Eastern Shore
Forest Watch Association

Education, action, alternatives for the long-term health of the Acadian forest ecosystem
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Fifteen Mile Stream Mine - Environmental Impact Statement Response 2021

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GENERAL COMMENTS

Eastern Shore Forest Watch Association has been engaged with the proposed Fifteen Mile Stream project since 2017. Our concerns about the proposed project are based on the Proponent's stated intention to construct four gold mines (Atlantic Gold's “string of pearls”) along the Eastern Shore, from Moose River to Sherbrooke.

All of the ore will be processed at Moose River. This plan includes using the Touquoy mine infrastructure at Moose River for activities for which the Touquoy mine is not currently permitted. The proposal puts enormous additional pressure on the fragile Eastern Shore ecosystem, particularly the Fish River watershed and the Ship Harbour Long Lake Wilderness Area – which is just 200 metres south of the Touquoy mine.

These four mines have the potential to upend proposed alternative futures for the Eastern Shore, especially the Wild Islands Tourism Advancement Partnership (WITAP). WITAP (http://www.witap.ca/) builds on the Eastern Shore Islands Wilderness Area and the inland protected wilderness areas of the Eastern Shore: White's Lake, Ship Harbour Long Lake, Tangier Grand Lake, Toadfish Lakes, Boggy Lake, and Liscomb River Wilderness Area, to name only the largest of the protected Wilderness Areas.

While reviewing the Fifteen Mile Stream EIS, we became alarmed by elements of the proposed mining process. Mining within the Liscomb Game Sanctuary – which is regrettably legal –entails a lethal impact on the diminishing local population of Mainland Moose. Diverting the flow of Seloam Brook and using public roads and highways as haul roads are not acceptable.

If permitted, Fifteen Mile Stream will be a very expensive mine. The true cost will not be borne by Atlantic Gold, but rather by the people of Nova Scotia. Atlantic Gold is planning two other mines nearby to complete its toxic “string of pearls,” which competes with protected wilderness areas for predominance on the Eastern Shore.

We are grateful to IAAC for an opportunity to contribute to the discussion of environmental issues around the proposed Fifteen Mile Stream project. Our response is not comprehensive, as there has not been sufficient time to comment on all sections, and life is too short. We have, however, addressed some of the pressing issues, where we have the competency and experience to speak with some authority.

SECTION 1: INTRODUCTION AND ENVIRONMENTAL ASSESSMENT CONTEXT

1.4 Purpose of the Project:

The Proponent states in Section 1.4 that the purpose is to extend the life of the Touquoy processing plant: to *"continue to provide economic and social benefits with minimal additional infrastructure"* in a way that will offer "optimal benefit" to the province, the Mi'kmaq of NS, and the community.

Please provide a definition of optimal benefit.

Please explain who has determined the optimal benefit and the methodology used for this determination.

Please provide a detailed description of the optimal benefits as they apply to the community and environment.

Please provide additional information regarding how the additional infrastructure, the associated permanent alterations to watercourses and wetlands, and a dramatic change in local topography can be categorized as "minimal."

1.5.4 Precautionary Approach Application:

IAAC advises that the Proponent use the precautionary approach, also known as the precautionary principle. Nova Scotia's Environmental Act defines the precautionary principle as a duty to prevent harm, when it is within our power to do so, even when all the evidence is not available. The precautionary principle acts as an insurance policy and is codified in several international treaties, to which Canada is a signatory. The precautionary principle is now commonly used to guide decision-making in resource and environmental management, especially when faced with scientific uncertainty and insufficient knowledge. The most widely accepted definition of the precautionary principle states: *"where there are threats of serious or irreversible damage, lack of full scientific certainty, [this] shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."* (Rio Declaration on Environment and Development, United Nations, 1992, Principle 15; https://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm).

Please demonstrate that the entire EIS adheres to the Precautionary Approach/Principle, as per instructions; that is, please show that you have acknowledged your duty to prevent harm even when there is no conclusive evidence that harm will occur. Please give substantial examples.

1.6.1 Benefits of the Project:
The EIS states, "*The environmental benefits of the Project to Nova Scotia are numerous.*"

There are no environmental benefits of the project. The EIS points out that the Fifteen Mile Stream area has already suffered significant impacts associated with mining and other activities. The project area may have disturbed and fragmented habitat and contain historical tailings. But the large mine footprint (400 hectares of disturbed area) and its potential for surface and groundwater contamination is not any better.

The Project area has been slowly regenerating since the last major disturbance (bulk sampling from an open pit in 1988), with newly established wetlands and other adaptive habitats. The existing habitats are of far greater value than what will be left by the mine (even after reclamation). A blasted pit, piles of rocks, and tailings retained by a rock embankment will not revert to the natural ecosystem (Acadian forest, in the case of Nova Scotia) for generations, even if covered with some clay, till, stockpiled topsoil, and/or engineered material. Such an unrealistic statement casts a shadow of doubt on the entire EIS.

Please provide additional information (i.e., a list) detailing and explaining the "numerous" environmental benefits associated with the project, as discussed.

Please provide additional information to explain how impacted components identified by the Proponent, such as "disturbed and fragmented habitats," will benefit from the project.

Please provide additional information and examples regarding possible environmental enhancements that are employed in other jurisdictions that can be suitable for implementation at Fifteen Mile Stream.

1.6.2 Socio-economic Benefits:
The EIS discusses the socio-economic benefits of the project based on a report by KPMG (Appendix E.1). The group estimates 289 yearly jobs in NS (323 total in Canada) for the duration of operations. A one-year spike in job numbers estimated at 778 would be realized for the construction phase of the project. Tax revenues from this project are estimated at CA $13 million/year for NS (CA $8 million for Canada/year) (p. 20). Furthermore, the Proponent states that they are "*committed to working with the local community and the Mi'kmaq of Nova Scotia to maximize socio-economic benefits as it develops its projects in the Province*." With an estimated 390,800 ounces planned to be mined over the life of the project, and a conservative estimate of $2000/ounce (spot price for gold was CA $2165/ounce as of 2021.03.24 11:30 a.m. ADT), revenues will be in the vicinity of **CA $782 million**. Expenditures on exploration (2014-2018), construction (one year), operation (five years), sustaining capital (five years) total **CA $399.4 million**; profit is in the neighbourhood of **CA $382 million**. The overall economic benefit to the local area is anemic compared to the profit destined to shareholders.

In order to prove the claim of estimated federal/provincial tax payments associated with FMS, please provide documentation to show that Atlantic Gold paid both Canadian federal and provincial income tax for the years 2017-2020, during which the Touquoy Mine has been operational.

Aside from the benefits attributed to employment, a small tax influx, and some spin-off economic activities, please explain or provide more information as to how the Proponent is maximizing social

benefits, as claimed.

Please provide examples of the creation of social benefit by other mining companies in various jurisdictions and provide a rationale why the local area is expected to shoulder all the risks (possible dam failures, habitat loss, and impacts to surface and groundwater) long after closure, but receive minimal economic and social benefits.

SECTION 2: PROJECT OVERVIEW

2.1.2 Touquoy Mine Site:
"The Touquoy Mine Site is a fully permitted and approved facility currently operating..."

The Proponent continues to refer to the Touquoy mine site as "fully permitted," but this is not true. The mine at Moose River is *conditionally* permitted. At least one of the major conditions of the mine's provincial permitting has not yet been met, 13 years after the original permit by the NS Minister of Environment. The Environmental Assessment Approval (http://novascotia.ca/nse/ea/MooseRiver/MooseRiver_Conditions.pdf) dated February 1, 2008 states:

> *2.0 Protection of Lands*
> *2.1 Within four years of the date of this Approval, the Proponent shall develop and implement a plan for procuring conservation land with valued protected areas attributes in the vicinity of the Undertaking for statutory protection by the province. The plan shall be developed in consultation with NSEL, NSDNR, the Community Liaison Committee, and any other parties identified by NSEL. The plan must be approved by the Minister prior to implementation.*

We request specific, detailed evidence that this condition has been met. Please identify the lands of high ecological value that the Proponent has purchased and given to the province of Nova Scotia for protection.

> *"5.2 The Proponent shall implement a Moose Management Plan for site development, operation and decommissioning."*

Please produce the Moose Management Plan for the Touquoy mine site.

Atlantic Gold is currently facing 32 environmental charges stemming from infractions at the Touquoy mine site. Please explain why the Fifteen Mile Stream gold project should be permitted when the Touquoy mine is already failing its limited provincial environmental approval. Change in ownership will not be accepted as a 'reason.'

2.2.1.3 Local Traffic Bypass Roads:
This section states, *"Bypass roads are being designed and developed in consultation with NS L&F, the Mi'kmaq of Nova Scotia and local stakeholders including ATV clubs."*

Please provide an explanation on why local environmental groups with detailed knowledge are not afforded the same opportunity to participate in these design discussions.

2.2.1.9 Seloam Brook Realignment:
The Seloam Brook Realignment plan by Wood (Appendix J.5) is the only compensation mentioned. It is a minimal tool and there is no information, such as case examples, to support the success of this approach. If it fails, fish habitat will be lost.

Please provide additional information on alternative compensation initiatives and case studies from other jurisdictions to support the plan as proposed.

Please provide additional information on how the success of the realignment will be assessed as well as the remediation measures that will be employed if the plan fails.

The EIS discusses lost habitat as having low Habitat Suitability with seasonal refuge capacity and that "*consideration is being given to providing similar habitat in the area of the Realignment Channel outflow that will mimic these conditions*." The EIS refers to the design plan but the Proponent does not state how this will be assessed or monitored over time.

Please provide confirmation that the adopted plan will provide similar functioning habitat to that being lost.

Please provide information on the program to monitor wetland functioning with details on participants, funding, timelines, and a remediation program if unintended impacts are incurred in the future.

2.3. Opportunities for Mine Life Extension:
Unless it is fully discussed and reviewed here, a mine life extension should be the subject of new EIS for assessment and permitting.
Please provide a map with the location of the three other additional gold resources.

2.4.2.1.6 Reagents:
There is absolutely no discussion of the fate of the reagents used for ore processing, which will presumably accumulate in the tailings pond and the mine effluent. Potassium Amyl Xanthate is toxic (according to *Material Safety Data Sheet*) and decomposes into toxic carbon bisulphite. It has been found to be toxic to trout in aquatic environments (for example, see: Webb et al., 1976). The chemical composition and characteristics of frother and coagulant are not given.

Please provide a list of all chemicals used in the project and information on their fate, as well as their effects on the environment, such as toxicity to plant and animal life, bioaccumulation, decomposition products, volatility, where they accumulate, etc.

Please provide information on how the project intends to mitigate the effects of these reagents in the environment.

2.4.3.1 Preamble on Reclamation/Decommissioning Stage:
"The Proponent will establish lease agreements with the province and private landowners for the life of the open-pit mine." And that leased land "*will be returned to the province and private owners (if warranted) following the completion of operations, equipment decommissioning and removal, and the acceptance of decommissioning and reclamation activities by NSE.*"

The stability of the tailings depends on long-term monitoring and security so they will not be disturbed. Passing the responsibility and liability to the province or landowners is not fair to the taxpayers of Nova Scotia or to the landowners, who may not fully understand the indirect liabilities they may be assuming. There are a number of cases in Nova Scotia where tailings have been significantly impacted by motorized 'recreational' activities.

2.4.3.2 FMS Reclamation Stage: Objectives and Goals:
The EIS states, *"The objective of the Reclamation and Closure Plan… is to return the site to a safe and stable condition, compatible with the surrounding landscape…"*

Please explain how the planned TMF – a 30-metre high, treetop, monolithic structure that significantly alters the existing natural landscape – meets the definition of being *"compatible with the surrounding landscape."*

2.4.5 Greenhouse Gas Emissions:
"Based on the Project GHG assessment, in an average full year of operation of the Project (most GHG-intensive phase), including operation of the FMS Mine Site, hauling of ore, and the processing of ore at the Touquoy facility, the Project facilities would emit 24.2 kilotonnes CO_2e."

This is inconsistent with Table 6.2-13, which shows an estimated annual GHG emission for the FMS mine operation and hauling of 35.0 kt CO_2e. This estimate is considerably higher than 24.2 kilotonnes CO_2e despite the fact that, in Table 6.2-13, the Proponent has not included the emissions caused by the processing of the concentrated ore at the Touquoy facility, nor the transport of chemicals, including cyanide, which will bring the total to considerably more than 35 kt. Moreover, Table 6.2-13 omits some sources of GHG, including:

1) Electricity consumption, which (in Nova Scotia) is mostly generated by burning fossil fuels or
2) Transportation of workers and supplies (including fuel) for mine operation.
3) CO2 emission from the decomposition of cyanide

Emissions in excess of 35 kt CO_2e represent more than 0.2% of the GHG emissions generated in Nova Scotia in 2015, which is not insignificant for a single industrial project.

Please provide a more comprehensive projection of GHG emissions and explain the discrepancy in the numbers.

Please provide an estimate of GHG emissions for the entire Moose River consolidated project, including all proposed satellite mines and transport of ore and materials.

2.5.3 Years 9 to 11 and Beyond:
The Proponent states, "*Monitoring will continue until the site reaches reclamation objectives and requirements.*"

Due to the lack of information in Section 10 (Follow-up and Monitoring Programs Proposed), an assessment of monitoring as described in the foregoing sentence is impossible. Please see Section 10 for additional comments.

Please provide additional information on the long-term management and monitoring of the TMF and how reclamation objectives will be measured and by whom.

2.6.13 Mine Waste Storage:
"The Proponent presented its preferred tailings storage option (conventional tailings slurry at the location shown on Figure 2.1-5) to DFO and ECCC, which have determined that a regulatory amendment to Schedule 2 of the Metal and Diamond Mining Effluent Regulations (MDMER) will be required."

This is because in the preferred option the TMF overlaps with the headwater of East Lake (WC- 43). But Option G does not impact WC-43 and does not necessitate an amendment to schedule 2 of MDMER regulations. The merit score of Option G (4.3) is only 0.1 less than the preferred option (merit score of 4.4). The slightly lower merit score is mostly due to a difference in ratings for the technical accounts (Table 17, Appendix J.6), particularly for design factor, safety factor, and final embankment configuration. On the other hand, Option G scores significantly better in the environmental accounts. Surprisingly, Option G scores less than the preferred option for ease of obtaining an initial permit, even though Option G is the only one that does not require a Schedule 2 amendment.

Please compare the preferred option and Option G in more detail and give the reasoning behind discarding Option G, which is essentially the preferred approach with a bend in the embankment to avoid the headstream flowing into East Lake (WC43).

Please indicate which of the two options is best for each VC and species of interest considered in the EIS.

Please explain: *"The configuration of the Stage 1 TMF embankment may be modified to avoid waters frequented by fish (in the event that an amendment to Schedule 2 under MDMER is required and not obtained at the time of commencement of construction) to allow for ongoing construction and operation during the period prior to receiving the Schedule 2 amendment."* (2.4.1.1.4, TMF embankment construction, p.27). **Does this mean that the configuration would be switched to Option G, or is this yet another configuration?**

SECTION 3.0 PUBLIC ENGAGEMENT

The Proponent states that it is *"committed to stakeholder and rightsholders consultation and engagement"* and that it uses *"key values of openness, transparency, collaboration and respect."*

There is considerable debate on what these terms actually mean 'in practice.' But by most standards, these terms relate to the underlying supporting aspects of relationship and trust building. The Proponent does not fully employ the values of transparency, inclusion, respect, and collaboration **merely by stating it is doing so**. The Proponent relies on advice from the community through a hand-picked Community Liaison Committee, consisting of members that support mine development. By most standards, the true intent of a CLC is to bring forth all perspectives, not just those in favour of development.

The Proponent states, *"EA legislation requires consultation,"* and that the Proponents *"strongly believe that meaningful engagement is crucial to the success of any development."* However, it remains unclear how marginalizing a group of interested stakeholders, where development is proposed, meets any level or standard of the values the Proponents say they employ.

Please provide definitions and examples of *"openness, transparency, collaboration, and respect"* to clarify the Proponent's meaning of these words.

Please explain or provide information on the standards for meeting the values being espoused.

Please explain or provide information on how this process champions *"meaningful engagement"* when residents and local environmental groups are marginalized from the planning process (i.e. the CLC), except for information sessions and occasional participation.

Please explain or provide information on how this project and the engagement process are equitable to the environment and residents when:

1. **There is no added value (benefit) to "the environment" other than minimal effort in reclamation (see comments on Section 1.6);**
2. **One social group is continually engaged (beneficiaries of development) but others are not (residents, recreational groups, and environmental groups);**
3. **Sidelined groups have limited access to information until an EIS is available and are then faced with a monumental task of navigating, understanding, and digesting – let alone responding to – thousands of pages of text and maps, prepared by multiple experts, in a short time frame.**

The Proponent's stance on limiting the engagement is evident in Atlantic Gold's parent company, St. Barbara. Their website states, *"We do not consider our impacts to include engagement with communities beyond those geographically proximate to our operations."* (https://stbarbara.com.au/wp-content/uploads/2020/09/2020.09.18-asx-2020-sustainability-story-and-report.pdf; p.6)

We view these kinds of statements as predictors of future actions. The Proponent acknowledges that the area is economically depressed. The Proponent leverages short-term economic benefits (for some) against environmental impacts and other social values (for the majority of residents). This approach to community engagement is simply to divide and conquer.

The tax dollars of all Nova Scotians contribute to the regulation of this industry at both the provincial and federal levels wherever it operates in the province. This constitutes an "interest" in the effective regulation of the mining industry.

The Proponent takes credit for provincial-wide economic and other benefits accruing from their operations (contribution to GDP, employment, tax revenue etc.) yet tries to constrain input at the front-end to a narrowly defined, local geographic area and community. This must be challenged because ensuring a robust and effective regulatory framework for mining is in the interests of all Nova Scotians.

Section 6.15.6 states, *"The Proponent is working to establish an office in Sheet Harbour to provide a place for the public to ask questions and provide a point of contact for community members."* This is part of the discussion on socio-economic conditions, but it **illustrates another example of the Proponent's community engagement approach. It represents a lost opportunity to connect with the community in a meaningful way, as the office would not be established until AFTER the mine was approved.**

SECTION 5.0 ENVIRONMENTAL EFFECTS ASSESSMENT METHODOLOGY

The EIS describes in detail the physical components and activities that *"reflect the scope of the project."* The effects discussed in the EIS are based on these components and activities. Part of the Valued Component selection process relies on the *"concerns raised by the public through open house meetings hosted by the Proponent."* This limited opportunity is woefully inadequate.

Furthermore, the EIS makes constant references to consultation with "the public." As described in the comments on Community Engagement, the lack of transparent engagement with "the public" and the Proponent's reliance on the narrow, socio-economic interests, and the cherry-picked Community Liaison Committee, result in a lack of discussion and an inadequate assessment of the long-term impacts related to the social portion of valued 'socio-economic' components.

A cursory review of the consultation sections clearly shows an overwhelming emphasis on First Nations consultation (which we applaud) but an anemic attempt at other community engagement activities. **Please provide additional information on the social concerns and an assessment of those concerns by a qualified consultant, who specializes in social-impact assessment.**

5.4.1 Temporal Boundaries:

The temporal boundaries are described for each Valued Component in subsequent sections of the EIS (Section 6.0). However, a summary would give the reader a collective picture of the effects over time, rather than an understanding of each individual effect.

Please provide a general summary of the effects over time.

5.4.2 Spatial Boundaries

The spatial (geographic) boundaries for assessing the scale and range of interactions between the mining project and Valued Components include the Project Area (PA), the Local Assessment Area (LAA), and the Regional Assessment Area (RAA). The Proponent states that the size of the area can vary, depending on the Valued Component being considered and the biological and physical variables present. However, all VCs were evaluated at the LAA level except Cultural and Physical Heritage (at the PA level), Socio-Economic Conditions (at the RAA level), and Cumulative Effects (also at the RAA level). The Proponent states that the justification for the range and extent of impacts is provided in Section 6:

Summary of Environmental Effects Assessment for Each Valued Component.

With regard to Valued Component Fish and Fish Habitat (6.8.1), please provide a more robust and detailed justification for confining the analysis of environmental effects to the Local Area rather than the more relevant Aquatic Regional Assessment Area, which corresponds to the East River Sheet Harbour Secondary Watershed 1EM-1 (or #53), a drainage basin into the marine estuary at Sheet Harbour. The East River Sheet Harbour system is also a source of drinking water for communities downstream.

5.5 Standards or Thresholds for Characterizing and Determining Significance of Effects:
The Proponent's assignment of significance of effects and residual effects is arbitrary and subjective. It is a good idea to try to qualify or quantify the project's effects on the environment (Table 5.10-1), but this is not a measure of significance. Significance is dependent on the particulars of the VC (Valued Components) considered in Nova Scotia. For example, the Proponent has labelled the loss and fragmentation of habitat and disturbance from noise, light, and traffic as "not significant" (Table 6.12-17) for species at risk. Yet, in the case of the mainland moose, the effects of the mine are very significant, as *"the FMS Study Area is located within a mainland moose concentration area, within the Liscomb Game Sanctuary"* (p. 599). The mine will eliminate regenerating habitat on the site's footprint. This habitat will not return within the extremely disturbed mine footprint, even long after the mine closure (many moose lifetimes). Moreover, the mine will render the surrounding area unsuitable habitat because of noise and light during the construction and operating phases, and the increased risk of road collisions. Because there are very few mainland moose in this particular part of the province, the loss of even one individual (whether by collision or fragmented/reduced habitat) is very significant for the Nova Scotia moose population. Even so, it will not necessarily be documented. Significance is only useful if assessed in the context of each VC or species considered, based on the overall environmental resilience and conservation goals for each.

Please revise your analysis of adverse effects throughout the EIS with a focus on preventing adverse effects, rather than dismissing these effects as 'not significant.'

SECTION 6.0 ENVIRONMENTAL EFFECTS ASSESSMENT

The effects on the selected Valued Components are described in detail in Section 6.0 of the EIS. The effects are discussed in isolation. For the average person, this approach is difficult to understand and navigate. A general summary of effects on components would help the reader to better understand the discussion on effects and how they are related to one another.

Please provide a general summary of effects and their relation to one another.

6.5 Groundwater Quality and Quantity:
Given the conceptual model adopted in 6.5, all groundwater flowing in surface soil and till down to bedrock is labelled as seepage and dealt with in surface water (p. 249).

Seepage that comes out in seepage collection ponds (presumably at the level of the original grade, such as the base of the TMF dam) can be treated before being released. But not much can be done about the seepage that will occur deeper and therefore bypass collection.

The TMF design includes a liner that *"will extend from the upstream toe of the embankment into the TMF basin for a length of approximately three times the height of the Stage 1 embankment to control seepage gradients prior to the development of the tailings"* (p.27). Since the Stage 1 embankment will have a height of 16 m, the liner will extend about 48 m back from the embankment. Yet the tailings pond appears to extend about 1500 m back from the embankment (Figure 2.1-5).

Please discuss the methods to reduce the seepage from the TMF facility (e.g., having impermeable liners over the whole area of the tailings pond to decrease penetration into groundwater).
Please discuss how seepage can be collected at the southernmost part of the TMF, which does not appear to be bound by any berm.

"The rate of groundwater seepage from the TMF was 6 m3/day to the East Lake Catchment and 75 m^3/day to the catchment to the north of the TMF. The rate of groundwater seepage from the WRSA to the flooded open pit was 175 m^3/day (of which 90 m^3/day originates from the PAG portion of the WRSA)" (p. 247).

Please compare these flows with the seasonal low and high flow of the affected stream catchments, particularly East Lake and Seloam brook, during operation as well as after closure.

Please provide a table with the predicted metals and other solutes in the seepage, along with the baseline concentrations of the same elements, measured in the affected stream catchments, to evaluate mass loadings.

Seepage from the pit to the surrounding area when the pit is full (post-closure) is not modelled (Figure 6.5-17) and could be important given the fractured pit walls, the presence of faults, and the proximity of Seloam Brook and other watercourses and wetlands.

Please model and discuss the seepage from the pit itself and its significance in transporting chemicals coming from the rock piles and TMF considering that all will be directed to the pit after closure.

<u>6.5.3.1.8 Groundwater Quantity Conceptual Model:</u>
"Due to the relatively shallow depth to bedrock, and the low hydraulic conductivity of the bedrock unit, groundwater flow within the FMS Study Area is conceptualized as occurring mainly within the till, and upper (contact) portion of the bedrock" (p. 220).

In other words, infiltration of mine water, possibly acidic and with metal concentration exceeding regulatory levels (tables 6.5-6 and 6.5-7) into the bedrock is not considered.

Faults are known to be a pathway of enhanced groundwater flow. If one attempts to extrapolate Figure 4.4-6, it appears that the two faults going across the pit extend under other parts of the mine, particularly the TMF.

Provide a map showing the faults over the area of the whole project, not only the pit.

"The Seigel and Serpent faults are smaller and do not appear to be capable of transmitting or storing large amounts of water based on the limited testing to date" (p. 220).

Very limited indeed: This is based solely on two hydraulic conductivity values, one for each fault, which are admitted to *"not fully represent the hydraulic conductivity of the fault zone."* The values have been inferred from data presented in Appendix B.1, even though the summary of that appendix states, *"No major features such as fault were observed during the FMS hydrogeological drilling program,"* meaning that the faults were not sampled for hydrologic conductivity. The two values inferred are 3×10 -7 m/s and 2×10 -7 m/s. Considering that the hydraulic conductivities measured in bedrock vary by about 3 orders of magnitude (between 6x10-8 and 1x10-5 according to Appendix B.1) the conclusion that there is *"no significantly enhanced hydraulic conductivity within the fault zone"* is completely unsubstantiated.

"Blasting of the open pit bedrock may increase the fracture frequency around the blast hole" (p. 236). The water first flowing through a fractured bedrock into the pit during the operation phase, then out of the pit when it fills after closure suggest that there will be lots of pathways for groundwater, potentially acid and containing significant amounts of contaminants such as Arsenic, to flow into water bodies which will be of lower elevation than the pit rim such as Fifteen Mile Stream and Anti Dam flowage.

Please address the potential pathways of groundwater (in terms of quantity and quality) in bedrock along faults, and fractures, either natural or caused by blasting. Tracers could be used to investigate groundwater flows into the Five Mile Stream, Anti Dam flowage and other nearby water bodies.

6.5.5.1.1 Spatial Boundaries:

"The groundwater LAA is defined as the extent of the groundwater numerical model." It is not a model that should inform the size of an LAA. Rather, the local conditions should inform the boundaries of the modelling. Moreover, in the case of groundwater, the spatial boundary should include a depth below the surface, particularly with a pit at least 165 m deep, reaching below sea water level, and thus below any body of water in both the LAA (local assessment area) and RAA (regional assessment area).

Please give explicit information on how the groundwater LAA has been determined.

Please give the vertical dimension of the spatial boundaries.

6.5.5.2.1 Groundwater Quantity:

"It should be noted that this model uses data collected up to June 4th, 2019." This EIS was published in February 2021. **Please update data to the most current and adjust the discussion accordingly.**

6.5.6.2 Groundwater Quality and Quantity – Touquoy mine site:

"The FMS concentrate will be processed at the Touquoy mill and the FMS concentrate tailings will be deposited into the exhausted pit, which will have been dewatered as part of the Touquoy Gold Project. Therefore, the dewatering of the Touquoy pit will be the initial condition for the Project. The groundwater conditions associated with the dewatered Touquoy pit were simulated with the

groundwater model described in Appendix I.4." (p. 237)

The dewatering of the pit is the initial condition ***only*** if FMS ore is processed immediately at the end of Touquoy ore processing. But there is conflicting information about the timing of the various projects.

1. The Proponent Profile (1.2.1) refers to *"the development of the Moose River Consolidated Project Phase I (Touquoy and Beaver Dam deposits), and Phase II expansion (Fifteen Mile Stream and Cochrane Hill deposits)."* (p.3) This suggests that the Beaver Dam project will be the one following Touquoy operations.
2. *"When the Beaver Dam Mine Project comes online (proposed in 2022 or 2023)…,"* (page 18), suggests that the Beaver Dam mine would come online a year before the Fifteen Mile Stream mine.
3. *"Tailings from the FMS concentrate will be deposited in conjunction with tailings from Touquoy and Beaver Dam ore, and Cochrane Hill concentrate (Appendix I.7)."* Does this mean that some of the tailings from other sites will go to the Touquoy TMF or that some tailings of the Touquoy ore will go into the open pit?
4. Appendix I.7 investigates the possibility expansion of the Touquoy open pit without giving timelines

Please explain why the empty, dewatered open pit is the initial condition for FMS tailings deposition and give a timeline for the processing or the ore from different mine location.

Please evaluate how previously deposited tailings will affect the modelling conclusions for FMS tailings in this EIS.

Please explain how the FMS tailings can be deposited in a mine pit that will be expanded.

The disposal of tailings in the Touquoy open pit HAS NOT approved and has not been the focus of a full EIS as far as we know. Such a drastic change in operations at the Touquoy mine is a direct result of the other mining projects and should therefore undergo a full review by the Impact Agency of Canada.

6.5.7.2.1 Mitigation:
"No specific mitigation is required at the Touquoy Mine Site to support the Project relating to groundwater quality." (p.243). **Please explain why no mitigation is required.**

6.5.8.2.2 Operation Phase:
"Waste rock infiltration through the pile that reports to groundwater table directly below the pile is not anticipated to reach the groundwater table during operations and is therefore not assessed during operations."

Please give the reasons why waste rock infiltration through the pile that reports to this groundwater table is not anticipated.

6.6. Surface Water Quality and Quantity:
Even though Appendix B.6 (2.2.1.6) states, *"an onsite water treatment plant will be in place during each Project phase to provide treatment effluent,"* water treatment seems hypothetical, contradictory, and ill-

defined throughout the EIS.

"Water treatment has not been predicted to be necessary during the Operations or post-closure stage of the Closure Phase of the Project" (p. 364). This statement is contradicted in other sections of the EIS, such as in Table 3.5-1: *"During the post-closure stage of Closure Phase, a water treatment system will be required, based on current modelling predictions."*

Modelling what will happen on a site with complex hydrogeochemical properties is indicative at best, given the many assumptions and simplifications inherent to the model. In particular, the assessment point locations have been chosen at a distance from where the discharge or seepage of effluent happens (Table 6.6-21). The assessment point is 100 m away in the case of EMZ-1 and EMZ-2, on the other side of the East Lake from the seepage source in the case of SW12, and over 1 km from where Seloam Brook will receive seepage from the TMF and the overflow of the mine pit after it has filled. The model ignores what happens in the vicinity of the outflow point where dilution has not taken place and the pH, metals, and nitrogen concentrations are likely to be significantly higher. In fact, mixing effluent with natural water is counted upon to decrease concentrations to regulatory values as stated on p. 79: "*The objective of the mixing zone is to meet the CCME CWQGs, the NSEQSs and the site-specific criteria at the downstream end of the mixing zone (EMZ-1 or EMZ-2). The 100 m length of the mixing zone is consistent with the approach taken for other projects in Nova Scotia, such as the Touquoy Gold Project and Beaver Dam."* This approach is hardly consistent with the precautionary approach and the fact that the same company has used it at the other mine sites does not justify it.

Modelling predictions cannot be relied on for decisions as critical as the need for water treatment of the mine effluent. Moreover, it is doubtful that treatment necessary during post-closure would not be necessary during mine operation when fresh rock is exposed daily, crushed, the waste rock piles and tailings are not covered yet and fresh tailings are produced. Indeed, it would be no less than during the pit development, *where "There is elevated arsenic and potentially mercury within this development area documented in surface water and sediment"* (p. 200).

The water treatment details have not even been determined at the present time: *"Further work will be undertaken to determine the need for, and design of, any treatment works to ensure such discharge meets environmental and regulatory requirements"* (section 2.2.1.12). There is only a "conceptual design" in appendix J.4, and a reference to a *"modular effluent treatment plant present on site during the construction phase."*

This is definitely not exercising due diligence. Any sound plan, which applies the precautionary approach, will include a fully operational water treatment plant. The treatment plant should be ready to deal with any increases in acidity, metal, and nitrogen concentrations, as well as any other water quality parameter of concern. Such a plan would be prepared in advance, not when problems arise.

Please describe the modular effluent treatment plant: is it the one described in Appendix J.4? What chemicals can the modular effluent treatment plant treat? What is the treatment plant's capacity in volume per unit of time? Please explain how the plant can be adapted over the lifetime of the project. Where is the off-site disposal of the dewatered sludge cake in the "Conceptual Minewater Treatment Design" (flow diagram, Appendix J.4)?

Please describe the water treatment plant that will be in place to treat effluent *"if needed."* When the mine effluent needs treatment, will the company stop all activities until it has built or modified a

treatment plant?

Please provide a table of the concentration – at the source of the effluent – of all parameters (listed in Table 6.6-39) that would trigger water treatment. Please explain the rationale for each concentration (CCME/CWQG, NSQS, FEQG, SSWQO or 95th percentile of baseline concentration?).

Please give the precise locations of the points at which monitoring of effluent water quality will take place, in order to decide on water treatment. This monitoring should happen before the effluent is released into the environment – not only into Anti-dam flowage – but also flowing out of the open pit into Seloam brook, after the pit has filled and is receiving TMF water.

Please explain the frequency of sampling and analysis for monitoring. How quickly will problems be detected and dealt with before the receiving environment has seen contamination? Monthly samples are not likely to detect significant concentration spikes.

Please explain how the samples will be taken, to ensure that a true representation of the effluent is measured, not only discrete components of the mine.

6.6.2.1.2 Touquoy Mine Site:

There is no mention of the Ship Harbour Long Lake Wilderness Area, which includes Scraggy Lake and lies in the Fish River watershed. The Touquoy mine directly impacts Ship Harbour Long Lake Wilderness Area, more than it does Tangier Grand Lake Wilderness Area. Ship Harbour Long Lake Wilderness Area is absent from Figure 6.3-2.

Please correct this omission and consider this wilderness area with the same level as importance as the Tangier Grand Lake Wilderness Area or other protected areas in the vicinity of the FMS project.

6.6.2.6 Touquoy Mine Site Surface Water Quality Baseline Methodology:

"The baseline conditions for the Touquoy Mine Site for the Project operations will be the conditions expected near the end of the Touquoy ore processing operations." (p.261)

*"As discussed in Section 6.6.2.6, the baseline water quality in WC4 and Scraggy Lake are not based on the existing conditions, as they will be changed by the Touquoy Gold Project. Therefore, the baseline water quality in these waterbodies are based on predictions presented by Stantec (2016b)."(*p.289)

There is no rationale for changing the baseline conditions. The fact that the ore has changed origin (FMS rather than Touquoy) does not justify changing the baseline conditions. The baseline conditions before the mine started in 2017 should be the reference when evaluating the impact to surface water quality (and groundwater).

A moving baseline leads to underestimating the cumulative effects and to "normalizing" previous increases in chemical concentrations of receiving waters due to mine operation. The baseline value prior to the start of the project should be used as the reference throughout the project. This will better evaluate effects and be the goal to achieve in mitigation and remediation, regardless of where the ore comes from.

Please provide the baseline data for Moose River, Scraggy Lake, and Watercourse No. 4 (measured before any mining activity started). The groundwater and surface water monitoring report by Stantec

(2018a) does not seem to be part of the Appendices.

Please explain why a change in baseline conditions at the onset of FMS ore processing should inform the Environmental Impact assessment.

6.6.3.2.2. Touquoy Mine Site:
"Model assumptions include: [….] the Touquoy pit is exhausted and empty." (p.279)

Please see comments about groundwater above; the Touquoy pit might not be exhausted and empty when the FMS tailings start to be deposited.

6.6.5.5 Touquoy Mine Site Surface Water Quality Effects Assessment Methodology:
For the water quality modelling, the EIS refers the reader to Appendix I.6. In this appendix, under "water treatment," (p.17) it states, *"The majority of the residual cyanide reagent introduced to the tailings during ore processing will be degraded and hydrolyzed to carbon dioxide and ammonium during storage in the tailings pond. Similarly, this will be expected to occur for the FMS and Beaver Dam tailings being stored in the Touquoy pit. Potential failures related to cyanide recovery and proposed Touquoy pit disposal will be addressed in updates to the existing Touquoy groundwater contingency plan (Stantec 2019a), as required in the Industrial Approval for the Touquoy mine site."*

The residual cyanide must be more than "expected" to degrade and hydrolyze in the pit. The FMS and Beaver Dam tailings will be stored underwater (limited oxygen supply), which is different from the Touquoy tailings in the TMF. In the TMF, exposure to air and light causes oxidation and decomposition of cyanide.

Please discuss and model how the different storage conditions can change the fate of the cyanide and its degradation products, some of which are still toxic, volatile, and ecologically damaging. For instance, Sodium cyanate is toxic to human and harmful to aquatic life. Ammonium can cause eutrophication in lakes and rivers.

Please provide – in this EIS – the groundwater contingency plan to deal with potential failures related to cyanide recovery.

6.6.8.4.3 Change to Moose River Water Quality from Effluent Discharge and Groundwater Seepage:
In summary, the water quality discharged from the pit into Moose River will be very close to (or above) the various permitted limits for arsenic, aluminum, cobalt, copper nitrite, and cyanide. In some instances, dilution in the first 100 m of Moose River is counted on to decrease the concentration to the allowed levels.

Please discuss and evaluate what additional technical means (e.g., additional treatment of tailings and/or water, engineered wetland, more impermeable barriers) could be used to decrease the contaminants in the pit water and thus in Moose River water.

6.6.9.1.2 FMS Surface Water Quality Monitoring:
"A baseline surface water quality monitoring program will continue during 2019/2020 and will incorporate baseline MDMER environmental effects monitoring stations."

This EIS is dated February 2021, but it sounds like data collected after 2019 and 2020 is not included. Appendix B.5 is dated September 6, 2019, and presents data up to June 2019. The same goes for hydrological data in Appendix B.3.

Please provide the data available up to the date of this EIS and revise Table 6.6-16, discussion, and conclusions accordingly.

6.7 Wetlands:
Globally, over 64% of wetlands have been lost due to human activity. As we lose wetlands, we also lose the incredible benefits and services that they provide to both humans and the natural environment. *The GPI Water Quality Accounts*, a GPI Atlantic study on Nova Scotia's water resource values (Wilson, 2000), estimates that wetlands provide $7.9 billion worth of benefits in ecosystem services to Nova Scotians annually. Despite this significant long-term value, the Fifteen Mile Stream gold mine will contribute to the continued loss and destruction of natural wetlands. Given that the operating phase of the FMS gold mine is 7 years, we do not believe that the direct and indirect impacts of mining activities on 690,817.164 m^2 of wetlands are appropriate or justified.

Like other freshwater sources across Canada and the world, Nova Scotia's wetlands are threatened by climate change. Climate change is presenting new challenges and exacerbating existing threats to freshwater, such as pollution and acid rain, overuse and development, habitat loss and fragmentation, alteration of flow, extreme weather events (e.g., hurricanes), and invasive species.

More consideration is needed regarding how:

1) Mining activities might contribute to climate change
2) The protection of the natural wetlands can help mitigate the increasing impacts of climate change
3) The alteration of the area's natural wetlands might exacerbate the impacts of climate change on the local ecosystems.

6.7.3.2 Wetlands of Special Significance:
In Table 6.7-5, the Proponent highlights wetlands with observed species at risk (SAR) and indicates whether the wetlands will be partially or completely altered. The SAR observed include: blue felt lichen, mainland moose, Olive-sided flycatcher, evening grosbeak, eastern wood-pewee, rusty blackbird, Canada warbler, and common nighthawk. With the exception of four of the wetlands with observed SAR, these wetlands have not been identified as wetlands of special significance (WSS) for various reasons. While the migratory species are not enough to classify a wetland as a WSS, special consideration should still be given to wetlands where these SAR have been observed. We are concerned that the alteration of these wetlands will have negative impacts on the observed SAR.

Please provide more information to address the concern that the habitat alteration may result in impacts beyond the immediate area.

In addition, the Proponent considers each wetland individually but does not adequately consider the ecosystem(s) as a whole. Even if other suitable habitats exist within the proposed site or surrounding areas, there is concern that the destruction of wetlands, the subsequent infrastructure that will be built, and human activity that will take place at these sites will have direct and/or indirect impacts on the observed SAR. These factors may deter species at risk from occupying the nearby wetlands.

Please provide information regarding the direct and indirect impacts of the altering of wetlands on SAR and the ecosystem as a whole in the surrounding area. Please use examples from existing mine sites.

6.7.6.1.1.1.1 Direct Impacts to Wetlands of Special Significance:

This section states that four wetlands have been identified as Wetlands of Special Significance (WSS) and that *"two wetlands are proposed to be partially (WL27) or completely (WL159) altered to support Project infrastructure."* Section 6.7.6.4. (Wetland Avoidance) states, *"Three WSS are proposed for partial or complete alteration as the result of the Project. The location of the TMF and associated impacts to WL27 and WL65 are unavoidable."* It is explained that blue felt lichen is present in the Eastern lobe of WL65, and only the Western lobe will undergo alteration. It is our opinion that a WSS should not be considered in fragments, but rather, each wetland needs to be examined in its entirety. Therefore, wetland WL65 and its proposed alteration should be given consideration in section 6.7.6.1.1.1.1.

Please provide information and case studies to support the fragmentation of a WSS. This should include information to support the assumption that the effects will only be limited to a fragment of the WSS.

The *Nova Scotia Wetland Conservation Policy* states*, "Government will not support or approve alterations proposed for a WSS or any alterations that pose a substantial risk to a WSS, except 1) alterations that are required to maintain, restore, or enhance a WSS; 2) alterations deemed to provide necessary public function, based on an Environmental Assessment (if required) with public review or other approvals (e.g., Wetland Alteration Approval) as appropriate."* Because this project does not appear to align with the exceptions outlined in the *Nova Scotia Wetland Conservation Policy*, the Proponent cannot alter these wetlands.

The Proponent states that the avoidance of WL27 (a WSS that contains blue felt lichen) is not practical. WL159, which will be altered completely, also contains blue felt lichen. The Proponent suggests the translocation of the blue felt lichen.

Please explain how practicality is conceptualized in this context.

Please explain the process of translocation, how the success of the translocation process will be monitored, and for how long.

Please explain what actions the Proponent will take should the translocation not be successful. Draw upon studies and research that demonstrate the success of the translocation of blue felt lichen.

6.7.6.1.1.1.3 Groundwater Drawdown:
We are concerned about the impacts on wetlands by groundwater drawdown, which is expected to occur near the open pit and around the surrounding area. The Proponent indicates, *"Groundwater modeling predictions of a lowering of the water table ranging from 13.0 m in areas close to the pit to 1.0 m at the extent of the predicted drawdown area a maximum of 830 m from the pit, during operations."*

Please clarify the impacts on wetlands should the water table lower by 13.0 m; please provide examples from other mine sites.

There is also concern about adequate monitoring of the wetlands. The Proponent writes, *"Of the 12 wetlands with potential indirect impacts from groundwater drawdown in the pit ROI, only wetland 11 is expected to have a direct interaction with groundwater,"* and thus only wetland 11 will be monitored. We believe that only monitoring a single wetland is inadequate; the potential impacts from groundwater drawdown are reason enough to warrant careful monitoring of all the wetlands.

The EIS also states, *"MEL used a reasonable worst-case scenario to estimate potential indirect impacts to wetland 11 from groundwater drawdown (0.46 ha)."*

Please explain how a "reasonable worst-case scenario" was determined and what this entails.

Please provide additional information regarding post-closure monitoring of indirect impacts to wetlands due to groundwater drawdown.

6.7.6.1.1.2 Direct and Potential Indirect Wetland Impact Summary:
The Proponent states, *"Design of suitable hydrological connectivity structures (e.g., culverts), the implementation of a Project EMS Framework document (Appendix L.1), and erosion prevention and sediment control methods will be employed to ensure that avoidable indirect impacts to upstream or downstream wetlands will not occur as a result of the activities associated with the Project."*

Please reference case studies and other relevant research that discuss the successes and failures of the methods proposed, specifically in relation to other mining sites.

The Proponent also writes, *"The maximum potential indirect impacts of the project on wetlands, considering groundwater drawdown, Seloam Brook Realignment flooding, and surface flow reduction, is 10.78 hectares. This represents 5.1% of delineated wetlands within the FMS Study Area and 0.8% of wetlands within the LAA. The magnitude of this effect is considered low.... This estimate represents the reasonable worst-case scenario of indirect impacts to wetlands."*

Please provide clarity on the methodology the Proponent used to determine the low status of the magnitude of effects. Provide additional information on what constitutes a low, medium, and high magnitude.

Please provide evidence from case studies regarding the success of the mitigation measures proposed. In addition, explain how a "reasonable worst-case scenario" was determined in this context and what this entails.

6.7.6.4 Wetland Avoidance:
Best management practices for wetland management adopt a three-stage sequence for wetland losses: avoidance, mitigation, and – as a last resort – compensation. The Proponent states, *"The extent to which the proposed Project can be manipulated to avoid impact to wetland habitat is limited"* and that *"efforts will be made during the final design process to avoid, and reduce impact to, as much wetland habitat as possible."*

Please provide more information on what particular actions will be taken to reduce the impacts to wetlands. Specifically, please discuss what methods will be used to avoid wetlands, and – if wetlands are not avoided – how the harms against the wetlands will be mitigated. Please provide alternative scenarios and explain the reasoning for why others are not considered.

The Proponent also states, *"Infrastructure that may offer more flexibility in this regard includes the detailed design of the site roads, settling ponds, and stockpile areas."*

Please clarify if the EIS, including Table 6.7-16 and the discussions around indirect impacts to wetlands, incorporate the estimated direct and indirect impacts on wetlands by all the site roads, settling ponds, and stockpile areas that are planned.

Please describe to what extent there is flexibility in this regard. Please provide examples to support the description.

There is also concern about the alterations of wetlands due to the construction of the haul road. The Proponent cites more than 15 wetlands in Table 6.7-16 that will be partially or completely altered due to the haul road. However, there is no further discussion about the impacts of the haul road on the wetlands, including indirect impacts.

Please provide further discussion about the impacts of the haul road on the wetlands, including both direct and indirect impacts.

6.8.1 Fish and Fish Habitat:
The Proponent has concluded that the quality of fish habitat within the FMS study area is predominately low, and proposes mitigation efforts accordingly. The Proponent bases this fish habitat assessment on the presence of hydroelectric and water dams, which have limited fish passage in the upper reaches of the watershed. The Proponent states that the area is also degraded by historic mine works and the deposition of mine tailings, concluding that there is no pathway for migrating anadromous and catadromous species.

Fifteen Mile Stream joins a series of downstream flowages (Anti-Dam, Marshall, Malay Falls, and Ruth Falls electric stations and water storage dams) to the Sheet Harbour estuary. Historically, there have been fishways, but these are no longer maintained. In the past, the river system also hosted upstream stocking projects for recreational angling of Atlantic salmon and brook trout. Nova Scotia Power has an ongoing requirement from DFO to take Atlantic salmon that find their way into the fishway and release it above the barrier dam, a requirement that has not been changed, even though stocking projects have not been conducted in 20 years.

Nonetheless, the cumulative downstream effects of pollution from mining operations are still a concern

for fish, fish habitat, and the quality of drinking water, particularly in the event of a major accident or catastrophic TMF failure.

East River Sheet Harbour Watershed (#53) and West River Sheet Harbour Watershed (#243) share the same marine estuary. The West River Sheet Harbour and Killag Rivers (West River Sheet Harbour Watershed #243) are the site of a significant Atlantic salmon and brook trout restoration project. This project was initiated by (and is operated by) the Nova Scotia Salmon Association. The project has ongoing support from both federal and provincial governments, as well as conservation stewardship organizations (such as the Atlantic Salmon Federation, ASF). This project has been operating for several years. The project has provided evidence that Atlantic salmon are present in coastal areas on the Eastern Shore. It has documented that even though there are threats to salmon smolts, both in the river system and in the estuary, 50% of smolts do return to the shared marine estuary.

Very recent studies involving acoustic telemetry (electronic tagging) and eDNA (environmental DNA) detection have provided additional evidence of the presence of Atlantic salmon in the Sheet Harbour marine estuary. In the most recent scientific study (Montgomery et al., 2020), the Nova Scotia Salmon Association concluded that the distribution of Atlantic salmon has remained relatively unchanged over the last 20 years. Salmon DNA was detected at 14 of 30 sites on the Eastern Shore, including in the Sheet Harbour estuary.

This evidence indicates that the Proponent needs to adopt a Precautionary Approach in regards to the assessments of fish presence and abundance.

The application of this eDNA methodology has recently been expanded to include a number of additional watersheds across Nova Scotia, as part of the Nova Scotia Salmon Association's W.A T.E.R. project (Watershed Assessment Towards Ecological Recovery), as a basis for more restoration work. The project is focused on 5 key species at risk: Atlantic salmon (Southern Uplands Population), Atlantic whitefish, Atlantic sturgeon (St. Lawrence population), brook floater, and American eel.

These recent studies have established that technologically advanced detection methodologies are available for environmental assessment research and for the detection of various aquatic species.

The Proponent should take into account the results of new detection methodologies in establishing fish presence.

The Proponent needs to acknowledge that the East River Sheet Harbour watershed joins the West River Sheet Harbour watershed in the same marine estuary, where this restoration work has been underway. The Proponent should acknowledge the documented presence of anadromous species. This is of particular importance, given the cultural and socio-economic significance of Atlantic salmon, as well as other anadromous and catadromous species.

With respect to catadromous species, it should be noted that the East River Sheet Harbour historic abundance data series for American eels (COSEWIC "Special Concern") is the longest available for the East Coast. The American eel was the source of an historic fishery for the Eastern Shore, including East River Sheet Harbour.

Furthermore, the Mi'kmaq have had a deep cultural and economic relationship with American eels, which were used for food and for their skins. It should be noted that very recently, the Mi'kmaq have

indicated an interest in adding the lucrative elver fishery to their moderate livelihood fishery intentions.

Brook trout are also present throughout this river system; the EIS should focus more attention on brook trout due to the species' significance as a recreational fishery.

The considerations above indicate that mitigation measures to preserve fish habitat downstream of the mine are important and necessary even if fish passage is currently impaired.

6.15 Socio-economic Conditions:

The EIS discusses socio-economic conditions in traditional, narrow terms – economic value. There is little discussion of social benefits (other than those to individuals). There are no references to the evaluation of values held by various groups or to the value of existing ecosystems. The economic value of the goods changing hands (labour to produce gold, in its simplest terms) is often the easiest to quantify and may contribute to the disproportionate emphasis on those aspects of the project.

Next, it is much easier to quantify impacts by area, numbers (*such as area of disturbance, wetlands affected, or species impacted*), or volumes of some description than to assign values to ecosystem services. Regardless, *value* is relative and some discussion should be provided to the readers to help them better understand how these values are assessed and by whom.

Please provide additional information with respect to the Proponent's understanding of all social and environmental values (the underpinnings of the concerns expressed in this segment) and the methodology used to assess those values, given the lack of effort to engage stakeholders in a transparent and meaningful way.

6.17 Accidents and Malfunctions:

The EIS states, "*Many accidents and malfunctions are preventable, and their likelihood and consequences are minimized during planning and design, and by developing thorough emergency response procedures and ensuring mitigation measures are incorporated into standard operating procedures.*"

While it is virtually impossible to predict an accident or malfunction, best practices that rely heavily on prevention and vigilance are the best way to avoid emergencies in the first place. The Proponent's reliance on an emergency response plan – that has not even been written at this point – is an issue.

Please provide more information on the best practices that support avoidance as the primary management tool. These should include administrative controls (policies, training, and best management practices), engineering controls (design elements at ecologically sensitive locations), and examples of these tools in use. Best management practices should all be backed by case studies.

6.17.4.4: Tailings Management Facility (TMF) Dam failure:

The EIS discusses catastrophic dam failure in terms of physical, biological, and chemical impacts to the area, including physical changes to downstream and adjacent areas and associated ecosystem losses. And that *"much of the tailings would be expected to report to the open pit"* but it does not state what – if any – action is required to direct flow to the pit. Furthermore, the Proponent states that (locally)

Seloam Brook and (regionally) Fifteen Mile Stream, would feel the most significant effects.

Please provide an additional explanation of how the pit design could be utilized to better protect the surrounding area from a catastrophic tailings release throughout the life of the project.

Please provide additional information regarding the consideration and evaluation of alternative tailings storage to prevent or minimize the impacts associated with a tailings dam failure.

The EIS discusses engineering design of the tailings dam to meet guidelines from 2013 and 2014. Dams fail, as seen in other areas of the world. The CEO of the International Council on Mining and Metals (ICMM) recently expressed concern about dam failures at the 2021 virtual *Prospector and Developers Association Conference*.

Please provide additional information to support the Proponent's commitment to the industry's best management practices through the adoption of the Global Industry Standard on Tailings Management (released August 5th, 2020), as supported by the UN's Environment Programme and the Principles for Responsible Investment.

Please provide additional information regarding a catastrophic dam failure in terms of material movement during remediation, reclamation, restoration, and storage.
Please provide additional information on how remediation, reclamation, and restoration efforts (associated with a catastrophic failure) would be funded.

The EIS identifies possible emergencies related to dam failure; however, the Emergency Response Plan (ERP) is not available for review at this time (as noted in Section 10). This is a critical issue with respect to how the Proponent is protecting the environment proactively vs. reactively (through emergency response planning).

Please provide more information on the ERP in the EIS, particularly as it relates to:

- **Day-to-day monitoring of the TMF to identify an emergency as quickly as possible**
- **A procedural framework to better understand the overall approach and**
- **The planned steps if the ERP is initiated.**

Please provide information on emergency response training for first responders in the event of an emergency.

SECTION 7.0 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

7.1.3.2: Effects of Climate Change on the Project:
The Knight Piésold Ltd. report (Appendix D.1) states, *"It is not possible to make strong conclusions about future climatic conditions based on the measured climate and flow data available."*

The report recommends that peak design flows be increased by 15% for structures with a design life longer than 30 years. This is based on the Engineers and Geoscientists of BC Professional Practice Guidelines. It is a middle ground value between a 10% increase (where no climate change trend is detectable in historic streamflow trends) and a 20% increase (where a statistically significant trend is

detected in historic streamflow trends). With the level of uncertainty, is 15% enough of a security buffer?

Please provide additional information from other climate change research to support the assumptions used to design for extreme events.

With respect to the TMF closure (Appendix D.3 - FMS Tailings Management Plan - Final (Knights Piésold)), statements such as "*The TMF embankment slopes are designed at 2H:1V downstream slopes, **which are expected to be stable following closure***" are quite worrisome. The Proponent should put more emphasis on measures built into the design to prevent failures and increase certainty. Where certainty cannot be confirmed, the Proponent should provide rates of failures for comparisons.

Please provide additional information on the use of these design criteria with case studies.

SECTION 8.0 CUMULATIVE EFFECTS

Comments related to *Socio-economic Environment* focus on possible effects to the Mi'kmaq of Nova Scotia. While we applaud this emphasis, there is a lack of discussion on other socio-economic interests. Aside from immediate short-term jobs and a small economic infusion into the province, little attention is given to long-term economic impacts or conservation interests.

A project of this magnitude – requiring a federally mandated environmental assessment – must evaluate how (or if) the project would negatively impact EVERY Valued Component.

Stakeholders include those groups interested in protecting local and downstream environments and ecosystems. Not engaging these groups does not mean that these stakeholders have no concerns. The responsibility of the Proponent should be to seek out ALL concerns in a transparent process. Mining for the maximum benefit of a few investors is but one perspective. Unfortunately, it's the perspective with the financial resources to create statements that might be technically correct in isolation but don't include all of the issues in order to accurately reflect the overall picture.

The EIS goes to great lengths to describe effects on VCs. The EIS either determines that there *is* no "significant effect" on VCs or leads the reader to *believe* that there is no significant effect.
There is a serious concern that the emphasis on short-term economic value diminishes other long-term community and environmental values by assessing this project in isolation (i.e., proposed short-term impacts) and from alternative competing values.

Paragraph 19(1) of CEAA 2012 states*, "At its foundation, EA is a planning tool used to ensure that projects are carefully planned to avoid or mitigate possible negative environmental effects and to maximize potential benefits."* This is an important statement, which sets the tone for this exercise. The assumption is that the project *can* proceed IF effects/impacts can be avoided or mitigated. But it is critical to understand and appreciate ALL values being affected to fully assess the long-term costs and benefits of this project.

As a general point of discussion in Section 3 (Community Engagement) and Section 6.15 (Socio-economic Conditions), if all values have not been accounted for, how will the Proponent assess the cumulative effects or impacts of this project?

Please provide additional information (collected by a qualified consultant) on socio-economic impacts on the values held by conservation groups, environmental citizen scientists, and an assessment of the impacts on those values.

8.4.3.1.3 Touquoy Mining Operations (Past, Present and Future):
"In the future, it is proposed that the Touquoy pit be expanded to extract additional high grade ore (Appendix I.7)"(p.870).

This is the first mention of an expansion of the Touquoy open pit in the EIS after more than 900 pages of text! Yet it affects many aspects of the EIS discussed up to this point. For example, Appendix I.7 – the only one that seems to have considered this expansion – shows predicted water and tailings storage (Figure 3.3) that is drastically different from the predictions shown in Figure 6.6-19 (p.370 of EIS). Therefore, the discussion of water quality and quantity in the EIS is not valid in the case of an expansion of the Touquoy pit.

Please provide a map showing the expanded pit within the overall mine footprint.

This expansion proposal is part of the "Moose River Consolidated Project" and should be subject to review by IAAC in addition to the provincial regulator.

"To support cumulative effects assessment for the Project, the expansion of the Touquoy pit is considered herein. In the future It is currently proposed that future tailings from the processing of ore or ore concentrate from four deposits at the Touquoy mill will be disposed of in the Touquoy pit".

The Touquoy gold mine at Moose River received provincial Class 1 Environmental Approval on February 1, 2008. The approval was for a mine life of five years, after which the mine would be decommissioned, according to the EARD and the Focus Report. Only ore from the Touquoy mine site was to be milled on-site, and only the tailings from the mine site were to be disposed of in the Touquoy TMF. According to the EARD and the Focus Report on which the approval was based (http://novascotia.ca/nse/ea/MooseRiver/MooseRiver_Conditions.pdf)**:**

> *Terms and Conditions for Environmental Assessment Approval*
> *1.0 General Approval*
> *1.1 The Environmental Assessment Approval for the project is limited to the project as described in the registration document. Any proposal by the Proponent for expansion, modification or relocation of any aspect of the project from that proposed in the registration document must be submitted to the Environmental Assessment Branch for review and may require an environmental assessment.*

To our knowledge, these basic conditions have not changed, and no other approvals have been granted. Therefore, we are confident that the Touquoy gold mine will be decommissioned in 2022, and the lands and waters will enter into the decommissioning and reclamation process. We sincerely hope that IAAC will hold the Proponent to the original Environment Approval.

It looks as though the Proponent is trying to create a back door to alter the original environmental approval, seeking to extend the mine life of Touquoy, using the mill for ore mined at other sites, using the mined-out pit (and possibly the Touquoy TMF) as a TMF for Fifteen Mile Stream and Beaver Dam ore. All of this is being included, for some reason, in this EIS rather than the Beaver Dam EIS. Furthermore, there is now an attempt by the Proponent to expand the Touquoy mine, without specifically requesting a federal Environmental Assessment in order to do so.

We recommend to IAAC:

1. **That the Touquoy mine site requires federal environmental approval from IAAC in order to diverge in any respect from the original provincial Class 1 Environment Approval.**
2. **That the IACC review the other three Atlantic Gold/Atlantic Mining/St. Barbara mine sites plus the Touquoy site together, as a whole, to understand the collective impact of four gold mines on the Eastern Shore. Please consider the cumulative impacts on the downstream lands, water bodies, wildlife and wildlife habitat, the many nearby protected wilderness areas, and the Eastern Shore communities.**

8.5.4.2.1.1 FMS Water Quantity Summary:

This section discusses the residual effects on surface water quantity as being of low magnitude on the macro-scale over the life cycle of the project. Yet, the East Lake outflow may be reduced by as much as 45%. The size of the area of disturbance is estimated to be about 400 hectares.

Please provide additional information on the possible effects of extreme (high and low) precipitation events, how this could impact runoff from the site, and how these factors could subsequently influence the analysis in this section.

8.5.4.2.1.2 FMS Water Quality Summary:

This section discusses annual and monthly concentrations of modelled parameters. **Please provide additional information on potential exceedances during extreme (high and low) precipitation events.**

8.5.5.1.1 Fish Habitat:

The EIS attributes the baseline conditions to industrial activities, such as dams and acidification from sulphur dioxide emissions, since the 1920s. The Proponent proposes an offset plan to compensate for lost fish habitat. Given the impacts experienced at FMS, this is **another lost opportunity to do better than the minimum required by regulation.**

Section 6.6 in the EIS discusses surface water quality and quantity in terms of flow regimes, hydrology, and watersheds *in isolation* from other proposed mines. Developments along the Eastern Shore are proposed along the Moose River anticline. The Beaver Dam Mine is discussed in various sections, such as the spatial overlap of transportation routes and job potential. Yet there does not appear to be a discussion on the potential combined or cumulative effects on the receiving surface water systems at the coast and possible impacts to those habitats.

Please provide a summary of the cumulative effects from the proposed mines along the Eastern Shore coastline.

SECTION 10 FOLLOW-UP AND MONITORING PROGRAMS PROPOSED

The EIS refers to a series of Environmental Management Plans that will be developed. There is significant concern regarding the content of these proposed plans. For example, how can the reader develop any understanding about the long-term monitoring of the TMF? The details that will be proposed in the Environmental Management Plans are as important as the details in this EIS when it comes to helping the reader understand potential impacts and the ways in which the Proponent plans to address them. To say that it will be completed at a future date leaves out a crucial component of understanding.

This is perhaps one of the most important parts of the EIS. The EIS should explain which activities would be employed to prevent, monitor, and measure changes. It should clarify who would be responsible for those activities, the posting of the monitoring activities, and information on how the Proponent would address shortfalls in managing predicted impacts and failures.

Please provide <u>detailed information</u> on the activities planned to:

3. **<u>Prevent impacts as the absolute top priority</u>**
4. **Monitor the ongoing and cumulative long-term changes to the area over time (structural systems, ecosystem and habitat alteration, etc.)**
5. **Measure these changes and identify the responsible entity as well as the methodology to quantify the changes and make that information public**
6. **Address/remediate missed targets, shortfalls, or failures in preventing or managing predicted impacts (with actual activity details, timing, and funding identified) as an <u>absolute last resort</u>.**

<u>10.2 Limitations:</u>

The Proponent mentions limitations briefly throughout the EIS. In general, these are limitations of data and data collection, such as wetlands modelling, impacts of light, and impacts on air quality. The Proponent even acknowledges limitations with regards to predictions of forestry activities, even though all the industrial forestry companies are a phone call away in Nova Scotia. In 11.2 the Proponent acknowledges a dozen 'personal communications.' It is interesting and relevant that issues of great significance (greenhouse gas budget, impact of project on climate change) are not, in the eyes of the Proponent, subject to limitations of the analysis. Numbers and percentages are produced with great authority that appear to show that the Proponent and the FMS project will not be responsible (or liable) for its emissions. With a highly selective lens, the Proponent chooses which issues are stated in this voice of authority and which issues have 'limitations'. The commonality is that in every case the Proponent absolves himself from responsibility, liability, and the need to do better.

However, this final section (10.2) is devoted entirely to limitations, and not only of data. For example, limitations arise from the Proponent's use of old aerial photographs.

- The aerial photos used in the mapping and spatial exercises may not represent actual on-the-ground conditions due to the age of the aerial photo.
- The aerial photos are reviewed from online sources. There can be an inherent error in the GIS positioning of aerial photos compared to actual coordinates in the field. If that occurs when the

placement of specific field observations from GPS coordinates are overlaid on these aerial photos, errors can occur but cannot be corrected. If there are errors in photo positioning and if figures are scaled, the errors are magnified.

Please explain why you did not commission new aerial photographs in order to produce a more accurate description of the Study Area, the RAA, and the LAA.

Section 10.2 reads like a disclaimer of responsibility by the Proponent for any miscalculation, mishap, or structural failure that may occur over the life of the mine and afterwards. The words in the last line express the view of many volunteer reviewers of the EIS: [The Proponent] "cannot mitigate all risks over time." We agree.

CONCLUSION

The Proponent acknowledges that it "cannot mitigate all risks over time," and that single phrase should carry great weight in the decision to authorize or reject the proposed FMS mine. The Proponent has produced considerable modelling of issues *that may not even match the exact nature of the Study* Area. The Proponent has dismissed concerns about water, wildlife and wetlands as "adverse but not significant." There are more than a few disclaimers of responsibility or liability, the most notable being in Section 10.2. The Proponent has not employed the Precautionary Approach in a consistent manner throughout this EIS. The possibility of miscalculations, mistakes, lack of attention to real world detail (there is an over-reliance on models with many assumptions), mishaps, and exclusion of important areas (public engagement is severely and unnecessarily restricted), all lead the reviewers to conclude that this project must be rejected, stopped in its toxic tracks. This is our recommendation to IAAC.

REFERENCES

Webb, M., Ruber, H., & Leduc, G. (1976). *The toxicity of various mining flotation reagents to rainbow trout (Salmo gairdneri)*. Water Research, Vol. 10, Issue 4, pp. 303–306.

Wilson, S. J. (2000). Nova Scotia's Water Resource Values and the Damage Costs of Declining Water Resources and Water Quality. GPI Atlantic, 178 p. Available at: http://www.gpiatlantic.org/publications/abstracts/waterquality-ab.htm.