KIA	KIA-NWB-30	ARD generation management - MLA Quarry (Palmer)	Quarry Management Plan (QMP), Section 6.1, Page 6-2.		It is important to plan and implement adequate measure for the effective management of ARD	Please specify what management measures would be adopted, should PAG materials are found at the MLA quarry.	Please specify management measures would be used if PAG materials are found at the MLA quarry.	Sabina does not anticipate encountering potentially acid generating (PAG) material at the MLA Quarry; this is supported by the geochemical testing outlined in Section 4.5.2 of 171002 2AM-BRP----MAD App E-3_GeochemCharactRpt-IMLE. All bedrock samples collected from the MLA Quarry are described as weathered quartzite conglomerate and quartz arenite/quartzite (sandstone). Overall, the geochemical testing results indicate a negligible potential for ML/ARD from these rock types. The samples collected from the MLA Quarry contained <0.02 to 0.04% total sulphur; all but two samples had total sulphur concentrations less than the analytical detection limits. There is no evidence that near-surface quarry rock from the MLA will contain elevated concentrations of sulphide minerals; however, it is possible that materials at depth could contain minor amounts of sulphide minerals. Therefore, management measures have been developed to identify the presence of potentially acid generating (PAG) rock, and mitigate the potential for acid generation should PAG rock be found: · PAG and non-potentially acid generating (NPAG) quarry rock will be delineated prior to quarry development by a pre-development sample and analysis program. Quarry rock will be classified according to the criteria and only NPAG rock will be used for initial development works, as outlined in KIA-NWB-27. · During quarrying, rock samples will be collected at a frequency of one sample per 100,000 tonnes of quarry rock in order to confirm that material is being excavated and used for initial development works appropriately. Sabina's understanding of the MLA Quarry indicates that sufficient volumes of NPAG material are available for initial development works. The results of ongoing monitoring during initial development works will be used to confirm the efficacy of the proposed classification criteria. In the unlikely event that PAG material is identified within the MLA Quarry, Sabina will stockpile these materials such that all contact water will be captured and monitored. Contact water will be monitored for signs of incipient acid generation (i.e., decreasing pH accompanied by an increase in sulphate, iron, and metal concentrations).	

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KIA	KIA-NWB-31	Mitigation of erosion in water courses (Palmer)	Quarry Management Plan (QMP), Section 6.2, Page 6-2.		In-stream work should be minimized to limit impacts on water courses. As such, riprap of river banks should be avoided and erosion should be controlled by means of runoff diversion channels	This needs clarification. Will riprap be placed along banks of water bodies affected by erosion? If so, this could affect the aquatic habitat of the affected water bodies. Erosion from surface water runoff should be minimized by means of runoff diversion channels, not by altering water bodies.	Please confirm if riprap will be placed along the banks of water bodies to prevent erosion.	Section 6.2, page 6-2, of the Quarry Management Plan (QMP) (170913 8BC-BRP----D3QuarryMgmtPlan-IMLE_Version2.0), states "Any evidence of erosion due to surface water flow from the quarries and borrow pits will be repaired by placing riprap over the affected area." This is simply stating if evidence of erosion is observed due to surface water flow from the quarries, the installation of covering material (e.g., riprap) will be utilized to protect the exposed landscape. Quarries are required by the NWB to be a minimum of 31 m away from the high water mark of any waterbody. Surveys of the quarry are conducted during the freshet season and after each major rainfall to determine if flow exists. Riprap will not be placed along the banks of water bodies in a manner that will affect the aquatic habitat of any water bodies. Project activities near water will follow the DFO Nunavut Measures to Avoid Causing Harm to Fish and Fish Habitat (Fisheries and Oceans Canada 2013). In-water work will be conducted during approved timing windows (Fisheries and Oceans Canada 2013). Only geochemically suitable rock quarries and borrow sources that provide non potentially acid-generating rock will be used to construct roads, pads, and structures. *References* *DFO. 2013. Measures to Avoid Causing Harm to Fish and Fish Habitat, http://www.dfo-mpo.gc.ca/pnw- ppe/measures-measures/index-eng.html (date modified 2013-11-25; accessed 2015-10-14).*	
KIA	KIA-NWB-32	Water management in quarry area (Palmer)	Quarry Management Plan (QMP), Section 6.2, Page 6-2. Golder states: "The quarry configuration will consist of a relatively flat surface graded such that water slopes to an area within, or adjacent to, the quarry boundaries. Since no [illegible] will occur below water			Extraction will occur below the depth of the active layer, where a shallow water level is present during the thaw season. A pond is likely to develop at the bottom of the quarry, as a result of snowmelt and as shallow water flows through the active layer and discharges into the quarry. Since the pond will be hydraulically disconnected from nearby water bodies (as it's surrounded by permafrost), it is not clear why the presence of a pond within the quarry would be relevant.	Please clarify what effects the development of a pond within the quarry are expected.	Sabina agrees that a potential pond formed from snow melt would not be relevant because it would be hydraulically disconnected from nearby water bodies (as it's surrounded by permafrost). Best management practices will be employed to divert storm and snow melt water away from the quarry in advance of freshet as stated in Section 6.2 of the Quarry Management Plan (170913 8BC-BRP----D3QuarryMgmtPlan-IMLE_Version2.0).	
KIA	KIA-NWB-33	Contact water event ponds (Palmer)	Quarry Management Plan (QMP), Section 6.2, Page 6-3.		It is important that the water contact pond be sited and sized in accordance with the site topography and anticipated volume of contact water generated at the site.		Please provide a preliminary estimate and rationale of the location and the required capacity of the contact water event ponds.	Please see Sabina Technical Comment Response, KIA-NWB-10.	
KIA	KIA-NWB-34	Dust control (Palmer)	Quarry Management Plan (QMP), Section 6.3, Page 6-3.		Measures of dust control need to be implemented at all times to minimize the quantity of wind-blown dust reaching the water courses in the project area.		Please indicate whether ROQ will be covered during truck transport to minimize dust.	Sabina does not intend to cover ROQ material during truck transport; as stated in Section 6.3 of the Quarry Management Plan (170913 8BC-BRP----D3QuarryMgmtPlan-IMLE_Version2.0), run-of-quarry (ROQ) material will be transported within set speed limits to reduce dust along the road corridors. Given the scope of activities proposed for development works, the number of vehicles on site (Table 3.2-1 and Table 3.2-2 from 170913 8BC-BRP----MainApplicationDocument_Version2.0), and the speed limits, Sabina does not foresee dust generation as a concern at this stage of initial development works. Under this Type B Application, Sabina is also proposing fresh water allocation for dust suppression and compaction of placed construction materials.	
KIA	KIA-NWB-35	Water quantity and quality monitoring (Palmer)	Quarry Management Plan (QMP), Section 7, Page 7-1.				Please specify the frequency for the spring seep survey.	As stated in Table 7-1 of the Quarry Management Plan (170913 8BC-BRP----D3QuarryMgmtPlan-IMLE_Version2.0), Sabina has committed to undertake the spring seep surveys of all quarries and major infrastructure components except roads. This spring seep survey is intended to be conducted once annually in spring. During active quarry operations, routine visual inspections will occur daily.	
KIA	KIA-NWB-36	Water quality (Palmer)	Quarry Management Plan (QMP) , Section 7, Page 21.				Provide an indication of what is the contribution of the total nitrogen blasting residue compared to the total nitrogen modelled in the water and load balance.	Please see Sabina Technical Comment Response, KIA-NWB-5.	
KIA	KIA-NWB-37	Mitigation of fuel spills (Palmer)	Spill Contingency Plan (SCP), Section 1.5, Page 4.		It is important to minimize risk of fuel spill by adopting all reasonable prevention measures.		Please indicate if the drums are double-walled or not.	The reference to drums in Section 1.5, Page 4 of the Spill Contingency Plan (SCP) (170913 8BC-BRP----D4ComprehensiveSpillContingencyPlan-IMLE) is referring to industry standard 205-litre fuel drums which are not double walled. Sabina acknowledges the importance of minimizing the risk of fuel spills by adopting all reasonable prevention measures. Sabina is proud of its environmentally responsible operations and the feedback received during Back River Project inspections by the various regulatory agencies. It's important to note that Sabina's Back River Project, as do all northern operations, operate under Crown Land use permits, Inuit Owned Land use permits, and Nunavut Water Board permits which all require Sabina to store fuel within adequate secondary containment at a minimum.	
KIA	KIA-NWB-38	Spill containment (Palmer)	Spill Contingency Plan (SCP), Section 1.5, Page 5.				Please specify what secondary containment is used.	For exploration activities already licenses under 2BE-GOO1520, Sabina's utilized lined earthen dams or Artic-grade instaberms or other engineered structures such as double walled tanks. Fuel and fuel storage areas are inspected daily by either site operations or environmental staff. For the purpose of the current Type B application for development works, Sabina proposes to use similar secondary containment.	
KIA	KIA-NWB-39	Grey-water disposal (Palmer)	Spill Contingency Plan (SCP) , Section 1.6.2, Page 6.		It is important to ensure adequate waste water disposal.	It is stated that grey-water from the exploration camp will be disposed of by infiltration into the ground. The presence of continuous permafrost would limit the infiltration of grey-water to within the active layer, which would provide minimal attenuation and dilution of the contaminant plume of grey-water. The water disposed of in the sump would likely flow through the active layer and part of it may discharge into nearby waterbodies, depending on the topographic gradient and hydraulic properties of the active layer between the sump and the nearby waterbodies.	Please confirm whether an assessment of the hydraulic connection between the proposed locations for grey-water discharge and nearby water bodies has been conducted.	The Comprehensive Spill Plan submitted with the initial development works application is based on the comprehensive spill plan approved by the NWB for operations at the Goose and MLA under the existing Type B Water Licenses, 2BE-GOO1520 and 2BE-GEO1520. Greywater disposal is not currently scoped as part of the initial development works application but rather is an already licenced activity under the exploration permits mentioned above. Sabina approach to spill contingency planning is to have one, all-inclusive spill plan that addresses all Type B water licences for the Back River Project.	
KIA	KIA-NWB-40	Grey-water disposal (Palmer)	Spill Contingency Plan (SCP), Section 2.2, Page 9.		Compliance of grey-water quality prior to release into the environment	What is the expected chemical composition of grey-water after settling. Will the water be tested for compliance with water license thresholds prior to release into the environment? How will release into the environment occur (e.g. diffuse or point discharge)?	Please provide more details on grey-water	Please see Sabina Technical Comment Response, KIA-NWB-39.	
KIA	KIA-NWB-41	Waste incineration ash disposal (Palmer)	Spill Contingency Plan (SCP), Section 2.2, Page 9.		Ash from waste incineration will contain contaminants that require adequate disposal		Please indicate how ashes from sewage incineration will be disposed of.	The Comprehensive Spill Plan submitted with the development works application is based on the comprehensive spill plan approved by the NWB for operations at the Goose and MLA under the existing Type B Water Licenses, 2BE-GOO1520 and 2BE-GEO1520. Ash incineration is not currently scoped as part of the development works application but rather is an already licenced activity under the exploration permits mentioned above. Sabina approach to spill contingency planning is to have one, all-inclusive spill plan that addresses all Type B water licenses for the Back River Project. Consistent with the scope of Type B exploration activities authorized under 2BE-GOO1520 and 2BE-GEO1520 ash from incineration for development works will continue to be shipped off site to an approved waste management facility.	
KIA	KIA-NWB-42	Waste water disposal (Palmer)	Spill Contingency Plan (SCP), Section 2.2, Page 10.				Please indicate what additional treatment of grey-water, sewage water and contact water will be considered if compliance is not achieved.	Effluent cannot be discharged unless it conforms with discharge water quality criteria established by the NWB. If Sabina cannot achieve compliance for effluent discharge through treatment, hazardous materials will be shipped off site to an approved waste management facility. Sabina would like to highlight the Project will not generate sewage water under the proposed Type B 8BC-BRP---- Application. As noted in the Main Application Document (Section 3.1.1.1, 3.2.1.1 of 170913 8BC-BRP----MainApplicationDocument_Version2.0), Sabina will continue to employ Pacto toilets, or incineration toilets.	
KIA	KIA-NWB-43	PAG rock disposal (Palmer)	Spill Contingency Plan (SCP), Section 2.3, Page 10		It is important to dispose of PAG rock adequately so to minimize generation f contact water and potential impact of contact water on water courses.		Please provide examples of how the disposal of PAG rock would occur.	Please see Sabina Technical Comment Response, KIA-NWB-8.	

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KIA	KIA-NWB-44	Drill cuttings disposal (Palmer)	Spill Contingency Plan (SCP), Section 2.3, Page 10			Please show exact location of exploration trench on a map. What will the minimum distance between the trench and waterbodies be? Will the hydraulic connection between the trench and nearby waterbodies be assessed?	Please show exact location of exploration trench on a map.	Please see Sabina Technical Comment Response, KIA-NWB-8.	
KIA	KIA-NWB-45	Water requirement in case of spills (Palmer)	Spill Contingency Plan (SCP), Section 6.4, Page 19.		The volume of water required for pressure-washing in the event of a spill may be significant, and it is important to determine whether the requested withdrawal of 297 m3/day will be sufficient to ensure that water for pressure-washing is available.	Please confirm whether the water for pressure-washing is included in the 297 m3/day requested in water license. If not, indicate how much water is expected to be required for pressure-washing in case of spill, and where would the water be sourced from.	Please indicate how much water is expected to be used for pressure-washing.	Sabina's existing 2BE-GOO1520 & 2BE-GEO1520 authorize allowances for camp water or miscellaneous industrial uses. For example; Part C, Item 1 of 2BE-GOO1520, authorizes up to 267 cubic metres per day which can be obtained from Goose Lake and Llama Lake in winter and from Goose Lake, Llama Lake, and Umwelt Lake in summer. If an emergency arose, and Sabina needed additional water usage outside of the already authorized allowance, Sabina would provide expected volumes and source locations to the NWB and seek approval.	
KIA	KIA-NWB-46	Spill response time (Palmer)	Spill Contingency Plan (SCP), Appendix B.		Estimating the response time of external assistance in case of a major spill is important to ensure that large spills will be adequately contained		Please indicate what is average response time by external assistance in case of major spill.	Sabina does not anticipate the need for third party spill response assistance; however, should additional assistance be necessary, Sabina will seek and could mobilize third party support to the Goose Lake Exploration Camp from Yellowknife, Cambridge Bay, or TMAC Resources in less than 2 hours utilizing the all-weather airstrip. Sabina's existing 3000 ft. airstrip is designed to Transport Canada standard TP 312 Aerodrom Standards and Recommended Practices (2005) and is capable of receiving Dash-7 aircraft and larger year round. At the MLA and the marine environment, Sabina would seek third party support from the Mackenzie Delta Spill Response Corporation (MDSRC). MDSRC offers 24/7 spill response support in the NWT and Nunavut, including additional expertise, response personnel, and access to a large inventory of marine spill response equipment positioned throughout Nunavut and the Northwest Territories. This includes a fit for purpose response boat located in the nearby Melville Sound. MDSRC will be notified in advance of an offload, and equipment can be rapidly deployed to the location needed by air or sea.	
KIA	KIA-NWB-47	Wildlife protection (Palmer)	Interim Closure and Reclamation Plan (ICRP), Section 5, Page 5-2.				Please indicate how wildlife will be prevented from accessing the pit lakes.	As per the Main Application Document (Section 3.0 of 170913 8BC-BRP----MainApplicationDocument_Version2.0), Sabina does not intend to develop any pits at this phase of the Project. Sabina has proposed to develop the Airstrip and Umwelt Quarries and components of the Marine Laydown Area. At closure of the proposed project in this application there will be a pond in the Umwelt quarry. As stated in the current application, "…in order to address any uncertainties, monitoring of the water quality will be carried out during quarry operations and quarry flooding to confirm that the water quality in the Umwelt Quarry meets discharge criteria as defined in the Type B Water Licence." The Wildlife Mitigation and Monitoring Program Plan (WMMP Plan) includes management for the attraction of wildlife to Project ponds and the Tailings Impoundment Area (TIA) (WMMP Plan, Section 7.1.10). Should water quality in the Umwelt quarry not meet wildlife guidelines and caribou be observed using the quarry for drinking water, then caribou would be excluded from the quarry. Sabina would work with the Inuit Environmental Advisory Committee (IEAC) to exclude caribou, likely by constructing Inukshuk surrounding the quarry.	
KIA	KIA-NWB-48	Groundwater monitoring (Palmer)	Interim Closure and Reclamation Plan (ICRP), Section 5, Page 5-2.			Please indicate examples of site-specific conditions that would require "groundwater" monitoring. It is also recommended that the word "groundwater" be replaced with "shallow water", since the term groundwater typical refers to sub-permafrost water, whereas only shallow, supra-permafrost water will be affected in this project.	Please provide site-specific conditions for groundwater monitoring. Substitute groundwater for shallow water in the submitted plan.	Sabina acknowledges and agrees that groundwater (in the context of water below the sub-permafrost) is not anticipated to be encountered during initial development works. However, in an effort to be conservative and in acknowledgment of adaptive managment and potential future monitoring requirements, Sabina has included the conditional statement that if site specific conditions dictate groundwater sampling is necessary, Sabina will complete those efforts during the Closure Phase. In regard to substituting the terminology of groundwater for shallow water in the ICRP, Sabina is choosing to implement the standard terminology as provided by the NWB in Guide 2 Terminology and Definitions (July 2015), which defines groundwater as "all water in a zone of saturation beneath the land surface, regardless of its origin." Furthermore, in most recent water Licence 2AM-MEL1631, the NWB defined groundwater to mean "the water that occupies the pores and fractures in rock and soil below the ground surface in a liquid or frozen state.	
KIA	KIA-NWB-49	Environmental monitoring (Palmer)	Environmental Management and Protection Plan (EMPP), Section 3.1, Page 3-1.				Please provide references (document, section, page) for the previously made commitments with regard to monitoring.	KIA-C-1, KIA-C-8, and ECCC-T-1 of Exhibit No. 45 submitted to the Nunavut Impact Review Board (NIRB or Board) during the FEIS Addendum Final Hearing of the Back River Gold Mine Project (NIRB File No. 12MN036). Exhibit No. 45 can be accessed from the NIRB's public registry at the following location: http://www.nirb.ca/application?strP=r	
KIA	KIA-NWB-50	Water quality monitoring (Palmer)	Environmental Management and Protection Plan (EMPP), Section 3.3, Page 3-3, Table 3.3-1.			Specify what is meant by "as required" with regard to testing the quality of runoff water in the Fuel Tank Farm containment area. Monitoring should be carried out on a regular basis with specified frequency, not 'as required', as stated in the document.	Please Specify what is meant by "as required"	During construction, inspections will be conducted regularly. A result of an inspection may include recommendation for additional sampling. A summary of the approach to routine and non-routine inspections was included in the Type B EMPP (Section 3.6 of 170913 8BC-BRP----D6EMPP-IMLE_Version2.0); more details on the inspection approach can be found in the Type A EMPP (Section 8.4 of 171002 2AM-BRP----SD20-EMPP-IMLE). Sabina has committed to constructing fuel storage areas in conformance with the Canadian Council of Ministers of the Environment (CCME) Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (CCME 2003). Project fuel storage facilities will be designed to have bermed spill containment with capacity equal to the volume of the largest tank plus 10% of the volume of the remaining tanks, or 110% volume of the largest tank, whichever is greater, and ponding water must not compromise this capacity. It is typical of northern operations for water to pond in the Fuel Storage Area during freshet. Although it is best practice to remove any accumulated snow captured within the lined berm, it is inevitable that any remaining snow will melt and pond. The Project area experiences relatively low amounts of precipitation. *References* *CCME (Canadian Council of Ministers of the Environment). 2003. Environmental Code of Practice for Above Ground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.*	
KIA	KIA-NWB-51	Water quality monitoring (Palmer)	Environmental Management and Protection Plan (EMPP), Section 3.3, Page 3-3, Table 3.3-1.			Specify what is meant by "as required" with regard to monitoring water quality at PN04, PN07 and PN09. Monitoring should be carried out on a regular basis with specified frequency, not 'as required', as stated in the document.	Please Specify what is meant by "as required"	Sabina's reference to "as required" water quality sampling is reflective of the emphemeral nature of the many streams around the Goose Property Area. These streams do not flow continuously during the open-water period. These watercourses will be sampled at least once annually for water quality during the freshet period. To inform "as required" sampling, routine and non-routine internal inspections will be conducted (Type B EMPP, Section 3.6; Type A EMPP, Section 8.4) (170913 8BC-BRP----D6EMPP-IMLE_Version2.0) . In addition, the Project will be subject to external inspections as directed under various authorizations, including inspections conducted under the authorities of the NWNSRTA. The objective of inspections (internal and external) is to confirm that the Project remains safe, stable, and fully compliant with all authorizations. Inspections will confirm that development work activities are carried out and managed in an environmentally sound, safe, and efficient manner. An outcome of an inspection (internal or external; routine or non-routine) may include collection of additional samples to document effectiveness of mitigation or to identify potential changes and need for additional mitigation.	
KIA	KIA-NWB-52	Water level monitoring in spill containment area (Palmer)	Environmental Management and Protection Plan (EMPP), Section 3.3, Page 3-3, Table 3.3-1.			Please confirm whether 'as required' means here whenever the water level in the containment area reaches a depth of 10 cm (see Spill Response Plan, section 2.2).	Please clarify 'as required' as being the containment area reaches a depth of 10 cm.	Section 2.2 of the Spill Contingency Plan (SCP) (170913 8BC-BRP----D4ComprehensiveSpillContingencyPlan-IMLE) will be revised to better align with the response provided to KIA-NWB-50. Sabina is committed to updating the SCP as directed by the NWB and will include the necessary clarification provided herein.	

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KIA	KIA-NWB-61	Monitoring and Assessment of Turbidity and TSS related to in-water works (Hutchinson)	Main Application Supporting Document (MASD), Section 3.1.2.9. MASD, Section 3.2.2.6. Interim Closure and Reclamation Plan (ICRP), Section 3.1.8. ICRP, Section 3.2.6.	Sabina has not proposed locations for monitoring stations for the in-water works in either the marine or freshwater environment. We further note that sufficient detail has not been provided regarding how TSS and turbidity levels will be monitored nor has the application provided threshold concentrations of turbidity and TSS that would be considered “too high”. We request Sabina provide additional detail as to how TSS and turbidity monitoring associated with the in-water works will be implemented.	Absence of adequate monitoring and thresholds for TSS and turbidity, and an interpretative framework for the resulting data, can result in insufficient mitigation for related risks to aquatic life.	1. Gap/Issue: To limit disruption to freshwater and marine aquatic resources during construction of water intakes, Sabina will implement several best practices including: “Total suspended solids (TSS) and turbidity levels will be monitored throughout construction and work will be delayed if TSS levels and turbidity become too high.” We note that no monitoring stations have been proposed for the in-water works locations in either the marine or freshwater environment. We further note that sufficient detail has not been provided regarding how TSS and turbidity levels will be monitored nor has the application provided threshold concentrations of turbidity and TSS that would be considered “too high”. 2. Disagreement with WL information/ conclusion: We are concerned that Sabina has not provided sufficient detail as to how TSS and turbidity monitoring associated with the in-water works will be implemented. 3. Reasons for disagreement: Absence of adequate monitoring, an interpretative framework for collected data, and adaptive management thresholds for TSS and turbidity can result in an unrepresentative characterization of the impacts associated with in-water works, and insufficient mitigation of the related risks to aquatic life.	We request Sabina provide additional detail as to how TSS and turbidity monitoring associated with the in-water works will be implemented. Monitoring protocols should include: a) continuous monitoring of turbidity at select locations, b) development of a site - specific relationship between TSS and turbidity to allow estimation of TSS concentrations from turbidity data, c) Assessing TSS and turbidity levels at various depths throughout the water column to ensure no seepage has occurred from beneath any silt curtains. We note that subsurface plumes of TSS and turbidity may not be visible from the surface nor would they be detectable through a surface grab sample, and d) Guidance for interpretation of results for grab samples from specific depths vs whole column composite data. We also request Sabina propose a threshold as to what total suspended solids (TSS) and turbidity levels will be considered “too high” and for allowable duration of exposure.	Water quality monitoring for total suspended solids (TSS) and turbidity will be implemented during any in-water initial development work activities carried out during the initial development phase (including water intake/discharge installation, construction of water crossings, winter ice road construction and operation). The Environmental Management and Protection Plan (EMPP) developed for the Type B includes: - monitoring of TSS and turbidity concentrations through construction; - a restricted in-water work window (at stream crossing) during freshet (May 1 to July 15); - no in-water blasting for construction of water intakes; Sabina will modify the EMPP to include: - inspections and sampling twice per day, and when a plume or a visible difference in turbidity is observed. - comparison of daily TSS and turbidity concentrations to baseline concentrations and to the TSS and turbidity guidelines for protection of aquatic life (CCME 1999). - should concentrations exceed the guideline, in-stream activities may need to stop and additional mitigations applied. Turbidity will be monitored around the outside perimeter of the silt curtain during in-water initial development works. Turbidity profiles will be taken using an in-situ water quality monitoring probe (e.g., YSI). Turbidity will be measured by taking vertical profiles of the water column (surface to bottom) to monitor for a potential turbidity plume. Discrete water quality samples will be collected from different depth intervals (horizons) and sent to an accredited laboratory for TSS and turbidity analyses. Analytical results will be used to verify in-situ turbidity measurements and to establish the relationship (correlation) between TSS and turbidity in order for turbidity to be used reliably as a surrogate for TSS. Also, visual monitoring will be conducted around the perimeter of silt curtains for turbidity plumes and hydrocarbon sheens. As stated in Section 3.3.4 of the Main Application Supporting Document, where surface runoff may directly or indirectly enter a waterbody, all flow shall meet the effluent quality limits for total suspended solids presented in Table 3.3-2. Sabina is providing the additional detail as requested for quality assurance and quality control protocols (Appendix A3). The additional details provided were developed, and included, as part of the Type A submission. Sabina will follow this QAQC Plan for all Type B initial development works.	Attachment A3 171002 2AM-BRP----SD24-QAQCPlan-IMLE
KIA	KIA-NWB-62	Additional Discharge Criteria (Hutchinson	Main Application Supporting Document (MASD), Section 3.3.4, Table 3.3-2. Fuel Management Plan (FMP), Section 7, Table 7-1. Comprehensive Spill Contingency Plan (SCP), Section 2.2.	Sabina has not presented discharge criteria for all key contaminants associated with the application. We request Sabina include discharge criteria for petroleum hydrocarbons, ammonia and nitrate for contact water associated with preconstruction activities covered under the Type B water licence.	Discharge criteria do not reflect the risks associated with water that may be affected by preconstruction activities involving transport and potential spillage of fuel and residues from blasting agents. This represents a potentially unmitigated risk to aquatic life.	1. Gap/Issue: We note that Sabina has only provided a general discharge criterion for total suspended solids (TSS) in the Type B application. We acknowledge that a comprehensive suite of criteria is not required for the proposed preconstruction activities, but note that the full range of potential contaminants have not been accounted for. Sabina has proposed a series of discharge criteria for several specific types of contact water, including Bulk Fuel Storage Pooling Water discharge to the tundra. All criteria other than phenol are in line with CCME water quality guidelines for the protection of aquatic life. No explanation for this difference has been provided. Note that all other proposed concentrations (benzene, ethyl benzene, toluene, pH and Oil and Grease) are in line with the Canadian Council of Ministers of the Environment Water Quality Objectives for the Protection of freshwater Aquatic Life. Not all types of contact water have associated discharge criteria; no discharge criteria nor monitoring of the contact water have been proposed for contact water collected in berms following a spill associated with preconstruction activities, which may have come into contact with petroleum hydrocarbons. 2. Disagreement with WL information/ conclusion: We express concern that the full range of potential contaminants have not been accounted for in the general discharge criteria. We are further concerned with the monitoring and discharge criteria (or lack thereof) proposed for specific types of contact water. 3. Reasons for disagreement: Discharge criteria do not reflect the risks associated with water that may be affected by preconstruction activities involving transport and potential spillage of fuel and residues from blasting agents.	We request Sabina include general discharge criteria for petroleum hydrocarbons, ammonia and nitrate for contact water associated with preconstruction activities covered under the Type B water licence. We recommend Sabina provide a rationale for the chosen phenol discharge criterion or adopt the more stringent criterion for phenol of 0.004 mg/L in line with CCME water quality guidelines for the protection of aquatic life. We further recommend discharge criteria for nitrate and ammonia as key components of the ammonium nitrate fuel oil blasting agent. See our comment titled “Quarry Contact Water” for additional detail. Reference: Canadian Council of Ministers of the Environment. 1999. Canadian water quality guidelines for the protection of aquatic life: Phenols — Mono- and dihydric phenols. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.	Discharge criteria proposed in the Type B Application for initial development works at the Back River Project are consistent with discharge criteria issued by the Nunavut Water Board in other Type B licenses. As outlined in the Fuel Management Plan (170913 8BC-BRP----D2FuelMgmtPlan-IMLE_Version2.0), Sabina will implement best management practices to reduce the likelihood of spills and the addition of hydrocarbons to the natural environment. If the unlikely event of a spill, Sabina has prepared a Spill Contingency Plan (170913 8BC-BRP----D4ComprehensiveSpillContingencyPlan-IMLE) to facilitate effective communication and efficient cleanup of spills of potentially hazardous materials. Inspections during and after the clean-up will be conducted to confirm that all potentially hazardous materials have been removed. Therefore, Sabina believes additional sampling for total petroleum hydrocarbons is not required. The Fuel Management Plan also does specifically state that prior to discharge, pooled water will be tested and will only be discharged if it meets the discharge criteria to the terrestrial environment at a minimum setback of 31 m from the highwater mark of any waterbody. Sabina notes that phenol should not have been listed in the discharge criteria proposed in Table 7-1 of the Fuel Management Plan (170913 8BC-BRP----D2FuelMgmtPlan-IMLE_Version2.0). The discharge criteria should be the same as those proposed in the Type A Fuel Management Plan (171002 2AM-BRP----SD16-FuelMgmtPlan-IMLE): - Benzene (0.37 mg/L), ethylbenzene (0.09 mg/L), toluene (0.002 mg/L), xylene (0.3 mg/L), lead (0.2 mg/L), oil and grease (5 mg/L and no visible sheen), and pH (6.0 to 9.5) The Fuel Management Plan for the Type B licence will be updated as directed by the NWB, to reflect these discharge criteria. Sabina will implement blasting best management practices to minimize dust production and to minimize the quantity of explosives, which will result in lower concentrations of nitrogenous compounds as residue. Any runoff from the roads is anticipated to be minimal and will be discharged to the terrestrial environment as diffuse sheet flow and will infiltrate into the terrestrial environment prior to reaching the aquatic environment. It should also be noted that the minimum 31 m buffer distance intended to minimize surface flow impacts on water quality, will be applied to all-weather service roads. This 31 m buffer was identified based on guidance documents and commonly established riparian zone buffer widths used in many regions, including the Arctic. Water in quarries is classified as temporary storage area water (Type B, EMPP, Section 3.3, Table 3.3-1; station type BRP-S-##). Water samples from temporary storage areas will be monitored for a suite of general chemistry parameters (Type B, EMPP, Section 3.3, Table 3.3-2). The Quarry Management Plan states water in the quarries that does not meet discharge criteria will be directed away from waterbodies or held in contact water ponds. The Sabina environmental department will evaluate any water	
KIA	KIA-NWB-63	Sampling Associated with Spills (Hutchinson)	(MASD), Section 6.4.	Sabina has failed to clarify what conditions must be met for sample collection following a cleaned spill to be deemed necessary. We therefore recommend that: a) Sabina conceptually define what conditions must be met for sampling to be required following a spill, b) Inform KitIA of a spill and, if possible, include KitIA as part of the emergency response team, c) Provide photographic documentation of all spills, cleanup activities and post cleanup status, and d) Document locations sampled as part of spills management, and details regarding the sampling plan.	Without a clear trigger for sampling, the proponent may miss an opportunity to characterize a spill’s impact to the aquatic environment, and evaluate the success of any subsequent mitigations or cleanup activities.	1. Gap/Issue: Sabina states that “Following the clean-up of a spill, the Environmental Department will inspect the spill site and, if necessary, collect samples to verify that the clean-up is complete.” Sabina has failed to clarify what conditions must be met for sample collection following a cleaned spill to be deemed necessary. 2. Disagreement with WL information/ conclusion: We are concerned this ambiguity may result in insufficient sample collection following a spill. 3. Reasons for disagreement: Without a clear trigger for sampling, the proponent may miss an opportunity to characterize a spill’s impact to the aquatic environment, and evaluate the success of any subsequent mitigations or cleanup activities.	We therefore recommend that: a) Sabina conceptually define what conditions must be met for sampling to be required following a spill, b) Inform KitIA of a spill and, if possible, include KitIA as part of the emergency response team, c) Provide photographic documentation of all spills, cleanup activities and post cleanup status, and d) Document locations sampled as part of spills management, and details regarding the sampling plan.	As stated in Section 8 of the Comprehensive Spill Contingency Plan (170913 8BC-BRP----D4ComprehensiveSpillContingencyPlan-IMLE), spills are externally reported the NWT/Nunavut Spill Response Line. This is consistent with the Nunavut Water Regulations Section 16 which legally requires the Licence to report to an Inspector (designed under the NWNSRTA) and the spill notification service of the Nunavut Government. In reporting the spill, Sabina will be required to outline the cause of spill, containment and clean up measures to be taken, factors affecting spill or recovery, and any additional action which may include specific monitoring defined by Sabina or as required by the Inspector and Spill Response Line Lead Agency (and/or support agencies), which may request monitoring dependant upon the type, location, and quantity of spill. Sabina notes the NWT/Nunavut Spill Report Form was not appended to the Plan as indicated. The form will be appended to the next version of the plan as directed by the NWB.	
KIA	KIA-NWB-64	Culvert Sizing (Hutchinson)	Road management Plan (RMP), Section 6.1.2.	It is not clear whether culverts will be adequately sized to accommodate storms and freshet thereby minimizing the likelihood of overtopping resulting in mobilized loose particulate matter degrading water quality and aquatic habitat. We recommend that “heavy rainfall flows” be defined and quantified to provide engineering certainty for culvert design. We further recommend Sabina define and quantify the expected storm flows and design criteria for culverts to minimize the potential for overtopping.	Culverts may not be adequately sized to convey storms and freshet without overtopping the road thereby mobilizing loose particulate matter into the watercourse, degrading water quality and aquatic habitat	1. Gap/Issue: Sabina has indicated “Culverts will be sized for each stream crossing to accommodate normal summer flows, as well as spring freshet and heavy rainfall flows.” It is not clear whether culverts will be adequately sized to accommodate storms and freshet without overtopping. 2. Disagreement with WL information/ conclusion AND Reasons for disagreement: We share the concern that culverts be adequate to convey storms and freshet without overtopping the road to minimize the potential for overtopping flows that can mobilize loose particulate matter into the watercourse thereby degrading water quality and aquatic habitat.	We recommend that “heavy rainfall flows” be defined and quantified to provide engineering certainty for culvert design. We further recommend Sabina define and quantify the expected storm flows and design criteria for culverts to minimize the potential for overtopping.	As stated in the reply to KIA-NWB-82, culverts will be designed to a 1-in-100-year event as stated in Section 4.1.1 of the Road Management Plan and in Section 6.1 of the Main Application Document (170913 8BC-BRP----MainApplicationDocument_Version2.0). In addition, Table 6.2-4 of the Water Management Plan (171002 2AM-BRP----SD05-WaterMgmtPlan_IMLE_Part6) specifies the culvert design criteria as a 1-in-100 year, 24-hour rainfall event. Culvert sizes and additional details will be included in the submission of construction drawings for initial development works; these drawings for any engineered facilities, will be stamped by an Engineer and submitted to the NWB for review 30 days prior to construction, as stated in Section 4.1 of the Road Management Plan (170913 8BC-BRP----D1RoadMgmtPlan-IMLE_Version2.0).	

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KIA	KIA-NWB-65	Quarry Contact Water (Hutchinson)	Quarry Management Plan (QMP), Section 6.2. Environmental Management and Protection Plan (EMPP), Table 3.3-1, Table 3.3-2.	Sabina has not provided discharge criteria for contaminants associated with water that has come into contact with ammonium nitrate fuel oil and blasting residuals. Sabina should provide proposed discharge criteria for all contact water, for ammonia, nitrate and petroleum hydrocarbons parameters as part of the Type B water licence. We recommend that all ponded water associated with the quarries be included in the water quality monitoring program, and be assessed for parameter suites A (field chemistry), B (suspended sediments and turbidity), nitrogen species, oil and grease, and petroleum hydrocarbons as per Table 3.3-1 and 3.3-2 of the EMPP.	Discharge of contact water that has not been required to meet defined discharge criteria, even to the terrestrial environment, may not be sufficient to mitigate the risk to aquatic life.	1. Gap/Issue: Sabina states "Any flowing water which may leave the working area will be sampled as part of ongoing monitoring and allowed to discharge to the environment if it meets discharge criteria as defined in the Type B water licence. Any problematic water will be directed away from waterbodies, or held in contact water event ponds with enough capacity to contain high runoff from the spring freshet." Currently, the only general discharge criterion proposed under the Type B water licence is for TSS. Sabina has not provided discharge criteria for contaminants associated with water that has come into contact with ammonium nitrate fuel oil and blasting residuals. We are also concerned that "problematic water" will simply be directed away from waterbodies without treatment and without a clear idea as to its contaminant burden. 2. Disagreement with WL information/ conclusion: Discharges from quarry sites may not meet accepted criteria for nitrate and ammonia and total petroleum hydrocarbons (THP), components of the blasting material that will be used for preconstruction activities. 3. Reasons for disagreement: Discharges that do not meet discharge criteria for nitrate and ammonia and petroleum hydrocarbons may pose unnecessary risk to aquatic life. This applies to all contact water, including "problematic water". We recognize that "problematic water" will only be discharged to the terrestrial environment at minimum 31 m from all waterbodies, but are concerned we cannot evaluate if this will adequately mitigate the risk to aquatic life without defined discharge criteria	Sabina should provide proposed discharge criteria for parameters associated with the blasting material that will be used for preconstruction activities, as part of the Type B water licence. We propose the following criteria for nitrogen species: Unionized Ammonia: 0.5 mg/L as nitrogen. MMER 2017 Nitrate-Nitrogen: 3.0 mg/L as nitrogen. CCME 2017 We also provide recommendations for petroleum hydrocarbon discharge criteria in our comment titled "Additional Discharge Criteria". Please see that comment for additional details. We recommend Sabina revise the quarry management plan such that they will not discharge any water to either the terrestrial or aquatic environment unless it meets discharge criteria for TSS, turbidity, ammonia, nitrate and TPHs. Discharges to the environment should only occur at specified and signed areas greater than 31 m from all watercourses and waterbodies. Sabina should provide additional detail as to how water that does not meet discharge criteria will be dealt with. We further recommend that all ponded water associated with the quarries be included in the water quality monitoring program, and be assessed for parameter suites A (field chemistry), B (suspended sediments and turbidity), nitrogen species, oil and grease, and petroleum hydrocarbons as per Table 3.3-1 and 3.3-2 of the EMPP. References: CCME. 2012. Canadian water quality guidelines for the protection of aquatic life: Nitrate. In: Canadian environmental quality guidelines, Canadian Council of Ministers of the Environment, Winnipeg. Government of Canada. 2017. Regulations Amending the Metal Mining Effluent Regulations.	Please see Sabina Technical Comment Response, KIA-NWB-62	
KIA	KIA-NWB-66	Water Quality Monitoring at BRP-18 and BRP-19 (Hutchinson)	Environmental Management and Protection Plan (EMPP), Section 3.3, Table 3.3-1, Table 3.3-2, and Figure 3.3-1. Concordance Assessment (CA), Section 8.0, subsection 1 and 6. EMPP, Section 3.3.	We are concerned that monitoring proposed at BRP-18 and BRP-19 is insufficient to characterize the potential impacts to the aquatic environment from proximal project activity. We propose a series of recommended changes to monitoring activities proposed for BRP-18 and BRP-19 to better reflect potential impacts from proposed project activities.	Insufficient monitoring at these sites may result in a failure to detect environmental impacts at those locations, and a failure to implement an appropriate mitigation response.	1. Gap/Issue: The freshwater environment monitoring sites BRP-18 and BRP-19 are located in small streams down gradient from the all-weather road between the Goose plant fuel storage pad and the main camp, airstrip and other infrastructure. The parameter suite proposed for these sites currently only includes total suspended solids (TSS) and turbidity – the "Surface Runoff" parameter suite. We are concerned that monitoring proposed at BRP-18 and BRP-19 is insufficient to characterize the potential impacts to the aquatic environment from proximal project activity. 2. Disagreement with WL information/ conclusion: Monitoring proposed at BRP-18 and BRP-19 is insufficient to characterize the potential impacts to the aquatic environment from proximal project activity. 3. Reasons for disagreement Insufficient monitoring at these sites may result in a failure to detect environmental impacts at those locations, and a failure to implement an appropriate mitigation response.	We provide the following recommended changes to monitoring activities proposed for BRP-18 and BRP-19: 1) As the all-weather road will be used extensively by vehicular traffic, the addition of total petroleum hydrocarbons to the monitored parameter suite is prudent as a secondary check to ensure there are no unintentional discharges of fuel to the receiving environment. 2) If additional dust suppression beyond the application of water is used along the all-weather road, the parameter suite should be adjusted accordingly to characterize any potential impacts to the aquatic environment. For example, if calcium chloride (an approved dust suppressant in Nunavut (2002)) is applied to the road, those parameters should be added to the monitoring suite. Reference: Government of Nunavut. Department of Sustainable Development and Environmental Protection Service. 2002. Environmental Guideline for Dust Suppression.	As outlined in the Fuel Management Plan (170913 8BC-BRP---D2FuelMgmtPlan-IMLE_Version2.0), Sabina will implement best management practices to reduce the likelihood of spills and the addition of hydrocarbons to the natural environment. If the unlikely event of a spill, Sabina has prepared a Spill Contingency Plan (170913 8BC-BRP---D4ComprehensiveSpillContingencyPlan-IMLE) to facilitate effective communication and efficient cleanup of spills of potentially hazardous materials. Inspections during and after the clean-up will be conducted to confirm that all potentially hazardous materials have been removed. Therefore, Sabina believes additional sampling for total petroleum hydrocarbons is not required. Dust suppression methods will be approved by the Government of Nunavut (GN) as outlined in the Nunavut Environmental Guideline for Dust Suppression (GN 2002). Prior to use of an approved chemical dust suppressant, notification will be provided to the GN (specifically, the Environmental Protection Service of the Department of Sustainable Development), the landowner, and the NIRB. As prescribed in the Nunavut Environmental Guideline for Dust Suppression (GN 2002), application rate will follow the manufacturer's specifications and will be limited to the road surface. This potential dust suppressant application will be monitored to ensure there is no pooling or runoff and that the product is incorporated into the road surface. Therefore, Sabina believes additional sampling for dust suppressants is not required. *Reference:* *GN. 2002. Environmental Guideline for Dust Suppression. Government of Nunavut, Environmental Protection Service, Department of Sustainable Development: Iqaluit, NU.*	
KIA	KIA-NWB-67	Monitoring frequency for sites BRP-18, BRP-19 and BRP 23 (Hutchinson)	Environmental Management and Protection Plan (EMPP), Section 3.3, Table 3.3-1.	The monitoring frequency outlined for sites BRP-18, BRP-19 and BRP-23 may not be sufficient to appropriately characterize any potential contaminants or sediment mobilized during freshet or by construction activities that may reach the aquatic environment. We recommend the monitoring frequency for be further refined to once during freshet as confirmed by on site air temperature and flow measurements consistent with an increase in flow indicative of melting snow and ice, and monthly during construction while visible flow is present at the station.	Failure to collect seasonally appropriate samples may result in an unrepresentative characterization of aquatic conditions during freshet and any corresponding impacts from preconstruction activities. This may in turn result in a failure to implement an appropriate adaptive response to project related changes in the aquatic environment.	1. Gap/Issue The monitoring frequency outlined for sites BRP-18, BRP-19 and BRP-23 are as follows: "Once during freshet; additional as required during construction". This frequency may not be sufficient or sufficiently detailed to provide assurance that potential contaminants or sediment mobilized during freshet or by construction activities that may reach the aquatic environment will be appropriately characterized. 2. Disagreement with WL information/ conclusion: Freshet represents a relatively short sampling window in which on land particulate matter may be rapidly mobilized to the aquatic environment. Insufficient detail regarding sampling frequency for sites BRP-18, BRP-19 and BRP-23 has been provided to provide assurance that monitoring will occur during this critical period and appropriately thereafter. 3. Reasons for disagreement: Failure to collect seasonally appropriate samples may result in an unrepresentative characterization of aquatic conditions during freshet and any corresponding impacts from preconstruction activities. This may in turn result in a failure to implement an appropriate adaptive response to changes in the aquatic environment.	We recommend the monitoring frequency be further refined to once during freshet as confirmed by on site air temperature and flow measurements consistent with an increase in flow indicative of melting snow and ice, and monthly during construction while visible flow is present at the station.	Sabina's reference to "as required" water quality sampling is reflective of the emphemeral nature of the many streams around the Goose Property Area. These streams do not flow continuously flow during the open-water period. These watercourses will be sampled at least once annually for water quality during the freshet period. Sabina concurs with the suggestion to utilize on site meteorological conditions to inform the annual sample collection during freshet. To inform "as required" sampling, routine and non-routine internal inspections will be conducted (Type B EMPP, Section 3.6; Type A EMPP, Section 8.4) (170913 8BC-BRP---D6EMPP-IMLE_Version2.0) . In addition, the Project will be subject to external inspections as directed under various authorizations, including inspections conducted under the authorities of the NWNSRTA. The objective of inspections (internal and external) is to confirm that the Project remains safe, stable, and fully compliant with all authorizations. Inspections will confirm that development work activities are carried out and managed in an environmentally sound, safe, and efficient manner. An outcome of an inspection (internal or external; routine or non-routine) may include collection of additional samples to document effectiveness of mitigation or to identify potential changes and need for additional mitigation.	

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KIA	KIA-NWB-68	Sampling Stations Downgradient of WIR 2A and 2B (Hutchinson)	Environmental Management and Protection Plan (EMPP), Section 3.3, Table 3.3-1. EMPP, Section 3.3, Table 3.3-1, Table 3.3-2, and Figure 3.3-1.	Sampling locations have not been proposed downgradient of winter ice road (WIR) 2A. Sampling stations should be added near the outlet of the Goose Lake neck and downgradient of Winter Ice Road (WIR) 2A. These stations should be assessed for parameter suites A (field chemistry), B (surface runoff) and total petroleum hydrocarbons. We recommend that these sites should be sampled at the beginning of freshet as confirmed by on site air temperature and flow measurements indicating an increase in flow indicative of melting snow and ice when the WIRs are beginning to melt into the underlying freshwater environment.	Failure to include sampling locations downgradient will preclude Sabina's ability to establish whether the construction and use of WIR 2A and WIR 2B are influencing the freshwater aquatic environment	1. Gap/Issue: Sampling locations have not been proposed downgradient of winter ice road (WIR) 2A. 2. Disagreement with WL information/ conclusion: Not Applicable 3. Reasons for disagreement: Failure to include sampling locations downgradient will preclude Sabina's ability to establish whether the construction and use of WIR 2A and WIR 2B are influencing the freshwater aquatic environment.	Sampling stations should be added near the outlet of the Goose Lake neck and downgradient of Winter Ice Road (WIR) 2A. These stations should be assessed for parameter suites A (field chemistry), B (surface runoff) and total petroleum hydrocarbons. We recommend that these sites should be sampled at the beginning of freshet as confirmed by on site air temperature and flow measurements indicating an increase in flow indicative of melting snow and ice when the WIRs are beginning to melt into the underlying freshwater environment. These recommended sites and parameter suites are intended to of the WIRs establish whether the construction and use of WIR 2A and WIR 2B are influencing the freshwater aquatic environment.	Sabina has responsibility for inspection of all Project components, including the inspection and monitoring of the temporary winter ice roads during initial development works. Sabina will follow best management practices with respect to the annual construction, use, and decommissioning of WIR 2A and 2B (Type B Road Management Plan, Section 4.2; 170913 8BC-BRP----D1RoadMgmtPlan-IMLE_Version2.0). Sabina has gained WIR development and operational experience under our existing 2BE-GOO1520 Type B Water Licence. If erosion near the waterbody at the road approach is observed during an inspection, water quality monitoring for TSS and turbidity will be conducted (i.e., parameter suites A & B). During initial development works, inspections will be conducted regularly. A result of an inspection may include recommendation for additional sampling. A summary of the approach to routine and non-routine inspections was included in the Type B EMPP (Section 3.6; 170913 8BC-BRP----D6EMPP-IMLE_Version2.0); more details on the inspection approach can be found in the Type A EMPP (Section 8.4). Inspections will continue and additional mitigation applied if required to maintain in-water TSS and turbidity within the guidelines for protection of aquatic life (CCME 1999). As outlined in the Fuel Management Plan (170913 8BC-BRP----D2FuelMgmtPlan-IMLE_Version2.0), Sabina will implement best management practices to reduce the likelihood of spills and the addition of hydrocarbons to the natural environment. If the unlikely event of a spill, Sabina has prepared a Spill Contingency Plan (170913 8BC-BRP----D4ComprehensiveSpillContingencyPlan-IMLE) to facilitate effective communication and efficient cleanup of spills of potentially hazardous materials. Inspections during and after the clean-up will be conducted to confirm that all potentially hazardous materials have been removed. Therefore, additional sampling for total petroleum hydrocarbons for the WIR is not required.	
KIA	KIA-NWB-69	Marine environment stations BRP-40, BRP-41, BRP-43 and BRP-46 (Hutchinson)	Environmental Management and Protection Plan (EMPP), Section 3.3, Table 3.3-1, and Figure 3.3-2. Concordance Assessment (CA), Section 8.0, subsection 1 and 6. EMPP, Section 3.3.	Marine environment stations BRP-40, BRP-41, BRP-43 and BRP-46 are not plotted on Figure 3.3-2. We request Sabina provide locations their locations on Figure 3.3-2.	Failure to provide locations of marine environment stations BRP-40, BRP-41, BRP-43 and BRP-46 prevents reviewers from determining where water intakes and discharges will be located in the marine environment and whether the proposed monitoring stations are appropriate.	1. Gap/Issue: Marine environment stations BRP-40, BRP-41, BRP-43 and BRP-46 are not plotted on Figure 3.3-2. 2. Disagreement with WL information/ conclusion: Not Applicable 3. Reasons for disagreement: Locations of these stations are required to understand where water intakes and discharges will be in the marine environment and whether proposed monitoring stations are appropriate.	We request Sabina provide locations for marine environment stations BRP-40, BRP-41, BRP-43 and BRP-46 on Figure 3.3-2.	Figure 3.3-2 of Type B EMPP (170913 8BC-BRP----D6EMPP-IMLE_Version2.0) (Attachment A1) has been updated to show the location of the water intake and desalination discharge line and associated monitoring stations BRP-40 and BRP-41, respectively. Note: BRP-43 was shown on the figure. BRP-46, which represents the monitoring station located at the MLA mid-shore by the water discharge pipeline, has also been provided on updated Figure 3.3-2 (Attachment A1). Sabina is committed to incorporating this update in the next revision of the plan as directed by the NWB.	Attachment A1 Updated Figure 3.3-2 dated January 26, 2018 from 170913 8BC-BRP----D6EMPP-IMLE_Version2.0
KIA	KIA-NWB-70	Additional Detail Required for Quality Assurance and Quality Control Protocols (Hutchinson)	Environmental Management and Protection Plan (EMPP), Section 3.5. Concordance Assessment (CA), Section 8.0, subsection 5.	Sabina has included limited detail on Quality Assurance and Quality Control protocols within the Type B application. We request additional detail for Quality Assurance and Quality Control protocols outlined in the Type B water licence sufficient to demonstrate analytical precision and reliability of the data.	Data collected concurrent to the preconstruction activities proposed under the Type B water licence will eventually be used to help confirm predictions of the aquatic environment during construction activities as outlined in the Final Environmental Impact Statement (FEIS). Additional assurance is required to demonstrate data collected under the Type B EMPP will have sufficient precision for that purpose. Data which is imprecise may skew the dataset or introduce increased variability, diminishing the capacity to distinguish project related impacts from natural variability in the aquatic environment.	1. Gap/Issue: Sabina has included limited detail on Quality Assurance and Quality Protocols within the Type B application. The only description is as follows: "Monitoring results collected under the various programs will undergo appropriate quality assurance and quality control checks, and will be included in the annual report." 2. Disagreement with WL information/ conclusion A more detailed QA/QC plan is required to ensure precision and reliability of environmental monitoring data. 3. Reasons for disagreement Data collected concurrent to the preconstruction activities proposed under the Type B water licence will eventually be used to help confirm predictions of the aquatic environment during construction activities as outlined in the Final Environmental Impact Statement (FEIS). Additional assurance is required to demonstrate data collected under the Type B EMPP will have sufficient precision for that purpose. Data which is imprecise may skew the dataset or introduce increased variability, diminishing the capacity to distinguish project related impacts from natural variability in the aquatic environment.	We request additional detail for Quality Assurance and Quality Control protocols outlined in the Type B water licence application beyond "Monitoring results collected under the various programs will undergo appropriate quality assurance and quality control checks, and will be included in the annual report." A more detailed plan is required, which should include a clear protocol for collecting duplicate samples and field blanks. These should be collected at a frequency of at least 10% of all samples collected to ensure the accuracy of monitoring data. A discussion of data quality objectives should also be included in the expanded QA/QC protocols. We recommend that the Type B application refer and adhere to a QA/QC plan that will be developed as part of the Type A water licence; environmental monitoring data collected concurrent to the preconstruction activities proposed under the Type B water licence will eventually be used to help confirm predictions of the aquatic environment during construction activities as outlined in the Final Environmental Impact Statement.	Sabina is providing the additional detail as requested for quality assurance and quality control protocols (Appendix A3). The additional details provided were developed, and included, as part of the Type A submission. Sabina will follow this QAQC Plan for all Type B initial development works.	Attachment A3 171002 2AM-BRP----SD24-QAQCPlan-IMLE
KIA	KIA-NWB-71	Water use for the construction and maintenance of Winter Ice Roads (Palmer)	Main Application Supporting Document (MASD), Section 3.3.1, Page 39.	Proponent states that all water used for the construction and maintenance of the WIRs will be sourced from Goose Lake and Lakes proximal to the MLA.	It is important to know which lakes proximal to the MLA will be used to assess potential fish habitat loss. Smaller, or shallow lakes that are fish bearing may potentially be affected by a 10% decrease in available water volume, as the overall percentage of potentially available fish habitat affected can be greater than in larger, deeper lakes with the same volume of water withdrawn.	The proponent does not mention which lakes proximal to the MLA will be used as a water source for construction of the WIRs and other water use. A list of potential lakes to be used as a water source and their fish bearing status should be included to assess any potential for effects to fish and fish habitat.	Please provide a list of potential lakes to be used as a water source for construction of the WIRs and indicate fish bearing status of these lakes.	The water source for the winter ice road (WIR) proposed under the 8BC-BRP Type B Water Licence Application in close proximity to the Goose Camp is Goose Lake, as described in the Type B Water Licence Application. The anticipated water sources near the Marine Laydown Area (MLA) includes MLA Pond S1 and MLA Pond S2. Max depth, lake volume, surface area, predicted under ice volume, and 10% of predicted under ice volume for MLA Ponds 1 and 2 are provided below in Table 1; please see Appendix V6-3F of the FEIS for additional information. If Sabina identifies additional water withdrawal is necessary from other proximal lakes for this Type B Application, Sabina recognizes that water from streams or any waterbody not identified is prohibited unless authorized and approved by the NWB in writing. For additional information refer to KIA-NWB-15. Goose lake is confirmed as fish bearing, and it is assumed that both MLA Pond S1 and MLA Pond S2 are fish-bearing. Table 1. Marine Laydown Area (MLA) Lakes Potential Water Sources | Waterbody | Max Depth (m) | Lake Volume (m^3) | Surface Area (m^2) | Predicted Under Ice Volume (m^3)[1] | 10% Under-Ice Volume (m^3) | | --- | --- | --- | --- | --- | --- | | MLA Pond 1 | 4.1 | 843,355 | 377,671 | 210,839 | 21,084 | | MLA Pond 2 | 3.7 | 577,689 | 442,045 | 144,422 | 14,442 | [1] assumes ice thickness of 2m, and conservatively assumes that the under ice volume is 20% the total volume of the lake Reference: FEIS, V6-3F 2014 Bathymetric Survey Report	

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KIA	KIA-NWB-72	Timing windows for Arctic fish species present (Palmer)	Road Management Plan (RMP), Section 4.1.5, Page 4-5.	The Proponent states that timing of in-water construction activities will conform, when possible, to Nunavut timing windows for the protection of fish and their habitat.		No timing windows for Arctic species present are included.	Please provide a table indicating important timing windows of species potentially present that may be affected during construction of watercourse crossings.	As per Term and Condition No. 29 of Project Certificate No. 007 for the Back River Gold Mine Project (NIRB File No. 12MN036) to Sabina Gold & Silver Corp., Sabina will implement all applicable DFO best management practices to avoid and mitigate serious harm to fish as a result of water crossing construction, operation, and decommissioning for fish-bearing water crossings. Sabina acknowledges these practices may include timing windows that incorporate spawning, incubation, and hatch times for species using watercourses. Timing of in-water construction activities will conform, when possible, to Nunavut timing windows for the protection of fish and their habitat. For stream activities, the window is in place to avoid the spring spawning time for Arctic Grayling from May 1 to July 15 each year (Table 1). For lake activities, this window is meant to avoid fall spawning species within the Local Study Area (Lake Trout and Whitefish spp.) and is from August 15 to June 30 each year (see Section 6.5.3 of the FEIS or DFO's website [DFO 2013]). Table 1. Important Timing Windows for Arctic Fish Species VEC / Location / Activity / Sensitive Period Arctic Grayling / Project streams / Spring spawning / May 1 to July 15 Lake Trout and Whitefish / Project lakes / Fall spawning / August 15 to June 30 *References* *Fisheries and Oceans Canada (DFO). 2013. Nunavut Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat. http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/nu-eng.html*	
KIA	KIA-NWB-73	Sensitive Spawning Areas (Palmer)	Road Management Plan (RMP), Section 4.1.5, Page 4-6.	Proponent states that mitigation measures include designing and planning in-water activities and works such that loss or disturbance to aquatic habitat is minimized and sensitive spawning habitats are avoided.	The primary objective of mitigation for potential effects to fish and fish habitat is to avoid loss or disturbance where possible.	It would be helpful to have a link to a map of sensitive spawning habitats for relevant fish species identified during baseline studies.	Please provide reference to a map of sensitive spawning habitats for relevant species.	Based on multiple years of baseline studies, the only road crossing in the Type B Water Licence application that intersects with fish-bearing water is the crossing over Rascal Stream West (Gander Pond outlet). The proposed crossing location is not expected to directly or indirectly affect sensitive spawning habitats such as Arctic Grayling. Known spawning locations for Arctic Grayling in that system are located upstream of the culvert location (e.g., Rascal Stream East reach downstream of Rascal Lake). For more information, see Volume 6 of the FEIS; specifically, the following figures describe available fish and fish habitat data: -Figure 6.1-4. Stream Fish Habitat Baseline Data (2010 – 2015) for the Goose Property Area -Figure 7.1-3. Stream Fish Community Baseline Data (2011 to 2015), Goose Property Area -Figure 7.1-6. Fish Bearing Status within the LSA, Goose Property Area -Figure 7.5-1. Infrastructure Layout and Locations of Potential Fish Bearing Habitat Loss, Goose Property Area Also see the following figures in the FEIS Addendum Appendix V6-6F: Rascal Stream Fishway Memo: -Figure 2.1-1. Sample Site Locations and Study Area -Figure 2.2-1. Rascal Stream East Fry Survey Observations, 2013 -Figure 2.2-3. Rascal Stream West Fry Survey Observations, 2013 The above information will be submitted to Fisheries and Oceans Canada (DFO) to seek any required approvals or authorizations prior to any construction below the high water mark in fish-bearing waters.	
KIA	KIA-NWB-74	Measures to Protect Fish and Fish Habitat (Palmer)	Road Management Plan (RMP), Section 4.1.5., Page 4-6.	The Proponent states that "Effective erosion and sediment control measures will be installed before starting work to prevent sediment from entering the waterbody."	Sediment control measures are important to protect fish habitat, especially spawning and rearing habitat.	What are the effective erosion and sediment control measures? These are not provided.	Please identify erosion and sediment control measures to be used.	Sediment and erosion control measures have been included in the bulleted list of Section 4.1.5 of the Road Management Plan (170913 8BC-BRP----D1RoadMgmtPlan-IMLE_Version2.0). Runoff may be managed locally with silt fences, turbidity curtains, interceptor channels, rock check dams, and/or small sedimentation ponds. As per Section 3.3.4 of the Type B Water Licence Application Main Application Supporting Document (170913 8BC-BRP----MainApplicationDocument_Version2.0), sediment and erosion control measures will be implemented prior to, and maintained during, the construction and operation of development works where necessary to prevent entry of sediment into water. This is similar to, and in accordance with, Part E, Item 8 and Part C, Item 6 of 2BE-GOO1520 and 2BE-GEO1520, respectively. Where surface runoff may directly or indirectly enter a waterbody, all flow shall meet the following effluent quality limits for total suspended solids presented in Table 3.3-2 in the Type B Water Licence Application (170913 8BC-BRP----MainApplicationDocument_Version2.0).	
KIA	KIA-NWB-75	Measures to Protect Fish and Fish Habitat (Palmer)	Road Management Plan (RMP), Section 4.1.5., Page 4-6.	The Proponent states that "Regular inspection and maintenance of erosion and sediment control measures and structures will be conducted during the course of construction."	Inspection and maintenance of erosion and sediment control measures is necessary to indicate any potential effects to fish and fish habitat.	The term "regular" is vague and it should be specified how often inspection will occur. Maintenance should be conducted immediately following cases where inspection indicates that an issue with sedimentation or erosion occurs.	Please identify at what interval sediment and erosion inspection will occur during the construction period.	Sabina intends to monitor for erosion and sediment management twice daily during any in-water work activities carried out during the initial development phase (e.g., water intake installation, construction of all-weather service roads and water crossings, winter ice road construction and operation). For additional information refer to KIA-NWB-61. A general overview of planned monitoring is provided in Table 3.3-1 in the Environmental Management and Protection Plan (EMPP) (170913 8BC-BRP----D6EMPP-IMLE_Version2.0) for the Type B Water Licence Application.	
KIA	KIA-NWB-76	Measures to Protect Fish and Fish Habitat (Palmer)	Road Management Plan (RMP), Section 4.1.5., Page 4-6.	The Proponent states that "If replacement rock reinforcement/armouring are required to stabilize eroding or exposed areas, appropriately-sized, clean rock will be installed at a similar		The term "appropriately-sized" is vague and should be specified. If size is dependent on size of sediment material already present or flow of water, then this should be stated.	Please state what appropriately-size rock is based upon.	Appropriately sized rock refers to substrates that match the range of sizes in a streambed.	
KIA	KIA-NWB-77	Water use for the construction and maintenance of Winter Ice Roads (Palmer)	Road Management Plan (RMP), Section 4.2.2, Page 4-9.	Proponent states that "all water used for the construction and maintenance of the WIRs will be sourced from Goose Lake and Lakes proximal to the MLA."	It is important to know which lakes proximal to the MLA will be used to assess potential fish habitat loss. Smaller, or shallow lakes that are fish bearing may potentially be affected by a 10% decrease in available water volume, as the overall percentage of potentially available fish habitat affected can be greater than in larger, deeper lakes with the same volume of water withdrawn.	The proponent does not mention which lakes proximal to the MLA will be used as a water source for construction of the WIRs and other water use. A list of potential lakes to be used as a water source and their fish bearing status should be included to assess any potential for effects to fish and fish habitat.	Please provide a list of potential lakes to be used as a water source for construction of the WIRs and indicate fish bearing status of these lakes.	Please see Sabina Technical Comment Response, KIA-NWB-71.	
KIA	KIA-NWB-78	Water Use for winter roads (Palmer)	Road Management Plan (RMP), Section 4.2.2, Page 4-9.	The Road Management Plan states that "Sabina will equip all water intake hoses with a screen of an appropriate mesh size to ensure that fish are not entrained, and will withdraw water at a rate such that fish do not become impinged on the screen."	Mesh size and withdrawal rate are important factors to ensure that fish are not harmed as defined in the Fisheries Act.	The proponent mentions that an appropriate mesh size will be used but does not specify what mesh size is appropriate for fish species found in these watercourses. Similarly, the proponent mentions that water withdrawal rate will be such that fish are not impinged, however they do not provide a maximum withdrawal rate appropriate for the fish species present	Please provide maximum mesh size to be used so that fish are not entrained. Please provide maximum withdrawal rate of water such that fish do not become impinged on the screen.	Please see Sabina Technical Comment Response, KIA-NWB-16.	
KIA	KIA-NWB-79	Monitoring (Palmer)	Quarry Management Plan (QMP), Section 7, Table 7-1.	The Proponent states that "a spring seep survey of all quarries and major infrastructure components except roads will be conducted."	Seep surveys of quarries and major infrastructure components are important to identify potential sources of contaminants to waterways.	The proponent indicates that a spring seep survey of all quarries and major infrastructure components except roads will be conducted however, monitoring frequency is not indicated. If this survey is to be conducted only one time this should be indicated with details surrounding survey timing.	Please indicate whether the seep survey will be conducted as a onetime spring survey or multiple surveys and how timing of the survey will be chosen (e.g. during freshet?)	Please see Sabina Technical Comment Response, KIA-NWB-35	
KIA	KIA-NWB-80	Risk Management (Palmer)	Spill Contingency Plan (SCP), Section 1.5., Page 5	The Proponent indicates that risk of fuel leaks during storage can be mitigated with secondary containment and frequent inspection of drums.	Secondary containment of fuel leaks is necessary to prevent accidental leaching of deleterious substances to fish bearing and other waterways.	The proponent indicates that risk of fuel leaks during storage can be mitigated with secondary containment and frequent inspection of drums, but no details are provided on secondary containment measures and frequency of inspection.	Please provide secondary containment measures to be used for fuel storage in case of a leak Please provide frequency of inspection of fuel storage containers.	Please see Sabina Technical Comment Response, KIA-NWB-38.	

Agency	TC No	Subject/Topic	Reference to Type B	Summary	Importance of issue to the Type B Water Licence review process	Detailed Review Comment	Recommendation/Request	SBB Response	Updated Attachment
KIA	KIA-NWB-81	Solid Waste (Palmer)	Spill Contingency Plan (SCP), Section 2.3, Page 10.	The Proponent states that "although the potential for waste rock (including drill core) currently stored to be acid producing is unlikely, any such waste would be disposed of in an approved location and under acceptable practices."	Location for storage of potentially acid producing material is important to prevent leaching of PAG into groundwater and downstream waterways.	No details are provided to indicate what qualifies an approved location and acceptable practices are indicated.	Please provide qualifiers to indicate what would consist of an approved location and acceptable practices. Are specific guidelines going to be followed for this practice? Who is responsible for approval of the location?	Please see Sabina Technical Comment Response, KIA-NWB-8.	
KIA	KIA-NWB-82	All Weather Road construction and associated water crossings (Palmer)	Interim Closure and Reclamation Plan (ICRP), Section 3.1.3, Page 3-6.	The Proponent states that "Stream flow across the service roads will be conveyed using appropriately sized culverts."	Culvert size is important for maintaining stream flow and maintaining habitat in fish bearing streams.	No details are provided to indicate what qualifies an appropriately sized culvert.	Please provide qualifiers to indicate what factors would dictate culvert size and provide minimum size if possible.	As stated in the reply to KIA-NWB-64, culverts will be designed to a 1-in-100-year event as stated in Section 4.1.1 of the Road Management Plan and in Section 6.1 of the Main Application Document (170913 8BC-BRP----MainApplicationDocument_Version2.0). In addition, Table 6.2-4 of the Water Management Plan (171002 2AM-BRP----SD05-WaterMgmtPlan_IMLE) specifies the culvert design criteria as a 1-in-100 year, 24-hour rainfall event. Culvert sizes and additional details will be included in the submission of construction drawings for initial development works; these drawings for any engineered facilities, will be stamped by an Engineer and submitted to the NWB for review 30 days prior to construction, as stated in Section 4.1 of the Road Management Plan (170913 8BC-BRP----D1RoadMgmtPlan-IMLE_Version2.0).	
KIA	KIA-NWB-83	Closure and Reclamation Activities (Palmer)	Interim Closure and Reclamation Plan (ICRP), Section 5, Page 5-2.	The Proponent states that "In the case of the Airstrip Quarry and MLA Quarry, no extraction will occur below water level and the area will be contoured to drain positively, so there will be no residual pond after the quarries are closed. The water quality of the runoff will be monitored."	Mitigation for poor water quality is imperative to protecting fish bearing and other watercourses.	No details are provided for mitigation in the case that water quality of runoff does not meet guidelines.	Please provide mitigation measures in the case where runoff from the airstrip quarry and MLA quarry do not meet water quality guidelines.	The Airstrip Quarry was operational in 2013 for use during construction under KIA Permit, KTP11Q001 and NWB Type B Water Licence 2BE-GOO1520. Ongoing surface drainage and surface water management procedures have been, and continue to be, implemented at the Airstrip Quarry. Since 2013, Sabina has experienced minimal contact water collecting in the Airstrip Quarry; it is anticipated that contact water in the quarry sites will continue to be minimal during initial development works. As stated in Table 7-1 of the Quarry Management Plan (170913 8BC-BRP----D3QuarryMgmtPlan-IMLE_Version2.0), Sabina has committed to undertake spring seep surveys of all quarries. This spring seep survey is intended to be conducted once annually in spring. Routine visual inspections of quarry occur daily during active quarry operations, during freshet, and after any major rainfall event. If the water from quarries does not meet the discharge criteria, the water will be treated prior to discharge. A notification of discharge will be submitted to appropriate regulatory parties under the land and water authorizations and also reported within annual reports. Water treatment will cease once the water quality meets the discharge criteria, only at this point will the water from the quarry be discharged directly to the environment.	
KIA	KIA-NWB-84	Closure and Reclamation Activities (Palmer)	Interim Closure and Reclamation Plan (ICRP), Section 5, Page 5-2.	The Proponent states that "Operation of the Umwelt Quarry will result in the formation of two closed depressions that will accumulate water over time. A wall of boulders will be constructed around the quarry to prevent inadvertent access to the flooded voids and warning signs will be posted. One small spillway will be excavated for each of the depressions to control the location and elevation of water discharge. The discharge water quality will be monitored."	Mitigation for poor water quality is imperative to protecting fish bearing and other watercourses.	No details are provided for mitigation in the case that water quality of discharge does not meet guidelines.	Please provide mitigation measures in the case where discharge water does not meet water quality guidelines.	The proposed closure activities for the Umwelt Quarry are based on the geochemical characterization carried out to date which indicated that the proposed quarry areas within the Umwelt Quarry are classified as either NPAG or low-sulphur material with a limited potential for ARD generation. Additionally, based on low solid phase arsenic concentration, metal leaching (ML) is unlikely. As a contingency, and in order to address any uncertainties, monitoring of the water quality will be carried out during quarry operations and quarry flooding to confirm that the water quality in the Umwelt Quarry meets discharge criteria as defined in the Type B Water Licence. Monitoring will continue in the flooded quarry and it will be discontinued after three years if discharge criteria are met. One small spillway will be excavated for each of the quarry depressions to control the location and elevation of water discharge. If the water from the Umwelt Quarry does not meet the discharge criteria the water will be treated prior to discharge (likely in the quarry by adding lime or ferric sulphate). A notification of discharge will be submitted to appropriate regulatory parties under the land and water authorizations and also reported within annual reports. Water treatment will cease once the water quality meets the discharge criteria, only at this point will the water from the quarry be discharged directly to the environment. Sabina has added an additional contingency to address any potential concerns associated with water quality in the quarry is protective of the natural environmental. Sabina commits increasing the cost estimate contingency from 10% to 20%, which amounts to an additional $91,000. Sabina will update the ICRP and the Quarry Management Plan to reflect the above prior to the commencement of activities in the Umwelt Quarry and will issue to the NWB.	
KIA	KIA-NWB-85	Closure and Reclamation Activities (Palmer)	Interim Closure and Reclamation Plan (ICRP), Section 5, Page 5-2.	The Proponent states that "the re-aligned section of the Rascal stream will be restored to its natural drainage and the original fish passage will also be restored when the airstrip is no longer required."	Offsetting requires that the benefits from offset must balance Project impacts.	For the construction of the re-alignment of Racal Stream to flow through Gosling and Gander Ponds, the proponent states in Section X of the Fisheries Assessment of Rascal Stream Re-alignment (dated October 2014) that "substrates remaining in RSE but no longer within a wetted channel will also be retained for use as spawning gravel and cobble during habitat mitigation in year 2". However, there are no details provided to indicate where substrate will be collected for reclamation activities to restore Rascal Stream East to its natural drainage.	Please provide details indicating where substrate will be collected for the restoration of Rascal Stream East to its natural water course. If the original material will be moved back to RSE after reclamation, then resulting habitat calculations should consider losses that will reoccur in RSW during the decommission phase.	As per Term and Condition No. 29 of Project Certificate No. 007 for the Back River Gold Mine Project (NIRB File No. 12MN036) to Sabina Gold & Silver Corp., the design, construction, and operation of adequate fish passage to permit migration of Arctic Grayling from Goose Lake to natural spawning and rearing habitat located in upper Rascal Stream East will be determined in conjunction with Fisheries and Oceans Canada, the Kitikmeot Inuit Association. Details related to the reclamation of any habitat modifications will be identified during those discussions, and included in an application for approval or authorization as part of the permitting process for any planned works that may result in Serious Harm to Fish, as per DFO's policy.	
KIA	KIA-NWB-86	Water Quality Monitoring (Palmer)	Environmental Management and Protection Plan (EMPP), Section 3.3, Table 3.3-1, Page 3-3.	The Proponent states that "water quality monitoring during road construction and culvert installation will occur once during freshet and additional as required during construction."	Water quality monitoring is important to ensure that water reaching fish bearing and other watercourses meets water quality guidelines.	No qualifiers are listed to indicate when additional monitoring would be required.	Please provide conditions whereby additional monitoring would be required and frequency of monitoring in those cases.	Sabina's reference to "as required" water quality sampling is reflective of the emphemeral nature of the many streams around the Goose Property Area. These streams do not flow continuously during the open-water period. These watercourses will be sampled at least once annually for water quality during the freshet period. To inform "as required" sampling, routine and non-routine internal inspections will be conducted (Type B EMPP, Section 3.6; Type A EMPP, Section 8.4) (170913 8BC-BRP----D6EMPP-IMLE_Version2.0) . In addition, the Project will be subject to external inspections as directed under various authorizations, including inspections conducted under the authorities of the NWNSRTA. The objective of inspections (internal and external) is to confirm that the Project remains safe, stable, and fully compliant with all authorizations. Inspections will confirm that development work activities are carried out and managed in an environmentally sound, safe, and efficient manner. An outcome of an inspection (internal or external; routine or non-routine) may include collection of additional samples to document effectiveness of mitigation or to identify potential changes and need for additional mitigation. Water quality monitoring for total suspended solids (TSS) and turbidity will be implemented during any in-water work activities carried out during the initial development phase (e.g., water intake installation, construction of all-weather service roads and water crossings, winter ice road construction and operation). The EMPP developed for the Type B includes: - monitoring of TSS and turbidity concentrations through construction; - a restricted in-water work window (at stream crossing) during freshet (May 1 to July 15); - no in-water blasting for construction of water intakes; Sabina will modify the EMPP to include: - inspections and sampling twice per day, and when a plume or a visible difference in turbidity is observed. - comparison of daily TSS and turbidity concentrations to baseline concentrations and to the TSS and turbidity guidelines for protection of aquatic life (CCME 1999). - should concentrations exceed the guideline, in-stream activities may need to stop and additional mitigations applied. Turbidity will be continuously monitored around the outside perimeter of the silt curtain during in-water marine works. Turbidity profiles will be taken using an in-situ water quality monitoring probe (e.g., YSI). Turbidity will be measured by taking vertical profiles of the water column (surface to bottom) to monitor for a potential turbidity plume. Discrete water quality samples will be collected from different depth intervals (horizons) and sent to an accredited laboratory for TSS and turbidity analyses.	

Agency	TC No	Subject/Topic	Reference to Type B	Summary	Importance of issue to the Type B Water Licence review process	Detailed Review Comment	Recommendation/Request	SBB Response	Updated Attachment
KIA	KIA-NWB-87	Water Quality Monitoring (Palmer)	Environmental Management and Protection Plan (EMPP), Section 3.3, Table 3.3-1, Page 3-3.	The Proponent states that "runoff water in the Fuel Tank Farm containment area will be monitored as required."	Water quality monitoring is important to ensure that water reaching fish bearing and other watercourses meets water quality guidelines.	No qualifiers are listed to indicate when additional monitoring would be required.	Please provide conditions whereby additional monitoring would be required and frequency of monitoring in those cases.	Industry standard environmental protection measures will be used around the fuel storage areas and fuelling operations (Fuel Management Plan, Table 6.3-1). At no time will water be allowed to freely runoff from fuel storage areas. When water is present, and if it needs to be discharged to land, it will be sampled and tested for the parameters listed in the EMPP (Tables 3.3-1 and 3.3-2). Please see Sabina Technical Comment Response, KIA-NWB 50 for additional information.	
ECCC	ECCC-1		Main Application Document (MAD) Section 3.1.2.9 page 29; Section 3.2.2.6 page 38			In-water works include the installation of water intake and discharge structures in both the freshwater and marine environments. In both cases, Sabina Gold & Silver Corp. (the Proponent) states that "Total suspended solids (TSS) and turbidity levels will be monitored throughout construction and work will be delayed if TSS levels and turbidity become too high." It is not specified what would be considered as unacceptable levels. Protective levels of TSS and turbidity could be specified either through the use of water licence criteria for TSS/turbidity for waters adjacent to in-water works, or with specified thresholds for triggering additional mitigation or shutdown of work. In either case, appropriate monitoring should be described.	ECCC recommends the Type B water licence include a mechanism for ensuring mitigation measures triggers for in-water works are explicitly defined. For example, this could be done through limits for TSS/turbidity in the waters adjacent to construction works, or by setting thresholds for mitigation in a TSS management plan. ECCC also recommends TSS/turbidity monitoring be identified and included in a plan, along with QA/QC for the use of turbidity as a surrogate for TSS.	Water quality monitoring for total suspended solids (TSS) and turbidity will be implemented during any in-water initial development work activities carried out during the initial development phase (including water intake/discharge installation, construction of water crossings, winter ice road construction and operation). The Environmental Management and Protection Plan (EMPP) developed for the Type B includes: - monitoring of TSS and turbidity concentrations through construction; - a restricted in-water work window (at stream crossing) during freshet (May 1 to July 15); - no in-water blasting for construction of water intakes; Sabina will modify the EMPP to include: - inspections and sampling twice per day, and when a plume or a visible difference in turbidity is observed. - comparison of daily TSS and turbidity concentrations to baseline concentrations and to the TSS and turbidity guidelines for protection of aquatic life (CCME 1999). - should concentrations exceed the guideline, in-stream activities may need to stop and additional mitigations applied. Turbidity will be monitored around the outside perimeter of the silt curtain during in-water initial development works. Turbidity profiles will be taken using an in-situ water quality monitoring probe (e.g., YSI). Turbidity will be measured by taking vertical profiles of the water column (surface to bottom) to monitor for a potential turbidity plume. Discrete water quality samples will be collected from different depth intervals (horizons) and sent to an accredited laboratory for TSS and turbidity analyses. Analytical results will be used to verify in-situ turbidity measurements and to establish the relationship (correlation) between TSS and turbidity in order for turbidity to be used reliably as a surrogate for TSS. Also, visual monitoring will be conducted around the perimeter of silt curtains for turbidity plumes and hydrocarbon sheens. As stated in Section 3.3.4 of the Main Application Supporting Document, where surface runoff may directly or indirectly enter a waterbody, all flow shall meet the effluent quality limits for total suspended solids presented in Table 3.3-2. Sabina is providing the additional detail as requested for quality assurance and quality control protocols (Appendix A3). The additional details provided were developed, and included, as part of the Type A submission. Sabina will follow this QAQC Plan for all Type B initial development works.	Attachment A3 171002 2AM-BRP----SD24-QAQCPlan-IMLE
ECCC	ECCC-2		MAD Section 3.2.2.6 page 38			The application describes mitigation measures to be used for in-water works at the Marine Laydown Area. These include installation of silt curtains to isolate the areas being disturbed by the work. There is no information provided on tidal amplitude, which is presumed to be low this far inland, but it should be confirmed that tides will not affect the use of silt curtains.	ECCC recommends the Proponent confirm that mitigation measures such as the use of silt curtains will not be influenced by tides at the Marine Laydown Area.	Measured tidal heights in Bathurst Inlet near the MLA are small with a maximum measured range of 0.4 m for spring tides and 0.1 to 0.3 m for neap tides (FEIS, Volume 7, Section 1.1.5.3). Based on the physical conditions and the limited magnitude of tides near the MLA, the use of silt curtains during initial development works are not likely to be influenced by tides.	
ECCC	ECCC-3		MAD Table F-1 List of Permits, Licences & Authorizations			Submission and milestone timing has not been updated.	ECCC recommends the Proponent update specified timing of events and submissions.	Sabina acknowledges ECCC request and attached an updated Table F-1. Main Application Document (MAD)- Appendix F, Table F-1 dated January 26, 2018. This is provided in Attachment A2.	Attachment A2 Update MAD, Appendix F, Table F-1
ECCC	ECCC-4		Environmental Management & Protection Plan Table 3.3-1			Section 3.3 discusses water quality monitoring. Table 3.3-1 lists proposed monitoring at Goose and the Marine Laydown Area for road construction and culvert installation. Frequency is listed for culvert installations as "Once during freshet; additional as required during construction", and this is just for TSS and turbidity. Further details would be useful on the frequency of monitoring, and what would indicate that monitoring can be stopped. Marine environment monitoring at the Marine Laydown Area is listed for BRP0-46 to 48; the marine group of parameters (group F) should be included in addition to groups A and C. This would pick up salinity variation in the area of the discharge, as well as the potential for hydrocarbons and a broader list of metals in the marine receiving environment and barge activity area.	ECCC recommends the Proponent further describe the proposed frequency and triggers for monitoring of road and culvert installation construction sites. ECCC recommends monitoring of the marine receiving environment and barge area include Group F as well as A and C.	Sabina intends to monitor for erosion and sediment management twice daily during any in-water work activities carried out during the initial development works (including water intake/discharge installation, construction of water crossings, winter ice road construction and operation). For addtional information refer to KIA-NWB-61. A general overview of planned monitoring is provided in Table 3.3-1 in the Environmental Management and Protection Plan (EEMP) for the Type B Water Licence Application. Not all stations at the MLA (EMPP, Table 3.3-1 and Figure 3.3-2) are within the marine environment and therefore the addition of salinity to all locations is not required for stations not in the marine environment. The Group F list of parameters (EMPP, TAble 3.3-2) will be added to stations BRP-47 and BRP-48. The EMPP will be updated as directed by the NWB. Sabina would like to note that Figure 3.3-2 of Type B EMPP (170913 8BC-BRP----D6EMPP-IMLE_Version2.0) (Attachment A1) showing MLA monitoring station locations has been updated. Please see KIA-NWB-69 for additional information.	Attachment A1 Updated Figure 3.3-2 dated January 26, 2018 from 170913 8BC-BRP----D6EMPP-IMLE_Version2.0
DFO	DFO-FPP Comment 1-		Back River Project Road Management Plan, Type B Development Works Water Licence Version 2.0 (August 2017); 4.1 All-weather Service Roads - 4.1.3 Water Crossings (p.4-5)				DFO-FPP understands that the new water licence application includes new activities such as the construction of an All-weather Service Road and Associated Water Crossings. DFO-FPP acknowledges that Sabina has committed to constructing culverts that "will be designed to, and conform with, Fisheries and Oceans Canada (DFO) Measures to Avoid Causing Harm to Fish and Fish Habitat" in the Road Management Plan, version 2 document. DFO-FPP notes that the construction of culverts within fish bearing watercourses will require review by DFO. As such, DFO-FPP request that Sabina provide detailed, site specific engineer drawings for any proposed culverts and watercourse crossings. This includes, but is not limited to, the calculations used to determine correct sizing of the culvert, which will ensure adequate velocities for fish passage during both high and low flows, and the hydraulic calculations showing the capacity of the culvert to adequately handle peak flows. However, DFO notes that this information can be submitted as part of Sabina's 'DFO Request for Review' application.	Sabina agrees and is committed to provide detailed, site specific engineered drawings for proposed crossings over fish-bearing streams. This will include the calculations used to determine the correct sizing of the culvert, including calculations for velocities during both high and low flows, and the capacity of the culvert to adequately handle peak flows. This information will be submitted as part of Sabina's 'DFO Request for Review' application. Sabina notes the final design will also be submitted to the NWB prior to construction.	
DFO	DFO-FPP Comment 2		Back River Project Road Management Plan, Type B Development Works Water Licence Version 2.0 (August 2017); 4.2 Winter Ice Roads - 4.2.2 Water Use for Winter Ice Road Construction and Maintenance (p. 4-9).				DFO-FPP notes that in the Road Management Plan, version 2 document, the proponent states "All water will be sourced from Goose Lake and Lakes proximal to the MLA [marine laydown area]." DFO-FPP recommends that Sabina provides DFO with further details of the "Lakes proximal to the MLA" that will be used as a source for road construction, for review. This should include, but is not limited to the location of each of the chosen waterbodies, bathymetry and volume, and expected water withdrawal limits. DFO-FPP notes that winter water withdrawal from ice-covered waterbodies has the potential to cause serious harm to fish. Furthermore, it remains the Proponent's responsibility to ensure it avoids causing serious harm to fish in compliance with the Fisheries Act, and that it meets the requirements under the Species at Risk Act as it may apply to your project. If the Proponent's plans have changed or changes in the future, the Proponent should consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html).	The water source for the winter ice road (WIR) proposed under the 8BC-BRP Type B Water Licence Application in close proximity to the Goose Camp is Goose Lake, as described in the Type B Water Licence Application. The anticipated water sources near the Marine Laydown Area (MLA) includes MLA Pond S1 and MLA Pond S2. Max depth, lake volume, surface area, predicted under ice volume, and 10% of predicted under ice volume for MLA Ponds 1 and 2 are provided below in Table 1; please see Appendix V6-3F of the FEIS for additional information. If Sabina identifies additional water withdrawal is necessary from other proximal lakes for this Type B Application, Sabina recognizes that water from streams or any waterbody not identified is prohibited unless authorized and approved by the NWB in writing. Goose lake is confirmed as fish bearing, and it is assumed that both MLA Pond S1 and MLA Pond S2 are fish-bearing. Table 1. Marine Laydown Area (MLA) Lakes Potential Water Sources **Waterbody** | **Max Depth (m)** | **Lake Volume (m^3)** | **Surface Area (m^2)** | **Predicted Under Ice Volume (m^3)[1]** | **10% Under-Ice Volume (m^3)** MLA Pond 1 | 4.1 | 843,355 | 377,671 | 210,839 | 21,084 MLA Pond 2 | 3.7 | 577,689 | 442,045 | 144,422 | 14,442 [1] assumes ice thickness of 2m, and conservatively assumes that the under ice volume is 20% the total volume of the lake Reference: FEIS, V6-3F 2014 Bathymetric Survey Report	

Attachment A1. Updated Figure 3.3-2 dated January 26, 2018 from 170913 8BC-BRP----D6EMPP-IMLE_Version2.0

GIS # MLA_NA-tab_EMPP_MonitoringLocations_WL_TypeB_Fig3.3-2

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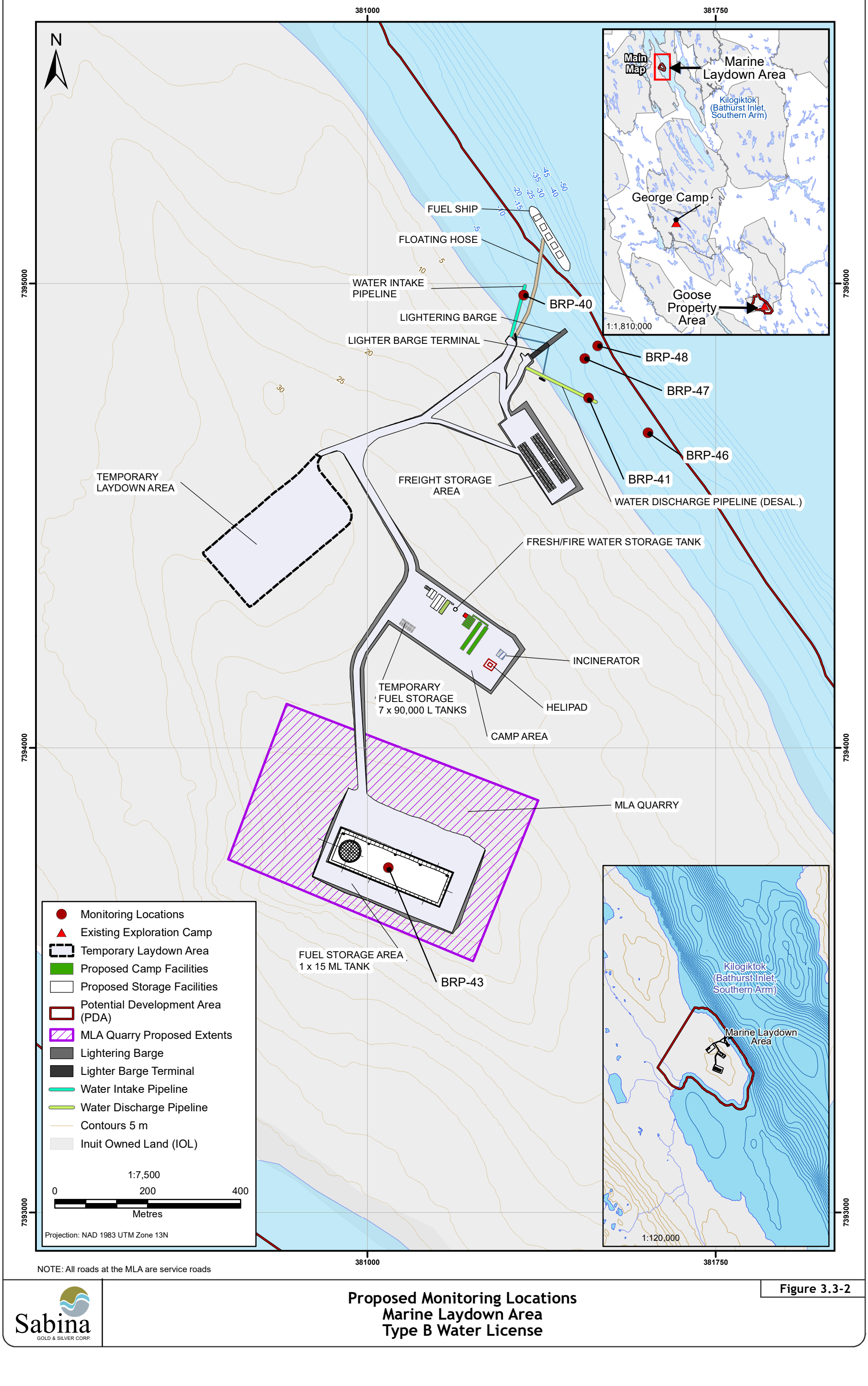
January 25 2018



NOTE: All roads at the MLA are service roads

Sabina GOLD & SILVER CORP.

Proposed Monitoring Locations
Marine Laydown Area
Type B Water License

Figure 3.3-2

Attachment A2. Update MAD, Appendix F, Table F-1

Table F-1: List of Permits, Licenses, and Authorizations Required for Project

Responsible Authority	Legislation	Authorization	Project Activity	Permitting Strategy/Timeline
Nunavut Impact Review Board (NIRB)	Nunavut Agreement Article 12 Nunavut Planning and Project Assessment Act (S.C. 2013, c. 14, s. 2)	Project Certificate	Required to obtain requisite permits and approvals to proceed with Project	Sabina received a Project Certificate from NIRB in Q4 2017
Kitikmeot Inuit Association	Nunavut Agreement Article 26	Inuit Impact and Benefits Agreement (IIBA)	Required to proceed with Project	Sabina aims to conclude successful negotiation of an IIBA after receiving a Project Certificate. Compensation agreements may form part of the IIBA. Compensation agreements to be finalized prior to the public hearing for the Type A Water Licence Application.
	Nunavut Agreement Article 20	Inuit Water Rights Compensation Agreement	May be required	
	Nunavut Agreement Article 6	Wildlife Compensation Agreement		
	Nunavut Agreement	Inuit Owned Lands - Commercial Land Use Lease	Access surface Inuit Owned Lands (IOL) to develop mine	Commercial land use and quarry concession permits will form part of the KIA Framework Agreement.
		Inuit Owned Lands - Quarry Concession Licenses	Extract aggregate on IOL	
Nunavut Water Board	Nunavut Agreement Article 13 *Nunavut Waters and Nunavut Surface Rights Tribunal Act* Nunavut Waters Regulations	Type A and B Water Licences	Required for water use and waste disposal	Sabina submitted its Type A Water Licence in Q4 2017. Existing Permits for the project provided in Main Application Document (MAD) Table 2.3-1 Sabina plans to utilize its existing Type B Water Licences or new licenses with already screened activities for initial construction activities, if necessary.
Indigenous and Northern Affairs Canada	*Territorial Lands Act* Canadian Mining Regulations	Prospector Licence Mineral leases	To obtain and hold subsurface mineral rights	Sabina plans to utilize its existing land use permits and/or will apply for new interim land use permits to support initial development works, to address delays in receipt of leases, if necessary. Refer to MAD Table 2.4-1
	Territorial Land Use Regulations	Crown Land - Class A and Class B Land Use Permits	Access surface Crown lands for initial Project development, prior to obtaining leases	
		Crown Land - Land lease and Waterlot lease	Access surface Crown lands for the Project life	
	Territorial Quarrying Regulations	Crown Land - Quarry Lease/Permit	Extract aggregate on Crown Land	

(continued)

Table F-1: List of Permits, Licenses, and Authorizations Required for Project (continued)

Responsible Authority	Legislation	Authorization	Project Activity	Permitting Strategy/Timeline
Transport Canada	*Navigation Protection Act*	Approval and/or Exemption	Construction of works in navigable water to protect navigation channels	Sabina has received feedback from Transport Canada through pre-submission services and will submit formal applications under the *Navigation Protection Act* for relevant in-water works in Q1 2017.
	Canada Shipping Act Response Organizations and Oil Handling Facilities Regulations		Approved Oil Pollution Emergency Plan (OPEP)	Formal submission of the OPEP to Transport Canada prior to shipping
	Canada Shipping Act Response Organizations and Oil Handling Facilities Regulations		Approved Ship Oil Pollution Emergency Plan (SOPEP)	Formal submission of the SOPEP to Transport Canada prior to shipping
Fisheries and Oceans Canada	*Fisheries Act* (Section 35(2))	Authorization under Paragraph 35(2)(b) of the *Fisheries Act*; required if serious harm to fish cannot be avoided. In instances in which serious harm to fish can be avoided, DFO may provide a letter of authorization in addition to compliance with Measures to Avoid Causing Harm to Fish and Fish Habitat.	Project activities directly removing or altering fish habitat: full lake dewatering, culvert installations, dam construction in watercourses, stream flow reductions and potential water and sediment quality changes.	Sabina's application for an Authorization under the *Fisheries Act* will be finalized and submitted in Q2 2018.
Environment Canada	*Fisheries Act (Section 36)* Metal Mining Effluent Regulations	Schedule 2 Amendment	Deposit of tailings in fish-bearing waters	Sabina submitted its Mine Waste Disposal Alternatives Assessment (MAA) in support of Sabina's application for a Schedule 2 listing in Q4 2017.

(continued)

Table F-1: List of Permits, Licenses, and Authorizations Required for Project (continued)

Responsible Authority	Legislation	Authorization	Project Activity	Permitting Strategy/Timeline
Natural Resources Canada	*Explosives Act* and Regulations Blasting Permits Explosive Magazine Permits Radio Licensing	Licence for a Factory and Magazine	Required for construction of explosives factories and magazines and storage of explosives	Sabina's explosives contractor (once contracted) will obtain the requisite licence(s).
GN Culture and Heritage	Nunavut Archaeological and Palaeontological Sites Regulations (Nunavut) *Nunavut Historical Resources Act*	Archaeology Permit	Required to conduct archaeology surveys and to mitigate cultrual/heritage resources	Archaeological permit applications will be submitted to the GN-CH by March 31 by Sabina's consulting archaeologist for survey or mitigation field work planned for the upcoming summer.
Nunavut Research Institute	*Scientist Act* (Nunavut)	Scientific Licences: Land and Water Social and Traditional Knowledge	Undertake non-biological and non-cultural heritage baseline and monitoring studies	Sabina or its consultants will obtain the requisite scientific licences as required prior to and during the life of the Project. Renewal Application submitted in Q1 2018.
GN Environment	*Environmental Protection Act* (Nunavut) Spill Contingency Planning and Reporting Regulations(Nunavut)	Approval of Spill Contingency Plan		Sabina has submitted Spill Contingency Plans for approval as part of the Type B and Type A Water Licence Application. Submission timing: Q3/Q4 2017
	Environmental Protection Act (Nunavut)	Hazardous Waste Generator		Sabina is currently registered as a hazardous waste generator
	Wildlife Act (Nunavut)			Sabina or its consultants will obtain the requisite wildlife research permits as required prior to and during the life of the Project.
GN Health and Social Services	*Public Health Act* (Nunavut) Camp Sanitation Regulations (Nunavut)	Approval of camp facilities	Construction and operation of camp, medical facilities, buildings and propane storage	Prior to construction and occupancy
	Emergency Medical Aid Act (Nunavut)	Medical facilities approval		

(continued)

Table F-1: List of Permits, Licenses, and Authorizations Required for Project (completed)

Responsible Authority	Legislation	Authorization	Project Activity	Permitting Strategy/Timeline
GN Community and Government Services	Building Codes (Nunavut)	Building Permits	Construction and operation of camp, medical facilities, buildings and propane storage	Prior to construction and occupancy
	Fire Prevention Act (Nunavut) Fire Prevention Regulations (Nunavut) Propane Cylinder Storage Regulations	Approval of camp facilities and propane storage		
Worker's Safety and Compensation Commission of Nunavut - Mine Health and Safety	*Explosives Use Act* (Nunavut) Explosive Use Regulations (Nunavut)	Authorization to store and use explosives	Required to store detonators in a magazine	Sabina's explosives contractor (once contracted) will obtain the requisite authorization(s).
	Mine Health and Safety Act (Nunavut) Mine Health and Safety Regulations (Nunavut)	Authorization to store and use explosives	Required to store detonators in a magazine	
	Worker's Compensation Act (Nunavut) Workers Compensation Regulations (Nunavut)	Authorization for Activities	Required to proceed with Project activities	Sabina is currently authorized to conduct business in Nunavut. Confirmation will be sought from WSCC if changes to this authorization are required for mine development. Sabina's contractors will be required to seek approval to work in Nunavut.

Notes:
IOL = Inuit Owned Land;

Attachment A3. 171002 2AM-BRP----SD24-QAQCPlan-IMLE

BACK RIVER PROJECT
Quality Assurance / Quality Control Plan

October 2017

BACK RIVER PROJECT
QUALITY ASSURANCE / QUALITY CONTROL PLAN

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List of Appendices

Revision Log

Version	Date	Section	Page	Revision
1	October 2017	All	All	Supporting Document for Type A Water Licence Application, submitted to Nunavut Water Board for review and approval

Acronyms

ECCC	Environment and Climate Change Canada
INAC	Indigenous and Northern Affairs Canada
MAD	Main Application Document
MLA	Marine Laydown Area
MMER	Metal Mining Effluent Regulations
NWB	Nunavut Water Board
Project	Back River Project
QA/QC	Quality Assurance / Quality Control
Sabina	Sabina Gold & Silver Corp.
SOP	Standard Operating Procedures
SIG	Supplemental Information Guide

1. Introduction

The Back River Project (the Project) is a proposed gold project owned by Sabina Gold & Silver Corp. (Sabina) within the West Kitikmeot region of southwestern Nunavut. It is situated approximately 400 kilometres (km) southwest of Cambridge Bay, 95 km southeast of the southern end of Bathurst Inlet (Kingaok), and 520 km northeast of Yellowknife, Northwest Territories. The Project is located predominantly within the Queen Maud Gulf Watershed (Nunavut Water Regulations, Schedule 4).

The Project is comprised of two main areas with interconnecting winter ice roads (Main Application Document [MAD] Appendix A, base Figure 2): Goose Property (MAD Appendix A, base Figure 3) and the Marine Laydown Area (MLA) (MAD Appendix A, base Figure 4) situated along the western shore of southern Bathurst Inlet. The majority of annual resupply will be completed using the MLA, and an approximately 160 km long winter ice road will interconnect these sites. Refer to the MAD Appendix A, base Figures 1 to 5 for general site layout and locations. A detailed project description is provided in the MAD.

This Quality Assurance/Quality Control Plan (QA/QC Plan or Plan) sets out standard procedures for collection of surface water and groundwater samples and data in support of monitoring programs outlined in the Water Management Plan (Supporting Document [SD]-05), the Environmental Management and Protection Plan (SD-20), and the Aquatic Effects Management Plan (SD-21). The QA/QC Plan and other management plans are intended to support the Type A Water Licence Application for the Project.

The Plan was prepared following the requirements of the Supplementary Information Guidelines (SIG) for Mining and Milling MM3 and Water Works M1, issued by Nunavut Water Board (NWB 2010 a, b) and the Environmental Impact Statement Guidelines issued by the Nunavut Impact Review Board to Sabina (NIRB 2013), and in accordance with best management practices and in conformance with current Federal and Territorial statutory requirements (see Applicable legislation and Guidelines Section 3).

This plan is a living document to be updated upon changes in related regulatory requirements, management reviews, incident investigations, changes to facility operation or maintenance, and environmental monitoring results, best practice updates or other Project specific protocols once construction starts through to Project closure activities. Any updates will be filed with the Annual Report submitted under the Type A Water Licence.

The information presented herein is current as of September 2017. An update will be initiated prior to the start of construction. The Plan will be reviewed as needed for changes in operation and technology and as directed by the NWB in the Type A Water Licence or other regulatory authorization where appropriate. Completion of the updated Plan will be documented through signatures of the personnel responsible for reviewing, updating, and approving the Plan.

A record will document all significant changes that have been incorporated in the Plan subsequent to the latest review. The record will include the names of the persons who made and approved the change, as well as the date of the approval.

Sabina will maintain a distribution list providing contact details for all parties to receive the Plan including key personnel, contractors, organizations, and external agencies.

2. Scope and Objectives

The QA/QC Plan is one of the documents that forms part of Sabina's overall General and Aquatic Effects Monitoring Program for the Project. This plan has been written to meet requirements of a Type A Water Licence and applies to all Sabina projects in the Kitikmeot region.

This plan is divided into the following components:

- Applicable Legislation and Guidelines (Section 3);
- Planning and Implementation (Section 4);
- Roles and Responsibilities (Section 5);
- Field Sample Collection (Section 6);
- Laboratory Analysis (Section 7); and
- Data and Reporting Requirements (Section 8).

The objectives of the Plan are to confirm that the chemical data collected are representative, are of known quality, are properly documented, and are scientifically defensible. Data of high quality can be achieved through the collection and analysis of samples using specified standardized procedures, the use of accredited laboratories (Appendix A), and use of staff with appropriate training.

2.1 RELATED DOCUMENTS

Documents within the Application for the Type A Water Licence, which support this plan include the following:

- Environmental Management and Protection Plan (SD-20); and
- Aquatic Effects Management Plan (SD-21).

3. Applicable Legislation and Guidelines

Specific legislation, regulations, and guidelines with provisions for Quality Assurance and Quality Control includes:

- *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (Government of Canada 2002a);
- Nunavut Water Regulations (2013);
- *Fisheries Act* (Government of Canada 1985)*; and*
- the *Metal Mining Effluent Regulations* (Government of Canada 2002b).

Sabina will also be bound by the terms and conditions of its Type A Water Licence to be issued by the NWB and the Project Certificate issued by the Nunavut Impact Review Board (NIRB).

In addition, the QA/QC Plan has been developed in accordance with the Indian and Northern Affairs Canada (currently known as Indigenous and Northern Affairs Canada) 1996 '*Guidelines for Use by Class "A" Licensees in Meeting SNP [Surveillance Network Program] Requirements and for Submission of a QA/QC Plan*'. For purposes of this plan, definitions for QA and QC (INAC 1996) are as follows:

- Quality Assurance: the system of activities designed to better ensure that quality control is done effectively; and
- Quality Control: the use of established procedures to achieve standards of measurement for the three principal components of quality – precision, accuracy, and reliability.

4. Planning and Implementation

Monitoring will be the principal mechanism to provide feedback to continually gauge the effectiveness of environmental performance. Operational control is facilitated through the contractor job-specific standard operating procedures (SOPs) work instructions, on-the-job instruction, tailgate meetings where required, contract requirements, and service agreements. The effectiveness of physical operational control will be reviewed according to preventative maintenance and review procedures and schedules.

Implementation of QA/QC measures will be executed throughout all phases of the Project from Construction to Post-Closure.

5. Roles and Responsibilities

The General Manager is ultimately responsible for the success of this plan and approves all relevant policies and documents, auditing, action planning and the verification process.

The Environmental Superintendent along with his/her direct reports are responsible for the implementation of this plan including overall management of the Plan and internal reporting, as well as for auditing Project performance to ensure compliance and adaptive management.

All other Project personnel involved with QA/QC, and monitoring activities will be responsible for the effective implementation of this plan including completion of required training, and maintaining compliance with training requirements or by Sabina's SOPs and best management practices. All employees are to work in compliance with Health and Safety Laws and Regulations.

6. Field Sample Collection

For purposes of this plan, aquatic monitoring consists of three forms as follows:

- **Regulated discharge monitoring** occurs at monitoring stations specified in licenses or regulations. It includes discharge limits that must be achieved to maintain compliance with an authorization (i.e., water licence) or regulation (i.e., Metal Mining Effluent Regulations [MMER]). Enforcement action may be taken if discharge limits are exceeded for a parameter.
- **Verification monitoring** occurs at select stations across the Mine for operational and management purposes by Sabina. This type of monitoring provides data for decision making and builds confidence in the success of processes being used. There is no obligation to report verification monitoring results, although these results can be mentioned in environmental management plans (i.e., sampling to verify soil remediation in the landfarm) or annual reports (e.g., Aquatic Effects Management Plan, site annual report).
- **General monitoring** occurs at stations across the Mine and outside of the Mine. In a water licence, these stations are often monitored according to a schedule and can cover all types of monitoring (i.e., geotechnical, lake levels, etc.). This monitoring is subject to compliance assessment to confirm sampling was carried out using established protocols, included QA/QC provisions, and addresses identified issues. General monitoring is subject to change as directed by an Inspector, or by the Licensee, subject to approval by the NWB.

6.1 SAMPLING LOCATIONS

Water quality monitoring will occur during the Mobilization and Construction, Operations, Closure, and Post-Closure phases. Proposed sampling stations, frequency, and parameters are listed in Appendix B of the Water Management Plan (SD-05). The stations and their requirements may be adjusted based on the requirements of the Type A Water Licence, updates to the Project management plans over the life of the mine and/or an adaptive management response. Proposed sampling stations are shown in the Water Management Plan (SD-05).

All sampling stations will have a GPS location and be landmarked. All stations will be used repeatedly with qualified personnel, using the same techniques to reduce operational error. The following sections outline the standard procedures for collection and handling of all surface water and groundwater samples.

6.2 SAMPLING EQUIPMENT

In the field, personnel will have suitable expertise to conduct surveys. All safety measures and SOP will be followed. Proper sampling gear, field instruments, and methods will be employed by personnel while in the field. Sampling information will be appropriately documented, and samples will be filtered and/or preserved (as necessary), stored in a cool environment, and shipped as soon as possible after sample collection to a qualified laboratory.

Equipment, such as the Analite NEP 160 Meter (turbidity), Oakton PCS35 Meter (pH and conductivity), and Hanna Multi-Parameter Meter (pH, dissolved oxygen and conductivity) are handheld instruments that can be used to measure field parameters as required. The instruments will be calibrated before each sample event, or as per manufacturer's schedule for optimal performance. Calibration and maintenance procedures will be followed as set out by the supplier's operation manual. Equipment and bottles will be

selected so that they do not contaminate or alter the concentrations of parameters of interest according to appropriate laboratory standards.

Surface water samples will be collected as grab samples directly into the sampling bottles (e.g., from streams) or from prescribed depths in lakes using a standard sampling device (e.g., GO-FLO Sampling Bottle). For groundwater sampling, a pump with low-density polyethylene tubing will be used.

A filter apparatus, manual pump, and filter paper will be used to filter water for specific analyses (e.g., dissolved metals).

New laboratory supplied containers will be used for sample collection. The bottles will be either polyethylene plastic or glass, dependent on the specific parameter being analyzed.

6.3 SAMPLING METHODS AND HANDLING

6.3.1 Sampling Identification

All samples will have a unique sample identification name based on a station identifier, date, and time of collection.

All sample bottles will be identified with the sample identification and date of collection. This information will be marked on a label with a water-resistant pen and affixed to the sample bottle. Additional information (time of sampling and parameters to analyze) will be included in the analysis request that will be sent to the accredited laboratory (Appendix A).

6.3.2 Surface Water Sampling

All water quality samples will be collected by qualified personnel using suitable sampling equipment (e.g., acid-rinsed GO-FLO sampling bottle, sampling gloves).

The bottles will be pre-labelled with the required sample identification before going to the field. Surface grab samples will be collected by submerging the sample bottle to half depth of the stream. For sumps, ponds, and piped discharge points, samples will be collected below the surface of the water. For lake sampling, samples will be collected from the prescribed depth for the particular station using an appropriate sampling device (e.g., GO-FLO sampling bottle).

Sample bottles will be provided by the accredited laboratory. They will be received pre-rinsed and either precharged with preservative or pre-rinsed with vials of preservative to be added in the field by qualified technicians or biologists. If the sample bottles are not precharged with preservative, they may be rinsed three times with sample water before filling as per direction from the lab. If the sample are precharged with preservative, the bottle will be filled by using another clean bottle to avoid any release of preservative. Sometimes, a preservative is added after filling as directed by the laboratory. The bottles will be filled appropriately to allow mixing, preservative addition, and thermal expansion. Samples analyzed for dissolved parameters will be filtered through filter paper (0.45 micrometres Millipore filter) and then preserved (if required) as soon as possible after sample collection.

Water quality samples will be analyzed by an accredited laboratory (still to be selected); the detection limits used will vary depending upon if the samples are collected on-site or in a downstream receiving environment. For samples collected from downstream receiving environments, samples will be analyzed at detection limits less than aquatic life and drinking water quality guidelines.

6.3.3 Groundwater Sampling (i.e., Westbay Well)

Well Purging

A fluid purge is conducted prior to collecting a sample from the specific Zone. Purges are conducted by directing water from the specific Zone into the Westbay casing through the sampler probe (MOSDAX sampler system, probe Model 2531) connected to the measuring port. The fluid in the casing is lowered such that pressure inside the casing is around 15 m H_2O lower than the natural pressure at the specific Zone.

Groundwater Sampling

Once purging of the well is complete, a groundwater sample for laboratory analysis is collected through the measuring port at the specific Zone using the MOSDAX sampling probe. A string of four 250 mL cleaned stainless steel bottles are first vacuumed out using a vacuum pump and then connected to a leading end of a motorized cable winch. The stainless steel bottles are filled iteratively by opening and closing the sampler probe valve while sustaining zone pressure.

Upon recovery of the stainless steel bottles at surface, water is directed into the laboratory bottles using the interconnect valve. Samples are preserved as instructed by the laboratory and shipped to the laboratory in coolers with ice packs.

6.3.4 Field Duplicates and Blanks

Duplicate samples will be collected from a subset (approximately 10 to 20%) of all samples collected to quantify environmental variability and analytical consistency. Travel, equipment, and field blanks will be collected to detect potential sources of contamination. Duplicates and blanks will be collected and handled in the same manner as the other samples in the field.

Duplicates and blanks will be given a unique QC code so samples are submitted blind to the laboratory. In the field notes, there will be clear documentation of the QC code, the type of QC sample (i.e., duplicate, blank), and when and where it was collected.

6.3.5 Sample Transport

All water samples will be stored upright in sealed coolers with ice packs and preserved as specified by the laboratory. Samples will be shipped to the external laboratory as soon as possible and dedicated ground transportation to ensure arrival in a safe and timely manner. If the sample cannot be shipped the same day, they are to be stored in a refrigerator at 4°C until shipping.

A Chain of Custody form with the following information will be completed for every shipment of samples:

- company name and sampler's name;
- sample identification name;
- time and date of sampling;
- presence and type of preservative and whether the sample was filtered or not;
- requested analytical parameters for each sample;
- time and date of shipping; and
- analytical laboratory address and contact person.

One electronic or PDF copy will be sent by email to the laboratory; an electronic copy will be kept at the Project site for reference.

7. Laboratory Analysis

7.1 EXTERNAL LABORATORY

All analytical chemistry analyses will be performed by an accredited commercial laboratory in Edmonton or Calgary, AB; Vancouver, BC; Winnipeg, MB, or elsewhere. This ensures that samples collected meet holding time requirements for all regulatory sampling. All data from the accredited laboratories will undergo a rigorous internal QA/QC process, including the use of spiked samples and duplicate samples. Toxicity tests will be performed by accredited professionals in Edmonton or Calgary, AB; Vancouver, BC; Winnipeg, MB, or elsewhere. Testing will be conducted as stipulated by the Licence and where appropriate Environment and Climate Change Canada's (ECCC) Biological Test Methods.

7.2 INTERNAL LABORATORY

An environmental and mining site laboratory will be available on-site. The in-house laboratory will perform on-site acid rock drainage testing, as appropriate to meet the day to day requirements of waste rock management and mine operations. These results will be for observational purposes and will not meet the standards of an accredited laboratory. Quality Assurance and Quality Control sampling will be completed at an accredited facility off-site at regular intervals to verify the on-site acid rock drainage data. Additional details on waste rock management can be found in the Mine Waste Rock Management Plan (SD-08).

Any long holding time parameters (e.g., metals most anions and cations, oil and grease) will go to an outside laboratory, shipped by air, after appropriate processing and preserving.

8. Data and Reporting Requirements

8.1 DATA COLLECTION

Record keeping will be conducted by Sabina and its subcontractors. Data for all water sampling will be entered into suitable electronic databases (e.g., Microsoft Access). The data will be stored and managed either by Sabina or with the subcontractor responsible for monitoring. Data will be maintained in a format to allow for comparison between years, trend analysis, and flagging out-of-compliance samples to enhance the effectiveness of the QA/QC program.

The following data will be collected for each sample in the field and will be entered into the database by the sampler for the corresponding sampling station:

- sample identification name;
- name of sampler;
- date and time of sampling or measurement; and
- physical characteristics (pH, temperature, etc.), if required.

Upon receipt of sample results from the laboratory, the data will be entered in the database and matched to the sample identification name. The certificate of analysis for each sample from the accredited laboratory will include but will not be limited to:

- analytical methods or techniques used;
- date of analysis;
- name of the person(s)/laboratory that approved the certificate; and
- results of any analysis.

All formal documents and reports will follow version-control procedures with revision tracking and version numbers. Version control information will be required for all documents and data that are issued, and approval will be given and tracked before issue. Designated personnel will coordinate preparation, review, and distribution, as appropriate, of the data and reports required for regulatory purposes.

8.2 DATA VERIFICATION

Upon receipt of analytical results, the field blank and duplicate analyses will be verified for potential contamination and accuracy, respectively. Results will be interpreted and recommended actions will be implemented, if necessary.

8.3 EXCEEDANCE REPORTING

Any measured concentration at a sample station exceeding a regulated discharge criterion will be reported to the NWB, ECCC, Kitikmeot Inuit Association, and the Indigenous and Northern Affairs Canada (INAC) water inspector; details will be provided within 30 days of the receipt of the analysis.

These regulated discharge criteria will be outlined as stipulated in the:

- Type A Water Licence (reported to NWB, ECCC, INAC); and
- MMER (reported to ECCC through the online Regulatory Information Submission System).

In addition, results of the action plan, where required, will be reported and, where necessary, mitigation options identified within 90 days after receipt of the analyses.

9. References

Government of Canada. 1985. *Fisheries Act*. R.S.C., c. F-14; current to March 28, 2016

Government of Canada. 2002a. *Nunavut Waters and Nunavut Surface Rights Tribunal Act.* S.C. 2002, c.10.

Government of Canada. 2002b. Metal Mining Effluent Regulations. SOR/2002-222; current to November 18, 2012.

INAC (Indian and Northern Development Canada). 1996. Quality Assurance (QA) and Quality Control (QC) Guidelines for Use by Class "A" Licensees in Meeting SNP Requirements and for Submission of a QA/QC Plan.

NIRB (Nunavut Impact Review Board). 2013. *Guidelines for the Preparation of an Environmental Impact Statement for Sabina Gold & Silver Corp.'s Back River Project*. NIRB File No. 12MN036).

NWB (Nunavut Water Board). 2010a. Mining and Milling Supplemental Information Guideline (SIG) for Mine Development (MM3). February 2010.

NWB. 2010b. Miscellaneous Supplemental Information Guideline (SIG) for General Water Works (including crossings, flood control, diversions, and flow alterations) (M1). February 2010.

Appendix A. Lab Accredited Certificate

To be provided as an addendum upon retention of services.

ATTACHMENT B:

Agency	TC No	Subject/Topic	Reference to Type B	Summary	Importance of issue to the Type B Water Licence review process	Detailed Review Comment	Recommendation/Request	SBB Response	Updated Attachment
KIA	KIA-NWB-6	Ship to shore bulk fuel transfer (BGC)	Oil Pollution Emergency Plan (OPEP), Section 10 Spill Scenarios and Response Strategies. OPEP, Annex 5 Bulk Cargo Transfer Procedures.	Ship to shore bulk fuel transfer is proposed at a Marine Laydown Area/Oil Handling Facility in Bathurst Inlet, utilizing floating hose deployed between the vessel and the shore. Transfer procedures appear to adhere closely to Transport Canada's Arctic Waters Oil Transfer Guidelines (TP 10783 E). However, the OPEP is not clear on roles and responsibilities for spill prevention and response related to the floating hose, or the coordination between Sabina's Fuel Transfer Master and the Supplier's Oil Transfer Supervisor. Similarly, it is not clear who is responsible for inspection of the floating hose by workboat during transfer.	The NWB has advisory functions over adjacent marine areas, but not regulatory jurisdiction. This comment is simply to provide clarity for the reviewing parties.	1. Gap/Issue: More detail is needed to clearly delineate the roles and responsibilities between Sabina's shore-based crew, and the Supplier's vessel-based crew during fuel transfer. In particular, the document should specify who is responsible for spill prevention and response for the floating hose during deployment, transfer, and demob. 2. Disagreement with WL information/ conclusion 3. Reasons for disagreement See above	Include additional detail in the OPEP to clarify the roles and responsibilities between Sabina's shore-based crew, and the Supplier's vessel-based crew during fuel transfer. It is recommended that the document specify who is responsible for spill prevention and response related to the floating hose during deployment, transfer, and demob.	On December 19th, 2017 the Nunavut Impact Review Board (NIRB or Board) issued the Project Certificate No. 007 for the Back River Gold Mine Project (NIRB File No. 12MN036) to Sabina Gold & Silver Corp. (Sabina). The Project Certificate contains the following OPEP (FEIS Volume 10, Chapter 6) specific terms and conditions: • The Proponent shall maintain an Oil Pollution Emergency Plan (OPEP) with a list of authorized personnel, staff training, and the required Northwest Territories-Nunavut spill report document (TC #90). • The Proponent shall contract only certified vessels to carry cargo for the Project, and will ensure shippers are aware of the requirements of the Shipping Management Plan, the Risk Management and Emergency Response Plan, and the Oil Pollution Emergency Plan (TC #91). • An inventory of spill equipment and listing of training undertaken shall be provided to the Nunavut Impact Review Board prior to the receipt of the first project-related shipment. Subsequently, results of annual inspections shall be included in the Proponent's annual report to the Nunavut Impact Review Board (TC #92). Under the shipper's Shipboard Oil Pollution Emergency Plan (SOPEP), the shipper is accountable for spill contingency and prevention of all spills to the marine environment, as documented in the OPEP (Annex 5; Section 3). The Supplier's Oil Transfer Supervisor will be responsible for spill prevention and response related to the floating hose and inspection of the floating hose by workboat during transfer. Sabina's Fuel Transfer Master will verify that Supplier's Oil Transfer Supervisor has implemented all safety controls and is ready for fuel transfer. Sabina remains committed to revising and providing an updated OPEP to the NIRB prior to the commencement of Project related shipping. The OPEP which will be provided to the NIRB will include detail in the OPEP to clarify the roles and responsibilities between Sabina's shore-based crew, and the Supplier's vessel-based crew during fuel transfer as suggested. The document will specify who is responsible for spill prevention and response related to the floating hose during deployment, transfer, and demob.	
KIA	KIA-NWB-53	Spill recovery capacity (Palmer)	Oil Pollution Emergency Plan (OPEP), Section 4.2.2, Page 4-2				Specify what is the expected maximum spill volume and what is the spill recovery capacity at the MLA-OHF.	The reasonably expected maximum spill volume during fuel offload is estimated to be 38 m^3 . This estimate is derived from the maximum expected discharge rate of 450 m^3/hr scaled by the longest period of time anticipated before pumping is ceased following spill initiation. During offload dedicated monitors will continuously monitor the discharge pump and pump pressure gauge as well as the discharge pipeline. A failure of the pipeline will immediately affect pump pressure allowing rapid detection and cessation of discharge. At most, this is expected to occur within 5 minutes; resulting a potential loss of 38 m^3 if the line had completely failed. The recovery capacity of the MLA-OHF is dependent on the length of time that recovery continues for. Sabina will have a skimmer capable of recovering 7.5 tonnes of oil per hour or more at the MLA during offload.	
KIA	KIA-NWB-54	Tanker ice class (Palmer)	Oil Pollution Emergency Plan (OPEP), Section 5.2, page 5-1.				Specify the ice classification system used and ice class for the fuel tanker.	Vessels entering Canadian Arctic waters must comply with Canadian shipping regulations. The Arctic Shipping Pollution Prevention Regulations (ASPPR) governs the navigation through what is commonly known as the Zone / Date System. In the Zone / Date System, the Arctic waters are divided into sixteen Shipping Safety Control Zones, with a schedule of earliest and latest entry dates for each zone corresponding to specific categories of vessels. Zone 1 has the most severe ice conditions and Zone 16 the least. The ships transporting cargo and fuel to Bathurst Inlet will be Arctic Class 1A or Type B. According to ASPPR, vessels of these types travelling the eastern route from Becancour, QC will pass through Zone 6 and are only permitted to navigate in this zone from August 25th to September 30th. Whereas a similar vessel travelling the western route from Vancouver, BC will pass through Zone 11 which allows for navigation from July 15th to October 20th. If there are any future changes to the zone/date system, Sabina's shipping plans would ensure that we meet all requirements.	
KIA	KIA-NWB-55	Oil Cargo Transfer (Palmer)	Oil Pollution Emergency Plan (OPEP), Section 5.2, page 5-1.			The oil transfer rate of 450 m3/hr is inconsistent with what is stated in Annex 5 - Bulk Cargo Transfer procedure (Section 5, 5.4), i.e. that transfer pumping rate will not exceed 149 m3/hr.	Please clarify	The MLA will have a Level 2 Oil Handling Facility (OHF) classification and an oil transfer rate of 450 m3/hr is anticipated. Annex 5 - Bulk Cargo Transfer procedure (Section 5, 5.4), i.e. that transfer pumping rate will not exceed 149 m^3/hr, will be corrected to reflect this.	
KIA	KIA-NWB-56	Spill assessment (Palmer)	Oil Pollution Emergency Plan (OPEP), Section 5.3.6.4, Page 5-7.		It is important to assess the risk and magnitude of spills assuming not only mild to moderate, but also extreme weather conditions	Spills are considered only under mild to moderate wind conditions. However, spills are expected to occur when ships hit shallow sea shelves or exposed rocks, which is more likely to occur with strong wind conditions.	Please explain why strong wind conditions were not considered in the assessment spills.	Section 5.3.6.4 of the Oil Pollution Emergency Plan (OPEP) (170913 8BC-BRP----D7OPEP-IMLE) specifically states "spills occurring in mild to moderate wind conditions generally did not progress past a few kilometres from the source location". Sabina notes that strong winds were appropriately considered in the FEIS. Bathurst Inlet marine diesel fuel spill modelling was completed to predict the fate of potential diesel fuel spills near the Marine Laydown Area (MLA) in Bathurst Inlet during the open-water season (i.e., approximately July to October). The spills were assumed to originate near the MLA site, where diesel would be stored on fuel barges anchored near the shore. The diesel volume scenarios were modelled under hundreds of different wind conditions (including strong winds), from which spill probability distribution figures were generated. Results of this modelling study can be found in Appendix V9-3A of the FEIS.	
KIA	KIA-NWB-57	Spill response - water requirements (Palmer)	Oil Pollution Emergency Plan (OPEP), Section 9, Page 9-2.				Please indicate where the water for pressure-washing will be sourced from, and whether this involves the installation of additional water intake points.	Sabina's existing 2BE-GOO1520 and 2BE-GEO1520 authorize allowances for camp water or miscellaneous industrial uses. For example; Part C, Item 1 of 2BE-GOO1520, authorizes up to 267 cubic metres per day which can be obtained from Goose Lake and Llama Lake in winter and from Goose Lake, Llama Lake, and Umwelt Lake in summer. If an emergency arose, and Sabina needed additional water usage outside of the already authorized allowance, Sabina would provide expected volumes and source locations to the NWB and seek approval.	
KIA	KIA-NWB-58	Spill containment - lined berms (Palmer)	Oil Pollution Emergency Plan (OPEP), Section 9.5, Page 9-7.				Please indicate whether the lined berms will be temporary and set up as a result of the spill, or whether they will be permanent structures. Also indicate expected locations of the lined berms.	Please see Sabina Technical Comment Response, KIA-NWB-38.	
KIA	KIA-NWB-59	Spill response - third party assistance (Palmer)	Oil Pollution Emergency Plan (OPEP), Section 10.1, Page 10-5.		It is important to determine whether third party assistance may be required in the event of a large spill.	The need for third party assistance should be determined prior to the commencement of the project, based on the expected maximum spill volume and the required capability to contain and clean it.	Please specify the need for third party assistance for spill response.	Sabina does not anticipate the need for third party spill response assistance due to the pre-emptive staging of spill response supplies at the MLA and implementation of stringent management practices aimed at ensuring both early detection of, and rapid and effective response to, any off-load related spill. Management practices to ensure rapid detection of fuel loss will include having personnel continually patrol the discharge lines and having dedicated personnel continuously monitoring pumping pressure and able to rapidly cease discharge. Additionally, spill response equipment will be positioned in a manner to allow rapid deployment, containment and retrieval of spilt fuel, and personnel will be trained in spill response procedures. As required, the fuel provider will also separately have spill-response-trained personnel and ship-board spill response equipment. However, should additional assistance be necessary, Sabina will seek third party support from the Mackenzie Delta Spill Response Corporation (MDSRC). MDSRC offers 24/7 spill response support in the NWT and Nunavut, including additional expertise, response personnel, and access to a large inventory of marine spill response equipment positioned throughout Nunavut and the Northwest Territories. This includes a fit for purpose response boat located in the nearby Melville Sound. MDSRC will be notified in advance of an offload, and equipment can be rapidly deployed to the location needed by air or sea.	
KIA	KIA-NWB-60	Oil Cargo transfer (Palmer)	Oil Pollution Emergency Plan (OPEP), Annex 5, Section 5, point 5.4.				The rate of 149 m3/hr indicated here is inconsistent with the maximum pumping rate of 450 m3/hr stated Section 5.2, page 5-1.	The MLA will have a Level 2 Oil Handling Facility (OHF) classification and an oil transfer rate of 450 m^3/hr is anticipated. Annex 5 - Bulk Cargo Transfer procedure (Section 5, 5.4), i.e. that transfer pumping rate will not exceed 149 m^3/hr, will be corrected to reflect this.	

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KIA	KIA-NWB-88	Wildlife Summary (Zoetica)	Type B Water Licence, Main Application Supporting Document, Section 5.2.4., Page 52. Sabina states: "A full summary of potential effects related to Terrestrial Wildlife and wildlife habitat is provided in FEIS Volume 5, Sections 5.5, 6.5, 7.5, 8.5, 9.5, and 10.5."	The summary of impacts to wildlife in Section 5.2.4. appears incomplete.	It is important that all relevant information is summarized in the water license application, including representation of wildlife impacts.	4. Gap/Issue Section 5.2.4. appears incomplete. 5. Disagreement with WL information/ conclusion Unlike other impact sections, such as for the physical environment, archeology, and fish, no summary or details were provided for wildlife. The reader is only referred to the FEIS. 6. Reasons for disagreement Given the numerous wildlife described in Section 5.2.2, a summary, even if brief, is warranted regarding the type and extent of impacts.	Please provide a brief summary of potential impacts to wildlife similar to the summaries for other sections.	The following response discusses the potential effects and mitigation for Project activities described in the Type B Water License Application. <u>Caribou</u> The caribou section of the FEIS (Volume 7, Section 5) describes the baseline surveys conducted for caribou, including Traditional Knowledge (TK) report preparation, aerial surveys, remote camera studies and range mapping. The Beverly/Ahiak herd overlaps the Project site during later summer, fall and sometimes in winter. The Bathurst caribou herd does not overlap the Project site; the closest this herd gets to the Project is during post-calving when it passes by, approximately 50-75 km south of the Goose site. The Dolphin and Union herd are generally to the north of the Project, including the Marine Laydown Area (MLA). Mitigation for caribou is described in the Wildlife Mitigation and Monitoring Program Plan (WMMP Plan) (Version 7, submitted with FEIS Addendum February 2017) which applies to all Project activities. Mitigation and management for caribou focuses on ensuring that caribou who use the Project site are safe, and managing activities to reduce noise disturbance to caribou. Mitigation to keep caribou safe includes speed limits (50 kph) and giving them the right of way on Project roads, as well as management of hazardous materials and fuel to manage these substances so that they do not enter the ecosystem and be available for caribou. Management to reduce disturbance to caribou includes managing helicopters to maintain separation from caribou, stopping vehicles when caribou are near the roads, and managing quarry blasts. Note that the activities proposed in the Type B Water License Application include quarry blasting and construction of short sections of on-site all-season service roads, but do not include construction or operation of a mill, open pit mining, or operation of the winter ice road from Bathurst Inlet to the Goose Property Area. With this mitigation in place, no significant effects were predicted due to the Back River Project, and for the initial development works of this Type B Water License Application. <u>Grizzly bears</u> The muskox section of the FEIS (Volume 7, Section 6) describes that baseline surveys for grizzly bears included a capture-recapture DNA study using scent-baited posts in a grid covering the Regional Study Area (RSA). This study indicated that grizzly bear occur throughout the broader RSA at low density including at the Project site. There were some areas with concentrations of grizzly bears, including the Western River at the east side of the RSA (35-40 km east of Goose Lake) and at the mouth of the Western River into Bathurst Inlet. Grizzly bears dig new dens each year, typically in eskers and stream banks. The footprint of the Type B Water License Application is not expected to interact with these features. Mitigation for grizzly bears is focused on managing attractants such as garbage, sewage, and food waste and ensuring that the Project site has been constructed in such a way as to exclude scavengers – e.g., skirting around buildings, and prohibit littering and feeding wildlife. With this mitigation in place, no significant effects were predicted due to the Back River Project, and for the initial development works of this Type B Water License Application. Muskox The muskox section of the FEIS (Volume 7, Section 7) describes that baseline aerial surveys reported muskox at low density in the RSA. The locations of muskox observations were variable in the RSA, however there were relatively consistent observations of muskox approximately 10-15 km west and north of the MLA in an area of rocky hills, presumably because the hill tops were wind-blown and vegetation was available there. Mitigation for muskox is focused on managing helicopters so that muskox are not disturbed, and on the use of vehicles on Project roads and the winter ice road from Bathurst Inlet to the Goose Property Area. Note that the winter ice road is proposed for the Back River Project, but not within this Type B Water License. With this mitigation in place, no significant effects were predicted due to the Back River Project, and for the initial development works of this Type B Water License Application. Wolverine and Furbearers The wolverine and furbearer section of the FEIS (Volume 7, Section 8) describes that baseline surveys for wolverine included a capture-recapture DNA study using scent-baited posts in a grid. These studies indicated that wolverine occur throughout the broader Regional Study Area (RSA) at low density including at the Project site. Aerial surveys for wolf and wolverine dens located several active dens in the RSA, however, no dens are located within the proposed Project footprint, and so no dens will be removed or altered by the construction of the Project. Mitigation for wolverine and furbearers is focused on managing (including incineration) of attractants such as garbage, sewage, and food waste and ensuring that the Project site has been constructed in such a way as to exclude scavengers – e.g., skirting around buildings. With this mitigation in place, no significant effects were predicted due to the Back River Project, and for the initial development works of this Type B Water License Application. Migratory Birds The migratory bird section of the FEIS (Volume 7, Section 9) describes that baseline studies for migratory birds included both Program for Regional Shorebird Monitoring (PIRSM) plots and Variable Radius Point Counts (VRPC) plots in and surrounding the Project Development Area (PDA), as well as aerial surveys in a grid for waterfowl. Both types of migratory birds were recorded at low density both inside and outside the PDA. Importantly, no migratory stopover locations were located within the PDA, but were reported at lakes in the Regional Study Area (RSA). Mitigation for migratory birds focuses on conducting vegetation clearing outside of the breeding season, conducting pre-construction surveys and buffering nests if clearing is scheduled in the breeding season and through the proper water management to ensure waterfowl using Project ponds or the ocean near the MLA are safe from oil. With this mitigation in place, no significant effects were predicted due to the Back River Project, and for the initial development works of this Type B Water License Application. Seabirds/Seaducks The raptor section of the FEIS (Volume 7, Section 6) describes that baseline studies for seabirds were conducted through aerial surveys of Bathurst Inlet and shoreline surveys for nests at the MLA. Shoreline surveys indicated that the cobble and gravel beach at MLA is a poor location for nesting seabirds, while rocky cliffs elsewhere supported seabird nests. However, no seabird colonies were found in southern Bathurst Inlet. Aerial surveys during spring, summer and fall indicated several bays where groups of seabirds and waterfowl were observed, including the bay to the south of the MLA peninsula. Mitigation for seabirds includes avoiding seabird colonies while shipping through the northwest passage and Bathurst Inlet, noise control, and fuel management at the MLA through the Fuel Management Plan, SOPEP and OPEP to manage the potential for spills. With this mitigation in place, no significant effects were predicted due to the Back River Project, and for the initial development works of this Type B Water License Application. Raptors The raptor section of the FEIS (Volume 7, Section 10) describes that baseline surveys found no raptors nesting within the footprint of the Goose or MLA sites. No raptor nests are located within 5 km of the MLA, while only one raptor nest is located within the Project Development Area (PDA) for the Goose Site. This nest is approximately 160 m from the all-weather service road connecting the Goose Plant Site Pad and the Goose Exploration Camp discussed in the Type B Water License application. Mitigation for raptors includes scheduling construction activities outside of the nesting period, where possible, and where construction cannot be delayed, maintaining a minimum of 100 m buffer surrounding the nest, as well as instructing pilots to avoid overflights of raptor nests. With these mitigations in place, potential effects on raptors were deemed Not-Significant for the Back River Project, and for the initial development works of this Type B Water License Application. Ringed Seals The ringed seal section of the FEIS (Volume 7, Section &) outlines that Traditional Knowledge (TK) and aerial surveys conducted in the spring indicate that the density of ringed seals and the pressure ridges they use for building lairs are common in the northern portion of Bathurst Inlet. However, seals were rare south of Kingaok where the sea ice has few pressure ridges, few breathing holes and no lairs were observed. TK did not identify the MLA as a good hunting location for seals during summer, but did identify other areas in northern Bathurst Inlet. Therefore, the density of seals is expected to be low during the summer when fueling operations will be performed at the MLA. The WMMP Plan indicates that mitigation for ringed seals includes: there will be no permanent in-water works, so there will be no habitat loss, ships will avoid groups of marine mammals when safe to do so, fuel handling will be conducted safety by ships (SOPEP) and at the MLA (OPEP), spills will be cleaned up promptly (Fuel Management Plan), and on-ice surveys will be conducted for lairs prior to construction should construction occur during the seal pupping period. Due to the low number of ringed seals in southern Bathurst Inlet, and the mitigation measures proposed, no residual effects were predicted to the Back River Project, and for the initial development works of this Type B Water Licence Application.	
KIA	KIA-NWB-89	List of Management Plans (Zoetica)	Type B Water Licence, Main Application Supporting Document, Section 6, Page 60, Table 6.1. List of Management Programs and Associated Management Plans under Development for the Project Type A Water Licence.	The Wildlife Mitigation and Management Plan (WMMP) were not referenced in this list of environmental plans.	It is important to have all plans listed so that readers are aware of the wildlife related plans.	This Table listing management programs and associated management plans under development for the Type A Water Licence does not include mention of a wildlife mitigation and management plan (WMMP) even though wildlife were mentioned/discussed at the beginning of Section 6. Was this reference missed, or is the WMMP covered within the Environmental Management and Protection Plan?	Please reference the WMMP if applicable.	The Nunavut Water Board (NWB) mandate is to license uses of water and deposits of waste and the management plans listed in Table 6.1 of the Main Application Document reflect this. As such, the Environmental Management and Protection Plan (EMPP) (170913 8BC-BRP-···-D6EMPP-IMLE_Version2.0) for the Type B Development Works Water Licence application (this application) focuses on mitigation and monitoring related to water quality. However, the Wildlife Mitigation and Monitoring Program Plan (WMMP Plan) focuses on mitigation and monitoring for wildlife and is applicable for all Project activities; from Section 1.0 of the WMMP Plan: "Unless otherwise indicated, measures described in the Plan apply to all Project components for the life of the Project."	

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KIA	KIA-NWB-90	Accidental wildlife death (Zoetica)	Type B Water Licence, Road Management Plan (RMP), 7.6 Management of Wildlife Incidents, Page 7-2. Sabina states: "In the case of the accidental death of an animal, environment personnel will contact the Government of Nunavut Wildlife Officer, KIA Senior Lands Manager, and the Hunters and Trappers Organization office in Kugluktuk and Cambridge Bay to discuss what to do with the carcass. The default action will be to remove the carcass from the road and incinerate it to avoid attracting scavengers, such as wolves, grizzly bear, Arctic fox, and/or wolverine."		It is important that wildlife deaths be handled with appropriate care to limit unnecessary waste.	This section states that in the case of the accidental death of an animal, KIA will be notified but the default action will be to remove the carcass from the road and incinerate it to avoid attracting scavengers. Is this correct? There is no requirement to use the meat, fur, or other parts?	Please confirm that there is no requirement to allow for use the animals for parts (e.g., by HTOs) in the default case.	The road management plan (Appendix D1, Section 7.6) indicates that the management actions to be followed are: "In the case of the accidental death of an animal, environment personnel will contact the Government of Nunavut Wildlife Officer, KIA Senior Lands Manager, and the Hunters and Trappers Organization office in Kugluktuk and Cambridge Bay to discuss what to do with the carcass. The default action will be to remove the carcass from the road and incinerate it to avoid attracting scavengers, such as wolves, grizzly bear, Arctic fox, and/or wolverine." Therefore, the first line of action is to contact the government, KIA and HTOs to discuss what to do with the carcass. Should the GN, KIA or HTOs be not interested in the meat, fur or other animal parts, then the default action will be to incinerate the carcass. In the absence of direction from the GN, KIA or HTOs, then the default action is to incinerate the carcass. However, if the GN, KIA or HTOs indicate that a different default action is preferable, then Sabina is open to discussing a different default action.	
KIA	KIA-NWB-91	Fuel Attraction (Zoetica)	Type B Water Licence, Fuel Management Plan (FMP).		It is important that wildlife be included in other management plans so that the readers of these plans are aware of potential issues with wildlife.	There was no reference to wildlife in this document. Is there any reason to prepare for the potential of wildlife attraction to fuel or fuel storage areas?	Please discuss any expected issues with regards to wildlife or indicate if there are none anticipated.	Sabina does not anticipate that wildlife will be attracted to fuels at the Project site. The management of fuels on site through the Fuel Management Plan will be conducted to ensure the safe handling of fuel, minimize any leaks and spills, and effectively manage any spills. By effectively managing and controlling the use of fuels, these measures will minimize the smell of fuel on site and limit the chance for wildlife to be attracted to site. The WMMP Plan includes provisions for minimizing the attractiveness of the Project site (See Sections 7.1.9 and 7.1.10), and address wildlife which may become attracted to the site, through reviewing mitigation measures, adaptively managing attractants, and deterring wildlife who's behaviour are putting them at risk of injury.	
KIA	KIA-NWB-92	Quarry Management Relating to Wildlife (Zoetica)	Type B Water Licence, Quarry Management Plan (QMP), Appendix A, Section 8, Page 23, Table 8-1. Mitigation and Adaptive Management Measures. Sabina states: "The Air Quality Monitoring and Management Plan will be followed to reduce or eliminate impacts from air."	The Quarry Management plan does not give any indication towards best practices relating to wildlife, or refer to the WMMP.	It is important that all the parts of the various plans that make up the water licence application are appropriately cross referenced so that the readers are aware of the WMMP.	Blasting mitigation does not state that blasting will follow applicable measures given in the WMMP to protect wildlife. This would be similar to referencing other plans such as for air quality etc. that will be followed.	Please indicate that that the WMMP plan will also be followed as it related to protecting wildlife from excessive blasting disturbance.	The Wildlife Mitigation and Monitoring Program Plan (WMMP Plan) is applicable to all Project phases and activities. The WMMP Plan includes provisions for managing noise from blasting when wildlife are nearby.	
KIA	KIA-NWB-93	Tactical Spill Response (Zoetica)	Type B Water Licence, Oil Pollution Emergency Plan (OPEP), Section 5.3.6.4, Page 5-7. Sabina states: "with these setbacks in place and the low residual spill probabilities provided, a tactical response plan showing fuel spill dispersion modelling results relative to local sensitivities was not deemed a requirement at this time".	It is unclear if all situations and input conditions to the model would result in low residual spill probabilities.	It is important to provide assurance that spill planning is sufficient	1. Gap/Issue It is unclear why a tactical response plan showing fuel spill dispersion modelling results relative to local sensitivities was not considered. 2. Disagreement with WL information/ conclusion This section seems to emphasize the volatile components of oils over long-lasting components, and focuses on low risk scenarios (such as low and moderate wind conditions). There is no mention of a high wind scenario for comparison. 3. Reasons for disagreement It would be helpful to provide more detail about the model results and assumptions to enable the reader to also arrive at the conclusion that a tactical response plan does not need to be considered.	Please provide an additional summary of high wind conditions and the effects of additional factors on spill results. Please also provide additional justification as to why a tactical response plan is not warranted.	Sabina notes that high winds and their effects on spill results were appropriately considered in the FEIS. Bathurst Inlet marine diesel fuel spill modelling was completed to predict the fate of potential diesel fuel spills near the Marine Laydown Area (MLA) in Bathurst Inlet during the open-water season (i.e., approximately July to October). The spills were assumed to originate near the MLA site, where diesel would be stored on fuel barges anchored near the shore. The diesel volume scenarios were modelled under hundreds of different wind conditions (including strong winds), from which spill probability distribution figures were generated. Results of this modelling study can be found in Appendix V9-3A of the FEIS. Sabina would also like to note their commitment to develop a tactical response plan prior to the commencement of any large-scale fuel transfer activity. As stated in the OPEP introduction (170913 8BC-BRP----D7OPEP-IMLE), various OPEP terms and conditions, and commitments, were made within and throughout the Nunavut Impact Review Board (NIRB) review process. Exhibit No. 45 submitted to the NIRB during the FEIS Addendum Final Hearing of the Back River Project (NIRB File No. 12MN036), commitment identifier "ECCC-C-5", states: *The Proponent commits to developing a tactical fuel spill response plan for the Oil Handling Facility at the MLA, including the required response capabilities, prior to the commencement of any large-scale fuel transfer and storage activities.* Exhibit No. 45 can be accessed from the NIRB's public registry at the following location: http://www.nirb.ca/application?strP=r	
KIA	KIA-NWB-94	Oiled Wildlife (Zoetica)	Type B Water Licence, Oil Pollution Emergency Plan (OPEP), Section 9.4, Page 9-6. Sabina states that: "efforts shall be made to collect alive or dead oiled wildlife. In the event of a spill occurring in or around a water body, shorelines and beaches shall be inspected for contaminated wildlife to be collected".	There is some uncertainty over the practices involved in collection and storage of oiled wildlife in the event of a spill.	In the event of a spill it is important to have clear procedural guidelines for how wildlife will be addressed.	While the oil emergency plan does include a description of collection of wildlife, and the storage of oiled wildlife in boxes, additional detail is needed. The plan notes that wildlife will be put into cardboard boxes. How would larger mammals such as seals be handled? The proposed response seems to be logical and well thought out, however it may benefit from planning for additional scenarios to ensure appropriate preparations are in place.	Please provide additional detail and planning with regard to how larger mammals that may be become oiled would be managed? Would these animals also be collected, and how would they be stored or rehabilitated?	In the unlikely event of an oil spill, if larger mammals such as seals are affected, DFO would be contacted for handling and rehabilitation. As per DFO guidelines, when oiled marine mammals are discovered, they will be reported to DFO as marine mammal incidents (dead, injured or sick). Marine mammals that are found oiled (alive or dead) or found dead near a recent spill event are likely to be examined and/or collected by DFO for both necropsy and legal purposes. In the event of an oil spill, the Central/Arctic Region will be contacted, as per the guidelines to report a marine mammal in distress. Furthermore, DFO guidelines require marine pollution incidents (i.e., oil spill, oiled wildlife) be reported to the Nunavut/Arctic Coast Guard. *Reference:* *DFO Central/Arctic Region: http://www.dfo-mpo.gc.ca/fm-gp/mammals-mammiferes/report-rapport-eng.html* *DFP Guidelines for marine pollution incident: http://www.ccg-gcc.gc.ca/eng/CCG/ER_Reporting_Incident*	
KIA	KIA-NWB-95	Oiled Wildlife Rehabilitation (Zoetica)	Type B Water Licence, Oil Pollution Emergency Plan (OPEP), Section 9.4, Page 9-7. Table 9.4-1, Emergency Contacts in Case of Spills Affecting Wildlife.	There is some uncertainty over the practices involved in treatment and rehabilitation of oiled wildlife in the event of a spill.	In the event of a spill it is important to have clear procedural guidelines for how wildlife will be addressed.	The Table indicates that the nearest wildlife rehabilitation center is in Nova Scotia. We do not assume that transport to Nova Scotia would be considered if wildlife rehabilitation is needed, as this degree of delay would not prevent mortality. It is unclear how wildlife would be dealt with following immediate treatment. More detail could be provided in this section.	Please provide additional detail and suggest ways that wildlife treatment and rehabilitation may implemented given the remote location.	As per DFO guidelines, when oiled marine mammals are discovered, they will be reported to DFO as marine mammal incidents (dead, injured or sick). Marine mammals that are found oiled (alive or dead) or found dead near a recent spill event are likely to be examined and/or collected by DFO for both necropsy and legal purposes. In the event of an oil spill, the Central/Arctic Region will be contacted, as per the guidelines to report a marine mammal in distress. Furthermore, DFO guidelines require marine pollution incidents (i.e., oil spill, oiled wildlife) be reported to the Nunavut/Arctic Coast Guard. *Reference:* *DFO Central/Arctic Region: http://www.dfo-mpo.gc.ca/fm-gp/mammals-mammiferes/report-rapport-eng.html* *DFP Guidelines for marine pollution incident: http://www.ccg-gcc.gc.ca/eng/CCG/ER_Reporting_Incident*	
KIA	KIA-NWB-96	Oil emergency Equipment for Wildlife (Zoetica)	Type B Water Licence, Oil Pollution Emergency Plan (OPEP), Annex 6 and Annex 4.	Emergency equipment quantity and location is described in these documents. However, equipment related to wildlife is incomplete.	It is important that oil emergency response plans are easy to implement if needed. All equipment referred to in the plans should be in a designated or known location. This would help to avoid unnecessary delay in locating supplies. In the case of preparing for oiled wildlife, there may be additional equipment which should be described in advance.	Annex 6 provides a list of equipment that is carried on ships in case of an oil spill. Annex 4 provides an additional list for equipment that will be available for dealing with spills on land. However, there may be additional supplies missing for the handling, storage, and potential first response treatment of oiled wildlife. Given the remote location, it may it may be beneficial to have at least some on-site wildlife rescue equipment.	Please clearly indicate where wildlife collection and treatment equipment will be located and consider listing additional supplies that would be needed in handling, storage, and the first response treatment of oiled wildlife.	As described in Section 1.0 of the Oil Pollution Emergency Plan (OPEP), the OPEP applies to the Project and specifically the Oil Handling Facility (MLA-OHF). The OPEP was developed to specifically assist in implementing measures to protect the marine environment and minimize impacts from potential spill events. Oil emergency equipment for wildlife will be stored at the MLA-OHF to meet the measures described in the OPEP for the management of oiled wildlife.	