NOVA SCOTIA
Environment

Comment and Information Request Index

Project Name: Beaver Dam IR Round 2-1

NS Government

Number	Source	Date Received
1	NS Municipal Affairs	April 3, 2019
2	NSE Climate Change	April 17
3	NS Lands and Forestry	April 17
4	NS Dept. of Business	April 17
5	NS Communities Culture and Heritage	April 19
6	NSE Mining Engineer and Inspector Specialist ICE Division	April 23
7	NS Transportation and Infrastructure Renewal	April 23
8	NSE Senior Surface Water Quality Specialist: Water Management Unit	April 26
9	NS Energy and Mines	April 26
10	NSE Air Quality	April 26
11	NSE Resource Management Unit	April 26
12	NSE Hydrogeologist ICE Division	April 26
13	NSE Hydrogeologist Groundwater, Water Management Unit	April 29
14	NSE Protected Areas and Ecosystems	April 30
15	NSE Hydrogeologist Surface Water	May 03
16	NSE Environmental Health Consultant	May 06

NOVA SCOTIA

Municipal Affairs

Maritime Centre, Floor 14 North
1505 Barrington Street
PO Box 216
Halifax, NS B3J 2M4

Date: April 3, 2019

To: Bridget Tutty, Environmental Assessment Officer, *Nova* Scotia Environment

From: Gordon Smith, Provincial Director of Planning

Subject: **Beaver Dam Gold Mine Revised EIS**

As requested , staff at the Department of Municipal Affairs have reviewed the Environmental Assessment Registration Documents for the proposed Beaver Dam Gold Mine.

Although we have found nothing of concern respecting the Department's areas of mandate, we would like to remind the proponent to ensure that they have undertaken adequate engagement with the Municipalityin order to confirm conditions for compliance with municipal planning policies and by-law provisions.

Thank you for the opportunity to review the Registration Documents for the above-noted project. Should you require additional information, please feel free to contact either Alan Howell, Senior Planner (902-483-3746 / Alan.Howell@n ovacotia.ca), or me (902-424-7918 / Gordon.Smith@ n ovascotia.ca).

Yours truly,
<Original signed by>

Gordon Smith
Provincial Director of Planning

c: Alan Howell, Senior Planner, OMA

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Halifax, Nova Scotia
Canada B3J 2P8

NOVA SCOTIA
Environment

Date: April 17, 2019

To: Environmental Assessment Officer

From: Climate Change Division

Subject: Beaver Dam Gold Mine Revised EIS (EA Document) Comments

Planning/design issue

Climate Change Adaptation

While it is noted that climate change will have no significant adverse effects on the project due to the relatively short duration of the project, the proponent should consider the effect of warmer temperatures as a result of climate change on the creation of a new lake in the decommissioning and post-closure phase. This consideration should be included in water treatment and monitoring program/plan.

GHG mitigation

The proponent has quantified the greenhouse gas emissions and has estimated that a full year of operation, from hauling to processing of ore would emit 37.13 kilotonnes CO_2e. The proponent does not indicate any mitigation measures to be used in the established processes. It is recommended that a review of potential measures to reduce the identified greenhouse gases be included and implemented.

Lands and Forestry

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M E M O R A N D U M

TO: Bridget Tutty, NS Department of Environment

FROM: Department of Lands and Forestry

DATE: April 17, 2019

RE: Beaver Dam Gold Mine Technical Review Requirements

The Department of Lands and Forestry provides the following comments on the above project:

Crown Lands:

According to the submission, the proponent is intending to develop a gold mine at Beaver Dam and transport the ore to the existing Touquoy gold mine. The Beaver Dam gold mine is being developed on private lands and requires no permits/authorizations from Lands and Forestry's Land Administration Division. The transportation route (2 options) identified in the submission appears to cross over portions of Crown lands The Option 2 route involves new construction and proponent would require permission/authorization from the Land Administration Division for road construction and use. The Option 1 route and remaining sections (not including the public road) that cross over Crown lands may require permission/authorizations from Land Admin if there is to be any widening of the existing roads. The public road (Mooseland Road and Hwy 224) may require a transfer of administration and control from Lands and Forestry to the Department of Transportation where the public road cross over Crown lands.

Wildlife:

At this time, the Department does not have sufficient information to complete the required technical review. Please see the enclosed table for what additional information is required.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-01	L&F	Lands and Forestry – Regional Services	Section 6.8.3.1 – Page 379	The report defines Wetlands of Special Significance (WSS). However, it does not identify any WSS that have Species at Risk (SAR) within or in close proximity to it. The report also does not address the fact that wildlife are mobile and can use Wetlands of Special Significance throughout their various life stages.	It is recommended that the proponent provide: 1. Maps of the WSS that identify this area now, the project footprint and changes to the area after restoration. 2. Conduct more baseline surveys. Surveys should include a complete list of <u>all</u> species observed in the site area including amphibians and migratory wildlife species. The description should also include dates when the surveys were conducted and locations so that it is clear what types of non-migratory and migratory wildlife species are currently using the WSS.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-02					3. A list of wildlife species currently using the WSS. The list should include migratory and non-migratory wildlife species (i.e. birds, reptiles, amphibians, mammals, etc.). 4. A list of species currently using the WSS. The list should include migratory and non-migratory species. 5. Identification of mitigation measures during the restoration phase to ensure that the resulting habitat supports biodiversity rather than support of only one or a few species. Mitigation measures could include types of vegetation/trees planted and water depth.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-03	L&F	Lands and Forestry – Regional Services	Section 6.8.6.4 - Page 413 Table 6.8-19 Wetland Cumulative Effects Modelling Results	Unsure how the numbers were determined that relate to percentages of loss of SAR species wetland habitat when no information was provided about the existing percentages of habitat present within the project area (e.g. 50% of the lands currently support Canada warbler, after the project is initiated only 5% of that habitat will be lost due to the project).	Provide total land % number for species. Report provides area loss but how much is left?
NSE 2-04	L&F	Lands and Forestry – Regional Services	Section 6.8.6.5 - page 416	The assumption should not be made that a wetland is not significant because there is lots of habitat nearby for SAR.... "it is not anticipated that these wetlands will be classified as WSS because the SAR birds are mobile species and similar suitable habitat is present within close proximity."	SAR have home ranges which may include wetland in the project area. When the wetlands disappear, they will be displaced and may cause conflict with other SAR and wildlife. Revise and provide mitigation measures of how the project will avoid SAR (i.e. timing windows, buffers around nests, etc).
NSE 2-05	L&F	Lands and Forestry – Regional Services	Section 6.8.6.0 – Page 398 – Table 6.8 – 14 Potential Wetland Interactions with Project Activities	Missing information	All the bullets under Operations and Maintenance have been deleted. Will no measures be taken?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-06	L&F	Lands and Forestry – Regional Services	Section 6.8.6.1- Page 399 - Table 6.8 -15 Direct and Indirect Wetland Impacts	Clarification	What is being done to ensure Vegetation and Habitat Integrity when it comes to vehicles? E.g. Vehicles are to be clean prior to entering the site and mud and debris are to be cleaned from machinery to prevent spread of invasive species from other locations. Seeds can spread through mud on vehicles from site to site.
NSE 2-07	L&F	Lands and Forestry – Regional Services	Section 6.8.6.3 Page 401 - 407	Unclear how "partial alteration" is defined.	When 94% of a wetland (WL 59) is impacted by development, 6% of WL 59 seems unlikely to recover to pre-impact condition for many species to use for habitat purposes. Partial alteration should be redefined, and it should be a range or under a certain percentage. The entire wetland should be compensated for.
NSE 2-08	L&F	Lands and Forestry – Regional Services	Throughout report	Incomplete data for review.	Years are provided for many of the all species searches, but not time of year or time of day. Please provide an appendix of all species observed in the assessment area including Odonata and other invertebrates.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-09	L&F	Lands and Forestry – Regional Services	Section 6.8.9 – Page 433 – Table 6.8-29	With habitat loss; incidental death of wildlife is likely and if habitat is not expected to fully recover for an extended period, impacts should be considered high.	When a VC is unlikely to recover or removed from a system, it would be significant. Habitat loss and incidental deaths are significant impacts. Revise.
NSE 2-10	L&F	Lands and Forestry – Regional Services	Throughout the report	Lack of mitigation measures considering aquatic species	With wetland loss, no wetland mitigations seem to be present when it comes to species present within the wetland. Will salvage measures occur to rescue and remove hibernating and/or resident frogs (eggs, tadpoles, adults), turtles and fish?
NSE 2-11	L&F	Lands and Forestry – Regional Services	Figure 6.10-2 – Priority Species	Missing information	One observation location box on figure has no species associated with it and the green box icon for *Chelydra serpentina* does not appear to exist.
NSE 2-12	L&F	Lands and Forestry – Regional Services	Figure 6.10-2L – Priority Species	Clarification	The green box is difficult to see within the observation location box.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-13	L&F	Lands and Forestry – Regional Services	Throughout the report	Missing information.	Provide details related to restoration of the site and restoring habitat for SAR and wetlands.
NSE 2-14	L&F	Lands and Forestry – Regional Services	General	Clarification	Please provide the rationale for applying the Australian water-based model to Nova Scotia and identify any modifications to the model that will be applied to adapt to Nova Scotia.

From: Tan, Minh
To: Tutty, Bridget R
Subject: DoB response to Beaver Dam Gold Mine Project EA
Date: April 18, 2019 5:18:34 PM

Hi Bridget,

The Department of Business would like to submit our response to the Beaver Dam Gold Mine Project EA.

"The proposed project is not inconsistent with the mandate of the Department of Business."

Thank you for the opportunity to comment on the EA.

Minh Tan
Corporate Strategist
Strategy & Policy

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NOVA SCOTIA

Environment

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Date: April 19, 2019

To: Bridget Tutty, Environmental Assessment Officer

From: Coordinator Special Places, Culture and Heritage Development

Subject: Beaver Dam Gold Mine Revised Submission

Staff of the Department of Communities, Culture and Heritage has reviewed the EA document for the Beaver Dam Gold Mine Revised Submission and have provided the following comments:

Archaeology

Staff reviewed the Registration Document, which contains 5 Archaeological Resource Impact Assessment (ARIA) reports, and the sections particular to archaeology. Issues of archaeological concern appear to have been addressed in the EA document in Section 6.15. There are no archaeological concerns at this time. It is recommended that at the end of the archaeological section, the statement "In the event that archaeological resources or human remains are encountered during ground disturbance activities, it is required that all activity stop, and the Coordinator of Special Places be contacted", be added. This standard paragraph can be found in each of the ARIAs however, it should be in the main body of the Registration Document.

Botany

Staff reviewed the Registration Document and the sections particular to botany. In section 6.8.2, page 343, the flora referred to in this section cited the reference (Roland, 1998) as the authority on Nova Scotia plants (with respect to the presence of wetland indicator species). Staff noted that this reference is 20 years old, and 2 editions out of date. The current authority on Nova Scotia's extant flora is Nova Scotia Plants (Munro et al. 2014). This can be found free of charge on the Nova Scotia Museum website: https://ojs.library.dal.ca/NSM/pages/view/Plants

There are a few typos that should be corrected. In section 6.8.4, page 381 according to the documents posted on the EA website, the Wetland Characterization Table is Appendix G-2. The Registration Document refers to the Wetland Characterization Table as H-2.

Section 6.10.2.4, page 521 – 'DNR' should now be 'Lands and Forestry'

Section 6.12, 6.12-5 – page 590 – there is a row in the table that just says, "warbler sp.", and has zero observations. This could be deleted.

Section 6.13.6.2, page 686 - The revised micrositing of infrastructure avoids many of the previously identified impacts on vascular and nonvascular flora, but some destruction of species of concern is still expected. The Nova Scotia Museum should be contacted to pre-emptively collect any SOCI individuals that will be directly displaced by this development. Such individuals could be either used for research on SOCI relocation techniques or added to the provincial reference collection in the herbarium.

Paleontology

Staff have reviewed the Registration Document, and sections particular to geology and paleontology resources. There are no issues of concern for encountering significant fossils in the surficial or bedrock geology based on the information provided.

Beaver Dam Gold Mine Technical Review Requirements: Round 2, Part 1 May 2019

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-15	Christine Hynes	NSE	Appendix G.5, Figure 2.2		Touquoy Pit question: Is a monitoring station going to be installed downstream of the spillway? Are additional wells planned to be installed between the Pit and Moose River after deposition of tailings? Spillway is designed in the Historical Tailings defined boundary. When will these tailings be removed? And where will they be disposed? Spillway is planned directly through the public road. Is there a plan to build another public road?
NSE 2-16			Table 1-1 Section 6.5.3.2.1	"There are no mapped historic tailings in any DNR or GSC reports, no air photo evidence, no geochemical anomalies to suggest any, no evidence seen during EBS work since 2014 and no evidence through historical research completed for the EIS." "**No known historic mining activity** or mineral occurrences, and therefore, it can be assumed that elevated values are attributed to background levels"	Inconsistent information throughout the report. Geoscience and Mines Branch released a report in October 2015 stating Beaver Dam milled 44,4345 tonnes and produced 2,908 ounces. https://novascotia.ca/natr/meb/data/pubs/15ofr04/ofr_me_2015-004.pdf A report prepared by CRA for Atlantic Gold proves that mining activities did occur at the previously at Beaver Dam. https://novascotia.ca/nse/ea/beaver-dam-mine-project/Appendix_O_Beaver_Dam_Mine_EIS.pdf This area was not sampled in the GEOSCAN program; however, it is still unknown if historic tailings are present. Lands and Forest map show a sluice from the old stamp mill to the Crusher Lake. This map is also presented in Figure 4 of Appendix N.1 https://novascotia.ca/natr/meb/download/mg/ofm/htm/ofm_1928-005.asp

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-17			2.2.1.6 6.6.6.2 6.7.2.2.1 6.7.3.1.2 6.8.7.3.1.6	No mention of settling ponds along the Haul Roads. "Both interactions have the potential to affect to groundwater quantity and groundwater quality, but such affects would be highly localized and limited in extent." "TSS analysis was limited to the Haul Road due to the potential for haul truck traffic to suspend particulate matter for deposition into watercourses adjacent to the Haul Road. The potential for this interaction at the Beaver Dam Mine Site is low, due to the **planned sediment and erosion control measures** and nature of the pit design." "Sixteen (16) mapped watercourses, including two major rivers, West River Sheet Harbour and Morgan River, intersect the Haul Road. Five smaller waterbodies are mapped west of Lake Alma." Preferred Alternative Haul Road Water Quality: "The NovaWET evaluation determined that all wetlands within the Preferred Alternative Haul Road PA."	The Haul Road at Touqouy creates a lot of sediment issues. This is not under control at Touquoy. What is the **planned sediment and erosion control measures** for Beaver Dam? What are the predicted affects to these watercourses?
NSE 2-18			2.3.1.2	"Construction material will be sourced from three quarries located along the length of the road with additional requirements for construction material, if required, sourced from either the Touquoy or Beaver Dam Mine Sites or local approved facilities"	What is the erosion and sediment control plan for the quarries? Will Industrial Approvals be required for the quarries along the Haul Road? Noise conditions from these quarries were not included in the noise survey.
NSE 2-19			2.3.2.1	"Emulsion will be the primary blasting agent as the majority of holes will be wet. It is anticipated that explosives and all accessories will be supplied on an as needed basis from the contractor's base location off-site and delivered to the **site explosive storage facilities** or directly to the blast holes using the contractor's equipment."	Explosive Storage Facilities are not shown on any maps.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-20			Table 2.3-2	States 1 Water/Gravel Truck Mine site road maintenance	Touquoy has proven that one water truck is not enough. The Site uses three regularly throughout the summer months for dust control.
NSE 2-21			2.3.3		What is the intent of land use after reclamation?
NSE 2-22			2.3.3.2 6.15.3.2	"The waste rock stockpiles will be constructed with 2.6:1 active slopes in 10 m lifts proceeding from north to south." "The waste rock stockpile will be constructed in multiple lifts of 10 m with each lift having an active slope of 2:1."	Inconsistent information; one section states slopes will be 2.6:1 and another section states 2:1. Energy and Mines request final slopes of 3:1 for stability for reclamation.
NSE 2-23			Tables 5.7-1 and 5.7-2		Do not include the activity "Crushing". Crushing consistently missing throughout report as an activity.
NSE 2-24			6.2.2.3	"Due to a lack of other sources of data for ambient TSP, the background concentration for TSP is based on the maximum measured 24-hour TSP concentration (there are insufficient data to provide a meaningful 90th percentile value), and the average of all the TSP measurements. There is a great deal of uncertainty in how representative."	If data is insufficient, is there a plan to sample more? Baseline TSP needs to be established as dust is going to be an issue.
NSE 2-25			6.2.4.2 2.3.1.1	"The Beaver Dam Mine mining, crushing, and transfer operations will primarily operate from within an open pit." "A collection pond will be constructed to the south of the site facilities pad to collect surface water run-off from this area, ROM pad, primary crusher and crushed ore stockpile"	Inconsistent with location of crusher. It is not realistic to place the crusher in the Open Pit with all the blasting events.
NSE 2-26			Table 6.2-6 Section 6.2.5.2 Table 6.9-23 and all other tables of this type		Needs to include crushing. The blasted material will have to be crushed to specification for Haul Road construction.
NSE 2-27			Table 6.2-7 and Section 6.2.5.3		Needs to include dust from deposition of tailings in the Touquoy Pit.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-28			Appendix C.3 Section 4.7	"Bench floors and haul roads should be constructed of material containing minimum fines. Capping should be competent granular material which doesn't easily break down into fines."	Based on the assumption that the geology is the same compared to Touquoy, the rock will easily breakdown into fines once driven over. Is the Proponent planning to source "granular material that doesn't easily break down into fines" off site? Report was written to provide Proponent options as opposed to having the Proponent commit to mitigation measures. From what we learned at Touquoy, this responsibility needs to have ownership ie environment or safety with daily commitment.

NSE 2-29			6.3.3.1	"Light monitoring was not completed during the baseline studies as ambient nighttime light conditions are not anticipated to cause any effects on the nearest residences. **The Haul Road will not be active** ~~at night~~ **overnight** and the Beaver Dam and Touquoy Mine Sites are located more than ~~5 km from the nearest residence.~~ 3 km from the nearest resident at the Beaver Lake IR; however, the Haul Road will pass in proximity to a permanent dwelling on Beaver Dam Mines Road and seasonal dwellings on the Cross Road. Furthermore, other than the hauling trucks, no other lighting sources will be present along the Haul Road (i.e. street lights, traffic lights)."	Inconsistent information about daylight conditions during haulage. Haulage will not be occurring "overnight" however hauling will be occurring during no sunlight conditions especially during the winter season as "Pre-curfew" conditions are prior to 23:00. Assess lighting for dark conditions or assess hours of haulage to be sunlight only.
			6.14.6	"With regards to the Haul Road, the Proponent has indicated that trucking operations will occur under **daytime and evening conditions (6am to 11 pm)**."	
			Appendix D Section 6	"Atlantic Gold has indicated that trucking operations will occur under **daytime and pre-curfew** conditions, and are unlikely to occur during dawn/dusk hours."	
			2.4.2.4	"The remaining mobile equipment will include haul trucks, which will travel from the Beaver Dam Mine Site to the Touquoy Mine Site, a distance of approximately 30 km. The number of return truck trips per day will be an annual average of approximately 185 (370 one-way trips) or **between 31 and 23 trucks per hour** for 12 or 16 hours per day, 350 days per year for the duration of the mine Project (3.3 years)."	Between 31 and 23 trucks per hour during winter conditions will have an impact on the nearest residences.
			6.11.6	"The calculated light levels at the residential receptors outlined within the Light Impact Assessment (Appendix D.1) are below the limits recommended by the Institute of Lighting Engineers (ILE) guidelines. Light impacts from trucks on the Haul Road are expected to be insignificant compared to baseline daylight illuminance and the amount of light blocked by the surrounding woodland and topographic changes at the Beaver Dam Mine Site will likely be >90%."	How is it compared to baseline no sunlight conditions?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-30			6.5.2 and Appendix C		How did you determine how grab samples to collect along the "Preferred Alternative Haul Road" to establish baseline?
NSE 2-31			6.5.3.2 and Appendix E.1		Is the figure for Appendix E.1 Figure 2-1 from the Instrinsik report (Appendix C.2)? If so, why isn't SED10 included in the Appendix E.1 data.
NSE 2-32			Table 1-1 6.5.3.4 Appendix E.2 section 4.1.2.2 2.3.3.3	"Acid is not expected to be produced during operating conditions. It is expected acid will be produced from the waste rock piles during post-closure conditions, however, onsite treatment and mixing with neutral groundwater in the pit prior to discharge will ensure minimal acid contribution to the Killag River. Discharge will likely have a pH higher than the background pH of approximately 5.4." "Approximately 40% of the Beaver Dam samples were classified as potentially acid generating (PAG) based on having an NPR-threshold of 2, where samples with an NPR of < 2 are considered PAG, while samples with a NPR of ≥ 2 are non-acid generating (NAG). This NPR value is consistent with the criteria proposed in Price (2009). Generally, argillitic samples have a higher proportion of PAG samples than the greywacke sample population." "The majority of PAG samples are expected to take several years to become acid producing." "The results of this exercise are shown in Figure 4-11b and show that it will take around 20 years for 10% of all PAG samples and 28 years for 50% of all PAG samples to turn acidic." "This post closure phase is estimated to be 15-20 years in length and is subject to revision with expected refinements to model predictions."	ARD is anticipated to be generated 10-20 years. Post closure plan is scheduled to end at 20 year when more of the 50% of the PAG samples are expected to start generating ARD. Why doesn't the closure plan extend past this point?
NSE 2-33			6.6.2.1	"To further define baseline conditions at the Beaver Dam Mine Site, a monitoring well drilling, installation and hydrogeologic investigation program was conducted from March 29, 2018 to May 7, 2018."	This is only 2 months of data, it's not even one complete season. More data is required.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-34			6.6.6.3 and Appendix F.6	"Upon the filling of the open pit to its ultimate lake stage at 108 m asl, groundwater flow is anticipated to flow from the pit to Moose River through the glacial till and weathered fractured bedrock. Solute transport modelling using the calibrated model simulates a slow migration of solutes to Moose River, with concentrations approaching a steady state after about 150 years of travel."	What is the plan to decrease this timeline? as the Proponent is not planning to monitor the site for 150 years. Also, as water is expected to flow through the fractured bedrock, what is the potential impacts to Moose River once tailings deposition starts?
NSE 2-35			6.6.8	"Groundwater modelling was completed for the Beaver Dam Mine Site and included an assessment of the geographic extent for changes to the quantity and quality of groundwater for the site, Haul Road, and Preferred Alternative Haul Road. No current water supplies will be affected by the project as designed and proposed in this EIS document**. Therefore, a mitigation plan is not necessary,** however the Proponent has stated in public and Mi'kmaq engagement sessions that prudent project planning means that monitoring of the water supplies at Beaver Lake IR and any identified water supplies along the selected final Haul Road would be completed."	This project is occurring on crown lands and could be considered potable in the future.
NSE 2-36			6.7.3.2.3	"The Touquoy Mine Site is in an area of historic gold mining activity, with a network of small underground workings and bottle pits dating from as far back as 1866. Gold production from Moose River Gold Mines, near the Mine Site, commenced around 1877. A field sampling plan of the Mine Site area identified historical tailings at the mines to have elevated concentrations of arsenic and mercury. Due to the wide distribution of historical tailings in the area, and the length of time the tailings have been in place, they have the potential to have a negative impact on surface water quality."	Complete a Phase II ESA to delineate historic impacts at Beaver Dam.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-37			2.2.1.6 6.7.6.1.1	"Based on results from recent surface and groundwater quality modelling, **an effluent treatment plant will be utilized** as required to ensure that any discharge meets the applicable federal MDMER criteria." "**The effluent treatment at the Beaver Dam Mine Site will be conceptually similar to the plant currently used at the Touquoy mine Site**." "The treatment system, **if required**, will be designed to ensure that all site effluent water meets MDMER and CCME, established background concentrations, or Site Specific objectives. **During EOM conditions the treatment system will be placed adjacent to the North Settling Pond. The treatment system during PC conditions will likely be moved to the proposed discharge point from the pit lake."**	Inconsistent information about ETP requirements. Section states that recent surface and groundwater quality modeling proves the necessity of an ETP. This ETP will be similar to the Touquoy set-up. How is this set-up going to be moved at EOM to the proposed discharge point from the pit lake? It is not a mobile structure. Is a second plant intended to be built?
NSE 2-38			6.7.6.1.1	"There are three discharge points proposed during EOM conditions and PC conditions. During EOM conditions, site water from the waste rock, low grade ore stockpiles and the pit will be routed through the North Settling Pond prior to discharge into the Killag River."	Why not change this to one discharge point at all times in order to better control water quality and use of ETP?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-39			6.7.6.1.1	"The results of the pre-mining geochemical characterization will also be used to inform the operational phase ML/ARD Monitoring & Management Plan, which will consist of the following: • Definition of geochemical analyses required for the classification or environmental rock types. • Derivation of proxies and criteria to classify PAG versus NPAG materials rapidly on site. • Definition of optimum sampling frequency of waste rock, ore, tailings and overburden throughout the life of mine based on the observed geochemical variability. • Definition of criteria distinguishing construction from non-construction materials. • Development of material handling and ARD prevention/mitigation strategies. The implementation of the above Plan will confirm whether acidic conditions can be anticipated during the closure phase and will inform the adoption of appropriate mitigation to be applied (refer to Section 6.7.8 for mitigation measures)."	What is the timeline for completing this work? This should be included in the EIS.
NSE 2-40			6.7.6.1.2	"The time to fill the pit is equal to the sum of the volume of water in the pit divided by the total inflow rate to the pit at each stage. Based on these calculations the pit filling time is equal to 13.8 years."	Can this time be decreased by pumping water from the ETP into the pit?
NSE 2-41			6.7.6.3.1 and Appendix G.2 Figure 2.1	"Based on the water balance model results (Stantec 2018d), no water will be discharged from the exhausted Touquoy open pit until the pit reaches the spillway elevation in Year 7. This allows for many years of water treatment in the pit as a batch reactor with the objective of adjusting the pH to precipitate metals, **potentially improving discharge criteria toward MDMER discharge criteria**."	Appendix G.2 Figure 2.1 shows an arrow from the Open Pit to the ETP for additional treatment at reclamation. Why is this not being utilized to treat the pit water? If it is, where is this water going to be release (ie back to the pit? Or to the Polishing Pond?)

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-42			6.7.6.3.1	"Concentrations of cobalt, copper and nitrite in groundwater were predicted in the model above the CCME FAL (Freshwater Aquatic Life guidelines) or NSE EQS (Nova Scotia Environment Environmental Quality Standards) in the untreated pit lake at discharge. The groundwater seepage quality was assumed to be consistent with the source terms pore water quality, at an estimated average concentration of 0.002 mg/L of arsenic to Moose River. **Based on the assimilative capacity model in Moose River these parameters meet CCME FAL/NSE EQS after mixing with Moose River 100 m downstream of the discharge point."** "The water quality discharged from the pit lake to Moose River will be treated to meet MDMER discharge/regulatory closure criteria or site-specific guidelines, if required. **Without treatment, arsenic concentrations of 0.86 mg/L are predicted to exceed the MDMER discharge criteria of 0.3 mg/L in Year 19 based on climate normal conditions**."	Inconsistent information. Doesn't the second paragraph prove that treatment is required before discharged? Why not utilize the ETP instead of mixing within Moose River?
NSE 2-43			6.9.3.5	"The Nova Scotia Salmon Association (NSSA) is currently conducting a liming project in tertiary watersheds that are located within the PA."	Proponent indicates that liming project won't be impacting by mining activities at Beaver Dam. The two discharges points upgradient (North Settling Pond and Pit Discharge) could impact water quality and the lime program.
NSE 2-44			Table 6.9-26	"Runoff from acid producing rock exposed **during construction activities** has the potential for negatively altering water quality within down-gradient fish habitat."	Inconsistent information, Appendix E.2 Section 4.1.2.2 states that it will take approximately 20 years for ARD to generate. This table states it will happen during construction and development of the mine.
NSE 2-45			6.9.6.2.1	"Once the lake is full (approximately 14 years) additional water will overflow the pit walls through an engineered outfall structure directly into the Killag River (Appendix G.5, GHD, 2018)."	This engineered outfall structure is not located in this Appendix. What is the set-back of the Pit East wall to Killag? Is what from the pit expected to seep into the Killag?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-46			6.9.6.2.2	"The removal of wetlands and watercourses also has the potential to alter surface flows and downgradient hydrology. Water quality could be further affected from an increase in Total Suspended Solids (TSS) associated with potential siltation and release of substances to downstream receiving surface water systems adjacent to mine infrastructure (LAA)."	Proponent will require a sediment control plan for this not to happen.
NSE 2-47			6.9.6.2.2	"Discharge from the till stockpiles does not require treatment because it is not anticipated to have any water quality concerns."	Inconsistent information, Appendix E.2 states that overburden samples have potential for elevated Al and As in runoff, and potentially other elements. There should be no anticipation at this point. Geochemistry should be fully assessed and evaluated at this stage.
NSE 2-48			6.9.7.2 6.9.7.3.2	"No fish collection, electrofishing, or benthic macroinvertebrate sampling was conducted within the watercourses of the Preferred Alternative Haul Road PA because these watercourses are located upstream of and are contiguous with watercourses that cross the current Haul Road. Methodologies and baseline conditions of fish collection, electrofishing, and benthic macroinvertebrate sampling on the Haul Road are presented within Section 6.9.2 and 6.9.3." "No electrofishing surveys were conducted within the Preferred Alternative Haul Road, however, all the watercourses within the Preferred Alternative Haul Road are tributaries to watercourses that are present within the Haul Road, to the south. Table 6.9-33 describes contiguity between watercourses."	Just because they are contiguous/upstream doesn't mean the conditions are the same. One would expect similar results however this unknown unless the study is completed.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-49			2.4.2.4 6.16.3.7	"The remaining mobile equipment will include haul trucks, which will travel from the Beaver Dam Mine Site to the Touquoy Mine Site, a distance of approximately 30 km. The number of return truck trips per day will be an annual average of approximately **185 (370 one-way trips) or between 31 and 23 trucks per hour for 12 or 16 hours per day**, 350 days per year for the duration of the mine Project (3.3 years)." "The Haul Road (sometimes locally referred to as the Cross Road) connects Hwy 224 and Mooseland Road. Currently, local traffic from a few seasonal properties and recreational use the Haul Road path. In the past (not observed during baseline studies) it is reported that the Haul Road will have intermittent high use periods **(up to 100 truck trips per day)** associated with haul trucks and forestry worker trucks from logging activities utilizing the Haul Road."	Inconsistent information; one section states 185 trips per day and another section states up to 100 truck trips per day.
NSE 2-50			6.18.3.1	"A worst-case scenario is the severe collapse of areas directly adjacent to the open pit and ground surface slump of the surrounding area possibly affecting the site's infrastructure, Haul Roads, and on-site access roads and worker safety. However, the site's components and infrastructure have been designed as far from the perimeter of the open pit as possible **so it is not expected that slope failure would affect the site's components and infrastructure**."	What is the distance between Killag River and the North/Northeast wall of the pit?
NSE 2-51			6.18.3.1	"An in-mine water diversion ditch will be established along the top bench of the mine to intercept any surface water that infiltrates the berm and flows into the mine. This ditch will direct water to in-mine sumps where it will be pumped out of the mine."	This will require a big holding pond. The Proponent has stated these ponds will be sized and designed in the IA process however the size of these ponds will be very large and will have an impact on the proposed site layout.
NSE 2-52			6.18.4.6 Table 6.18-9	"Unplanned Tailings/Reclaim Water Line Event Interactions with VCs"	The following areas are listed as "No potential interaction anticipated" however there is potential for contamination with an unplanned tailings/reclaim water line event: • Geology, Soil, and Sediment Quality • Groundwater Quality and Quantity • Habitat and Flora

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-53			6.18.4.6	"Other immediate responses may include lowering tailing pond levels, stopping the inflow into the tailings pond from the mill, stabilizing unstable slopes, and mitigating downstream consequences."	Not fully understanding this action plan; the water level in the Touqouy pit will not be an issue for the deposition of tailings and to take Mill process water. Why are there unstable slopes?
NSE 2-54	Rachel Bower	NSE	2.2.1.6	*Surface water run-off from the eastern and western waste rock stockpiles, low grade ore stockpiles, Beaver Dam Mine Site roads, and some natural area will flow by gravity, with the aid of berms and channels, to the north settling pond, located west of the pit. This settling pond will also receive water from the pit dewatering program. Overflow from the north settling pond is directed to the Killag River outfall (Cameron Flowage).* *Based on results from recent surface and groundwater quality modelling, an effluent treatment plant will be utilized as required to ensure that any discharge meets the applicable federal MDMER criteria. Potential reagents include flocculants for solids settling, iron sulphate and oxidizers for metals precipitation, and liming for pH adjustment. If treatment for metals is required, the metal sludge will be collected and temporarily or permanently stored on site or shipped offsite to an appropriate landfill facility. The options for sludge collection include the use of geotubes and /or clarifiers. The effluent treatment at the Beaver Dam Mine Site will be conceptually similar to the plant currently used at the Touquoy Mine Site.* *Runoff from the till stockpiles located to the southeast of the open pit and east of the mine facilities area will be captured with the aid of channels around the stockpile perimeter and diverted north to Cameron Flowage by gravity via separate water discharge structures and engineered channels. At this time, it is not anticipated that a collection pond would be required, however such a pond can be constructed should settling of solids prior to discharge be required.*	- Unknown whether treatment will be required? Geochem should already be done. - No storage after ETP to ensure water quality meets effluent limits prior to discharge? - No area for treatment identified on figures. - Is storage volume adequate enough to allow for potential ETP shut down. - Final disposal of waste sludge not mentioned. - Is pond large enough to accommodate pit dewatering activities? What about all the water currently in pit. Has quality been assessed? Where is disposal? - Why wouldn't a collection pond and treatment be required for this area? Surface water quality potentially no different than north pond. - TSS from run-off a constant issue at Touquoy. Why would it be any different at BD?
			6.18.3.2	*Given surface water runoff from all stockpiles will be directed to settling ponds for treatment and a slope failure would likely not result in disturbance to a greenfield environment, potential adverse effects to other VCs from a stockpile slope failure are anticipated to be non-existent.*	Surface water runoff from ALL stockpiles (including topsoil) should be collected due to potential impacts (historical, TSS, increased potential for metal leaching)
NSE 2-55			2.3	*Site Preparation - Clearing, grubbing, grading, and stockpiling of vegetation, topsoil, and till in the pit area will be conducted progressively prior to accessing host rock for mining purposes, to avoid erosion.*	- Drainage control and erosion protection should be established prior to any grubbing.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-56			2.3	*Site Preparation - Clearing, grubbing, grading, and stockpiling of vegetation, topsoil, and till in the pit area will be conducted progressively prior to accessing host rock for mining purposes, to avoid erosion.*	- Where is the water going to be pumped from the current pit? - No samples were presented of the current water conditions in the pit
NSE 2-57			2.3	*Site Construction - A collection pond will be constructed to the south of the site facilities pad to collect surface water run-off from this area, ROM pad, primary crusher and crushed ore stockpile. A culvert will be constructed beneath the mine access road and will facilitate decant overflow from the pond along a discharge channel that will run down gradient to the south and ultimately discharge into wetland areas to the south of the Beaver Dam mine site.*	- No mention of a need to assess this water quality before release into wetland habitat.
NSE 2-58			2.3	*Site Construction - Runoff from the till stockpiles will be captured and directed into a collection pond located on the eastern side of the open pit. Water from both these ponds will be gradually decanted to Cameron Flowage by gravity via separate water discharge structures and engineered channels.*	- Inconsistent information. Pond not shown on Fig. 6.7. – 15 or 16
NSE 2-59			2.4.2.2	*The source of greatest risk for potential spills and releases of diesel fuel relates to the improper execution of procedures for transfer and handling to and from stationary and mobile tankage.*	- No mitigation noted. All fueling, storage and equipment maintenance should be done in an area with secondary containment.
NSE 2-60			6.7.6.1.1	*Surface Water Quality Modelling Results - With the expectation that the composition of the material within the till stockpiles will be at or below background constituent levels, it is likely there will be no additional loadings of constituents, from background condition, into the Killag River. In addition, it is anticipated that the till stockpiles will have low infiltration rate and high absorption rate. Immediately after the till stockpiles are constructed, they will be vegetated and standard erosion protection measures will be implemented. Therefore, there is likely little to no significant effluent containing higher than background constituents expected to be discharged into the Killag River from this discharge point. The only discharge points with potential for discharge of impacted mine effluent into the Killag River system are the North Settling Pond (EOM) and the pit (PC).*	- What is this expectation based on?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-61			6.18.3.3.	*Settling Pond Failure - Given the settling pond is a passive treatment process and it will not provide habitat for terrestrial species, adverse effects to other VCs from a settling pond failure are anticipated to be non-existent.* *The settling pond will be lined with suitable materials, such as clay or a plastic liner. In the event of a 1 in 100 year precipitation event that creates volumes in excess of the capacity available in ponds and ditching, or infrastructure failure, a spillway into the water diversion structure will be used for overflow. In the case of a storm event or infrastructure failure, settling ponds will be monitored regularly.* *If settling pond failure were to occur, emergency procedures would be implemented that will be outlined in the site emergency response plan. Generally, settling pond failure emergency response includes raising the alarm and evacuation of all equipment and personnel from the area. If settling pond contents encroach on neighbouring properties or public roadways, appropriate authorities will be notified and construction of bunds and/or diversion drains may be required to contain settling pond contents on-site. An assessment is then made using on-site staff and possibly external resources (surface water specialists) as to what repairs are needed and actions to prevent future incidents. This will be detailed in a recovery plan. Depending on the regulator involvement there may be a requirement to file incident reports with certain regulatory agencies prior to initiating the repairs and return to work in the area, these are very case specific and often dependent on whether personnel were injured or equipment damaged as a result of the settling pond failure.*	- Inadequate plan. Unacceptable to think that a settling pond failure is low risk. Not preventative nor protective of the environment.

From: Colomb, Sylvie
To: Tutty, Bridget R
Subject: RE: Beaver Dam Gold Mine Revised EIS (EA Document) Submission Email 1 of 2
Date: April 23, 2019 3:48:18 PM

Hi Bridget,

NSTIR staff have reviewed this new document and have compared this to our original comments

that were made in July 2017. Comparative analysis is below.

1. Our first comment from July 2017 indicated the need for the Haul Road's impact on any provincially owned roads to meet NSTIR standards. The proponent has indicated that there will be discussions to ensure that this happens. Discussions with local staff and application through the Working Within Highway Right of Way Permit would most likely need to happen as indicated back then. With regards to any crossings for mine vehicles on provincially owned roads, there would need to be sufficient sight distance to allow any trucks to cross safely, and to allow any traffic on the road to have sufficient sight distance to allow them to be able to stop.

2. Also as mentioned in July 2017, with the number of trucks, and the weights involved, there may be a need for a Special Moves Permit as well. We encourage the proponent to contact our Departmental Contact for Special Moves, Manuel Abreu, to see if this permit is required. He can be reached at Manuel.Abreu@novascotia.ca . Weight restrictions on any provincial roads, as well as any spring weight restrictions, would also need to be adhered to as well.

3. As stated in July 2017, any workplaces created on any provincially owned roads would need to be in compliances with the appropriate sections of the Nova Scotia Temporary Workplace Traffic Control Manual.

4. The final comment that we had made in July 2017 indicated the additional volume of vehicles that were anticipated as a result of the mine's. The proponent has indicated that any volumes would be able to be absorbed into the volumes that currently exist on Hwy 224 and Mooseland Road, and that there should be no cumulative impact with any additional mining projects currently going on in the area. This would need to be monitored closely through the mine's lifetime to ensure that any impacts can be monitored, and that any necessary mitigation measures can be addressed at that time should the volumes warrant.

Thank you for the opportunity to review this.

Regards,

Sylvie Colomb

Environmental Analyst/French-language Services Coordinator

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Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-62	Surface Water Quality Specialist	Nova Scotia Environment	Section 2.2.1.6, pg. 30; Section 2.3.1.1, pg. 39; Section 2.3.2.1, pg. 52 ; Section 2.4.1.3, pg. 64 ; Section 2.6.9, pg. 75-76 ; Section 6.7.6.1.2, pg. 320 ; Section 6.9.6.2.2, pg. 496 ; Section 6.18.3.2, pg. 831 ; pg.833 ; pg. 834 ;	Section 2.2.1.6 and Section 2.6.9 state the following about the proposed till stockpiles located in the Beaver Dam Project Area: "*Runoff from the till stockpiles located to the southeast of the open pit and east of the mine facilities area will be captured with the aid of channels around the stockpile perimeter and diverted north to Cameron Flowage by gravity via separate water discharge structures and engineered channels. At this time, it is not anticipated that a collection pond would be required, however such a pond can be constructed should settling of solids prior to discharge be required."* Section 2.3.1.1 states the following: *"Runoff from the till stockpiles will be captured and directed into a collection pond located on the eastern side of the open pit."* Section 2.3.2.1 states the following: *"Runoff from the till stockpiles located to the southeast of the open pit and east of the mine facilities area will be captured with the aid of channels around the stockpile perimeter and diverted north to Cameron Flowage by gravity via separate water discharge structures and engineered channels."* Section 2.4.1.3 states the following: *"Runoff from the till stockpiles will be captured and directed into a collection pond located on the eastern side of the pit."* Section 6.7.6.1.2 states the following: *"Surface water runoff from the surrounding area of the Mine Site, stockpiles, Mine Site roads and till stockpiles will be managed with the aid of berms and newly constructed channels, which will discharge into collection/sedimentation ponds."* Section 6.9.6.2.2 states the following: *"Discharge from the till stockpiles does not require treatment because it is not anticipated to have any water quality concerns."* Section 6.18.3.2 (pg. 833) and (pg. 834) states the following: *"Surface water run-off from the non-ore bearing waste rock stockpile, Mine Site roads, and till stockpiles will flow by gravity, with the aid of berms and channels, to a settling pond located west of the ~~surface mine~~ open pit."* There are contradictions between the above statements on whether a collection pond will be constructed to capture surface water runoff from the till stockpiles, and which collection pond (east or west) will receive the flow. Additionally, Section 6.18.3.2 (pg. 831) states the following about how the till stockpiles will be managed with respect to stabilization: *"Till stockpiles will be constructed to completion in single lifts of 15 m with 1.5:1 active slopes during the preparation and construction phase. They will be progressively capped with topsoil excavated from the surface mine open pit area and hydro seeded at the end of operations. This should allow for revegetation to being prior to or shortly after the decommissioning and reclamation commences."* The above statement indicates parts of the till stockpile will be not stabilized for extended periods, which could be potentially months or years.	A. Will the surface water runoff from the till stockpiles in the Beaver Dam Project Area be captured and directed to a collection pond prior to discharge into Cameron Flowage? B. Confirm that surface water runoff from the till stockpiles is not planned to drain into the collection pond located west of the Open Pit? C. If a pond is to be constructed to receive surface runoff from the till stockpiles, will it be designed to remove suspended soil particles from the runoff via settling? What will be its design criteria? D. If no pond is to be constructed and the till stockpile is to remain active with exposed soils for an extended period (e.g., months, years), what mitigation measures will be implemented to reduce potential sediment loading into the Cameron Flowage? Will these proposed measures be as or more effective than the use of a settling pond as part of the site water management system?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-63	Surface Water Quality Specialist	Nova Scotia Environment	2.3.2.1, pg. 52	The Surface Water Management sub-section states the following: *"A berm surrounding the pit will direct surface water runoff into a water diversion channel that discharges to the settling pond to the west. Since this water is non-mine contact water, there will be a high likelihood that this water can be discharged directly to the Killag River should it meet applicable water quality criteria"* If the berm runoff is discharged into the north settling pond that receives surface water runoff from the waste rock stockpiles, low-grade ore stockpiles, site roads and the pit dewatering program, it would indicate that when mixed with these waters it will require some level of treatment during the how will it be able to be discharged directly into the Killag River (Cameron Flowage).	A. Clarify whether the water diversion channel around the open pit will discharge into the north settling pond? a. If so, will the settling pond and its associated treatment system treat the water diversion channel waters prior to discharge to the Cameron Flowage? If not, how will the system function to separate the inflows from the various sources (pit dewatering, waste rock surface water runoff, pit diversion channel) b. If not, how will the surface water runoff be managed prior to discharge to the Cameron Flowage? c. What are the berm and diversion channel materials proposed for the berm surrounding the pit? Is there potential that potential acid generating materials will be used, and how will their potential use be managed?
NSE 2-64	Surface Water Quality Specialist	Nova Scotia Environment	2.5, pg. 67	As part of Year 1 for the Project Schedule the following is stated with respect to the surface water management infrastructure: *"Surface and ground water management facilities including monitoring wells, ditches and berms will also be constructed during this period."* There is no confirmation that the collection ponds will be constructed during this period to receive and manage surface water runoff prior to discharge into adjacent surface water features.	Confirm whether the collection ponds and treatment system will be constructed during Year 1 to manage surface water runoff? If not, what mitigation measures will be put in place to manage surface water runoff (quality and quantity)?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-65	Surface Water Quality Specialist	Nova Scotia Environment	2.3.3.3, pg. 61; 2.5, pg. 68	For the Beaver Dam Project Area post-closure water treatment and monitoring is stated as the following in Section 2.3.3.3: *"Water treatment will continue, as required, at this discharge location and monitoring programs will be on-going until such time that discharge water quality meets appropriate confirmed criteria at the point of discharge. This post closure phase is estimated to be 15-20 years in length and is subject to revision with expected refinements to model predictions."* Table 2.5-2 in Section 2.5 indicates Beaver Dam Reclamation and Environmental Monitoring will be 2027 to 2029+, which equates to 3+ years. There is a discrepancy between how the information is presented between these two sections, with Table 2.5-2 indicating that reclamation will occur in a relatively short period of time instead of 15+ years in Section 2.3.3.3. Is the applicant expecting water treatment and supporting monitoring activities to take 15 to 20 years?	Confirm that water treatment and supporting monitoring activities for post-closure will take a minimum of 15 to 20 years based on current model predictions. Is there a commitment to support water treatment activities beyond this timeframe if the discharge quality from the Beaver Dam pit does not meet applicable criteria?
NSE 2-66	Surface Water Quality Specialist	Nova Scotia Environment	Section 2.6.7, pg. 74	The energy sources assessment states the following about the preferred approach of diesel generators: "The preferred approach based on economic and environmental feasibility is to provide electrical power to the Beaver Dam mine site through the use of diesel-powered generators." None of the preceding alternatives discussion indicates why alternative energy sources are not environmentally feasible.	Explain how the preferred energy source approach of diesel generators is environmentally feasible in comparison to the alternative energy sources of permanent grid tie-in and renewable energy sources.
NSE 2-67	Surface Water Quality Specialist	Nova Scotia Environment	6.5.3.2.1, pg. 204 - 206	Table 6.5-2 lists the nine sites that sediment samples were collected at and describes their locations for the Beaver Dam site. No figure is provided with respect to where the samples were collected.	Provide a figure presenting the locations of the nine sediment sampling sites with respect to the proposed project development areas.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-68	Surface Water Quality Specialist	Nova Scotia Environment	Appendix E.1, pg.1	A. A table is presented of sediment quality lab analysis results for metals. No listing of the lab that conducted the analysis is provided. B. Sediment quality was only analyzed for metals. There is no indication within the Revised EIS Submission that other parameters were analyzed for in the samples. The current analysis results do not include other potential contaminants of concern associated with the project, such as petroleum hydrocarbons, chlorides and pH. Also, general chemistry parameters, such as calcium, sulphate, carbonate that would indicate the receiving environment conditions, such as buffering capacity to handle receiving acidic effluents is not included. Analysis for these parameters would assist with project impact assessment and understanding the receiving sediment environment response to discharges from the Project water management system.	A. Were sediments samples submitted to an accredited lab for analysis? If so, provide lab result tables provided by the laboratory for reference. B. Was chemical analysis conducted of the sediment samples for other parameters related to potential contaminants of concern (e.g., petroleum hydrocarbons, chlorides, pH)? What chemical analysis was conducted for general chemistry parameters of the sediment samples? If no analysis was conducted, please discuss how baseline concentrations will be estimated prior to project commencement, including whether additional baseline sampling and analysis will be conducted?
NSE 2-69	Surface Water Quality Specialist	Nova Scotia Environment	6.5.3.2.1, pg. 204; Appendix E.1, pg. 1	The following statements are provided in the Revised EIS Submission with respect to arsenic concentrations in sediments within the Beaver Dam Project Area: *"Arsenic levels above CCME ISQG, CCME PEL and Tier 1 NSE EQS were identified at Sediment locations 1 to 7."* *"In a gold mining area rich in arsenic mineralization (e.g. arsenopyrite), high As concentrations indicate naturally occurring arsenic. Arsenic concentrations in soils around Mine Sites have been reported as high as 4,700 ppm in areas where historic mining activity has concentrated As levels in mill waste."* *"Historical regional studies completed by Nova Scotia Department of Natural Resources (DNR) show areas sampled around Beaver Dam Mine Site are below CCME Soil Quality Guideline for Inorganic Arsenic. The Killag Historic Gold Mining area is located approximately 9 km to the southeast of the project site. Studies show areas with elevated arsenic values over the CCME SQG (12 mg/kg) despite no known historic mining activity or mineral occurrences, and therefore, it can be assumed that elevated values are attributed to background levels."* The above conclusion that the arsenic concentrations observed in the sediment samples is attributed to background levels is based on a qualitative assessment. Additional information is required along with comparison to regional results, etc. to confirm that the observed arsenic concentrations are not associated with historic mining activities.	Provide quantitative assessment of Beaver Dam arsenic results and for other metals with observed exceedances in comparison to the guideline criteria and appropriate literature/study results as to whether the Beaver Dam site results represent baseline conditions or are potentially associated with historic mining works. If observed metal concentrations in the sediments potentially indicate historic mining activities, provide details on how the extent of these potentially contaminated soils and sediments will be delineated, impacts evaluated, and appropriate mitigation measures developed.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-70	Surface Water Quality Specialist	Nova Scotia Environment	6.5.3.2.1 , pg. 204 - 206; 6.5.3.2.2 , pg. 206-207	Baseline sediment quality is discussed with respect to potential impacts at the Beaver Dam and Touquoy sites, but not along the haul road, which will intersect several surface water features (watercourses, wetlands). There will be potential impacts associated with accidents/malfunctions along the roadway (e.g., hydrocarbon spills), road salting for ice management and dust management (magnesium chloride).	A. Confirm whether baseline sediment quality was sampled in appropriate watercourses along the haul road route (including preferred alternate)? B. If not, discuss how baseline concentrations for contaminants of concern will be estimated prior to project commencement, including whether additional baseline sampling and analysis will be conducted?
NSE 2-71	Surface Water Quality Specialist	Nova Scotia Environment	6.5.7.3, pg. 215	The following statement is provided the Revised EIS Submission with respect to sediment sample results along the Preferred Alternative Haul Road: *"Sediment was sampled at several representative locations around the Beaver Dam Mine Site, Haul Road and one sample along the Preferred Alternative Haul Road route (Sediment #11). Table 6.5-2 presents the sediment quality results and exceedances from the Beaver Dam Mine Site. Sediment values from the 2018 program are found in Appendix E.1 and have been discussed previously."* Table 6.5-2 and Appendix E.1 do not present results for Sediment #11.	A. Provide sediment quality results for the Preferred Alternative haul road, and appropriate figure indicating the locations of the monitoring sites. B. Discuss baseline sediment quality results for the sample sites in comparison to applicable guideline criteria.
NSE 2-72	Surface Water Quality Specialist	Nova Scotia Environment	6.5.3.2.2, pg. 206-207; Figure 2.2-4	This section compares Touquoy site sediment sample chemical analysis results for 10 sites collected in 2007 against applicable guideline criteria and discusses exceedances observed at the site. There is no figure provided to indicate the locations of the sample sites at the Touquoy site. Figure 2.2-4 is provided identifying the surface water quality monitoring sites at the Touquoy Mine site, but it is not clear whether these sites match the sediment sample locations. There is no numeric results table provided within the Revised EIS Submission of the values with comparison to the applicable guideline criteria. Having the results and site locations would allow the reviewer to conduct a more thorough review to confirm that the proposed sites are enough with respect to the change in activities proposed for the Touquoy open pit being used as a tailings disposal site. The results discussion indicates that cyanide concentrations above that detection were observed while the Touquoy site was in operation. There is no further discussion related to whether these detections represent background concentrations or are potentially representative of existing Touquoy project impacts.	A. Provide a figure of the sediment sampling locations for the Touquoy site to provide additional context to the sediment quality discussion. B. Provide a sediment sample results table for the Touquoy sampling program with comparison to applicable guideline criteria. C. In conjunction with the figure and results table, provide discussion on relevant site results with respect to the Touquoy Open Pit and its proposed overflow discharge location. D. Provide additional discussion on cyanide results observed above laboratory reportable detection limits at the Touquoy site, and whether they potentially represent project impacts or baseline conditions. If baseline, what are the potential sources.

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NSE 2-73	Surface Water Quality Specialist	Nova Scotia Environment	Appendix E.3, 3.2.3.1, pg. 3-9; 4, 4-1	The till stockpile model setup discussion stated the following about the removal of one of the overburden sample results from the analysis: *"Considered a geochemical outlier sample, one sample (LX-BDT-03) was excluded from source term calculations."* Appendix E.2, which describes the LX-BDT-03 laboratory chemical analysis results of the soil sample does not indicate that the results represent a geochemical outlier, and indicate it had the highest arsenic and sulphur content. Appendix E.2 also recommended further overburden characterization be conducted. There is a lack of assessment within the Revised EIS Submission and its supporting documentation provided for why LX-BDT-03 is considered a geochemical outlier sample. Given that there were historic mining activities at the Beaver Dam Site there should be discussion of whether the sample results represent potential existing contamination that requires management.	A. Provide reasoning for why in Appendix E.3 the LX-BDT-03 results are considered a geochemical outlier and not included in the till stockpile geochemical assessment. If no reason to exclude, provide a revised till stockpile geochemical assessment and results interpretation. The result should also be discussed with respect to whether it represents contamination from historic site activities. B. Discuss whether additional till samples will be collected to confirm geochemical variability and how these will be incorporated into assessing potential project impacts and development of appropriate mitigation measures. If not, present appropriate mitigation measures to address potential variability, particularly with respect to metals concentrations.
NSE 2-74	Surface Water Quality Specialist	Nova Scotia Environment	Appendix E.2, 3.5, pg. 3-7; 5, pg. 5-1 to 5-2; Appendix E.3, pg. 4-1	Appendix E.2 presents and discusses the results following 24 weeks of kinetic testing of Beaver Dam mine rock. The report recommends in Section 3.5 that the kinetic tests continue to 120 weeks. Appendix E.3 recommends that the Beaver Dam humidity cells (kinetic tests) continue to assess the long-term effect of metal leaching. Both Appendices recommend that the kinetic tests continue.	As part of the response to this information request, provide an update on the kinetic testing results to date, including discussion of potential acid generating material and metal leaching and if there are potential changes to predictions.
NSE 2-75	Surface Water Quality Specialist	Nova Scotia Environment	6.5.5.2, pg. 215	Table 6.5-6 lists no relevant operation and maintenance activities for the Touquoy Mine Site that would potentially interact with soils and sediments. Would the tailings discharge not interact with the soils and sediments associated with the pit area, and potential discharges outside the pit environment? What about construction of the spillway?	Please confirm if there would be potential soil and sediment interactions at the Touquoy Mine Site during the operation and maintenance phase? If not, provide appropriate assessment of these activities.
NSE 2-76	Surface Water Quality Specialist	Nova Scotia Environment	6.5.8, pg. 216-217	As part of the proposed mitigation measures there is no mention of the settling ponds. Would these not reduce off-site sediment loading and reduce potential impacts to sediments and soils?	Confirm that settling ponds will be part of the mitigation measure strategy for mitigating potential impacts to soils and sediments.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-77	Surface Water Quality Specialist	Nova Scotia Environment	6.5.3.4, pg. 207 – 209; 6.5.8, pg. 216-217; 6.59, pg. 218; Appendix E.2; Appendix E.3	Acid rock drainage and metal leaching is discussed as potentially being generated from the ore and waste rock generated at the Beaver Dam site in Appendix E.2 and E.3. As well as the following statements in Section 6.5.3.4 about the potential for the mine rock to produce acidity and leach metals: *"Approximately 40% of the Beaver Dam samples were classified as potentially acid generating (PAG) based on having an NPR-threshold of 2, where samples with an NPR of < 2 are considered PAG, while samples with a NPR of ≥ 2 are non-acid generating (NAG)."* *"Parameters of potential concern identified by the solid phase elemental analysis include As, Cu, Mn and Pb. Of these, As is considered the species with the greatest potential for deleterious effects on mine contact water."* The mitigation measures proposed for geology, soil and sediment quality in Table 6.5-7 focus specifically on sediment and erosion control, which do list limiting exposed soils. Table 6.5-8 lists a number of mitigation measures for the Beaver Dam Site that do not specifically align with sediment and erosion control, which include: • *Select removal of impacted materials* • *wet dust suppression controls* • *hardened surfaces where practical* • *covering of haul trucks to reduce dust during transportation* • *vehicle speed reduction to minimize dust* No reason is provided as to why acid rock drainage and metal leaching is not presented as a mitigation measure category or specifically discussed in the text supporting the tables in Sections 6.5.8 and 6.5.9. Acidic conditions and metals leaching into soils and sediment outside the project area would have potentially negative environmental impacts, and the current presentation of mitigation measures is potentially not sufficient to support the estimated residual environmental effects to geology, soil and sediment quality associated with the Beaver Dam site activities.	Provide mitigation measures beyond sediment and erosion control to mitigate potential impacts to soils and sediments from acid rock drainage, including providing details on how those activities will address the potential issues (e.g., select removal of impacted materials). Discuss how these measures will be routinely installed. Additional details on the acid rock drainage and metal leaching mitigation measures and how they are proposed to address environmental effects should be provided in the write-ups to support the information presented in Tables 6.5-7 and 6.5-8.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-78	Surface Water Quality Specialist	Nova Scotia Environment	Section 6.5.10, pg. 221; Appendix O.1, 2.5	Section 6.5.10 states *"Geology and soils monitoring will be completed to verify the accuracy of the predicted environmental effects and the effectiveness of the mitigation measures outlined in Table 6.5-7. There is no determined need for geology and soils to have compliance or effects monitoring programs."* The first sentence of the above statement indicates that geology and soils monitoring will be completed to verify the effectiveness of the mitigation measures in Table 6.5-7. How will not having a compliance or effects monitoring program be able to evaluate the effectiveness of mitigation measures. Sediment is not listed as whether it will require compliance or effects monitoring programs.	A. Provide reasoning for why geology and soils do not have to have compliance or effects monitoring programs to assess the effectiveness of mitigation measures? B. Confirm that sediment will be included in compliance and effects monitoring programs for the Project.
NSE 2-79	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.1.1, pg. 264	The following statement is made about surface water and groundwater interaction: *"These relatively impermeable and poorly jointed rocks result in slow groundwater recharge and most of the excess surface water is retained on the surface, often called a 'deranged' drainage pattern."* No reference is provided with respect to the source(s) of this information or any other geographic and drainage information presented in Section 6.7.2.1.	Provide appropriate references for information presented in Section 6.7.2.1.1.
NSE 2-80	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.2.1, pg. 266 - 267	Table 6.7-1 lists surface water quality monitoring locations within the Beaver Dam project area. The numbering system is not a continuous list with some numbers missing: 3, 7, 8. There is no discussion on whether these monitoring sites existed or if they are located outside the project area. Several of the sites are located within the project development area and will be potentially removed by activities such as pit construction and operation (e.g., SW-5)	A. Confirm whether additional water quality samples were collected at monitoring sites are missing from the numerical list. If so, please discuss if the sites are outside the project area and whether associated results would be applicable as reference site results. If these sites were not include in the monitoring program, provide a response as to why the sites were dropped or not considered appropriate for use in the project baseline study. B. Identify which monitoring sites will be maintained after site development with respect to the project development footprint. Indicate potential additional sites that will be added to the program.

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NSE 2-81	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.2.1, pg. 266	SW-9 is listed as a water quality monitoring reference site in a different watershed. No details are provided on the upstream drainage area, land uses and surface water features to confirm that it is an appropriate reference site for comparing baseline water quality to sites within Beaver Dam project area and the Killag River.	Provide a comparison of the SW-9 monitoring site upstream watershed with appropriate sites within the Beaver Dam project area. The comparison should include at a minimum evaluation of drainage areas, land uses and hydrologic features between the two features.
NSE 2-82	Surface Water Quality Specialist	Nova Scotia Environment	Figure 6.7-3 and its series A to B	A. There a red/orange dashed polylines on all the 6.7-3 figures without definition in the legend. They appear to be existing logging roads. B. There is a linear wetland that extends approximately 2/3 up the Figure 6.7-3. This appears to be a graphical anemology and not a continuous wetland feature.	A. Confirm what the red/orange dashed polylines on all the 6.7-3 figures are? B. Confirm that the linear wetland approximately 2/3 of the way up the figure is a graphical anomaly?

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NSE 2-83	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.2.1, pg. 267; Appendix G.2; 6.7.3.1.1, pg. 275	*A.* The baseline monitoring program summary in Section 6.7.2.2.1 states the following: *"Surface water monitoring data was collected around the Beaver Dam Mine Site to be representative of the site conditions and considers stream water rather than lake water."* Lakes within the project development area, based on mapping include Crusher and Mud Lake. Sampling was conducted at the downstream of the outflow from Crusher Lake (SW6A) and downstream of the outflow of one section of Mud Lake (SW4a). Section 6.7.2.2.1 further states the following: *"The 2017 surface water samples collected from Mud Lake and the stream from Crusher Lake provide ample baseline SW data for these sites."* No reasoning is provided as to why lake water sites in Mud Lake and/or Crusher Lake were not included in the surface water quality monitoring program. Crusher Lake is indicated as having a lake depth of up to 10 m (Section 6.7.3.1.1, Table 6.7-5). Many lakes within the Province can become thermally stratified during the winter and summer season that are of similar depths. Stratified lakes can have different water quality between the various thermal layers and associated processes. *B.* The following statement is also made about sample collection with respect to Mud Lake and Crusher Lake in Section 6.7.2.2.1: *"The 2017 surface water samples collected from Mud Lake and the stream from Crusher Lake provide ample baseline SW data for these sites."* Within Appendix G.2 no data is provided from 2017 with respect to surface water quality in Mud Lake and/or Crusher Lake. *C.* Section 6.7.2.2.1 states the following about Kent Lake: *"Kent Lake would provide no additional data. A monitoring location here prior to construction and during operation may be warranted."* No rationale is provided to support the statement that monitoring Kent Lake would provide no additional data, or why a monitoring site should be established in Kent Lake prior to construction. D. A single sampling event (October 2017) was conducted at Tent Lake and an unnamed Lake southwest of the project development area at the Beaver Dam site. These two sites, besides the single event haul road monitoring event locations are the only sites located downstream and south of the Beaver Dam project area, and Tent Lake will be receiving managed surface water runoff from the mine facilities, crusher and run-of-mine pads and associated haul roads. No rationale is provided as to why a single fall sampling event is sufficient to represent baseline water quality in these receiving waters. No details are provided as to whether either lake was sampled at an inlet or outlet, or within the waterbody itself.	A. Provide rationale for why lakes that will be potentially impacted by project development activities at the Beaver Dam project area did not have baseline surface water quality monitoring conducted within the lake bodies themselves. Indicate how lake water quality will be included/estimated in the assessment of potential project effects given the absence of lake water quality data. Provide a discussion on how outlet monitoring data will be used to evaluate impacts to in-lake water quality, particularly with respect to potential thermal stratification of Crusher Lake given its maximum depth. B. Provide missing 2017 water quality results for Mud Lake and stream from Crusher Lake. C. Provide rationale to support the statement that monitoring water quality in Kent Lake for the baseline study would provide no additional data, but that monitoring may be required here prior to construction and operation. Provide water quality results if monitoring is required for the baseline study. D. Provide rationale as to why a single sample event in October 2017 is sufficient to represent baseline conditions in receiving waters southwest and south of the Beaver Dam project area, particularly with respect to Tent Lake, which is planned to receive managed surface water runoff from the mine facilities, and crusher and run-of-mine pad. E. Indicate where the monitoring sites are located within each respective water body (e.g., inlet, outlet, water body deep spot).

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NSE 2-84	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.2.1, pg. 267-268; Appendix E.2	A. The sampling criteria indicates that grab surface water quality samples were analysed for dissolved metals (RCAp-MS(dissolved). *B.* Monitoring sites within the Beaver Dam project area are stated as not including analysis for total suspended solids, and no results are presented in Appendix E.2. The following rationale is provided: *"TSS analysis was limited to the Haul Road due to the potential for haul truck traffic to suspend particulate matter for deposition into watercourses adjacent to the Haul Road. The potential for this interaction at the Beaver Dam Mine Site is low, due to the planned sediment and erosion control measures and nature of the pit design."* Given that haul roads and ground disturbance are proposed within the Beaver Dam project area, would this rationale not support monitoring of total suspended solids in these watercourses as part of the baseline study. No discussion is provided on how the efficacy of the erosion and sediment control measures within the project area will be evaluated given the absence of total suspended solids baseline data to confirm the project impacts. *C.* Section 6.7.2.2.1 states the following: "*Flow rate and water levels at sample locations along the Haul Road did not allow for consistent field parameter data collection."* This potentially indicates that water quality samples were collected at watercourse sites with little to no observed flow during a given sample event. No discussion is provided with respect to the potential effects on water quality results or whether sampling watercourses under these conditions is standard practice. D. Additionally, in Appendix E.2 no field parameter results are provided for August 24, 2015 at all baseline water quality sampling sites. E. No accredited lab results sheets/tables are provided with the Revised EIS Submission. These would provide an additional reference to the tables prepared within the document and may provided additional notes from the lab analysis.	A. Confirm whether the surface water quality samples were analysed for total metals or dissolved metals. If dissolved, provide a discussion on the field filtering process, and how results were assessed with respect to guideline criteria, which are typically total. B. Provide additional rationale on why total suspended solids at surface water quality monitoring sites within the Beaver Dam project area were not analysed for given the proposed construction and operation phase activities at the Site (e.g., disturbance of soils, hauling of materials). Indicate how baseline conditions will be estimated for total suspended solids given the absence of data (e.g., pre- and post-development modeling of sediment loads), or alternatively provide additional baseline water quality monitoring results for total suspended solids given that it is a contaminant of concern for the project. C. Confirm whether surface water quality samples were collected from watercourses during periods of observed flow. If samples were collected during periods of no flow, indicate how baseline results were considered and interpreted for these watercourse conditions, and whether they should be included in the assessment of baseline conditions (e.g., average values, standard deviation). D. Provide comment on the August 24, 2015 sample event and why flow conditions did not allow for field parameter measurements at all monitoring sites in the study area. E. Provide accredited lab results sheets/tables for surface water quality samples.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-85	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.2.1, pg. 268; Appendix E.2	*A.* The following statement is provided on how results were compared to guidelines: *"Analytical results were compared to the CCME FWAL guidelines, updated to 2014; the MDMER guidelines (formerly MMER) updated to 2018; and the NSEQSs for Surface Water, updated to 2013."* The revised EIS was prepared in 2019. There is no reasoning provided as to why the most recent versions of the CCME FWAL and NSEQSs for Surface Water were not applied for the baseline surface water quality assessment. In the fall of 2018 zinc was updated in the CCME FWAL guideline list, and in 2015 silver was revised from 0.1 µg/L to 0.25 µg/L. B. Several of the guideline values (e.g., aluminum, ammonia as nitrogen) are calculated using pH values. Lab pH can substantially differentiate from field pH, and it is typical practice to use field pH to calculate whether a results exceeds a criteria value. There is no discussion on whether field pH was consistently used to calculate the criteria (e.g., August 24, 2015 results with no field pH).	A. Provide a revised comparison table using the most recent versions of applicable guidelines, and update relevant assessment sections. B. Confirm that field pH was used to calculate whether applicable water quality results exceeded criteria values.
NSE 2-86	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.2, pg. 268; 6.7.3.2.1, Table 6.7-8, pg. 289-291; Appendix G.1	*A.* The following statement is provided about baseline sampling along the proposed haul road routes: *"One sampling event was completed in June 2015 for the 29 sampling locations along the Haul road."* No further discussion is provided on whether a single sample event is sufficient to characterize baseline surface water quality in these watercourses. B. Within the Revised EIS Submission no quantitative water quality results are provided for the Haul Road baseline surface water quality study. The results are only discussed with respect to exceedances of applicable criteria values and representing baseline conditions.	A. Provide rationale on why a single sample event is expected to be sufficient for characterizing baseline water quality conditions in watercourses crossed along the proposed Haul Road route(s). B. Provide the quantitative surface water quality results for samples collected for the Haul Road baseline study. Additionally, provide the accredited lab results sheets for reference and comparison.
NSE 2-87	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.3, pg. 271; Appendix G.5, 3.2.2, pg. 4	The following statement is made about the type of water balance model used for the Beaver Dam site: *"Under baseline conditions, the Australian water balance model (AWBM) was used to calculate runoff volumes based on the surplus of rainfall/snowmelt depths from the soil storage multiplied by the contributing drainage area."* No details are provided on the AWBM and its applicability to the Nova Scotia climate and local hydrologic cycle. There are other Canadian and North America developed water balance models available, and these were not discussed or compared to the AWBM to indicate why the AWBM was chosen as an appropriate model for this project.	How is the Australian Water Balance Model appropriate for use to simulate the local hydrologic cycle at the Beaver Dam site in Nova Scotia, Canada? Particularly with respect to the snow portion of the hydrologic cycle. Provide rationale on why this model is most appropriate including potential comparison against other applicable water balance methods.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-88	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.5, 2.2.1, pg. 2; 4.1, pg. 17	The Harmon equation is used to estimate potential evapotranspiration and climate normal data is used to estimate lake evaporation within the water balance as described in Section 2.1.2. As presented in Table 2-1, no evaporation or potential evapotranspiration is predicted to occur during the months of December, January, February or March. However, in Table 4-1 evaporation is predicted to occur within the collection system with the Killag River outfall for the End-of-Mine and Post-Closure conditions. Both Tent Lake and Mud Lake outfalls have no winter evaporation estimated. No explanation is provided as to why evaporation is predicted for those months at the Killag outfall site.	How is evaporation occurring within the water balance model for the Killag River in the months of December to March? If an appropriate water transport mechanism for this time period, why is transport via evaporation not occurring in Mud or Tent Lake, and not during the baseline condition at the Killag site?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-89	Surface Water Quality Specialist	Nova Scotia Environment	Appendix F.3, Table 4A – N; Figure 6.7.3; 6.7.3.2.1, Table 6.7-7, pg. 289; 6.7.3.3.1, pg. 298	SW10, which is located upstream of the existing settling pond, when water quality results for metal parameters are compared to the other sites monitored as part of the baseline program there are a few that are one to two orders of magnitude higher than the other monitored sites. An example of this is arsenic with values of 130, 36, 380 (370 duplicate) µg/L for three sequential events in the summer of 2015, and SW-5 which is the outlet of the existing settling pond at arsenic values ranging from 15 to 47 µg/L. SW-6A had one sample with an arsenic concentration of 130 µg/L on June 30, 2015 with its duplicate sample having a concentration of 3 µg/L. All other arsenic concentrations observed as part of the baseline program were below 10 µg/L. These results indicate that the waters within the settling pond have increased arsenic concentrations in comparison to baseline conditions to other water features in the area. Parson et al. (2012) found that total arsenic concentrations associated with natural waters range in concentration between 5 and 100 µg/L. Other compounds with elevated concentration at SW10 compared to the other sites include calcium, cobalt, iron, manganese, nickel and strontium. Calcium, manganese and strontium also were elevated at the outlet monitoring station for the existing settling pond (SW5). There is no discussion within the Revised EIS Submission about the elevated metals results at SW10 and for select metals at SW5 in comparison to the other baseline sites. Based on some of the observed concentrations, particularly for arsenic at SW10 there is potential for historic mining activity contamination within the area. References: Parsons, M B; LeBlanc, K W G; Hall, G E M; Sangster, A L; Vaive, J E; Pelchat, P. 2012. *Environmental geochemistry of tailings, sediments and surface waters collected from 14 historical gold mining districts in Nova Scotia*; Geological Survey of Canada, Open File 7150, 326 pages, https://doi.org/10.4095/291923 (Open Access)	Provide analysis comparing the baseline surface water quality results, particularly metal parameters, at SW10 and SW5 with the results from the other monitoring sites. The analysis should include assessment on whether the results represent background concentrations typical for the local geology and land use or indicate potential historic mine activity contamination within the site.

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NSE 2-90	Surface Water Quality Specialist	Nova Scotia Environment	6.7.3.2.1, pg. 287	A. The following statement is made in Section 6.7.3.2.1 with respect to sediment loading into the watercourses within the Beaver Dam site and along the Haul Road route: "The watersheds have been logged extensively, yet turbidity is low, indicating a lack of silt in the soils and/or little erosion from logging practices. The Haul Roads have been used to haul timber as well; however, TSS levels were low, which may be attributable to existing road conditions and allowable speeds." There is no discussion with respect to when water quality samples were collected at each of the sites and local precipitation events. Higher sediment loads within the water column are typically observed in surface water systems during or immediately following precipitation events that contribute surface water runoff. If water quality samples were collected during precipitation events it would be expected increased TSS and turbidity levels would be observed. During baseflow conditions it is common for lower TSS and turbidity results. B. Within Figures 6.7-3A to K there are a number of haul road water quality monitoring sites located on the upstream side of the existing haul road (e.g., WC-26, SW-46). The comments in Section A above include discussion about haul road activities and the monitoring program capturing their influence on water quality from the single June sampling event. Sampling upstream of infrastructure typically does not represent the influence of that infrastructure on local water quality.	A. Provide precipitation data with respect to when water quality samples were collected for the baseline study for the Beaver Dam site and Haul Road. Assess whether the monitoring events coincide with storm flow or baseflow conditions. With this information, discuss potential influence of local land uses (e.g., logging, haul roads) and surface water runoff on observed water quality results. B. Discuss if the baseline study for the Beaver Dam site captured a sufficient number of baseflow and stormflow events to represent those flow conditions at the site. Provide additional baseline results, if required, to represent different flow conditions. C. Discuss how monitoring on the upstream side of the existing haul roads captures the full influence of the haul road activities on water quality. Will the project monitoring sites be moved to the downstream side of the haul road to capture potential impacts on water quality?
NSE 2-91	Surface Water Quality Specialist	Nova Scotia Environment	6.7.3.1.1, pg. 272	The following statement is made about the nature of the onsite watercourses: *"Other streams across the Beaver Dam Mine Site are generally small with minimal pool/riffle structure and consist of mucky organic substrate. Many of these streams would be ephemeral in nature, with little water present at dry times of the year."* No details are provided on how watercourses were identified as ephemeral.	Provide details on how watercourses at the site were identified as ephemeral.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-92	Surface Water Quality Specialist	Nova Scotia Environment	Table 6.7-5, pg. 275-276	Waterbodies within the Project development area for Beaver Dam are described within this section with surface area and depth measurements provided. There is no description within the Revised EIS Submission whether bathymetric mapping was conducted in these waterbodies.	Was bathymetric mapping conducted within the waterbodies listed in Table 6.7-5?
NSE 2-93	Surface Water Quality Specialist	Nova Scotia Environment	6.7.3.1.2, pg. 277; 6.7.3.2.1, pg. 287	The following statement is provided in the surface quality baseline assessment (Section 6.7.3.2.1): *"The majority of nutrients were below or slightly above detectable concentrations, indicating little to no influence from agricultural operations in the area."* The existing site activities do not describe active agriculture within the Beaver Dam project development area. The description of the Killag River watershed (Section 6.7.3.1.2) also does not indicate the presence of agricultural activities, only sparse development and timber harvesting.	Provide details on the agricultural operations within the Killag River and project development area watersheds and their potential influence on baseline conditions.
NSE 2-94	Surface Water Quality Specialist	Nova Scotia Environment	6.7.3.2.3, pg. 291 -	The two stations that are most applicable to the Touquoy pit discharge to Moose River are SW-11 (upstream of pit site on Moose River) and SW-2 (downstream of proposed discharge location to Moose River). Figures 6.7-8 to 6.7-11 present graphical representations of the multiple site results (10 sites total) within the Touquoy monitoring program, separated based on background and downstream classified locations. The baseline conditions should specifically focus on the watercourse monitoring sites and their results that would be applicable with the proposed Touquoy open pit discharging effluent to the Moose River. Background and downstream sites associated with Touquoy activities that are already permitted and not expected to change with the introduction of the Beaver Dam ore processing are potentially not as relevant for assessing baseline water quality within the project development area, if appropriate surface water quality monitoring site data is available.	Provide baseline water quality results for the monitoring sites (e.g., SW-11 and SW-2) that are applicable to the Touquoy open pit operation, and assess their general baseline water quality on their own as a receiving water environment for the Beaver Dam project.

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NSE 2-95	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.1.1, pg. 264	The Beaver Dam site and Haul Road project development area water quality monitoring sites did not conduct flow monitoring. Given the expected changes to site drainage and flows due to the proposed site activities within the Beaver Dam project development area the establishment of flow monitoring stations would assist with monitoring potential impacts to surface water flows, and effectiveness of mitigation measures.	A. Confirm if flow monitoring was conducted at the Beaver Dam site. Provide baseline flow analysis results if available. a. If baseline flow monitoring was not conducted, include discussion on why this is not required for assessing potential impacts to flow from the project development? Or how baseline water quantity will be monitored and established prior to construction? B. Provide locations for long-term flow monitoring stations at the Beaver Dam site to support assessing the effectiveness of mitigation measures on reducing surface water quantity impacts.
NSE 2-96	Surface Water Quality Specialist	Nova Scotia Environment	6.7.3.3.1, pg. 299	The depth duration frequency (DDF) rainfall data used to represent the design rainfall events for the Beaver Dam site was from the Truro Environment and Climate Change Canada meteorological station. No explanation is provided as to why this DDF data was the most appropriate for the Beaver Dam site.	Provide rationale for why the Truro Environment and Climate Change Canada meteorological station DDF data is the most appropriate for estimating design rainfall at the Beaver Dam site.
NSE 2-97	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.4, Section 2.3, pg. 4	The following statement is provided with respect to derivation of baseline criteria for when observed concentrations exceed existing CCME CEQG-FAL criteria: *"Where substances were found to exceed the selected guideline, and the 75th percentile of baseline, consideration was given to developing a Site Specific Water Quality Objective (SSWQO), following CCME guidance (CCME, 2007)."* The referenced guide lists that site-specific water quality objectives can be established for a site using a number of different methods to establish the upper limit of background, which includes the mean value plus two standard deviations, and using the 90th percentile. There is no rationale provided in the Revised EIS Submission on why the 75th percentile of baseline values for given parameters was selected.	Provide rationale for why site-specific criteria with baseline measurement values used 75th percentile to calculate the value for select parameters.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-98	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.4, Section 2.3 pg. 4 – 5; Section 3.1, pg. 7; Section 3.4, pg.11	Arsenic was selected to have a site-specific water quality objective (SSWQO) developed for the Beaver Dam and Moose River discharge sites, based on observed baseline exceedances of the CCME CEQG-FAL criteria at the two sites in existing surface water features. Other metals (aluminum, iron, lead, cadmium and copper) also were observed to exceed the CCME CEQG-FAL criteria at the Beaver Dam site, and the benchmark concentrations were selected to be either the CCME CEQG-FAL criteria (cadmium, lead, copper) or 75th percentile baseline concentration (aluminum, iron,).	A. Provide rationale for why a SSWQO was used instead of the 75th percentile method for developing a baseline concentration for arsenic? B. Provide rationale for why a SSWQO was not developed for other metals (aluminum, iron, lead, cadmium and copper) observed to exceed the CCME CEQG-FAL criteria as part of the baseline monitoring program.

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NSE 2-99	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.4, Section 3.1, pg. 6-7; Section 3.5 & 3.6, pg. 11 - 24	A. Within the Killag River at SW1, arsenic concentrations in water quality samples are assessed from nine sampling events conducted between October 2014 and August 2015 (Table 3-1). None of the samples had arsenic concentrations that exceeded the CCME criteria. The following statement is made about another station on the Killag River upstream of the Cameron Flowage (SW2A): *"While an additional surface water station is available in the program (Station SW2A), it is north of the Cameron Flowage and distant to the proposed discharge site and hence was not used to characterize receiving environment conditions."* Both sites did not have water quality samples that exceeded the CCME CEQG-FAL criteria for arsenic. No additional rationale is provided as to why SW2A was not included in the assessment for determining why a site-specific criterion for arsenic was required. B. SW-11 and SW-12 had one sample taken at each site in October 2017, and arsenic concentrations were observed to be below the CCCME CEQG-FAL criteria. No rationale was provided as to why they were not included in the assessment of baseline conditions and rationale for why a site-specific criterion was developed. C. The arsenic concentrations were observed to be elevated above the CCME CEQG-FAL criteria at several stations within the Beaver Dam study area (SW-4A, SW-5, SW-6A, and SW-10). Based on these elevated concentrations observed at these sites, a site-specific arsenic criterion was developed following the CCME protocol (2003). There is no additional rationale provided as to why these sites were used to determine that a site-specific arsenic criterion was required, and other sites listed above were not included. SW-5 and SW-10 are associated with an existing sediment pond from previous mining activities and are discussed in another information request with respect to potentially representing historic on-site contamination.	A. Provide rationale for why SW2A was not considered in the assessment of background arsenic concentrations? Particularly given that other water quality monitoring sites were used to indicate elevated arsenic concentrations within the Beaver Dam Project Development Area. B. Additionally, why were SW11 and SW12, also located within or near the project, were not included in the assessment for development of a site-specific criterion for arsenic? C. Provide additional rationale for why a site-specific criterion was developed for discharge to Cameron Flowage based on the responses to the above questions. As part of the response provide comment on if the data associated with SW-5 and SW-10 water quality results is associated with historic mining activities and should be included in assessing baseline arsenic conditions within the Cameron Flowage. D. Based on the responses to the questions above, if a site-specific criterion for arsenic is determined to not be appropriate for this site, provide additional assessment of whether treatment will be required for effluent discharge from the Beaver Dam project site to Cameron Flowage and Tent Lake.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-100	Surface Water Quality Specialist	Nova Scotia Environment	2.3.2.3, pg. 56; Appendix G.2; Appendix G.4	The Touquoy open pit after receiving tailings from the Beaver Dam project is referred to in many locations within the report as a pit lake. This is typically associated with the end of mine and reclamation scenarios. If the open pit was to remain as an open pit with no addition of tailings it would eventually fill up to become a pit lake. No rationale is provided to support the reference referring to the open pit containing both Beaver Dam tailings, and surface water and groundwater inflows as a pit lake feature.	Provide rationale on why the Touquoy open pit tailings storage facility should be referred to as a pit lake, particularly when it will contain tailings, as well as surface water and groundwater inflows following closure?
NSE 2-101	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.2, Section 4.2, pg. 17	The following statement is provided about the dry climate conditions and potential sources of water as there will be insufficient water available in the existing tailings management facility and the open pit tailings storage area: *"Therefore, under dry climate conditions or based on the operational requirements of pumping infrastructure, start-up water in the open pit may be supplied from Scraggy lake (subject to provincial permitting) and/or effluent from the effluent treatment plant."* For the dry climate scenario where water from Scraggy Lake would be potentially required there is no discussion of the water balance condition within Scraggy Lake.	Does the Touquoy site water balance estimate the volume of water available within Scraggy Lake? If so, for the dry condition scenario with consideration of ecological maintenance flows and the needs to downstream users, would withdrawing additional water from Scraggy Lake for the dry climate condition scenario be potentially feasible?
NSE 2-102	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.2, Section 5.2, pg. 25-27	Several water treatment strategies are proposed, which include in-pit treatment, pumping to the existing effluent treatment plant with discharge into Scraggy Lake at the existing discharge location, and pumping to the to the existing effluent treatment plant with discharge back into the Touquoy pit. Predicted water quality within the pit in Year 10 and Year 50 are presented in Table 5.2. No confirmation is provided that the expected Touquoy pit tailing storage area water quality at Year 10, or any other time, can be adequately treated using the existing effluent treatment plant to meet the Metal and Diamond Mine Effluent Regulation criteria.	Provide confirmation that the expected water quality within the Touquoy pit tailings storage area can be adequately treated using the existing treatment facility, and meet discharge requirements for release into Scraggy Lake.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-103	Surface Water Quality Specialist	Nova Scotia Environment	6.7.3.2.1, pg. 287-288; Appendix G.1, Table 1, pg. 1 - 7	A. Field pH values observed at the Beaver Dam baseline surface water quality monitoring sites were typically acidic with pH values less than 7. SW1, which is located on the Killag River downstream of the Cameron Flowage and the proposed site water management discharge locations had the lowest observed field pH values, including two samples with values below 3. SW2A is upstream of Cameron Flowage and had the 2nd lowest field pH levels of the Beaver Dam sites. Section 6.7.3.2.1 provides comment on low pH waters occurring within Nova Scotia. Looking at water quality monitoring program field pH results for other provincial and federal programs within the province (Maritime Coastal Basin Long-term Water Quality Monitoring Data [https://open.canada.ca/data/en/dataset/b42b8484-95a2-4654-ad83-ebb2aa8407e3]; Surface Water Quality Monitoring Network Grab Sample Water Quality Data [https://data.novascotia.ca/Nature-and-Environment/Surface-Water-Quality-Monitoring-Network-Grab-Samp/wncu-ppda]; Acid Sensitive Lakes, Atlantic Canada, http://data.ec.gc.ca/data/substances/monitor/acid-sensitive-lakes-atlantic-canada/) there are no field program results for lakes and watercourses with field pH values observed below 3. B. The Killag River is the proposed receiving water environment for the majority of water management discharge from the Beaver Dam site. There is no discussion within the Revised EIS Submission related to the observed low pH Killag River receiving water environment and potential effects from discharge from the site.	A. Provide additional discussion of the observed low pH values (<3) at SW1 with respect to whether these are typical for local geological conditions or potentially associated with historic mining activities. B. What effect will the water management discharge from the Beaver Dam site during the operation and closure phases have on pH and associated metals concentrations within the Killag River with respect to the existing low pH values (<3)? Will metal transformation potentially occur in the Killag River and become more bioavailable?
NSE 2-104	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.2.2, pg. 268-270; 6.7.2.3.3, pg. 291-297	The Touquoy mine site baseline assessment focuses predominantly on all the existing water quality monitoring site, including SW1, SW2 and SW11 on Moose River which will be receiving discharge from the Touquoy pit. The assessment focuses on grouping all sites as either upstream or downstream of the existing project activities. Not all of the surface water quality monitoring sites assessed at Touquoy will be associated with the proposed Beaver Dam ore processing and tailings disposal activities. There is no discussion provided on which of the baseline and downstream monitoring sites will be applicable to these activities.	Indicate which monitoring sites are applicable to baseline and downstream monitoring for the proposed Touquoy activities, specifically related to the Beaver Dam project.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-105	Surface Water Quality Specialist	Nova Scotia Environment	6.7.2.3.1, p.g 271; 6.7.3.3.1, pg.300-301; 6.7.5.2.2, pg. 307	Potential evapotranspiration for the project site is estimated using the Hamon equation on a monthly time step with daily average rates. The equation uses average temperature and hours of daylight as input parameters. There is no discussion provided on why the Hamon equation was selected. The results are provided but not compared to other regional estimations for potential evapotranspiration for area of Nova Scotia where the project is located.	A. Provide rationale on why the Hamon equation was chosen in comparison to other potential methods for estimating potential evapotranspiration. B. Compare the estimated potential evapotranspiration rates against literature values applicable for the region where the project site is located. Provide rationale on why the estimated rates are appropriate for the project site during the different project phases.
NSE 2-106	Surface Water Quality Specialist	Nova Scotia Environment	6.7.3.3.1, Table 6.7-13, pg. 301	The title of Table 6.7-13 is *"Average Evaporation Runoff Volume per Year"*. Evaporation runoff is not a common water balance term. Is it a combination of water available for either evaporation and/or surface water runoff?	Provide a definition of the term evaporation runoff in Table 6.7-13.
NSE 2-107	Surface Water Quality Specialist	Nova Scotia Environment	Section 6.7.6.1; Appendix G.5; Appendix G.5, pg. 12	A. Runoff from the Beaver Dam site is proposed to be directed through the north settling pond prior to discharge to the Killag River and to the east settling pond prior to discharge to Tent Lake. Storage volumes are estimated within Appendix G.5 for each pond and simulated in the water balance model. There is no discussion of the design criteria for each of the ponds with respect to storage volume function and discharge water quality commitments. Examples of these design criteria would include the return period storm storage volume, # of days of pit dewatering storage prior to discharge, # of m of freeboard, spillway flow rate, pond berm materials (waste rock, clay core) and side slopes, and mitigation measures to reduce thermal charging from discharge into receiving water bodies. B. Appendix G.5 describes active and permanent storage volume values for the north and east settling ponds. No discussion or information is provided with respect to what are the design criteria used to estimate these volumes, particularly with respect to design storm event storage.	C. What are the preliminary design criteria for the north and east settling ponds at the Beaver Dam site, including design storm event and dewatering storage capacities prior to discharge? D. Based on the response above, describe the estimated active and permanent pool storage within the north and east settling ponds with respect to the design storage criteria.
NSE 2-108	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.5, Figure 3-6 and 3-8	The Mud Lake drainage area south of the proposed onsite Haul Road at the Beaver Dam site is displayed as flowing via a culvert system north to Mud Lake under the Haul Road and the west waste rock storage area drainage ditch. Given the low topographical relief of the Project site there is no indication that this proposed drainage network is feasible.	Provide preliminary analysis to indicate that the proposed Mud Lake drainage area south of the proposed onsite Haul Road draining north under the Haul Road and west waste rock area drainage ditch is feasible.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-109	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.6, Section 7.0, pg. 12	Table 6 presents predicted average concentrations of select parameters in the groundwater seepage from the Touquoy open pit. The average concentrations in the groundwater seepage that are below the detection limit are represented by 'Below DL' and not quantitatively. There is no way to determine whether the average concentration detection limits are sufficiently low enough in comparison to the MDMER, NSE Tier 1 EQS Freshwater and CCME FAL criteria listed in the table.	Provide quantitative values for the parameters with average concentration values listed as 'Below DL'. Provide discussion if any of the listed average concentration detection limits are higher than the criteria listed in the table.
NSE 2-110	Surface Water Quality Specialist	Nova Scotia Environment	6.7.5.1, pg. 305; 6.9.6.2.2, pg. 497	The Beaver Dam project administrative boundaries are listed for the site with discharge that would be subject to the Metal and Diamond Mining Effluent Regulations (MDMER) criteria, which are listed as the following: • *During operations, discharge from the North Settling Pond to the Cameron Flowage (Killag River) at the Beaver Dam Mine Site;* • *During closure, discharge from the pit to the Cameron Flowage (Killag River) at the Beaver Dam Mine Site; and,* • *During closure, discharge from the pit to the Moose River at the Touquoy Mine Site.* In Section 6.9.6.2.2 the following statement is made as well: *"Additionally, no residual effect is expected on fish and fish habitat based on water quality because discharge from Tent Lake outfall does not require treatment as it is not anticipated to have water quality concerns."* At the Beaver Dam site during operations there will be an east settling pond that receives runoff from the crusher and run of mine stockpile pad prior to discharging south to Tent Lake. As this pad will be holding and processing various grades of ore for the project, its runoff and discharge into the environment would potentially contain contaminants of concern (e.g., suspended solids, metals) associated with those activities. The dust created by the crushing process would potential create a different type of substrate to potentially discharge from the site in comparison to the waste rock and ore stockpiles. No rationale is provided as to why this discharge point is not included as one that will be subject to the MDMER.	Provide rationale on why the east settling pond discharge would not be included as a location subject to the MDMER criteria for the Beaver Dam site. Also provide rationale to indicate why discharge from the Tent Lake outfall does not require treatment in general (as per Section 6.9.6.2.2).

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-111	Surface Water Quality Specialist	Nova Scotia Environment	Table 6.7-20, pg. 315	*A.* The following statement is made about ore management at the Touquoy Mine site for the Beaver Dam project: *"Ore management (drilling, blasting, loading and hauling of ore and waste rock)"* No other sections of the Revised EIS Submission mention drilling or blasting activities at the Touquoy site, or the hauling of waste rock. B. Within Table 6.7-20 the construction of the Touquoy Open Pit spillway to discharge to Moose River is not included.	A. Confirm whether drilling, blasting and hauling waste rock are expected to be activities at the Touquoy Site. If so, provide details on the processes and include effects assessment of potential activities on appropriate valued ecosystem components. B. When is the construction of the spillway from Touquoy Pit to Moose River expected to be constructed within the project schedule?
NSE 2-112	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.5, pg. 13	The Beaver Dam pit in the post-closure scenario is proposed to have its overflow directed to the Killag River. No preliminary concepts are provided on the routing, design and flow conveyance capacity for the proposed overflow.	Provide preliminary design details on the overflow connection between the Beaver Dam pit and the Killag River. Will blasting be potentially required and how will effects be mitigated to the Killag River aquatic ecosystem? Will there be potential for exposure of historic mine workings and how will those effects be mitigated? What will be the design flow capacity of the proposed connection channel? Will aquatic organism barriers be required to prevent fish from entering the pit lake environment for the post-closure condition?
NSE 2-113	Surface Water Quality Specialist	Nova Scotia Environment	6.7.6.1.1, pg. 316	The following statement is provided about mixing within the Killag River: *"Based on previous experience with mixing models in rivers of similar size to the Killag River and the results of the Touquoy Moose River mixing model (30 m distance to fully mixed) (Stantec, 2018f), it was assumed that full mixing would occur in a relatively short distance from the discharge point."* The Beaver Dam site is proposed to discharge into Cameron Flowage during the operations phase and immediately downstream of the Flowage via the open pit for the post-closure scenario. A flowage typically involves altering flow patterns within a watercourse through some type of control structure, and most often were constructed in support of logging activities. There is no discussion on whether flow within Cameron Flowage is managed by a historic or current control structure. Moose River is a free-flowing watercourse without a control structure near the proposed Touquoy Pit discharge location (SW-2). No rationale is provided to indicate how Cameron Flowage and the Killag River at the Beaver Dam site are similar in hydrology (e.g., watershed [land uses, size], flows, watercourse dimensions [width, depth, slope], channel bed and bank materials) to Moose River or other watercourses modeled for the Beaver Dam/Touquoy projects.	Provide rationale to support the statement that the Killag River and Moose River are similar in size and why a site-specific mixing model is not required for the Beaver Dam site discharges to the Killag River. If the watercourse hydrology characteristics differ between the Moose and Killag Rivers are sufficient that the Moose River mixing model would not be applicable to the Killag River, then develop a Killag River mixing model to assess project effects on water quality within this river system.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-114	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.3, Section 2.1, pg. 4-6	A. Table 2-1 presents background concentrations of constituents of concern within the Killag River and its tributaries. There is no discussion on how the values presented in this table were calculated, such as average values or median. Also, sample results would typically represent a range of values that potentially change seasonally and due to other environmental factors (e.g., storm events). B. No discussion is provided on the appropriateness of the seven monitoring locations in representing background constituents of concentrations within the Killag River. Some of these sites are located within or adjacent to historic mining activities (SW10 and SW5), others are located downstream of small ponds or wetlands (SW4A, SW12). Also, no discussion is provided as to why the background water quality for the Killag River did not just use SW2A or SW1 monitoring results.	A. Provide the method for how the values were calculated in Table 2-1. Also, discuss why a range of values not presented to represent concentrations of constituents of concern for the project for the water quality assessment. B. Provide rationale on why the sites selected to represent water quality in the Killag River were chosen and indicate their appropriateness for estimating water quality within this watercourse. As part of the discussion, provide details on the differences in monitoring site environments and their potential influence on water quality results.
NSE 2-115	Surface Water Quality Specialist	Nova Scotia Environment	6.7.6.3.2, pg. 330; Appendix O.1, 2.7.2	The following statement is provided in the Revised EIS Submission: *"As shown in Figure 6.7-17, the spillway will discharge to a conveyance channel that outlets to Moose River, approximately 70 meters downstream of the surface water monitoring station SW-2."* No discussion is provided within the EIS on whether additional monitoring stations will be added along Moose River to monitor surface water quantity and quality. There are no monitoring sites located further downstream on Moose River from SW-2. The Environmental Effects Monitoring Plan states that additional monitoring sites will not be anticipated for the Touquoy Mine Site following deposition of Beaver Dam tailings.	Will additional surface water quantity and quality monitoring sites be established on Moose River downstream of the proposed spillway discharge point? Provide approximate locations, monitoring parameters and sampling frequencies be proposed based on the preliminary site layout.
NSE 2-116	Surface Water Quality Specialist	Nova Scotia Environment	6.7.8.1, Table 6.7-23, pg. 334-335	The following mitigation measure is listed as only being implemented during the operations phase: *"Ensure pit water meets applicable regulatory quality criteria for discharge – otherwise treat water prior to discharge"* No rationale is provided as to why this mitigation measure will not be implemented as part of the decommissioning and reclamation phases when in some cases for the Beaver Dam and Touquoy pits the discharge is expected to exceed applicable criteria.	Will the proponent commit to having pit water meet applicable regulatory criteria for discharge during the decommissioning and post-closure phases.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-117	Surface Water Quality Specialist	Nova Scotia Environment	6.7.9. Table 6.7-24, pg. 337	There is a reduction to surface flows to Crusher Lake and Mud Lake downstream, as well as WC-5 which connects the two waterbodies at the Beaver Dam site. The impacts to Crusher Lake and Mud Lake are predicted to be partially reversible; however, there is no indication in the report on how the proposed surface water management plan will partially reverse the permanent changes in surface water flows.	A. Provide rationale, based on the proposed surface water management plan for the Beaver Dam site, on how will expected impacts to Crusher Lake and Mud Lake be partially reversed? B. There is an unnamed watercourse downstream of Mud Lake where monitoring site SW4a is located. Given the reduction in surface water flow to this watercourse, would it not have irreversible impacts from the project to surface water quantity and associated VECs? Provide rationale to support why it was not included as potentially requiring a fisheries authorization or other permit due to reductions in surface water flows?
NSE 2-118	Surface Water Quality Specialist	Nova Scotia Environment	Figure 6.7-17	The proposed spillway routing from the Touquoy open pit to Moose River is presented as crossing an existing road and a new site development area. No discussion is provided on the proposed routing, associated construction methodologies, local geology and soils encountered during construction and proposed mitigation measures.	A. Provide discussion on expected soils and geology to be encountered by the construction of the Touquoy open pit spillway, including potential interception of historic mining activity sites/workings. B. Provide preliminary construction methods, including whether blasting will be conducted. Assess the potential effects on applicable VECs (e.g, fish and fish habitat in the vicinity of blasting) from the construction activities, and propose applicable mitigation measures. C. Provide a description of the existing roadway to be intersected by the spillway routing, and an assessment of potential effects to the existing roadway and associated VECs, if applicable.
NSE 2-119	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.1; Appendix A, Figure 6.7-3	SW10 has elevated concentrations for a number of contaminants of concern in comparison to the other locations at the Beaver Dam site. This location is located within the proposed open pit excavation site and in an area of historic mining activities. Based on the observed water quality there is potential for impacts if these waters were pumped and discharged into other surface water features within the Beaver Dam site.	Provide an assessment of whether the waters associated with SW10 require treatment prior to discharge into other surface water features within the project area as part of the open pit site development. If treatment is required, identify mitigation measures to address the surface water quality issue.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-120	Surface Water Quality Specialist	Nova Scotia Environment	6.8.6.2.2, pg. 496	The following statement is made above expected water level changes in Mud Lake: *"The proposed Project would result in diversion of water from WC-5 and a 43.0% reduction in volume discharged into Mud Lake during EOM and 35.5% reduction during PC conditions (Appendix G.5). This is predicted to correspond to an approximately 7 cm of vertical drop in water levels year-round in Mud Lake."* There is no methodology provided in the Revised EIS Submission on how the 7 cm reduction in water levels in Mud Lake was calculated.	A. Provide methodology for how the annual average 7 cm reduction in water level in Mud Lake was calculated. B. Has a similar methodology been applied to Crusher Lake? If not how are expected changes to Crusher Lake quantified to support the results assessment?
NSE 2-121	Surface Water Quality Specialist	Nova Scotia Environment	6.9.3.1, pg. 443	Cameron Flowage is identified as a water body as part of the fish habitat assessment. No rationale is supported with respect to why this section of the Killag River would be classified as a waterbody.	A. Provide rationale on why Cameron Flowage is considered a waterbody. B. If it is a waterbody, would this potentially change how discharge from the proposed North Settling pond is assessed with respect to impacts to surface water quantity and quality, and fish and fish habitat?
NSE 2-122	Surface Water Quality Specialist	Nova Scotia Environment	6.7.6.4.2, pg. 331; 6.9.6.2.2, pg. 497; Appendix G.6;	There is a 53.1% increase in annual surface water runoff predicted to discharge to Tent Lake from the Beaver Dam site due to the increase in drainage area for End-of-Mine and Post-Closure conditions. There is no discussion on the potential effects of this increase in surface runoff to these systems with respect to water quantity (e.g., increased scour, flooding) or how these water quantity impacts will be managed. Section 6.9.6.2.2 discusses how flooding within WC-B and adjacent wetlands will potentially have a positive impact and increase suitable fish habitat.	Provide assessment of the potential impacts on downstream surface water features from the increased drainage area to Tent Lake from the Beaver Dam project. Include discussion of potential mitigation measures to manage this increase in surface water runoff.
NSE 2-123	Surface Water Quality Specialist	Nova Scotia Environment	8.5.4.2.2, pg. 943	Fish and Fish Habitat only considers local forestry operations and the Touquoy Gold project in its assessment of effects from other projects. There is no mention of Fifteen Mile Stream and Cochrane Hill which are proposed to be adjacent to and potentially discharge into fish habitat at other locations along the Eastern Shore, including watercourses with known salmonid populations and habitat. American eel and Atlantic salmon are currently being reviewed for protection under the Species at Risk Act (SARA) and may be present in these watercourses.	A. Provide rationale for why Fifteen Mile Stream and Cochrane Hill are not included in the Fish and Fish Habitat cumulative effects assessment, particularly with respect to fish species such as salmonids. This would be particularly applicable to species that are currently being reviewed for protection under the SARA. B. If cumulative effects from these two projects should be considered in association with the Beaver Dam project, provide a revised residual cumulative effects and significance assessment.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-124	Surface Water Quality Specialist	Nova Scotia Environment	6.5.3.4, pg. 207-208; Appendix O.1, 2.5.2	At the existing Touquoy site, waste rock has been used to construct onsite haul roads, ditches and pad infrastructure around the site. Approximately 40% of the Beaver Dam samples were classified as potentially acid generating. The proposed rock testing program uses existing humidity tests cells to assess sulphide oxidation and metal leaching rates. The potential acid generating samples are expected to take several years to become acid producing. The Environmental Effects Monitoring Plan (Appendix O.1) proposes to conduct regular sampling of the fresh waste rock and tailings with respect to acid base accounting, total and percent sulphur.	How will the proponent manage the materials used for the construction of haul roads, ditches, pads and other rocklined infrastructure at the Beaver Dam site to mitigate the potential use of acid generating materials? Will there be additional monitoring conducted in addition to that proposed in the Environmental Effects Monitoring Plan, given that these materials may be placed outside of proposed controlled drainage areas (e.g., berms, ditches)?
NSE 2-125	Surface Water Quality Specialist	Nova Scotia Environment	Appendix G.3, Section 3.3.3, pg. 15; Table 3-2, 3-3, pg. 18-19; Section 4, pg. 34 ; Appendix G.4, pg.13-14	Exceedances of the MDMER criteria are not estimated for the end-of-mine scenario at the Beaver Dam site for base and upper scenarios as being discharged from the north settling pond. Section 3.3.3 recommends that a treatment system be installed during end-of-mine conditions and as well in post-closure even though end-of-mine settling pond water is predicted to meet the MDMER criteria.	Will the proponent commit to the development, construction and use of a treatment system to treat discharge from the North Settling Pond prior to discharge into the Killag River? If not, what are the proposed criteria besides the MDMER to determine when the development of a treatment system will be required to treat project water prior to discharge into the Killag River or Tent Lake? Will the water management system be sufficiently sized to provide contingency storage prior to discharge to allow the Beaver Dam site to continue to operate and not discharge into the environment?
NSE 2-126	Surface Water Quality Specialist	Nova Scotia Environment	6.7.6.3.1, pg. 326	It is estimated up to 17.5 m of water cover is predicted to be over the tailings stored within the Touquoy Pit eventually during the post-closure condition. Settled tailings are not predicted to be resuspended due to wind or wave action. The expected water depth cover could potentially become thermally stratified as many water bodies of that depth to in Nova Scotia. There will be expected times of the year when the anoxic waters that are expected to develop at depth will completely mix throughout the water column. No discussion is provided in the Revised EIS Submission with respect to tailings and surface water quality conditions in the Touquoy Pit due to thermal stratification potentially occurring.	Provide assessment of predicted depth of water cover within the Touqouy open pit tailing storage area and potential effects to tailings and water quality due to thermal stratification processes.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-127	Surface Water Quality Specialist	Nova Scotia Environment	6.7.6.4.2, pg. 331; 6.9.6.2.2, pg. 494-495	There are predicted reductions in flows to Mud Lake and Crusher Lake, and their associated wetland features and watercourses. The information provided is predominantly a predicted percent reduction in drainage area associated with a 1:1 ratio in reduced surface water runoff (e.g., 52% for Crusher Lake). Section 6.9.6.2.2 provides discussion of the expect changes in fish habitat within these surface water features related to the percentage reduction in surface water runoff at a qualitative level with one quantitative estimate of surface water level reduction (7% for Mud Lake). The information provided is insufficient to assess the potential impacts to fish and fish habitat within these surface water features.	Provide more detailed analysis and rationale, including quantitative assessment, of the expected seasonal impacts to the surface water features associated with Crusher and Mud Lakes (wetlands and watercourses) due to the reduction in runoff. There should be discussion related to the baseflow/low flow conditions scenario and habitat impacts (quantity/quality).

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MEMORANDUM

To: Bridget Tutty
Environmental Assessment Officer

From: Tom Lamb
Mining Engineer

Date: April 26, 2019

Subject: ***Comments on the Revised Environmental Impact Statement***
Beaver Dam Mine Project
Atlantic Gold Corporation
Marinette, Halifax County

Staff of the Geoscience and Mines Branch have reviewed selected sections of the Revised Environmental Impact Statement submitted by Atlantic Gold Corporation, dated February 28, 2019, for the proposed Beaver Dam Mine Project. The following comments are provided regarding the project:

1) The Geoscience and Mines Branch confirms that the project will develop mineral resources for the Province and will provide social and economic benefits to the Province through direct employment and associated investment. The Department of Energy and Mines supports the development of the Province's mineral resources when such development is conducted in an environmentally and socially responsible manner as outlined in this document.

2) The proposed undertaking will provide multiple benefits for the Province by eliminating hazardous conditions that exist on the site (about 20 documented abandoned mine openings and various pits) and simultaneously providing substantial socioeconomic benefits during the construction, operating and reclamation phases. The project will contribute significantly to the Province's mineral industry, creating and maintaining approximately 246 jobs in rural Nova Scotia and contributing an estimated $38 million annually to the Province's economy.

   As well, typically two to three indirect jobs are generated for each position created. Therefore, the project would generate or maintain a total of 750 to 1000 jobs. As stated in the EIS, tax revenues from the project are estimated at $10.2 million annually to the province and $8.1 million annually to the federal government. Total revenues for project's operating phase will be $44 million to the province and $35 million to the federal government.

3) The overall mining approach outlined by the proponent is appropriate and consistent with good operating practices.

4) The proponent or a subsidiary company will require a Mineral Lease from DEM under the Mineral Resources Act. As noted in the Revised EIS, the exploration license for the area is currently held by Annapolis Properties Corp., a subsidiary company of Acadian Mining Corporation, which in tum, is a subsidiary company of Atlantic Gold Corporation. Excepting certain conditions (withdrawn lands, tendered rights), Mineral Leases may only be issued to holders of an exploration license. Presumably the exploration license will be transferred to Atlantic Mining NS Corp. at some point.

5) Additional information on reclamation planning and post-reclamation monitoring for the Beaver Dam property will be required at later stages of the permitting and approval process. Some of the components in the reclamation approach outlined in the EIS will need to be reviewed in order to be acceptable to DEM. Submission of an acceptable reclamation plan will be required to support the application for a Mineral Lease. We did note that the revised EIS does not appear to recognize that reclamation plans must be accepted by the Department of Energy and Mines (as well as NSE and L&F) and be updated at three-year intervals.

6) DEM would be reluctant to see reclamation of the Touquoy tailings pond deferred in order to use it in the treatment of surface runoff and discharge water from the Touquoy open pit while the Beaver Dam tailings are being placed in the open pit. The document is not clear on this point, although some of the figures do show both the waste rock storage area and the tailings pond reclaimed, presumably while the Beaver Dam Mine is in operation. Use of the Effluent Treatment Plant, and possibly the polishing pond, could be considered, but as stated, DEM would much rather see the Touquoy tailings pond reclaimed once tailings deposition from the Touquoy ore has been completed.

The Geoscience and Mines Branch would like to reiterate that the Department of Energy and Mines supports the development of the Province's mineral resources when such development is conducted in an environmentally and socially responsible manner. The proponent has demonstrated that their gold mining project will provide tangible benefits and will be operated in an environmentally responsible manner.

These comments are provided to assist in the evaluation of this project. If you have any questions, please feel free to contact me.

<Original signed by>

Tom Lamb
Mining Engineer, Mineral Development and Policy

cc D. T. James (by pdf)
G. MacPherson (by pdf)

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-128	S. Vervaet	NSE	Section 6.2.10, Appendix O.1 Appendix C.1	The Proponent was requested to "provide monitoring locations identified on a map along with seasonal wind roses. The proposed baseline monitoring locations should be informed, in part, by results of air dispersion modelling". This information has not been provided. The proponent has indicated that an operational methodology and protocols will be established following granting of the IA with NSE.	The proponent should submit a detailed ambient air monitoring plan for baseline, construction, operation and reclamation phase of the project, as part of their application for an Approval to Construct and Operate. The monitoring plan should include, but not be limited to, proposed parameters to be measured, details on proposed instrumentation, monitoring schedules, proposed monitoring locations, seasonal wind roses and proposed meteorological data to be measured.
NSE 2-129	S. Vervaet	NSE	Section 6.2 Appendix C.1	The Proponent was requested to complete an inventory of expected air contaminants from this project which includes both air contaminants regulated under the NS Air Quality Regulations and any others of concern (e.g. metals, volatile organic compounds etc.). The proponent provided air dispersion modelling of TSP, PM10, PM2.5, NOx, SO2 and total VOCs. The report was silent on metals.	1) Are air emissions of metals a concern for this project? If not, the report should justify why specific metals were not included in the modelling. 2) The modelling identified predicted exceedences for TSP, PM10 and PM2.5. The submitted dust control plan requires more definitive actions and commitment to address the modelling results (see comments below regarding dust control plan). 3) The consultant has assumed that the air dispersion modelling results are conservative and that the exceedences are an overprediction. Therefore, the proposed ambient air quality monitoring plan should be designed to confirm the consultant's assumptions that the air dispersion modelling is an overprediction. The level of monitoring proposed should reflect this concern.
NSE 2-130	S. Vervaet	NSE	Appendix C.3	The Dust Control Plan does not provide the level of response required to address the air dispersion modelling results. The air dispersion modelling results predicted exceedences with the assumption that the dust control is 75% effective. Therefore, the plan should be designed to be at least 75% effective. The proposed plan should be more prescriptive.	1) The loads of haul trucks should be covered at all times, not when feasible. 2) There should be a defined minimum schedule for the application of dust suppressant. 3) How will the haul road be monitored to determine adjustment of the schedule to apply dust suppressant? 4) What mitigation is proposed to ensure chemical dust suppressants and chemical additives will not enter waterways. 5) Technical details on proposed chemical dust suppressants or chemical additives should be included as part of the application for an Approval to Construct and Operate.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-131	S.Vervaet	NSE	Section 2.2	The proponent indicates “minimal volumes of water will be re-used from the north settling pond and/or collection pond for on-site dust suppression purposes, as required (assuming the water meets applicable regulatory criteria).”	Provide details on the monitoring protocol for the use of site water as a dust suppressant. Details such as proposed contaminants to be tested, the proposed criteria to be used for comparison and sampling schedule should be provided.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-132	Brent Cox	NSE	6.5.3.2.1 pg. 204	Section 6.5.3.2.1 was referenced to address: "was sufficient baseline data collected (away from the former mine operations) to establish that elevated occurrences are not attributed to former mine operations?" <u>Soil</u> Section 6.5.3.2 (pg. 203) indicates a review of regional till samples collected by Seabright Exploration Inc. identified 98 samples in the vicinity of the project area. Results indicate arsenic concentrations were identified to be above CCME soil quality guideline of 12 mg/kg in 29 of the 98 samples. No details are provided on the magnitude/extent of arsenic in soil exceeding guideline value. Section 6.5.3.2.1 indicates regional studies of till samples show high levels of arsenic that have no mineral occurrences, and therefore it can be concluded that the elevated arsenic levels are attributed to natural background levels. <u>Sediment</u> Section 6.5.3.2.1 indicates arsenic levels above CCME and Tier 1 EQS were identified at samples 1 to 7 (of 9). The report goes on to state…." In a gold mining area rich in arsenic mineralization (e.g. arsenopyrite), high As concentrations indicate naturally occurring arsenic, Arsenic concentrations in soils around mine sites have been reported as high as 4,700 ppm in areas where historic mining activity have concentrated As levels in mill waste". The report goes on to state…." High levels of As in the hundreds of mg/kg in sediments indicate that further monitoring is warranted. It is noted that the action of movement in water concentrates many higher density materials including metals such as the naturally occurring arsenic".	Clarification is required to differentiate between elevated concentrations attributed to natural background versus elevated concentrations attributable to historic mining activities (including mill waste/tailings). Under supervision of a site professional, as defined by the Contaminated Sites Regulations, baseline studies should be conducted as necessary to determine natural background conditions of relevant environmental media (soil, sediment, surface water, groundwater). Under supervision of a site professional, as defined by the Contaminated Sites Regulations, a Phase 2 Environmental Site Assessment should be conducted that provides a baseline for all areas within the project lease boundary which are known or suspected to have contamination resulting from historical mining activities (including mill waste/ tailings) which are likely to or potentially could be disturbed during the construction, operation or reclamation of the facility.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-133	Brent Cox	NSE	6.5.2: pg. 200 6.5.3.2: pg. 202 6.7.3.2: pg. 287	Sections 6.5.2 and 6.5.3.2 were referenced to address: "compare baseline soil/sediment analytical results to Tier I EQS." Full analytical results compared to CCME and Tier 1 EQS are indicated to be included in Appendix E.1.	Sediment baseline analytical results table in Appendix E.1 does not compare results against Tier 1 EQS. Also, sediment sample locations are indicated as being represented on Figure 6.5-7. However, the figure referenced presents geochemical overburden sample locations. Other than an approximate description of sediment sample locations within Table 6.5-1, there does not appear to be any graphic representation of sediment sample locations within the figures provided.
NSE 2-134	Brent Cox	NSE	6.5.2: pg. 200 6.7.5.5: pg. 312	Sections 6.5.2 and 6.7.5.5 were referenced to address: "Identify Tier 1 EQS soil/sediment exceedances as trigger for adverse effects should a release occur (as with surface water – Section 6.3.5.2)." Section 6.5.2 presents baseline sediment conditions. There does not appear to be any mention of threshold for determination of significance for sediment within the report. Section 6.7.5.5 presents threshold for determination of significance for surface water as "A significant adverse effect to surface water quality within Beaver Dam and Tourquoy mine sites is defined as a repeated or sustained exceedance of the MDMER criteria at the point of discharge from each mine site, and the CCME FWAL criteria, confirmed background concentrations, or site specific established criteria for TSS, and metals (especially arsenic), in surface water samples collected insitu from the receiving environments (Killag or Moose River)".	This issue remains to be addressed. Tier 1 EQS should also be listed as a threshold for a significant adverse effect to surface water quality (It is noted that Section 2.1 indicates that no federal lands will be used to undertake the project).
NSE 2-135	Brent Cox	NSE	6.6.6: pg. 244	Section 6.6.6 was referenced to address: "compare groundwater quality results to Tier 1 EQS." Tabulated groundwater data is presented within Appendix F4. The Tier 1 EQS comparison column is not populated (nor is Tier 2 PSS for groundwater discharge to surface water >10m). No Table exceedances are highlighted. The field activities report (Appendix F3) indicates that the groundwater results were not compared to any guidelines or other criteria as data is only baseline and will be compared in the future to	Groundwater data should be compared to applicable guidelines/criteria (if only for comparison purposes) as with other media (soil, sediment, surface water). Beyond establishment of baseline conditions, exceedances should be identified to ensure the requirement for appropriate

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
				compliance values set out in the IA and later to CCME and/or MMER.	risk mitigation measures are recognized (i.e. potable well restrictions, as warranted).
NSE 2-136	Brent Cox	NSE	Concordance Table NSE 1-39 and 1-41	In response to NSE 1-39(f, g) and 1-41 (a) with respect to historic tailings, the concordance table states "There are no mapped historic tailings in any DNR or GSC reports, no air photo evidence, no geochemical anomalies to suggest any, no evidence seen during EBS work since 2014 and no evidence through historical research completed for the EIS".	No section of the report is referenced to support this statement. Section 2.1.1 summarizes the area as being subject to exploration and mining since 1868. The report references approximately 967 ounces of gold production at Beaver Dam between 1889 and 1941; and 2,445 ounces of gold production between 1986 and 1989. Also, 20 abandoned mine openings are reported within the Beaver Dam Mine Site. Figure 2.1-4 (Beaver Dam Mine Site Existing Mine Conditions) illustrates areas designated as Historic Mining Area and Settling Pond (Constructed). Based on the historical information contained within the EIS, in conjunction with apparent anomalous metals chemistry data (specifically within surface water and sediment), it can be inferred that the Beaver Dam site is likely to include historical tailings along with other potential impacted materials caused by past mining activities.

Beaver Dam Gold Mine Technical Review Requirements: Round 2, Part 1 May 2019

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-137	Hydro-Geologist NSE ICE Division		2.2.1.2	Section states, regarding mine roads, that 'The roads will be constructed out of non-ore bearing waste rock from the open pit'. Given that there is demonstrated potential for a significant portion of the mine rock to be acid-generating, roads made of waste rock could be acid generating.	Please evaluate whether mine roads made of waste rock from the mine could be acid generating. Please identify and evaluate the potential use of alternative sources of material for construction of mine roads. Are there any nearby quarries which could provide rock which is known to be non-acid generating for mine road construction?
NSE 2-138			2.6	Only two alternatives were considered for disposal of Beaver Dam tailings at Touquoy: expansion of the existing TMF and use of the exhausted Touquoy pit. However a third alternative, creation of a second TMF at the Touquoy site, has not been considered or evaluated.	Please evaluate the potential for construction of a new TMF at the Touquoy site for disposal of BD tailings as an alternative to disposal in the exhausted Touqoy pit. Given potential for long term water quality impacts to Moose River, could a second TMF, constructed in an area more isolated from surface water resources than the Touquoy pit provide more protection for surface water resources and aquatic life over the long term?
NSE 2-139			6.5.2 p. 200	This section states sediment grab samples were collected from nine locations throughout the BD mine site to obtain baseline sediment quality. It references Figure 6.5-7, presumably for sample locations. The scale of this figure is regional and it is difficult to see the BD mine site details to determine exactly where samples were taken. It does not appear that all nine samples at the BD site are on this figure. Table 6.5.1 references a sample downstream from Crusher Lake but it isn't clearly visible.	Please provide a detailed figure identifying the locations of all sediment samples reported for the BD mine site. Please clearly identify the location of the sample reported to be downstream from Crusher Lake (SED3).

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-140			6.5.3.2.1 p. 204	This section states that 'there are no indications of historic tailings at the Beaver Dam Mine Site and no indications that mercury was used in any of the historic stamp mills or other crude processing of ore'. The archeological/ cultural heritage study shows that there are at least two known crusher (stamp mill) locations at Beaver Dam plus a sluice running from one of the crusher locations to Crusher Lake. A high probability inference that can be made is that there was disposal of tailings from the crusher via the sluice into Crusher Lake. Shoreline areas with sediment and wetlands at the eastern end of Crusher Lake require evaluation for tailings or tailings/sediment mixes based on arsenic concentrations in sediment. Historically, the most common method of gold production at NS gold mining sites during the early 20th century was with mercury amalgam; therefore, it is very likely that there was some mercury use at the site. It is notable that the sediment sample taken downstream of Crusher Lake (SED3) had mercury concentrations (0.31 mg/kg) exceeding the CCME sediment quality limits (0.17 mg/kg). While the sample location has not been mapped (see other comments), downstream from the crusher at Crusher Lake is where elevated mercury would be expected related to historic tailings disposal in Crusher Lake. In order to avoid inadvertent disturbance and distribution of tailings, or of further redistribution of soils or sediments impacted by past disturbance of tailings, into the environment during mine development, a systematic sampling program to look for anomalously high arsenic and mercury concentrations in surficial materials is likely necessary to find historic (19th/ early 20th century) tailings. This should include those areas that may have been disturbed during subsequent generations of mineral exploration (eg 1980s) and any nearby 'overburden' piles or infills for land levelling from this era.	The presence of historic crushers and the likely presence of historical tailings and /or historic tailings mixed with other overburden materials at the BD site in areas of past infill, surface disturbance, or sediment deposition, should be acknowledged. In light of this, an appropriate systematic methodology (eg grid sampling) should be used for sampling of soil and sediment in targeted portions of the site, for analysis of arsenic and mercury content. Lower lying areas downgradient of the old crushers and/or sluices, and areas of borrowed 'overburden' infill from more recent site disturbances should be targeted for grid sampling to maximize the chance of finding them. A systematic method is necessary so that tailings are not unknowingly (further) disturbed causing mobilization of arsenic or mercury. There should be a focus on the eastern end of Crusher Lake, any shoreline and wetland areas of the lake, and upstream of any flow constrictions in watercourses or wetlands that might be indicative of historic dam construction for tailings impoundments. Initial systematic work should be followed by more detailed chemical delineation in three dimensions of any hotspots. This delineation work should be completed prior to any mine development and prior to applications for Industrial Approval. This is necessary so that locations, volumes and chemistry are fully understood, management plans are in place, appropriate volumes for containment (if necessary) of contaminants are designed into mine plans, and appropriate terms and conditions for Approvals are in place to ensure regulators can oversee implementation of the management plans during site development (grubbing and stripping) and construction, when the risk of accidental disturbance is highest.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-141			6.5.3.4, 207-209, and Appendix E.2 (Bedrock Geology, ML/ARD assessment)	This section reports the results from ML/ARD assessment. The only indication of the locations of samples is a map in Figure 3-1 in Appendix E-2. No cross sections are provided and so it is not possible to assess the distribution of samples throughout the proposed mine pit and the range of rock which will be encountered. Also it is not clear which of the samples are being assessed for kinetic testing represent ore (which will ultimately be disposed to the Touquoy pit) and what portion represent waste rock (which will remain at BD). As per the MEND Prediction Manual for Drainage Chemistry from Sulphidic Geological Materials (page 8-5), geological cross sections should be provided showing the locations of the samples in three dimensions within the proposed mine pit, particularly for the kinetic	Please provide geological cross sections showing the locations of the ML/ARD samples in three dimensions within the proposed mine pit, particularly for the kinetic test samples.
NSE 2-142			Appendix E.2, section 3.1.1 (ML/ARD assessment)	This section states that 'Eight of the samples collected for the EIS submission could not be classified by lithology as the corresponding logs were not made available. The results from these samples are not included in the report.' Eight (8) is a significant portion of the total number of bedrock core samples selected by Lorax for the EIS submission (30). It therefore raises a question as to the representativeness of the samples for which results are reported in the EIS submission.	Please explain the reasons that the corresponding core logs were not made available for eight of the samples collected by Lorax. Was ML/ARD analysis completed on these samples? Is there kinetic testing occurring on these samples? What did analyses show? Are they different from the other samples? Please describe whether the eight samples that were selected but not classified are likely to be more or less representative of the potential for acid generation at either Beaver Dam during waste rock disposal, or at Touquoy during tailings disposal, based on criteria such as whether or not these cores are from the ore zone or from portions of the mine expected to be waste rock.

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NSE 2-143			6.5.3.4, p. 208 And ML/ARD Report Section 4.1.1.1	This section reports in the second paragraph that petrographic analysis was performed on the humidity cell samples (n=8) and that the main sulphide mineral identified by petrography was pyrrhotite (<1% to 3%). In the Lorax ML/ARD report, the mineralogy reported for the XRD analysis of the mine rock samples it states that pyrite was the only sulphide phase detected and that it was only detected in 6 of the 8 samples. However the footnote notes that pyrrhotite was found in petrographic analysis. In Touquoy ore, arsenopyrite is typically associated with gold, however it appears from this reporting that arsenopyrite was not detected in most of the humidity cell samples for BD.	Please explain the source of the difference between the sulfide minerals reported by petrographic and XRD analysis of the humidity cell samples for the BD ore body and waste rock. Please explain the significance of identification of pyrrhotite versus pyrite. Do the 8/30 samples selected by Lorax which were not reported (Appendix E.2, section 3.1.1) have different sulphide mineralogy than the ones which are reported? Please confirm the representativeness of the samples selected for humidity cell testing of the sulphide mineralogy of the overall ore body and mine waste rock at BD.
NSE 2-144			6.6.1, p. 221	This section cites the relevant legislation in Nova Scotia as the *Environmental Act.* This is not correct.	Please correct all citations of the name of the NS legislation to '*Environment Act*'.
NSE 2-145			6.6.1; also section 6.6.5.1	The statement of groundwater as a VC should also identify that groundwater is a provincially owned resource and has inherent value even if not currently in use. In this area, where there are no municipal services, all groundwater is considered potable. The quality of any groundwater impacted by activities on the site, which could migrate under land not owned by the proponent, during or after operations, must be considered. If impacts were to occur to groundwater quality due to migration of contaminants from the proponent's site they would need to be remediated or managed pursuant to the *Contaminated Sites Regulations;* Tier 1 EQS or natural background criteria would apply off site for the contaminants of potential concern.	Please acknowledge that all groundwater is owned by the Province of Nova Scotia and has inherent value; and that potable criteria apply off the site. In section 6.6.5.1., Administrative boundaries, evaluate the risks to the quality of potable groundwater resources under all lands not owned by the proponent (not just to existing wells), due to migration of impacted water off the site.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-146			6.6.3.3	Groundwater quality results for Beaver Dam are reported for only two quarterly sampling rounds. Further results are needed to clearly establish baseline groundwater quality before commencement of construction at Beaver Dam because of natural fluctuation in groundwater quality. At Touquoy, the proponent has not clearly established baseline conditions prior to mining, despite the 9 years available for baseline water monitoring between EA approval and mine construction (and 5 years from IA Approval to mine construction). This is because baseline data collection was suspended and not restarted until a few months before mine construction started, and because (as expected) seasonal fluctuation is being observed in quarterly sampling. The proponent's groundwater consultant is now reporting for Touquoy (see Section 6.6.3.4) that there is insufficient baseline data available for groundwater at Touquoy to establish definitive baseline values to be used to develop triggers for responding to groundwater impacts, and is instead continuing to monitor results during operation and modify baseline results upward. This is not an ideal approach, as determining whether or not impacts are mine-related once construction and operations have started is very subjective.	Please clearly define the number of groundwater sampling rounds that will be necessary to adequately define baseline for the Beaver Dam monitoring well network and which will be sufficient to serve as the basis for setting contingency levels for responding to groundwater impacts, prior to the start of construction at the site. How many additional rounds of groundwater quality sampling have been completed since September 2018? Is quarterly groundwater quality monitoring ongoing as indicated in the EIS and how long will it continue regardless of timing of EIS? Submission of the minimum amount of data required to establish groundwater baseline data should be a condition of Environmental Assessment and should be completed prior to application for Industrial Approval.
NSE 2-147			Appendix F.2; Appendix F. 5	Data from hydraulic conductivity testing done in the 1980s, in a report by Jacques Whitford reproduced in Appendix F.2, is relied on for conclusions about how to incorporate the Mud Lake Fault zone in groundwater modelling. It is reported that the Mud Lake Fault zone is filled with 'clay-like gouge' and that hydraulic conductivity is low and similar to the surrounding bedrock; the BD groundwater model reported in Appendix F.5 concludes model calibration is best when the fault has similar hydraulic conductivity to the rock. However, the report in Appendix F.2, prepared to assess groundwater inflows to a proposed underground mine, states: "*It is concluded from the above, that the Mud Lake Fault zone will not likely be a major source of groundwater inflow to the mine. It should be noted, however, that the fault zones are saturated, and could be very unstable and would require special consideration should mining penetrate such rock materials.*"	What are the implications of dewatering of the open pit and its drawdown cone for the stability of the 'clay-like gouge' and water flow in the Mud Lake Fault Zone? Will the fault gouge become destabilized during mining and would this change the way this zone should be modelled during or after mining?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-148			6.6.3.4	It is not clearly stated what the definition of baseline conditions for groundwater quality will be for disposal of Beaver Dam tailings at Touquoy. Given that monitoring of slowly migrating groundwater to monitoring wells will, for most parameters, not be able to distinguish between impacts arising from Beaver Dam tailings and impacts arising from Touquoy mining or mining-related disturbance of historical impacts at Touquoy during the Touquoy mine development, baseline definition for groundwater quality at Touquoy for the Beaver Dam project should be based on pre-mining conditions at Touquoy. Responsibility of the mine operator (whoever that is) for changes to groundwater quality arising from either phase of the overall development of the Touquoy Consolidated Project at the Touquoy site (Touquoy mining or BD tailings disposal) must be recognized for the current proponent AND all future owners of the Touquoy and Beaver Dam mines, rather than 're-setting' of background after completion of each phase of activity. Baseline conditions at Touquoy which would have to be be used to evaluate whether or not an impact has occurred due to Beaver Dam tailings are described as not fully defined yet. The reason given is insufficient baseline data from prior to initiation of Touquoy mining activity (although other documents to regulators submitted previously described baseline as robust). It is therefore not clear how the potential impact of Beaver Dam tailings disposal on groundwater quality at Touquoy will be determined or responded to.	Please clearly define baseline conditions and Contingency Action levels for Beaver Dam tailings disposal, based on pre-mining Touquoy baseline conditions. It should not depend on future interpretation of ongoing monitoring results during operations at Touquoy.
NSE 2-149			6.6.5.2, Appendix F.5, p.26	In the description of the groundwater model calibration for the Beaver Dam site, the report by GHD Limited states: "The river boundary conditions within the model domain were held constant between the base case, dry, and wet conditions as average observed surface water levels at the Beaver Dam Mine Site showed less than 6 centimetres (cm) variation over the four synoptic rounds of groundwater/surface water monitoring conducted at the Beaver Dam Mine Site from July 18 through September 5, 2018. In general, the dry and wet condition residual statistics are similar to the base case calibration." During the summer period (the period of surface water elevations used to calibrate the wet conditions model), water elevations are often significantly lower than in other seasons in Nova Scotia, particularly in flowing rivers such as Cameron Flowage/ Killag River, so may not represent wet conditions well; while the model fit was considered acceptable, the final calibration is probably not a unique solution .	Please explain how BD model calibration would likely have changed if river boundary conditions were varied so that they reflected typical wet conditions in Nova Scotia; would model calibration have needed to change significantly, which parameters, and how would that have influenced the predictions made using the model? It is suggested that additional data be collected for surface water elevations to develop river boundary conditions for actual wet conditions, and the model recalibrated.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-150			Appendix F.5, p. 32	This section states: "There are no potable groundwater uses at the Beaver Dam Mine Site, therefore, simulated COC concentrations are compared against the Nova Scotia Environment (NSE) Tier 1 Environmental Quality Standards (EQS) for non-potable course grained soil for agricultural/residential use. The NSE Tier 1 EQS guidelines do not specify concentration limits for the potential COCs at the Beaver Dam Mine Site, therefore there will be no significant groundwater impacts above applicable groundwater guidelines." The absence of current groundwater users at the mine site or adjacent properties does not mean that Tier 1 QS for a potable site do not apply. In the absence of municipal drinking water supply, the site and its surrounding properties are considered potable. Any off site migration of contamination to third party property would need to meet Tier 1 EQS for a potable site. For most metals, Tier 2 PSS comparisons are more conservative than Tier 1, therefore the comparison conducted of modelled potential groundwater quality impairment is adequately conservative to understand potential impacts. However, the need to manage to meet potable criteria for groundwater migrating off site to property not owned by the proponent should be recognized for this section and all sections of the EIS relating to groundwater quality.	Revise all sections of the EIS addressing groundwater quality, including monitoring and mitigative measures, if necessary, to acknowledge potability criteria must be applied to any off site migration of groundwater to lands not owned by the proponent.
NSE 2-151			Section 6.7.5.3. page 322-4	This section states that "The objectives of the Touquoy water quality model are to predict the period of time that water treatment will be required prior to the pit lake effluent discharge to Moose River…." The findings do not appear to be stated in the summary document description of modelling results.	What is the period of time that water treatment will be required prior to the pit lake effluent discharge to Moose River? How will the costs of this be accounted for in the post-mining period? Will it form part of bonding for the Beaver Dam project and/or the Touquoy project based on the model predictions?
NSE 2-152			6.7.6.1, p. 316 (Feb 28 version)	At the BD mine site, the plan is currently to divert some portion of the clean water from the site to Crusher Lake. Based on experience at other historic gold mining sites across NS, Crusher Lake likely contains historic mine tailings (perhaps covered by organics and other sediment from runoff since historic mining ended). There may also be historic tailings downstream from Crusher Lake (toward and in Mud Lake) which were remobilized over time from Crusher Lake, during high flow events. Adding flow from the site could remobilize these historic tailings.	Please identify an alternative location for diversion of clean water from the site which does not have potential for the presence of historically deposited or re-deposited historic tailings. Any change to the shoreline or hydrology of Crusher Lake or its outflow through addition of water from engineered site drainage should be avoided unless a high density sediment and soil sampling program can prove that tailings are absent.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-153			Appendix F.6, Section 5.4.1, page 5.17	The Model Setup section describing the groundwater model for BD tailings disposal in the open pit at Touquoy reports use of the following assumption: 'The water quality associated with the tailings pore water was …based on this (sic) assumption that the Beaver Dam tailings would have the same characteristics as Touquoy based on the general rock characteristics, and that the tailings will be produced by the same mill at the Touquoy site'. The rock at Beaver Dam has been identified as having the potential for ARD in 40% of reported samples; and field pH results of surface water baseline data collection at BD show significantly acid water at SW-1 immediately downstream from the BD site, particularly during 2014 sampling rounds. Sulfide mineralogy appears to be quite different from Touquoy. Despite the differences in sulfide mineralogy between the BD and Touquoy ore, the tailings for Touquoy have been used to determine the source terms for predictive modelling of metal leaching from the disposal of Beaver Dam tailings in the Touquoy open pit.	Given the apparent differences between the sulfide mineralogy of Touquoy versus Beaver Dam rock, and the prediction that ARD will start to occur after about 25 years for BD rock, please provide analysis of the suitability of using Touquoy tailings as a surrogate for derivation of source terms for modelling the impacts to water of disposal of BD tailings at the Touquoy site. What criteria will be used to determine when and if modelling should be re-conducted using results from rock extracted from the BD ore body?
NSE 2-154			Appendix F/6, Section 5.4.2.1, page 5.26	This section recommends additional testing of the hydraulic conductivity of the mapped faults to assess the potential for zones of higher permeability which could increase the potential for higher solute transport rates and associated increased impacts to Moose River arising from disposal of BD tailings in the Touquoy pit. Also it does not appear that modelling has referenced the available information about drawdown resulting of dewatering of the open pit at Touquoy to date (particularly in the area of existing OPM 2A/B). Drawdown in OPM2B was significantly greater than predicted in the first year of pit development.	Additional testing of the hydraulic conductivity of the faults intersecting the Touquoy pit should be completed and used to update the groundwater model and solute transport predictions. The model should also be calibrated in the zone between the pit and Moose River using results of water level monitoring from the existing monitoring wells since pit development and dewatering started.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-155			Table 10-1.3, Page 993	The Groundwater Quality and Quantity section states: " Based on evaluation of predicted aquatic risk, pump and treatment of groundwater (if required based on monitoring results) from installed groundwater wells at Beaver Dam Mine Site including those at Crusher Lake, Mud Lake, outlet from Mud Lake to the Killag, and Cameron Flowage, and existing groundwater wells at Touquoy between the open pit and the Moose River. The purpose of this groundwater treatment is to intersect groundwater seepage impacted with COCs above Tier II pathway specific guidelines or groundwater baseline/background prior to seepage discharging into surface water bodies".	Please provide a quantitative evaluation of the potential effectiveness of pump and treat to capture an impacted groundwater plume in the hydrogeological conditions at the BD and Touquoy sites and if viable, describe the approximate number, location and design of wells, and probable duration of the required program, which would be required to implement an effective pump and treat system.
NSE 2-156			Appendix O.1	Groundwater monitoring program The groundwater monitoring well network at BD or the Touquoy pit are not adequate for purposes of monitoring potential contaminants migrating toward surface water or off site. A higher well density will be required at both locations.	Please provide locations and design of a comprehensive groundwater monitoring program for the Beaver Dam project with wells more closely spaced and located directly between all potential contamination sources and surface water receptors or downgradient third party property. Please provide locations and design of an enhanced groundwater monitoring program between the Touquoy pit (during and after BD tailings disposal) and Moose River with wells placed in the centerline of any potential preferential pathways for an impacted groundwater plume.

Beaver Dam Gold Mine Technical Review Requirements: Round 2, Part 1 May 2019

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-157	SAS Hydro-geologist	Nova Scotia Environment	Appendix E.3 3.2.1, page 3-6	Geochemical results show 35-40% of waste rock stockpile will be potentially Acid-Generating and that this may last for decades. The expectation that mixing with NAG material will allow pH to be acceptable and not an issue seems overly hopeful and perhaps not realistic based on the discussion of pH estimates. Potential Low pH releases into the local watercourses are of major concern to water quality	What are the mitigation plans for addressing acidic generation from waste rock drainage in the short and long term?
NSE 2-158	SAS Hydro-geologist	Nova Scotia Environment	Appendix F5 1.1 Page 1	Statement that Seabright Resources recovered 2,445 oz gold from bulk samples from an open pit mine at Beaver Dam.	Did Seabright process ore from Beaverbank on-site (1986-1989) ? If so is there any residual contamination from the process?
NSE 2-159	SAS Hydro-geologist	Nova Scotia Environment	Appendix F5 1.1 Page 3	Report describes scope of work for calibration to include steady state water conditions only and not transient conditions or flow discharge measurement. However, since the model is being used to predict transitory/changing conditions, its prediction validity under different conditions should ideally be calibrated.	Can the model be better calibrated if measured stream/river discharges are incorporated into stream boundary conditions? Was the model calibrated for a range of conditions – low water table, high water table etc?
NSE 2-160	SAS Hydro-geologist	Nova Scotia Environment	Appendix F2 Appendix 1	Appendix F2 includes a 1986 report with pumping test data from Austin Shaft at the site which presumably could be used	Was pumping test data from the site used in calibrating the model? Will it be incorporated at some point for future model revisions?
NSE 2-161	SAS Hydro-geologist	Nova Scotia Environment	Appendix F5 5.2 Page 19	The model assumes no-flow boundary conditions combined with river, drain and general head boundary conditions. These may not be completely representative of the natural flow system as the model thus assumes a bathtub-like condition with inputs/outputs, rather than a regional-flow-towards-the-ocean system. Constant or specified-head conditions that could represent cross-domain flow were not used. The inferred base of the active flow system is modelled at 250 m bgs	Was the possibility of representing some degree of regional flow by constant or specified head boundary conditions considered for the model domain? What were your conclusions? Does the conceptual site model not include any regional flow component at depths to 250 m bgs? Explain why the model does not appear to be designed to represent regional groundwater flow systems. Could regional groundwater flow ever be important with respect to fate and transport related to long-term impacts from the site?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-162	SAS Hydro-geologist	Nova Scotia Environment	Appendix F5 6.1 Page 22	The model has been calibrated only with observed water level conditions. Groundwater-surface water interaction and calibration with measured surface water flows was not included. MODFLOW does allow the incorporation of conditions that use measured stream flow discharges as inputs and these can result in a more representative groundwater model.	Did you considered calibration targets that incorporate measured stream/river flow discharge values and observed stage levels related to baseflow? Explain.
NSE 2-163	SAS Hydro-geologist	Nova Scotia Environment	Appendix F5 7 Page 28	The groundwater model may also be used to predict changes in groundwater interaction with surface water bodies during the proposed mining operation – not only at EOM (End of Mine life) or PC (post-closure)	Explain/quantify flow estimates in Cameron Flowage during stages of mine operations, based on modelling with note of groundwater flow contributions to, or depletion of, dry, summer baseflow. Is baseflow reduced, and if so by how much.
NSE 2-164	SAS Hydro-geologist	Nova Scotia Environment	Appendix G4 Section 4 Tables 4-1 to 4-3 Section 6 Page 21	Water balance is used to assess volume impacts to Killag River, Mud Lake, Crusher Lake and Tent Lake outfalls at EOM and PC conditions. The effects on groundwater baseflow contributions to Cameron Flowage and the Killag River during the open pit mining operations are not clear.	Do the open pit groundwater dewatering extractions during mining and culminating at EOM decrease dry, summer baseflow contributions to Cameron Flowage and/or the Killag River. And by how much? During dry, summer conditions, what are the maximum decreases in stream/river flow that may occur? How are changes from groundwater dewatering reflected in the surface water runoff values predicted at drainage outlet locations?
NSE 2-165	SAS Hydro-geologist	Nova Scotia Environment	Appendix G4 2.1.3 And Figure 3.7	It does appear that some inputs from groundwater modelling (Appendix F5) were used in the Water Balance Analysis Appendix G4. The GoldSim Model used (Figure 3.7) seems to include groundwater inputs.	Are all of the results of the Water Balance Analysis consistent and inclusive of the Groundwater Model results? The water balance largely reports in terms of monthly and annual surface runoff. Can groundwater baseflow be incorporated into the water balances in Tables 4-1, 4-2 and 4-3 and Cameron Flowage?
NSE 2-166	SAS Hydro-geologist	Nova Scotia Environment	Appendix F5 Section 7.4.5 Page 34	The report states that “aluminum, silver, arsenic, cadmium, and copper are simulated to exceed both the Tier 2 PSS guidelines and the observed background groundwater concentrations.”	Please explain the mitigation measures developed to address the simulated predictions of COC exceedances and avoid contamination off site.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-167	SAS Hydro-geologist	Nova Scotia Environment	Appendix F5 6.4 Page 27 And Appendix F5_II Table 6.6	Sensitivity analysis results should demonstrate which input parameters the model is most sensitive to, or in other words what are the most significant input parameters in being able to adequately calibrate the model	A simple description, or list, or graphical plot of the most important (sensitive) model parameters, from highest to lowest rating would help to show relative importance of the faults etc.. For example – see Figure 4.4 in the other Groundwater Model report in Appendix F6 as an easy-to-interpret plot.
NSE 2-168	SAS Hydro-geologist	Nova Scotia Environment	Appendix F6 Section 4.4.2 Page 4.8	Model calibration is based on water levels	Several data sets for water levels were noted. Do these reflect different seasonal conditions- i.e. was the model calibrated for a range of conditions – low water table, high water table etc?
NSE 2-169	SAS Hydro-geologist	Nova Scotia Environment	Appendix F6 4.3 Page 4.6	The model assumes no-flow boundary conditions combined with river, drain and general head boundary conditions. These may not be completely representative of the natural flow system as the model thus assumes a bathtub-like condition with inputs/outputs, rather than a regional-flow-towards-the-ocean system. Constant or specified-head conditions that could represent cross-domain flow were not used.	Was the possibility of representing some degree of regional flow by constant or specified head boundary conditions considered for the model domain? What were your conclusions? Explain why the model does not appear to be designed to represent regional groundwater flow systems. Could regional groundwater flow ever be important with respect to fate and transport related to long-term impacts from the site?
NSE 2-170	SAS Hydro-geologist	Nova Scotia Environment	Appendix F6 Page 4.5	The inferred base of the active flow system seems to be at approximately 160 m, based on the description on page 4.5.	The two models (Appendix F6 – 160 m and Appendix F5 – 250 m) appear to use different inferred depths for base of the active flow system. Please provide a rationale for why the CSM value wasn't used for both models and the relative importance of this.
NSE 2-171	SAS Hydro-geologist	Nova Scotia Environment	Revised EIS Section 6.6.3.4 Page 238 Figure 6.6-5 6.6-5	Groundwater quality around the open pit at the Touquoy Mine Site containing cyanide as shown in Figure 6.6-5	Please explain why cyanide and cyanide derivatives are present in groundwater around the open pit at the Touquoy Mine site. What areas are affected?
NSE 2-172	SAS Hydro-geologist	Nova Scotia Environment	Revised EIS Section 6.6.5.4 Page 243	Thresholds for determining significant adverse effect	What are appropriate thresholds of significance for groundwater baseflow inputs into surface water bodies such as Cameron Flowage and the Killag River?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-173	SAS Hydro-geologist	Nova Scotia Environment	Revised EIS Section 6.6.6 Table 6.6-4	Table 6.6-4 provides activities and durations	Given the predicted development of ARD in 40% samples over time from the waste rock stockpiles, shouldn't monitoring be specified for a longer term than 3+ years Post-Closure?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-174	Wetland Specialist	NSE	6.8.2 Wetlands: Baseline Program Methodology Pg. 343 6.8.3.1 Wetland Functional Assessment Results Pg. 357	*Delineated wetlands that extended outside of the PA (for both the mine footprint Beaver Dam Mine Site and the Haul Road footprint) were only delineated to the PA boundary. Wetland habitat extending beyond the PA was evaluated through desktop resources, including topographic mapping, NSDNR NSL&F wetland inventory, and the WAM to estimate wetland type, size, and broad wetland function.*	Provide additional discussion on function assessment methodology in relation to how desktop study was included in assessment of the wetland function. While the NovaWet assessment is currently recognized as a suitable methodology, it is possible that future approvals may require assessment using WESP-AC. Provide discussion on how function assessment results will be used in future to support post-construction evaluation and approval process.
NSE-2-175	Wetland Specialist	NSE	Table 6.8-1: Wetland Types and Approximate Sizes	As indicated in section 6.8.2, wetland habitat extending beyond the PA was evaluated through desktop resources to estimate wetland type, size, and broad wetland function	Provide total approximated wetland areas determined from this exercise.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-176	Wetland Specialist	NSE	Section 6.8.3 Baseline Conditions: Touquoy Mine Site Pg. 357	*"Six wetlands were identified within the Touquoy Mine Site in 2006 as part of the EARD process, five of which were assessed. One of these wetlands was deemed to not be affected from Project development and therefore was not evaluated (CRA 2007).* *A total of 52 wetlands were identified within the Touquoy Mine Site (including the western bypass road) during field studies by MEL biologists from 2015-2017. These wetlands were identified for wetland permitting process and functional assessments were completed to support permitting. Evaluation will be limited to riparian wetlands along Moose River, downstream of the discharge location, to confirm potential indirect impacts from the Beaver Dam Mine Project."*	Provide the baseline information and discussion on wetlands in proximity to Touqouy Mine Site infrastructure. Provide details on evaluation referenced and rational as to why this is limited to riparian wetlands and clearly identify those wetlands.
NSE-2-177	Wetland Specialist	NSE	Table 6.8-4 Wetland Functional Information Pg. 362	Table identifies existing stressors on wetlands related to forestry and recreational trails.	Given potential for historical mining in the region, what information was used to determine if historical mining stressors are present within or near wetlands on the project site. Have soil and/or water quality results been used to support not including historical mining as a stressor to wetland habitat. If so, provide rational.
NSE-2-178	Wetland Specialist	NSE	Section 6.8.3.1 Functional Assessment Results Pg. 379	Under the *Identification of Exceptional Features* discussion, the report states an excerpt from the NS Wetland Conservation Policy: "*The [Nova Scotia] Government will consider the following to be WSS:* *• All salt marshes;* *• Wetlands that are within or partially within a designated Ramsar site, Provincial Wildlife Management Area (crown and provincial lands only), Provincial Park, Nature Reserve, Wilderness Area or lands owned or legally protected by non-government charitable conservation land trusts; • Intact or restored wetlands that are project sites under the North American Waterfowl Management Plan and secured for conservation through the NS–EHJV;* *• Wetlands known to support at-risk species as designated under the federal Species at Risk Act; (endangered or threatened) or the Nova Scotia Endangered Species Act (endangered or threatened); and,* *• Wetlands in designated protected water areas as described within Section 106 of the Environment Act*."	Wetlands that support a significant species or species assemblages, high wildlife diversity, significant hydrological value or high social/cultural importance can also be classified as WSS. Provide a summary tables identifying wetlands that provide high functional significance within discussion of all the function groups listed. Also provide summary table and figure(s) identifying wetlands that will be impacted by the project that provide multiple significant functions, have the potential to provide multiple significant functions, or otherwise support the conditions listed above within the impacted watersheds identified as a result of all project components.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-179	Wetland Specialist	NSE	Section 6.8.3.1 Functional Assessment Results Pg. 379	*"A review of the NSE predictive WSS layer identified two WSS within portions of the PA…… "*	Confirm the most recent version of the predictive mapping has been used. Confirm that baseline field surveys have been conducted for all species that may be present in wetlands.
NSE-2-180	Wetland Specialist	NSE	Section 6.8.6.1: Wetland Impacts and Section 6.8.3 Baseline Conditions: Touquoy Mine Site Table 6.8-14: Potential Wetland Interactions with Project Activities Pg. 398	Discussion on project impacts to wetlands at Touquoy site has been removed.	Confirm that alterations to reclaim infrastructure and pipelines will not interact with wetlands at Touquoy site during site preparation and construction. Confirm that operations and maintenance activities at Touquoy site, including discharges, will not interact with wetlands. Provide rational as why operation and maintenance interactions have all been removed.
NSE-2-181	Wetland Specialist	NSE	Section 6.8.6.1: Wetland Impacts Table 6.8-15	Vegetative and Habitat Integrity: "Introduction of invasive species can occur indirectly into wetlands when equipment or people enter the wetlands or via runoff or dust from the roads. Introduction of mine and Haul Road traffic during construction and operation can elevate this risk. Invasive species, such as purple loosestrife (Lythrum salicaria), can severely degrade wetland habitat and function. No purple loosestrife was noted during field surveys in the mine footprint Beaver Dam Mine Site or Haul Road PA. "	Was purple loosestrife the only invasive plant considered? Have invasive species been evaluated at the Touquoy Site following site construction?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-182	Wetland Specialist	NSE	Section 6.8.6.3 Wetland Impact Extent Pg. 401 Tables 6.8-16 Expected Direct Wetland Impacts within the Beaver Dam Mine Tables 6.8-17 Expected Direct Wetland Impacts within the Haul Road Table 6.8-19	Section provides details on size of wetland feature and estimated Direct Impact area.	A) Consider including % of wetland area in Tables 6.8-16/17 that is estimated to be directly impacted and discussion on the impacts to wetland function for wetlands that will be lost as a result high percent of wetland area being lost. B) Results provided in table 6.8-19 only consider effects of the current project. Are there no potential cumulative effects relating to other impacts or projects in relation to wetlands (i.e. climate change, changes in land use outside of the study area?).
NSE 2-183	Wetland Specialist	NSE	Section 6.8.5.2 Wetland Cumulative Effects Modelling Pg. 388 Tables 6.9-4 and 6.9.27	"*As such, the purpose of the wetland cumulative effects assessment is to evaluate the spatial cumulative effects associated with the loss of wetlands as a result of developing the Beaver Dam Mine Site*."	Given that fish/fish habitat support CRA fisheries were identified, impacts to these fisheries as a result of project impacts to wetlands that provide these functions/benefits.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE 2-184	Wetland Specialist	NSE	Section 6.13.2 Species of Conservation Interest and Species at Risk Pg. 629	"*As such, understanding the distribution and diversity of rare species present within a PA is key to proper risk assessment, Project planning, and mitigation of risks posed to rare species by a given project*." "*Methods and results from SAR/SOCI surveys at the Touquoy Mine Site are summarized in subheadings within the applicable sections of this EIS, however, the data is not being reevaluated*."	Given the date of referenced reports, discussion on any changes to conservation rankings to SAR/SOCI species should be provided to ensure priority species have not been overlooked in the assessment. Consideration to new species occurrences, since the time of the report, that could be impacted by the project should be provided.
NSE 2-185	Wetland Specialist	NSE	General Comment	Discussion on generation of wetland priority species list (SAR/SOCI) is unclear and seems inconsistent.	Provide further discussion on generation of baseline data that is supported by field surveys. Provide a complete list of species that occur or were observed in the study area and confirm that baseline surveys have been collected in appropriate times to identify all species interacting with wetlands. Where the potential for wetland to provide habitat for priority species is noted, the species should be assumed to be present unless biophysical survey confirms their absence (particularly for fish and migratory species).

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-186	Hydrologist	Nova Scotia Environment	Appendix G.4, pg 8 Pg 321 Pg 495 Pg 496	"The Mud Lake and Crusher Lake catchment areas experience the largest reduction in subcatchment area between baseline and EOM due to the construction of the waste rock stockpile, 43% and 52% respectively. The contributing drainage area to Tent Lake encompasses the East Collection Pond subcatchment area that represents the proposed crusher pad and is increased from baseline condition by 28.7%." "The percent change in total annual runoff from baseline to EOM and from baseline to PC conditions {for Tent Lake} is 53.1%, indicating there is an increase in annual runoff from baseline conditions." "WC-5, north flowing between Crusher Lake and Mud Lake, will have a reduction of approximately 43% (at EOM) based on the losses to its contributing area. This proposed reduction of flow is predicted to impact the ecological maintenance flow within this portion of WC-5 during low flow periods." "There is a predicted increase in runoff volume discharged to the Killag River of 0.91% and 0.03% during EOM and PC, respectively. Additionally, a 5 to 7% reduction in baseflow is predicted for the Killag River (Appendix G.5). Together, the impact to fish and fish habitat within the Killag River was deemed negligible."	• Additional information is required to understand the specific impacts associated with the changes in surface water outlined, and the risk for impacts to fish, fish habitat, and channel stability that result from the decreases and increases that are predicted. • With the level of information provided, it is difficult to assess the impacts to the water resources in the Beaver Dam Site area, as the information provided is on such a large time step and does not go into details on how the various developments (e.g., pit lake, ditching, settling ponds) alter flows on site at a smaller scale. For example, how does the proposed works affect the Killag River in periods of low flow? How does the need to treat discharges from the two collection ponds affect discharges during these times? • The statement that there is a reduction of 5 – 7% of baseflow – I couldn't find this in Appendix G.5. Where is this located?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-187	Hydrologist	Nova Scotia Environment	Appendix G.4, pg 16 Appendix F.1, pg 7 Appendix G.4, pg 17	"The percent changes in total annual runoff from baseline to EOM conditions and from baseline to PC conditions are -43.0% and -35.5%, respectively. The negative values indicate that there are decreases in annual runoff from baseline conditions. The percent changes are proportional to the reductions in catchment areas." "As dewatering progresses and groundwater levels in the vicinity of the open pit are lowered, some surface water bodies which are presently groundwater discharge areas may become areas of groundwater recharge." Table 4-1	• Approaches are outlined in Appendix G.4 for the calculation of infiltration and runoff for various stockpile types, but it is stated here that the percent changes are proportional to the reductions in catchment areas. Please clarify. • It is outlined in other sections of the submission that the creation of the pit may alter inflows to the surrounding waterbodies. How is this and other uncertainties in the approach considered in producing the final values? • Why does evaporation increase in the End-of-Mine and Post-Closure conditions, as shown in the Tables in Appendix G.4?
NSE-2-188	Hydrologist	Nova Scotia Environment	Appendix G.4, pg 20 Appendix F.1, pg 9	The inputs to the Mine Pit include groundwater inflow, direct precipitation minus evaporation, pit wall runoff and mine site runoff. "Where the till consists of relatively coarse grained gravels with a small proportion of fines there is the potential for larger groundwater inflows to occur. Whether these inflow rates are sustained will depend on the lateral extent of the gravel deposits, and the degree of interconnection between the gravels and surface water bodies. This may require further investigation if the risk is considered significant."	• How was mine site runoff calculated? A description of this piece is not provided in the paragraph that follows, although it is shown in table 5-1 as 'Surface Water Ditch Inflow' • Is this statement from Appendix F.1 further explored in the water balance or elsewhere in the submission?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-189	Hydrologist	Nova Scotia Environment	Appendix F.1 pg 8	"The results from the water balance analysis can be used to assess the impact of the proposed mine development on the receiving environment in terms of the change in water volume discharged to the Killag River, Mud Lake, Crusher Lake and Tent Lake outfalls." "Some caution is needed when using the results of packer tests conducted in diamond core holes. Packer tests in core holes may underestimate the actual hydraulic conductivity of the tested interval due to blinding, or blocking, of permeable fractures by fine grained drill cuttings or viscous drilling fluid. It is not possible to quantify the magnitude of these effects, and they may not necessarily be a significant factor. The set of hydraulic conductivity results from the tests at Beaver Dam appears reasonable given the lithology and the type of aquifer (fractured bedrock)."	• Described earlier in this Appendix that runoff volumes were not calculated directly for Crusher Lake • Statements in the submission regarding the level of uncertainty and confidence in the values reported is required.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-190	Hydrologist	Nova Scotia Environment	Appendix G.4, pg 20 Appendix F.1 pg 9 Appendix G.4, pg 21	"Based on these calculations the pit filling time is equal to 13.8 years." "The estimated groundwater seepage rate into the 100 m deep pit from both the north and south walls would thus be 622 kL/day (7.2 L/sec)…It is recommended that a range of groundwater seepage rates from bedrock at Beaver Dam of between 100 kL/day (1.2 L/sec) and 1,000 kL/day (12 L/sec) be used for planning purposes." "The proposed mine development results in a 0.91% and 0.03% increase in runoff volume discharged to the Killag River under EOM and PC conditions, respectively."	• What does the water balance look like during the period of pit lake filling? As mentioned, it will take 13.8 years before the pit lake is full and discharging. During this time, there is no contribution from the pit lake drainage area to the Killag system, which differs from the EOM condition where the pit is pumped to the North Pond and discharged. What are the impacts to water resources during this time? • What is the level of uncertainty in the calculations presented, considering the assumptions made and range of potential inputs outlined in other sections of the submission? • There are several groundwater seepage rates for both Touquoy and Beaver Dam presented in the various Appendices of the submission. Please present a summary of these in the main report, with a discussion on the range and the values that were chosen in modelling • What is the impact of alterations to natural flow patterns (e.g., extensive ditching in Mud Lake watershed, settling ponds, post closure pit lake) on the flows within these watersheds, specifically during low flow periods? • How are the local waterbodies and the pit lake estimated to interact? How will the pit lake impact water levels in Cameron Flowage, Mud Lake, and others, and thus flows within the Killag River? • What monitoring will be completed to validate and update the model?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-191	Hydrologist	Nova Scotia Environment	Pg 30 Pg 30	"Runoff from the till stockpiles located to the southeast of the open pit and east of the mine facilities area will be captured with the aid of channels around the stockpile perimeter and diverted north to Cameron Flowage by gravity via separate water discharge structures and engineered channels. At this time, it is not anticipated that a collection pond would be required, however such a pond can be constructed should settling of solids prior to discharge be required." "The majority of water collected in the north settling pond will be released to Cameron Flowage. Smaller volumes will be released south into Wetland 64 from the collection pond."	• How will the proponent know if settling of solids from the flows from the till areas 'is required'? • What state will the till area be in? What are the risks to water quality? • Without contours, difficult to have confidence in drainage areas defined in Figure 6.7-2 – please put contours on this map

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-192	Hydrologist	Nova Scotia Environment	Pg. 29	"Raw water at the Beaver Dam Mine Site will be required for fire protection and other processing requirements. Sources of raw water include surface water runoff and raw water pumped from Cameron Flowage. Raw water drawn from Cameron Flowage will be pumped by a single duty submersible water pump to a combination raw water and firewater reserve storage tank."	• Further information is required to understand the potential impacts associated with this activity. What are the water needs, does this trigger the need for a water withdrawal approval under the Activities Designation Regulations, and is the Cameron Flowage an appropriate location for water withdrawals to occur?
			Pg. 922	"The cumulative effect of the combined projects could mean a reduction in the streamflow from Scraggy Lake to the Fish River system; however, assuming that the rate of withdrawal is consistent with current needs of the project, then it has been shown that the withdrawal from Scraggy Lake is sustainable given the current level of inputs to the watershed."	• Clarification is required for the statements in Appendix G.3. From the main submission, it is stated that the existing withdrawal from Scraggy Lake will just require extension, and not modification, which contradicts the information in Appendix G.3, which indicates additional water is likely to be required. Please provide an assessment of what additional water is expected, and analysis into the options presented (e.g., 'build a reservoir', additional water from Scraggy Lake)
			Appendix G.3, pg 9	"Freshwater make-up for the process will continue to be sourced from Scraggy Lake. Additional make-up process water required in a dry year or to build a reservoir incase of a dry year will be sourced from effluent from the TMF treatment plant or Scraggy Lake, subject to NSE approval"	
			Appendix G.3, pg 17	"The water balance simulated a water deficit under dry climate conditions that would require takings exceeding the permitted water volume from Scraggy Lake for Touquoy operation. Therefore, under dry climate conditions or based on the operational requirements of pumping infrastructure, start-up water in the open pit may be supplied from Scraggy lake (subject to provincial permitting) and/or effluent from the effluent treatment plant."	

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-193	Hydrologist	Nova Scotia Environment	Appendix F.1 pg 1 Pg. 495	"Cameron Flowage is a remnant of past logging operations - There is a shallow sediment settling dam located in the eastern part of the proposed open pit (Figure 2). This dam was used to trap sediment generated by the dewatering of the Seabright underground operations in the mid-1980s before discharging to Cameron Flowage." "WC-5 has been surveyed extensively through multiple seasons. WC-5 exits Crusher Lake as a narrow channel flowing over a historic, man-made dam."	• Do any dams exist on Cameron Flowage that may be impacted by the proposed activity? • What details are available surrounding the dam on WC-5? Who owns the dam, is it maintained? What impact does this have on flows and fish passage?
NSE-2-194	Hydrologist	Nova Scotia Environment	Pg. 40 Pg. 40 Pg 323	"Road construction will allow for a clear porous subgrade or cross drainage culverts in order for wetland hydrology to be maintained post-construction." "Where deviations from the existing course are required, culverts of the same design will be installed beneath the new span and culverts beneath the old span will be removed where appropriate to facilitate the restoration of corresponding watercourses and to improve fish passage." "Many of the existing culverts are in poor shape (crushed, blocked, and deteriorated) but where construction or drainage changes take place this will facilitate the restoration of the existing drainage conditions and improve fish passage where deemed appropriate."	• Please provide additional details to support this approach and to support how impacts to local drainage resulting from the road will be mitigated • What is the rationale/justification behind replacing culverts with those of the same design? • Clarification of what is written here is required – is this meant to convey that the 'old span', which is understood to be the previous road, would be completely removed, or just the culverts? If the culverts are to be removed, what will be left in these areas (e.g., riprap)? • How will cases be 'deemed appropriate'? • In general, more information surrounding the approach and design of the haul road is required to sufficiently assess the potential impacts on surface water resources, and whether the mitigations proposed are appropriate

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NSE-2-195	Hydrologist	Nova Scotia Environment	Pg. 330 Appendix F.6, pg 5.17	"As the predevelopment and post development catchment areas draining to the discharge location at Moose River are similar, Moose River is capable of handling the resultant flows." "Compared to the existing conditions, the dewatering of the open pit is anticipated to reduce the baseflow in Moose River at SW-2 by 208 m3/d."	• Please provide further rationale/justification for this sentence, as sufficient information to support the validity of this statement is not provided • For clarity, is this statement correct? Or is this number meant to reflect pit full conditions, as is mentioned in the previous sentence?
NSE-2-196	Hydrologist	Nova Scotia Environment	Appendix F.1	Appendix F1 is in Draft, missing figures	• Please provide the final report for Appendix F1 • Please provide the figures that are referenced in the report

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NSE-2-197	Hydrologist	Nova Scotia Environment	Pg 330	"A spillway is proposed to be installed at elev. 108 m to prevent the pit lake from overtopping. The capacity of the spillway will be sized to accommodate the Canadian Dam Association inflow design flood and associated freeboard requirements for wind run-up and wave set-up and in consideration of DFO requirements."	• What requirements, if any, are necessary for the on-going maintenance of the spillway? How will this be maintained appropriately after mine closure? • What are the potential impacts downstream as a result of this spillway? Are they acceptable, and are any mitigations proposed? What are the design criteria for the spillway itself?
NSE-2-198	Hydrologist	Nova Scotia Environment	Pg 497	"There is an increase, however, of 53.1% in the predicted annual runoff volume discharged to Tent Lake due to mine development… Flooding of WC-B and adjacent wetlands may have a positive impact and increase suitable fish habitat. The expected flow increase will effect Wetland 64 and will have limited effect on WC-B, and associated fish habitat in either system."	• Additional analysis is required to support these statements. What will be the impact on the watercourse associated with such an increase in flow, as far as channel stability and geometry is concerned, and what is the potential for impacts downstream (e.g., Tent Lake) as a result of these changes?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-199	Hydrologist	Nova Scotia Environment	Appendix F.1, pg 7	"The estimated average groundwater inflow rate into an open pit at Touquoy from the till is 450 kL/day (5.2 L/sec) (Peter Clifton & Associates, 2006). Given the proposed open pits at Touquoy and Beaver Dam have similar crest perimeter lengths, this estimate of groundwater inflow rate from the till can also be applied to the Beaver Dam site.	• The submission should include enough information to have confidence with the approach to size the settling pond to meet water quality objectives based on the expected inputs to the pond.
NSE-2-200	Hydrologist	Nova Scotia Environment	Pg 30	"Based on results from recent surface and groundwater quality modelling, an effluent treatment plant will be utilized as required to ensure that any discharge meets the applicable federal MDMER criteria… The effluent treatment at the Beaver Dam Mine Site will be conceptually similar to the plant currently used at the Touquoy Mine Site."	• The need for treatment at Beaver Dam is inconsistently reported in the submission – please clarify.

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-201	Hydrologist	Nova Scotia Environment	Pg. 30	"Smaller volumes will be released south into Wetland 64 from the collection pond."	• What is water quality associated with the crusher pad - does collection pond before Wetland 64 have any design criteria for TSS settling or similar? Or is this just for the purposes of runoff attenuation?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-202	Hydrologist	Nova Scotia Environment	Pg. 323 Appendix G.2	"Deposition of tailings in the exhausted open pit for Beaver dam ore processing will accelerate the time to naturally fill the pit and create a pit lake during reclamation. However, this does not change the environmental effects predicted for the reclamation and closure plans for the existing Touquoy Mine Site as it simply changes the total time for the pit to fill…There are no further effects to surface water quality or quantity anticipated to be caused by the processing of ore and the management of tailings (exhausted pit) from the Beaver Dam Mine." "The geochemical model simulated the oxidation and reduction reactions to understand the water quality of the mixed pit lake quality based on the geochemistry of the individual water quality parameters during operation and reclamation." "Based on results of the groundwater flow model (Stantec 2018b), the open pit acts solely as a sink (i.e., gaining groundwater to the Touquoy open pit) at pit lake stages lower than 104 m in elevation. The interaction between the Touquoy open pit lake and Moose River is limited to groundwater flow from Moose River to the pit during this period." "When the pit lake level rises into and above the more permeable geological units at elevations above 104 m, the groundwater flow gradients will begin to reverse, and seepage from the open pit will migrate towards the Moose River as baseflow at a rate of approximately 310 m3/d. The flow rate in Moose River in April is 125 times this rate, and therefore represents a dilution ratio of approximately 125." Table 5.2 – Predicted Water Quality Concentrations to Moose River, not considering water treatment	• What about the impacts to water quality in the pit resulting from contact with the deposited Beaver Dams tailings? • What was done to understand mixing processes and their impacts on water quality in the proposed water cap? Has it been assumed to be a fully mixed system, and is this a reasonable assumption? • What about potential for stratification of the water cap, and what this could mean for water quality discharges? • Does the statement re: sink align with the information provided in the other Appendices and statements in the submission? • Does the value of 310 m3/d align with what is provided in other appendices in the submission? What is the level of confidence in this number, and what is the range of values presented from the other studies completed? What is the uncertainty in this value, and how is this considered in the assessment of impacts? • Re: Table 5.2 – what is the level of confidence of these values? What are the potential ranges for these values?

Comment #	Reviewer	Department	EIS section & Page	Rationale	Question/Request
NSE-2-203	Hydrologist	Nova Scotia Environment	Appendix G.4 pg 12	"Runoff from the North Settling Pond subcatchment area is routed through the North Settling Pond storage element. Inputs to the North Settling Pond storage element include pumped water from the open Mine Pit, and runoff from the North Settling Pond subcatchment area, which includes the waste rock stockpiles, ore stockpile, and a portion of haul road. Output from the North Pond includes overflow from the North Settling Pond storage element. The North Settling Pond storage element has a permanent pool capacity of approximately 7,500 m3 and an active storage capacity of approximately 6,600 m3. Overflow from the North Settling Pond storage element is directed to the Killag River outfall."	• What about treatment? Additional details surrounding how the provided settling pond design criteria will allow it to treat inflows to meet discharge water quality objectives are required

NOVA SCOTIA

Environment

Date: May 06th, 2019

To: Environmental Assessment Officer

From: Environmental Health Consultant, Sustainability and Applied Science

Subject: Revised Environmental Impact Statement Beaver Dam Mine Project

Scope of review:

The focus of this Environmental Assessment review from the NSE Sustainability and Applied Science Division's Regional Environmental Health Consultant is potential impacts on human health. In general, the scope of this review includes the assessment of the potential for the proposed undertaking/project to adversely affect human health in all phases of the project. Note that while general comments may be included, applicable technical specialists should be consulted for specific guidance. The recommendations provided below are meant to supplement the actions that are outlined in the EIS submission documents.

Documents reviewed:

The documents outlined below formed the basis for this EA review, and is referred to as the 'EIS submission' through the rest of this memorandum:

- Environmental Assessment Registration Document – Revised Environmental Impact Statement- Beaver Dam Mine. Report Prepared by Atlantic Gold Corporation

Comments re: Revised Environmental Impact Statement- Beaver Dam Mine:

In addition to the comments submitted by Regional Environmental Assessment Specialist, Environmental Health Program -Health Canada (Atlantic Region) the NSE Environmental Health Consultant (EHC) offers no additional comments on the EIS submission.

The EHC supports and agrees with all comments made by the Health Canada - Environmental Assessment Specialist and reiterates the comments regarding gaps and errors in assessment methodology and the need for a multi-media Human Health Risk Assessment (qualitative & quantitative assessment) to evaluate health risks from contaminants of potential concern and contaminant exposure from multiple media.