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FISHERIES AND OCEANS CANADA

Technical Review Comments

Application for Type 'A' Water Licence, File No. 2AM-BRP---, Back River Project; Sabina Gold & Silver Corp.

Submitted to: **Nunavut Water Board**

March 26, 2018

DFO File No.: 12-HCAA-CA7-00007
NWB File No.: 2AM-BRP----

Canada

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Executive Summary

The Back River Project (The Project) is a proposed gold mine owned by Sabina Gold and Silver Corporation (Sabina or the Proponent) within the West Kitikmeot region of Nunavut. The Project is composed of two areas: The Goose Property and the Marine Laydown Area (MLA) situated along the western shore of southern Bathurst Inlet.

The Fisheries Protection Program (Program) of Fisheries and Oceans Canada (DFO-FPP) is responsible on behalf of the department for regulatory review of proposed developments occurring in or near Canadian fisheries waters. The Program has reviewed the Application for a Type "A" Water Licence and supporting documents for the Back River Project, and is providing DFO-FPP's comments based on our mandate under the *Fisheries Act* to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries, including marine mammals and their habitat. DFO-FPP's primary focus in reviewing proposed developments in and around fisheries waters is to ensure that works, undertakings and activities are conducted in compliance with the applicable provisions of the *Fisheries Act*.

The fisheries protection provisions of the *Fisheries Act* (2013), specifically subsection 35(1), state that "*No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery or to fish that support such a fishery*." However, under paragraph 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries and Oceans may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish. Serious harm to fish is defined in Section 2 of this Act as the death of fish, or permanent alteration to or destruction of fish habitat.

DFO-FPP is providing the following technical review submission in response to the Nunavut Water Board correspondence dated February 23, 2018, requesting written technical review comments related to Sabina's Application for a Type "A" Water Licence for the Back River Project. The technical review comments in this submission are categorized under the following general topics: Freshwater Environment and Conceptual Fish-Out and dewatering Plan.

<u>Freshwater Environment</u>

Proposed infrastructure and Project works, undertakings and activities, including blasting, water withdrawals in support of winter road construction, watercourse crossings, and flow reductions in Rascal Stream East, Goose Inflow South and Goose Inflow East have the potential to cause *serious harm* to fish as defined by the *Fisheries Act*.

The proposed project will result in the loss of Rascal Stream East, Goose Inflow East and Goose Inflow South Arctic Grayling spawning habitat. To offset this, Sabina proposes to construct fish passage in Rascal Stream. This will help address the uncertainty as to whether Arctic Grayling spawning will be limiting for the Goose Lake grayling population.

Fish-Out and Dewatering Plan

Sabina has previously submitted a Conceptual Fish-Out Plan, which was developed to address the need to dewater both Llama and Umwelt lakes for the development of the Back River Project. During the Regulatory Review Phase, DFO-FPP will continue to work with Sabina and the affected communities to finalize a Fish-Out and Dewatering Plan.

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ᐅᓴᖅᑕᕐᕋᐅᔨᓯᒪᔪᖅ The Back River Project (ᐅᓴᖅᑕᕐᕋᐃᖅ) ᐱᓇᓱᒃᑕᐅᔨᖅ ᔪᓂᓯᐅᓂᓂᑎᒃ ᐅᓴᖅᑕᕐᕋᐃᖅ ᐱᖏᑎᑎᑭᐅᔨᖅ ᓴᐱᐱᓇ ᔪᓂ ᖃᓪᓗᓯᖏᓪᓗᓂ ძᐊᐳᓴᓴᵒ Sabina Gold and Silver Corporation (ᓴᐱᓇ ᐃᓕᑎᕐᓴᖓ) ᐃᓂᐊᓂ ᐊᑭᵒᓇᖓᓂ ᖃᑎᖏᑎᐅᓪ ᓄᓇᕗᑦ. ᐅᓴᖅᑕᕐᕋᐃᐅᔨᓯᒪᔪᖅ ᒪᑕᓪᖓᓴᔨᖅ: ᔪᓴ ᓄᓇᖓᓂ The Goose Property ᐊᓘᒐᓂ ᑕᓚᐅᖏᓯᓂᑯᒥ Marine Laydown Area (MLA) ᓂᕆᖓᓂ ᐊᑭᵒᓇᖓᑕ ᓂᑎᐊᓂ ᖃᑎᓕᐅᓪ Bathurst Inlet.

ᐃᖏᓂᐃᓪ ᓴᐳᖓᐅᓂᒪᓂᕐᑎᑦ ᐊᐅᓪᑕᑎᐅᔨᖅ ᐃᐃᒪᖏᐅᑕᓚᓱᐅᓄᓪᓄᑦ ᑲᓇᑕᒥ ᑲᒪᑎᕆᖏᖏᒪᑕ ᑭᒪᕐᑐᐃᓪᓕᑐᑎᑲ ᒪᓕᒪᑐᖏᑲᐅᓄᓪᓄᑲ ᐱᓕᓪᓚᐊᓂᐅᔨᑦ ᑕᓚᐅᖓᑕ ᖏᖏᑎᐅᑕᓂ

ᐱᓪᒪᖅᓯᒃᐳᓪᓗᖅ ᐱᖏᑎᖓᒋᑦ ᐊᒻᒪᓗ ᓴᓇᕗᐅᓂᐊᖏᑐᑦ, ᐱᓕᕆᑭᐊᓂᐊᖏᑐᑦ, ᐱᓯᓕᓕᐊᓂᐅᓂᐊᖏᑐᑦ, ᐱᖏᓱᐅᑎᑦᓗᒋᑦ ᖃᐅᖏᑦᑎᖏᑦᑕᖏᓂᖅ, ᐃᒪᐃᓴᐃᓂᖅ ᐊᖏᑦᑐᐅᓂᖓᓪᓕᑦ ᐅᑭᐅᓄᑯᑦ, ᐃᐅᑭᑎᓕᐅᖏᓂᖅ, ᐊᒻᒪᓗ ᑯᓚᓂᖅᓱᓂᖅ ᑎᑭᓕᕆᓂᖏᑎᓂᖅ ᑯᒥ Rascal Stream East, Goose Inflow South ᐊᒻᒪᓗ Goose Inflow East ᐃᓄᐱᓚᐅᑎᓂᐊᖏᒪᑕ ᐱᐅᖓᑦᑐᒍᓪᓕ *ᐃᓄᐱᓚᐅᑎᑦᓭᓚᓄᓄᓄ ᐱᐅᓴᓂᔪᑕᐅᓗᓂᓂ* ᐃᖏᓗᓂᓂᐅᑦᑐᓂ ᑐᑭᖓᓗ ᒪᓕᓄᓗᒍ *ᐃᖏᓗᓂᓚᓂᐊᓂᓂ ᐱᖏᖅᖓᑦᑐᓂ.*

ᐱᓪᒪᖅᐅᓂᖅ ᐱᖅᓕᐊᓂᐅᓂᖅ ᐊᔪᐅᐸᓴᑕᐅᓂᐊᖏᒪᑦ ᑯᖓᒍᑦ Rascal Stream East, Goose Inflow East ᐊᒻᒪᓗ Goose Inflow South ᐅᑭᐅᖏᑕᖏᑐᒥ ᐃᖏᓄᓗᐃᑦ ᐃᖏᓂᐅᕐᖓᓚᓂ ᐃᓂᒋᔭᖏᓚᓂ. ᑕᐃᒪᐃᓐᓂᖓᓚᓄᑦ ᑯᓕᐅᕈᒪᓪᒪᑕ ᐃᖏᓄᓗᐃᑦ ᐊᖏᑎᖓᑎᓂᐊᖏᑕᖓᓚᓂᓂᖅ ᑕᐅᓐᓇ Rascal Stream. ᐃᓄ ᓴᑕᐅᓂᐊᖏᑐᖅ ᖁᓄᐅᒪᓇᖓᓐᓂᖓᓐᓂᓄᑦ ᐅᑭᐅᖏᑕᖏᑐᒥ ᐃᖏᓄᓗᐃᑦ ᐃᖏᓂᐅᕐᖓᖅᖓᑎᑦ ᑕᓐᓂᑐᐊᖏᖅ ᑕᓯᖏᒥᓄ Goose Lake ᐃᓂᖏᑦᓚᖓᒍᑕ.

<u>ᐃᖏᓄᓗᐃᓴᐃᓂᖅ ᐃᒪᐃᓴᐃᓂᖏᓗ <ᖏᓇᐅᑎᑦ</u>

ᓴᐱᓇ ᑐᓂᓯᓯᒪᓴᑦ ᖁᓄᓀᐃᓕᓚᖓᓚᓂᓚᓂᓄᑦ ᐃᖏᓄᓗᐃᓴᐃᓂᖅ ᐃᒪᐃᓴᐃᓂᖏᓗ <ᖏᓇᐅᑎᑦ, ᐊᖏᑲᑕᐅᓕᐅᖏᑐᑦ ᐃᒪᐃᓴᓇᐊᖏᖅᓂᖓᓚᓂᓂᖅ ᒪᑭᑲ ᑕᓯ Llama ᐊᒻᒪᓗ Umwelt ᑕᓯ ᐱᓕᕆᓕᐊᓂᒋᑦ ᐅᓴᖅᑕᖏᕐᕕᑲ Back River Project. ᖁᑎᑭᓴᐅᑎᓂᓗᒍ ᒪᓕᓚᑎᒍᑦ, ᐃᒪᖏᐅᑕᓕᓇᓱᑲᒥᑦ ᐱᓕᓇᖏᑎᖏᐃᓐᓇᓂᐊᖏᑐᑦ ᓴᐱᓇ ᓄᓇᓕᐅᕐᓂᑲ ᖁᓂᑎᓴᓚᓂᓂ ᐃᖏᓄᓗᐃᓴᐃᓂᖅ ᐊᒻᒪᓗ ᐃᒪᐃᓴᐃᓂᖅ ᐅᖏᓂᐅᓯᐅᓕᓕᓇᑎᓂᓗᒍ.

Ataniuyunut Nainaqhimayuq

Tamna Hanningayuq Kuugaq Havanguyuq (Tamna Havanguyuq) uuktutauyuq guulit uyagakhiuqvik nanminigiyat tapkuat Sabina Guulit Silverlu Kuapurisan (Sabina tamnaluniit Uuktutilik) tahamani pingangnaani Kitikmeot avikhimaniani Nunavut. Tamna Havanguyuq ilalik malguk nunait: Tamna Goose Havakvia tahamnalu Tagiuqni Iliuqaqvik Nuna (MLA) inilik tahamani pingangnaata hinaani tahaphuma nigingani Kingaok.

Tamna Iqaluliqutinut Hapuhimani Havagutit (Havagut) tapkunanga Iqaluligiyit Tagiuligiyitlu Kanata (DFO-FPP) havalgit kivgaqtuqhugit tapkuat timinga aulattiyuninut naunaiyainiq uuktutauyunut pivalianit atuqtauyut tahamani hanianiluniit Kanatamiuni iqaluliqutit imait. Tamna Havanguyuq naunaiyaqhimaya tamna Tukhigaut taphumunga Qanugittunia “A” Imaqmun Laisa ikayuqhiutinilu titiqat taphumunga Hanningayuq Havanguyuq, piqaqtitnilu DFO-FPP-nga uqauhini pihimayut havagiyaqaqtaptingni malikhugit tapkuat *Iqaluliginiqmun Piquyat* ihuaqhihimaninut tapkuat atutqikhalat atuinaqtutlu hanayaunit maniliugutit, aliahutauni naunaiyaqnilu uuktutauyut tapkuatlu Nunaqaqaqtut iqaluliqutit, ilautitlugit tagiuqni mitqulgit nayuqpaktailu. DFO-FPP-kut aturniqhat pinahuaqni naunaiyainiqmun uuktutit pivaliatitni tahamani avataanilu iqaluliginiq imait atuqpiagiangi tapkuat havat, havagiyauyut huliniitlu havaktauni malikhugit tapkuat atulaqnit piqagutauni tapkunani *Iqaluliginiqmun Piquyat*.

Tapkuat iqaluliginiqmun hapuhimani piqagutaunit tapkunani *Iqaluliginiqmun Piquyat* (2013), piluaqtumik nakataata ilaani 35(1), uqaqhimayuq tamna “*Kinaliqak atuqniangilaq kitunikliqak havaqnik, havakni huliniiluniit tapkuat qanugitni huliniiluniit piyutauyut akhut huguqtitni iqaluit ilagiyat maniliugutinut, aliahutauni tamnaluniit Nunaqaqaqtut iqaluliqutit tamnaluniit iqalukhiurniq ikayuqtuiyuq taimaittumun iqaluliqutit*.” Kihianik, malikhugu taiguaq 35(2)(b) tapkunani *Iqaluliginiqmun Piquyat*, tamna Minihitauyuq Iqaluliginiqmun Tagiuqmiutanutlu tunihilaq pilagutmik maligaqaqtitlugit atuqgialgitlu tugangayut taphumunga uuktutauyuq havaq, havagiyauni huliniitluniit pityutaulat akhut huguiniq iqaluknik. Akhut huguiniq unniqtauyuq talvani Nakataani 2 uumani Piquyat tamna tuqupkaqnia iqaluk, ahianguqtitpiaqnialuniit ahigurtiqnialuniit iqaluknit nayuqtauyuq.

DFO-FPP piqaqtitiyut tahapkuninga pitquhiliqutit naunaiyaqni tuniyauni kiuplugit tapkuat Nunavut Imaligiyit Katimayit titigaqtai uplulik Fibruari 23, 2018, tukhiqni titigaqhimayut pitquhiliqutit naunaiyaqni uqauhit tugangayut tapkununga Sabina-kut Tukhigautit taphumunga Qanugittunia “A” Imaqmun Laisa taphumunga Hanningayuq Kuugaq Havanguyuq. Tamna pitquhiliqutit naunaiyainiq uqauhiq uumani tuniyauniani avikhimayut malikhugit tahapkuat tamaitnut pityutit: Imigaulaq Imaq Avatiliqutit Ihumagiyaunilu Iqaluiyainiq imaiyainiqlu Parnaut.

<u>Imigaulaq Imaq Avatigiya</u>

Uuktutauyuq havagutit tamnalu Havanguyuq havat, havanguyuq huliniitlu, ilalgit qaqtainiq, imirtarniq ikayuqhiutininut ukiumi apqut hanayaunia, imakut ikartuqvit, kuuknilu mikhigiaqni talvani Rascal Kuugauyaq Kanangnaani, Goose Kuukviunia Nigiani tamnalu Goose Kuukviunia

Kanangnaani pilaqtut pipkagauni *akhut hugurtitni* iqaluit unniqtaunitigut tapkunani *Iqaluliginiqmun Piquyat*.

Tamna uuktutauyuq havanguyuq pityutauniaq tammainianik tamna Rascal Kuugauyaq Kanangnaani, Goose Kuukviunia Kanangnaani tamnalu Goose Kuukviunia Nigiani Ukiurtaqtumi Hulukpaugaq huviuqvia nayuqtauvaktuq. Ihuaqhigiaqnianut una, Sabina-kut uuktugutilgit hananianik iqaluit apqutikhanik talvani Rascal Kuugauyaq. Una ikayurniaq hugiaqninik tapkuat naunapyaktut naliaknut Ukiurtaqtumi Hulukpaugaq huviuqvia kikliqaqniagianga talvunga Goose Tahiq hulukpaugat amigaitninut.

Iqaluiyaqtaunia tamnalu Imaiyaqnia Parnaut

Sabina-kut hivuani tunihihimayut taphuminga Ihumagiyauyut Iqaluiyainiqmun Parnaut, tamna pivaliatitauhimayuq hugiaqninut piyaqaqnia imaiyaqnia tamatkiknik Llama tamnalu Umwelt tahiit pivaliatitninut tamna Hanningayuq Kuugaq Havanguyuq. Atuqtitlugu tamna Aulattiyiuyunut Naunaiyaqnia Tukligiknia, DFO-FPP havaqatiginnaqniagai tapkuat Sabina-kut aktuayauyutlu nunaliuyut iniqtiqninik tamna Iqaluiyainiqmun tamnalu Imaiyainiq Parnaut.

1 Introduction

This technical review submission summarizes Fisheries and Oceans Canada (DFO) – Fisheries Protection Program's (FPP) assessment and recommendations concerning the proposed Back River Project (the Project). The purpose of this submission is to provide expert advice to the Nunavut Water Board (NWB) regarding the completeness of the water licence application and identify potential impacts to fish and fish habitat associated with the project proposed.

As directed by the NWB in their letter dated February 23, 2018, this submission focuses on a complete and thorough technical assessment of the Application for a Type "A" Water License for the Back River Project. The objective being to analyse the updated plans and/or revised information presented by Sabina Gold & Silver Corporation (the Proponent or Sabina) in support of the water licence, and reflects DFO-FPP's mandate.

2 Mandate, Relevant Legislation and Policy

The *Constitution Act* (1982) provides the Federal Government with exclusive authority for coastal and inland fisheries within Canada's territorial boundaries. DFO exercises this power through the administration of the *Fisheries Act* and some aspects of the *Species at Risk Act*. Under the *Fisheries Act*, DFO is responsible for the management, protection and conservation of fish (which include marine mammals as defined by the *Fisheries Act*) and their habitats. The Minister of Fisheries, Oceans and the Canadian Coast Guard is one of the competent ministers under the *Species at Risk Act* (SARA).

In general, DFO-FPP undertakes the review of proposed project in and around fisheries waters to ensure that works, activities and undertakings are conducted in such a way that the proponents are in compliance with the applicable provisions of the *Fisheries Act.*

The mandate of DFO-FPP is to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. Sub-section 35 (1) of the *Fisheries Act* states that "No person shall carry on any work, undertaking or activity that results in *serious harm to fish* that are part of a commercial, recreational, or Aboriginal fishery or to fish that support such a fishery."

Fisheries and Oceans Canada interprets *serious harm to fish* as:

- the **death of fish**;
- a **permanent alteration** to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery,

rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;

- the **destruction of fish habitat** of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of these life processes.

However, under Paragraph 35 (2) (b) of the *Fisheries Act*, the Minister of Fisheries, Oceans and the Canadian Coast Guard may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish. Subject to the consideration of the four factors in Section 6 of the *Fisheries Act*:

1. The contribution of the relevant fish to the ongoing productivity of commercial, recreational or Aboriginal fisheries;

2. Fisheries management objectives;

3. Whether there are measures and standards to avoid, mitigate or offset serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or that support such a fishery; and

4. The public interest.

DFO-FPP is guided by the "Fisheries Protection Policy Statement (2013)", which is intended to provide guidance to Canadians and ensure compliance with the *Fisheries Act*. The *Fisheries Protection Policy Statement* strengthens the Federal Government's ability to address key threats to the productivity and sustainability of our fisheries, through standards and guidelines to avoid, mitigate, and offset impacts to fisheries.

The "Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting (2013)" provides guidance on undertaking effective measures to offset serious harm to fish that are part of or that support a commercial, recreational or Aboriginal fishery, consistent with the fisheries protection provisions of the *Fisheries Act*. The objective of offsetting is to counterbalance unavoidable *serious harm to fish* and the loss of fisheries productivity resulting from a project. For more information, see: http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html

The *Species at Risk Act* (SARA) is intended to prevent Canadian indigenous species, subspecies and distinct populations of wildlife from being extirpated or becoming extinct. SARA facilitates the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and manage species of special concern (to prevent them from becoming

endangered or threatened). The Minister of Fisheries, Oceans and the Canadian Coast Guard is the competent minister for listed aquatic species that are fish as defined in the *Fisheries Act* Section (2) and for marine plants as defined in the *Fisheries Act*, Section 47.

Environmental and Climate Change Canada (ECCC) is responsible for the administration and enforcement of the pollution prevention provisions of the *Fisheries Act*, Sections 34 and 36-42 on behalf of DFO.

For more information, see: http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html

3 Technical Review Comments

3.1 Blasting

Review Comment Number	3.1 Blasting
Subject/Topic	Avoidance and Mitigation of Effects of Blasting on Fish
References	• FEIS addendum, volume 1, appendix v1-9; table regarding Party-Recommended Terms and Conditions and Commitments, p. 1 • FEIS addendum, volume 6, Table – Recommended Terms & Conditions and Commitments, p. 6-17 • FEIS addendum, volume 10, chapter 19, section 5.4.6, p. 5-12 • Back River Project, Conceptual Fish Offsetting Plan, February 2017, Part 2, table 5.1-1, p. 24 • Back River Project, Conceptual Fish Offsetting Plan, February 2017, Part 2, section 5.4, p. 27 • Borrow Pits and Quarry Management Plan, section 4.3.3: Winter Ice Road, pg. 4-8 • Nunavut Impact Review Board, Project Certificate [No.: 007], December 2017, pg. 25 and 26
Summary	DFO-FPP notes that in the FEIS addendum, Sabina states*: "All Project activities requiring the use of explosives in or near water bodies will adhere to the Guidelines for Use of Explosives In or Near Canadian Fisheries Waters, as directed by Fisheries and Ocean Canada (DFO) (Wright and Hopky 1998). The blasting management plan will be discussed with DFO prior to any blasting activities, and subject to adaptive management."* (FEIS addendum, vol. 10, chap. 19, section 5.4.6, p. 5-12 and Conceptual Fish Offsetting Plan – Part 2, p. 24 and 27) DFO-FPP also notes that Sabina committed to *"engage with Fisheries and Oceans Canada in exploring possible Project specific thresholds, mitigation and monitoring for blasting that would exceed the requirements of Fisheries and Oceans Canada's Guidelines for the Use of Explosives In or Near Canadian Waters (Wright and Hopky, 1998)."* (FEIS addendum vol. 1, appendix v1-9, p. 1; vol. 6, p. 6-17; Conceptual Fish Offsetting Plan – Part 2, p. 27)
Importance of issue to the impact assessment process	Blasting operations have the potential to have a negative impact on fish and fish habitat if adequate blasting thresholds and setback distances are not appropriately calculated and implemented.
Detailed Review Comment **1. Gap/Issue** **2. Disagreement with conclusion** **3. Reasons for**	DFO-FPP's Final Written Submission (March 2016) noted several recommendations related to updating the blasting thresholds: • Recommendation 3.1.1 - Fisheries and Oceans Canada recommends that Sabina revise their instantaneous pressure threshold limit of 100 kPa to 50 kPa, and recalculate the

disagreement with conclusion	appropriate setback distances. Development of adequate mitigation measures to address the effects of blasting on fish and reduce the risk of *serious harm to fish* as a result of the Back River Project should also be based on Fisheries and Ocean Canada's Measures to Avoid Causing *serious harm to fish* and fish habitat. • Recommendation 3.1.2 - Fisheries and Oceans Canada recommends that Sabina develop an appropriate blast monitoring and mitigation plan to ensure that peak particle velocities do not exceed 13 mm/s at important spawning habitats in Goose lake, especially during the time of Lake Trout egg incubation and should include procedures to be followed in the event that blasts may approach or exceed this threshold. In response to DFO-FPP recommendations, Sabina committed to *"engage with Fisheries and Oceans Canada in exploring possible Project specific thresholds, mitigation and monitoring for blasting that would exceed the requirements of Fisheries and Oceans Canada's Guidelines for the Use of Explosives In or Near Canadian Waters (Wright and Hopky, 1998)."* DFO-FPP notes that Sabina's commitment was captured in Term and Condition #25 of Sabina's Back River Project Certificate No. 007. DFO-FPP is still awaiting the project specific details respecting updated blasting thresholds, setback distances and blast monitoring. However, DFO-FPP notes that Sabina will be required to adhere to Term and Condition 25 of the Project Certificate issued by the Nunavut Impact Review Board (pg. 25&26), and will need to submit the requested information to DFO-FPP as part of any 'DFO Request for Review' submission.
Recommendation/ Request	**Recommendation 3.1.1**: DFO-FPP recommends that Sabina continue to work with DFO-FPP to finalize project specific blasting thresholds, mitigation and monitoring for blasting that would exceed the requirements of Fisheries and Oceans Canada's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (D.G. Wright and G.E. Hopky, 1998) as per Term and Condition 25 of the NIRB Project Certificate 007. **Recommendation 3.1.2:** DFO-FPP also recommends Sabina continue to work with DFO-FPP to develop and finalize a blast monitoring and mitigation plan.

3.2 Water Crossings

Review Comment Number	3.2 Water Crossings
Subject/Topic	Avoidance and Mitigation of Effects to Fish and Fish Habitat

References	• FEIS addendum, volume 6, Table – Recommended Terms & Conditions and Commitments, p. 6-18 • Back River Project, Conceptual Fish Offsetting Plan, February 2017, Part 2, section 5.2, p. 25 • Back River Project, Conceptual Fish Offsetting Plan, February 2017, Part 2, section 6.3.3, p. 36 • Nunavut Impact Review Board, Project Certificate [No.: 007], December 2017, pg. 27 and 28 • Back River Project, Water Management Plan, October 2017, Part 1, section 9.3, p.9-2 • Back River Project, Water Management Plan, October 2017, Part 5, Figure A-17 • Back River Project, Main Application Document, October 2017, section 5.3.4.5, pg. 5-24
Summary	A number of watercourse crossings are associated with the proposed Back River Project. Sabina indicates in their FEIS addendum (Vol. 10, Ch. 21 sect. 5.2) that road construction for the Back River Project involves up to five water crossings (culverts) which will be required to maintain drainage patterns across the haul road and airstrip and states that "*All crossings occur over small, ephemeral streams. One of these crossings will occur over a fish-bearing stream the Gander Pond outflow stream located north of the airstrip, and therefore will be designed for passage of fi*sh". Sabina stipulates in the FEIS addendum (Conceptual Fish Offsetting Plan – Part 2, s. 6.3.3) that for the fish-bearing crossing that *"Gander Outflow crossing will be culverted with a closed bottom corrugated metal pipe designed to maintain Arctic Grayling passage by keeping water velocities under 1.5 m/s." "Furthermore, the culvert will be embedded to a depth of 0.4 m and filled with streambed material to promote fish passage and habitat suitability."* DFO-FPP notes and acknowledges Sabina's Back River Project Certificate No. 007, term and condition #29 and #30: *29. The Proponent shall implement all applicable Fisheries and Oceans Canada best management practices to avoid and mitigate serious harm to fish as a result of water crossing construction, operation, and decommissioning for all fish-bearing water crossings. These measures should include, but are not limited to, appropriate design of water crossings to facilitate fish passage at both high and low flows, timing windows that incorporate spawning, incubation and hatch times for all species using watercourses, sediment and erosion control, protection of riparian vegetation, and other forms of bank stabilization*. (NIRB Project Certificate 007, p.27) *30. Unless otherwise directed by Fisheries and Oceans Canada, the Proponent's monitoring program for culverts on fish bearing watercourses during the operations and closure phases shall include measures to ensure that barriers to fish passage do not form over time as a result of crossing*

	damage due to ice blockage, flooding, or movement of debris; all of which may occur at freshet. Detailed design drawings and an updated monitoring program shall be produced prior to construction.(NIRB Project Certificate 007, p.28)
Importance of issue to the impact assessment process	If appropriate avoidance and mitigation practices are not employed in water crossing design, construction and maintenance, fish passage may be impeded or *serious harm to fish* may occur.
Detailed Review Comment **1. Gap/Issue** **2. Disagreement with conclusion** **3. Reasons for disagreement with conclusion**	DFO-FPP acknowledges Sabina's commitment to adhere to Terms and Conditions 29 and 30 of the Project Certificate issued by the Nunavut Impact Review Board (pg. 27&28). DFO-FPP notes that Sabina has updated their Back River Project Water Management Plan (October 2017) to incorporate the terms and conditions: • *"For fish bearing crossings, Sabina will implement all applicable DFO BMPs to avoid and mitigate serious harm to fish as the result of water crossing construction, operation, and decommissioning for all fish-bearing water crossings. These measures will include, but are not limited to, appropriate design of water crossings to facilitate fish passage at both high and low flows; timing windows that incorporate spawning, incubation and hatch times for all species using watercourses; sediment and erosion control; protection of riparian vegetation; and other forms of bank stabilization."* (Water Management Plan, s. 9.3, p.9-2) • *"unless otherwise directed by DFO, Sabina's monitoring program for culverts on fish bearing watercourses during Construction, Operations, and Closure phases will include measures to ensure that barriers to fish passage do not form over time as a result of crossing damage due to ice blockage, flooding, or movement of debris; all of which may occur at freshet. Detailed design drawings and an updated monitoring program for culverts on fish bearing watercourses will be produced prior to construction."* (Water Management Plan, s. 9.3, p.9-2) DFO-FPP acknowledges that in the Back River Project Main Application Document dated October 2017, in section 5.3.4.5 Water Crossings, it states: "*Sabina will conduct a fish passage flow assessment as part of the culvert design process (wherever fish passage is required) … Sabina has committed (FA-DFO-C-3) to providing DFO with detailed site-specific plans of all fish bearing water crossings, supported by measured or modeled stream flow data, for review during the regulatory phase."* (Main Application Document, pg. 5-24) Although DFO-FPP acknowledges the above noted commitments, DFO-FPP notes that the design schematics provided as part of the Water Management Plan, Part 5, in Figure A-17 are "*Typical cross-section of double culvert crossing*" and as such, not site or watercourse specific.

	DFO-FPP will require the detailed site-specific plans, that includes engineered drawings for each watercourse crossing supported by measured or modeled stream flow data as part of Sabina's 'DFO Request for Review' submission.
Recommendation/Request	**Recommendation 3.2.1**: DFO-FPP recommends that Sabina provide detailed site-specific plans of all water crossings, supported by measured or modeled stream flow data, for review prior to construction. This may be provided as part of Sabina's 'DFO Request for Review' submission and Application for *Fisheries Act* Authorization.

3.3 Winter Ice Roads Water Withdrawal

Review Comment Number	3.3 Winter Ice Roads Water Withdrawal
Subject/Topic	Avoidance and Mitigation of Effects to Fish and Fish Habitat
References	• FEIS addendum, volume 6, Table – Recommended Terms & Conditions and Commitments (p. 6-17) • FEIS addendum, volume 6, appendix V6-6G • Nunavut Impact Review Board, Project Certificate [No.: 007], December 2017, pg. 26 and 27 • Technical Memorandum, Draft: Winter Ice Road Withdrawal Evaluation – Back River Project, Prepared by Golder Associates for Sabina Gold & Silver Corp., February 5, 2018
Summary	In the FEIS, Sabina states "*Bathymetric maps will be generated for all potential water withdrawal source lakes along the winter ice road alignment using stereophotogrammetry of satellite imagery... This level of topographic detail will be useful for identifying fish habitat features, such as shoals, and assessing fish habitat for fall spawning species (Lake Trout, Arctic Char, whitefish and ciscoes) during the application for a* Fisheries Act *(1985) Authorization, if required*" (FEIS addendum, vol. 6, appendix V6-6G, p. 1) "*A shoreline break line will also be captured and used to generate an estimated lake volume*" (FEIS addendum, vol. 6, appendix V6-6G, p. 2) DFO-FPP notes that the Project Certificate No. 007, Terms and Conditions #27 and 28 states: 27. *"The Proponent shall provide bathymetry, depth, and location of proposed water withdrawal sites, volumes to be extracted, anticipated water level decreases, and fish habitat features within each waterbody proposed to be used for winter water withdrawal in support of the annual construction of the winter ice roads. If additional waterbodies are required the Proponent shall provide*

<table>
<tr><td></td><td>
all required information on the additional proposed lakes prior to the use of the waterbodies." (NIRB Project Certificate 007, p.26)
28. "The Proponent shall implement all applicable Fisheries and Oceans Canada best management practices to avoid and mitigate serious harm to fish as a result of the construction, operation, and decommissioning of winter ice roads, and from under ice water withdrawals. This includes adequately screening the water intakes pipes to prevent impingement and entrainment of fish." (NIRB Project Certificate 007, p.27)

DFO-FPP notes that Sabina has not yet provided a detailed water withdrawal plan for review.
</td></tr>
<tr><td>Importance of issue to the impact assessment process</td><td>Water withdrawal from ice covered water bodies has the potential to have a negative impact on fish and fish habitat.</td></tr>
<tr><td>Detailed Review Comment
1. Gap/Issue
2. Disagreement with conclusion
3. Reasons for disagreement with conclusion</td><td>
DFO-FPP acknowledges that Sabina commits to adhere to Terms and Conditions 27 and 28 of the Project Certificate issued by the Nunavut Impact Review Board (pg. 26&27).

DFO-FPP also notes a Technical Memorandum was submitted on February 5, 2018 that provided bathymetry, depth and potential locations of possible water withdrawal sites, proposed volumes to be extracted and anticipated water level decreases. The Technical Memorandum provided a preliminary desktop analysis and discussion on the potential risk to shoal habitat from a 10% water level withdrawal as shown in Table 1 below (WIR Tech Memo, 2018, pg. 2):

Table 1: Water Withdrawal Risk Level Framework for Spawning Shoal Habitat for Fall-Spawning Fish[a]
<table>
<tr><th>Risk of Spawning Habitat Loss</th><th>Change in Water Elevation Under Ice (m)</th><th>Rationale</th></tr>
<tr><td>Nil or negligible</td><td>Less than 0.22</td><td>The reduction in water level lies within the average change in ice thickness (i.e., within normal variation)</td></tr>
<tr><td>Low</td><td>0.22 to less than 0.42</td><td>The reduction in water level remains within 1 SD of the average</td></tr>
<tr><td>Medium</td><td>0.42 to 0.8</td><td>The reduction in water level remains between 1 and 2 SD of the average</td></tr>
<tr><td>High</td><td>Greater than 0.8</td><td>The reduction in water level is beyond 2 SD of average and there is less than a 5% chance for this occurring naturally</td></tr>
</table>
a) includes coregonid species, such as Lake Whitefish (Coregonus clupeaformis), and Lake Trout (Salvelinus namaycush); SD = standard deviation

DFO-FPP acknowledges the preliminary analysis and discussion of risk to shoal habitats, however, DFO-FPP will require detailed water withdrawal plan that includes an in- depth risk analysis informed by site specific fish and fish habitat features for the waterbodies chosen for water withdrawal as part of Sabina's 'DFO Request for Review' submission.
</td></tr>
<tr><td>Recommendation/Request</td><td>Recommendation 3.3.1: DFO-FPP recommends that Sabina provide a detailed water withdrawal plan for the winter ice road, including specific fish habitat features within each waterbody proposed to be used for winter water withdrawal and before use of the waterbodies. This information can be provided as part of Sabina's 'DFO Request for Review'</td></tr>
</table>

	submission and / or Application for *Fisheries Act* Authorization.

3.4 Rascal Stream Fish Passage

Review Comment Number	3.4 Rascal Stream Fish Passage
Subject/Topic	Arctic Grayling Goose Lake Population - Spawning Habitat
References	• FEIS Addendum, volume 6, appendix V6-6F • Main Application Document Appendix F-6: Rascal Stream Fishway Memo, ERM, February 2017 • Nunavut Impact Review Board, Project Certificate [No.: 007], December 2017, pg. 26.
Summary	In Volume 6, appendix V6-6F of the FEIS addendum, section 1.1, Sabina acknowledges DFO-FPP's concern regarding the migration potential between Goose Lake and spawning and rearing habitat in upper Rascal Stream East (RSE) via Rascal Stream West (RSW). In response to DFO-FPP's concern, Sabina proposes "*mitigation by design to ensure adequate fish passage between Goose Lake and upper RSE. The proposed fish passage mitigation included design, construction, and operation of a migratory fishway (i.e., the Rascal Fishway) between Gosling Pond 1 and upper RSE and the engineering/diversion of flow such that stream flow in RSW is sufficient to promote migration through the entire route from Goose Lake to upper RSE.*" *"Sabina proposed mitigation by design to ensure adequate fish passage between Goose Lake and upper RSE. The proposed fish passage mitigation included design, construction, and operation of a migratory fishway (i.e., the Rascal Fishway) between Gosling Pond 1 and upper RSE and the engineering/diversion of flow such that stream flow in RSW is sufficient to promote migration through the entire route from Goose Lake to upper RSE (Figure 1.1-2)."* (Appendix F-6, p.6-17) "*An approximately 740 m section of upper RSW (Rascal Stream West Reach 7 in Figure 2.2-2; identified as potential habitat loss in Figure 1.1-2) may be lost through the operation of the Rascal Fishway. Operation may entail the diversion of flow away from this upper-most section of RSW to flow through upper RSE… [and] is deemed as poor to fair spawning habitat. This reach may become seasonally impassable to fish during low flow periods due to the abundance of large, closely packed boulders, and may restrict movement between RSW and RSE under natural flow conditions."* *"The diversion of flow from upper RSE into Gosling Pond 1 will be engineered such that flow is sufficient to allow for upstream and downstream migration of all life stages of Arctic Grayling through the entire route from the Gosling ponds through Gander Pond and ultimately*

	to Goose Lake. This strategy will ensure that the upper 1.1 km section of RSE will continue to provide good quality spawning and rearing habitat to Arctic Grayling from Goose Lake, now accessed through RSW." *"A monitoring program will be implemented to determine if the proposed Rascal Fishway is functioning effectively as migratory habitat for Arctic Grayling."* DFO-FPP notes Term and Condition 26 of the Project Certificate issued by the Nunavut Impact Review Board (pg. 26&27): *"The Proponent shall engage Fisheries and Oceans Canada, the Kitikmeot Inuit Association, and other interested parties during the regulatory phase on 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, south of the planned airstrip. Any additional information required to ensure the design of the fish passage will be completed prior to significant construction activities at the Goose Property."*
Importance of issue to the impact assessment process	It is important for DFO-FPP to have a complete understanding of the fish and fish habitat that have the potential to be affected by the project.
Detailed Review Comment **1. Gap/Issue** **2. Disagreement with conclusion** **3. Reasons for disagreement with conclusion**	By providing a Rascal Stream Fish Passage Mitigation memorandum, DFO-FPP understands that Sabina is potentially addressing DFO-FPP's concern regarding the Arctic Grayling population of Goose Lake. DFO-FPP also acknowledges that Sabina commits to adhere to Term and Condition #26 of Project Certificate No. 007 issued by the Nunavut Impact Review Board: "*The Proponent shall engage Fisheries and Oceans Canada, the Kitikmeot Inuit Association, and other interested parties during the regulatory phase on 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, south of the planned airstrip. Any additional information required to ensure the design of the fish passage will be completed prior to significant construction activities at the Goose Property."* (NIRB Project Certificate 007, p.26&27) However, DFO-FPP will require further information as part of the Rascal Stream Fish Passage plan to be able to determine the effectiveness of the proposed mitigation strategy. This updated plan should include design, construction, operation, monitoring, closure/remediation, and design of habitat creation.
Recommendation/Request	**Recommendation 3.4.1:** DFO-FPP recommends Sabina provide a Rascal Stream Fish Passage plan prior to its construction. The plan should include, but not be limited to, design, construction, operation, monitoring, closure/remediation, design of habitat creation, etc. This information can

	be provided as part of Sabina's 'DFO Request for Review' submission and Application for *Fisheries Act* Authorization.

3.5 Conceptual Fish-out and Dewatering Plan

Review Comment Number	3.5 Conceptual Fish-out and Dewatering Plan
Subject/Topic	General Fish-out and Dewatering Plan
References	• FEIS addendum, Volume 6, Table – Recommended Terms & Conditions and Commitments, p. 6-18 • FEIS addendum, volume 10, chapter 31, section 1.1, p. 1 • FEIS addendum, volume 10, chapter 31 • DFO Final Written Submission to NIRB, April 24, 2017, section 3.5, pg. 23: Response to Appendix B of a letter from the NIRB dated February 23, 2017 • Back River Project, Water Management Plan, October 2017, Part 1, section 9.3, p.9-2
Summary	Sabina states: *"The current mine plan development will involve the dewatering of Llama Lake and Umwelt Lake (Figure 2); a fish-out program will be carried out prior to dewatering. The fish-out program will follow Fisheries and Oceans Canada (DFO's) General Fish-out Protocol for Lakes and Impoundments in the Northwest Territories and Nunavut (Tyson et al. 2011)."* (FEIS addendum, vol. 10, chap. 31, p.1) …[and] "*will continue to work with Fisheries and Oceans Canada (DFO) and the impacted communities at the regulatory approval stage to develop a detailed fish-out and offsetting plan."* (FEIS addendum, Vol. 6, p. 6-18) Sabina also proposes to engage with communities on *"how to best utilize the fish resource and conduct dewatering activities."* The final fish-out plan was planned to be finalized during the regulatory review process.
Importance of issue to the impact assessment process	It is important to understand the fish-out process that will be followed in Llama Lake and Umwelt Lake to ensure that the amount of fish lost is accurately documented.
Detailed Review Comment **1. Gap/Issue** **2. Disagreement with conclusion** **3. Reasons for disagreement with conclusion**	During the Nunavut Impact Review Board's environmental assessment process, Sabina proposed to work with DFO-FPP and the impacted communities during the regulatory phase to finalize the fish-out plan. Sabina also proposes to engage with communities on *"how to best utilize the fish resource and conduct dewatering activities."* The final fish-out plan was planned to be finalized during the regulatory review process. DFO-FPP will continue to work with the proponent in finalizing the fish-out plan. DFO-FPP notes that in the Water Management Plan submitted by Sabina

	in October 2017, it states: "*Inline with dewatering, a fish-out program will be completed. The fish-out program will follow the DFO's* General Fish-Out Protocol for Lakes and Impoundments in the Northwest Territories and Nunavut *(Tyson et al. 2011). Lake dewatering will commence once the catch-per-unit-effort (CPUE)/recapture phase of the fish-out program has been completed (typically between August and September)."* (Water Management Plan, s. 9.3, p.9-2) DFO-FPP notes Sabina will be required to submit a finalized fish-out and dewatering plan as part of their Application for a *Fisheries Act* authorization should the water license be granted.
Recommendation/Request	**Recommendation 3.5.1**: DFO-FPP recommends that Sabina continue to work with DFO-FPP and the impacted communities to develop a detailed fish-out and dewatering plan.

3.6 Additional References

- DFO (Fisheries and Oceans Canada). (2010). DFO Protocol for Winter Water Withdrawal from Ice-Covered Waterbodies in the Northwest Territories and Nunavut. 3 p.
- Moulton, V.D., and B.D. Mactavish. (2004). Recommended seabird and marine mammal observational protocols for Atlantic Canada. LGL Rep. SA775-1. Rep. from LGL Ltd., St. John's, NL, for Environmental Studies Research Funds, Calgary, AB. 71 p.
- Tyson JD, Tonn WM, Boss S, Hanna BW. 2011. General Fish-out Protocol for Lakes Impoundments in the Northwest Territories and Nunavut. Can. Tech.l Rep. Fish. Aquat. Sci 2935: V + 34p
- Wright D.G., Hopsky G.E. (1998). Guidelines for the use of explosives in or near Canadian fisheries waters. Canadian Technical Report of Fisheries and Aquatic Sciences 2107, 34 pp.

4 Summary of Recommendations

Freshwater Environment		
1. Blasting		
1	Ref. 3.1.1	DFO-FPP recommends that Sabina continue to work with DFO-FPP to finalize project specific blasting thresholds, mitigation and monitoring for blasting that would exceed the requirements of Fisheries and Oceans Canada's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (D.G. Wright and G.E. Hopky, 1998) as per Term and Condition 25 of the NIRB Project Certificate 007.
2	Ref 3.1.2	DFO-FPP also recommends Sabina continue to work with DFO-FPP to develop and finalize a blast monitoring and mitigation plan.

2. Water Crossings		
3	Ref. 3.2.1	DFO-FPP recommends that Sabina provide detailed site-specific plans of all water crossings, supported by measured or modeled stream flow data, for review prior to construction. This may be provided as part of Sabina's 'DFO Request for Review' submission and Application for *Fisheries Act* Authorization.
3. Winter Ice Roads Water Withdrawal		
4	Ref. 3.3.1	DFO-FPP recommends that Sabina provide a detailed water withdrawal plan for the winter ice road, including specific fish habitat features within each waterbody proposed to be used for winter water withdrawal and before use of the waterbodies. This information can be provided as part of Sabina's 'DFO Request for Review' submission and / or Application for *Fisheries Act* Authorization.
4. Rascal Stream Fish Passage		
5	Ref. 3.4.1	DFO-FPP recommends Sabina provide a Rascal Stream Fish Passage plan prior to its construction. The plan should include, but not be limited to, design, construction, operation, monitoring, closure/remediation, design of habitat creation, etc. This information can be provided as part of Sabina's 'DFO Request for Review' submission and Application for *Fisheries Act* Authorization.
Fish-Out and Offsetting Plans		
5. Conceptual Fish-Out and Dewatering Plan		
6	Ref. 3.5.1	DFO-FPP recommends that Sabina continue to work with DFO-FPP and the impacted communities to develop a detailed fish-out and dewatering plan.