

Comment Index

MacLellans Mountain Quarry Expansion Project

Publication Date: May 17, 2019

Government

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Date: March 28, 2019

To: Candace Quinn, Environmental Assessment Officer

From: Gillian Fielding, Aboriginal Consultation Advisor

Subject: MacLellans Mountain Quarry Expansion Project – Additional Information Addendum

OAA has reviewed the Additional Information Addendum for the MacLellans Mountain Quarry Expansion Project for environmental assessment, in accordance with Part IV of the *Environment Act*. Currently, OAA has no comments. OAA will however continue to work with the EA Branch to address any comments submitted by the Mi'kmaq through the environmental assessment process.

Environment

Date: April 12, 2019
To: Candace Quinn, Environmental Assessment Officer
From: Environment Inspector, Inspection Compliance Enforcement
Subject: Weeks MacLellans Mountain Quarry Expansion Project

Following a review of the additional information submitted the following comments can be made:

The development of the wetland monitoring plan and water course monitoring plan will be crucial in the long-term effects monitoring of the development of the quarry. It will be necessary to maintain the baseline data to accurately track the effects of the project on the area.

No additional comments with regards to the additional information submitted

Environment

Date: April 16, 2019
To: Candace Quinn, Environmental Assessment Officer
From: Regional Engineer, ICE Unit
Subject: MacLellans Mountain Quarry Expansion Project – EA Additional Information

The following comments are limited to the review of the additional information provided by S.W. Weeks Construction Ltd. for the MacLellans Mountain Quarry Expansion Project. The additional information included the requested hydrological assessment and results of an electrofishing survey in Watercourse 2, and provided additional fish and fish habitat information and updated effects assessment.

- Should the project be approved, a detailed surface water monitoring program, including plans for monitoring wetlands and watercourses, should be submitted and deemed acceptable by NSE prior to expansion.
- Additionally, the Environmental Protection Plan (EPP), including monitoring plans and mitigation methods, should be submitted and deemed acceptable by NSE prior to expansion.

No other issues were identified with respect to the additional information provided.



Date: April 25, 2019

To: Candace Quinn, Environmental Assessment Officer

From: Kelley Fraser, Regulatory Review Biologist, Ecosystem Management

Subject: MacLellans Mountain Quarry Expansion Project, Additional Information Submission

Dear Ms. Quinn,

The Additional Information Request included the following requests:

- 1) *Provide a hydrological assessment that includes the following:*
 - a) *Analysis of flows and discharges under current and post-development conditions with considerations for seasonal variation and an assessment of impacts on the watercourses and wetland identified in the Registration Document resulting from this analysis. This analysis should include delineation of watersheds for current and post-development conditions, modelling of flows and discharges using information currently available and considerations for validation through monitoring;*
 - b) *A plan to progressively monitor and update results; and*
 - c) *Analysis signed off by a qualified Professional Engineer or Geoscientist.*

- 2) *Provide results of an electrofishing survey in the section of Watercourse 2 identified as Type IV Habitat (in the Registration Document) to determine the relative abundance of fish species and if salmonids are present.*

Below you will find the comments from DFO, Fish and Fish Habitat Protection Program regarding impacts to fish and fish habitat for the above referenced project's additional information submission.

- An electrofishing survey was not able to be conducted at Watercourse 2 (WC2) due to lack of suitable water depths. The proponent committed to conducting a detailed qualitative habitat assessment to evaluate the environmental effects on fish and fish habitat. The methodology was reviewed by NSE and DFO in December 2018.

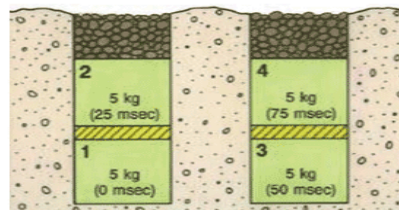
- The habitat assessment in the additional information report provided more details on the potential flows, habitat characteristics and an evaluation of potential for Atlantic salmon, alewife and brook trout to use WC2 for migration, rearing, overwintering and spawning. The report also evaluated WC1, WC3, WC4, Wetland 1 and Stewart Brook for each species. It is understood that WC2 will be most impacted by the quarry expansion operations. The report states that WC2 provides seasonal flow, and potential rearing and foraging habitat is present during periods of flow (e.g., spring freshet and high flow conditions). As well, the report states that although no spawning or overwintering habitat is present in WC2, there could be alewife spawning habitat in Wetland 1, through which WC2 drains, if water is present. As the report states, there is limited habitat present in

WC2 and only in higher flow conditions, and fish passage may also be inhibited by a steep incline at the lower reaches of WC2. There is also limited habitat in WC1, WC3 and WC4. Stewart Brook, however, receives water from WC1, WC2 and WC4, and then drains into the East River of Pictou which has Atlantic salmon (Gaspé-Southern Gulf of St. Lawrence population, COSEWIC Special Concern). Brook trout and alewife have also been found within 5.8 km of the existing quarry.

- A hydrological assessment was conducted and evaluated peak flow rates and potential changes in stream flow. However, the consultant compares Ecological Maintenance Flow (EMF) requirements outlined in Nova Scotia Environment's 'Guide To Surface Water Withdrawal Approvals' (NSE 2016) with the predicted reduction of streamflow. However, this Guide was written specifically for the withdrawal of surface water from a water body such as a lake or river, not the alteration of drainage areas that cause reductions in surface water flows. The Guide forms part of the Approval process that generally has measurable terms and conditions, and usually involves the installation of equipment and the requirement to monitor how much water is used and ensuring the proponent stays within the established limits. The Guide and the EMF also only form part of the regulatory decision-making process surrounding the issuance of water withdrawal approvals. Comparing predicted streamflow reductions with the EMF in this manner is not appropriate as it is not the right application.
- The proponent should conduct baseline monitoring of streamflow in order to provide the opportunity to measure the actual reduction in streamflow of the watercourses as the quarry expands. Monitoring should include collecting baseline, during construction and post construction flow data for onsite watercourses as well as for offsite locations of WC1, WC2, WC4 and Stewart Brook. A surface water monitoring plan should be prepared in consultation with NSE and DFO.
- Under section 36(3) of the *Fisheries Act*, 'No person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water'. Quarry activities should be managed to avoid deleterious substances from entering fish-bearing waters.
- The use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs causing death to fish. Blasting vibrations may also kill or damage fish eggs or larvae. As the quarry operation expands over time, any blasting or use of explosives should be conducted in a way that mitigates any potential serious harm to fish.
 - Blasting should be in accordance with DFO's measures to avoid harm. To prevent serious harm under section 35 of the *Fisheries Act*, please follow measures on our national website when proposing to blast near water (<http://www.dfo-mpo.gc.ca/pnw-ppe/mesures-mesures/mesures-mesures-eng.html>). If these measures cannot be followed, then a *Fisheries Act* section 35 Authorization may be required.
 - Do not use explosives where *Species at Risk Act*-listed aquatic species, their residences or critical habitat occur, without review by DFO.
 - Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.

- If explosives are required as part of a project (e.g., removal of structures such as piers, pilings, footings; removal of obstructions such as beaver dams; or preparation of a river or lake bottom for installation of a structure such as a dam or water intake), the potential for impacts to fish and fish habitat should be minimized by implementing the following measures:
 - Time in-water work requiring the use of explosives to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries timing windows (<http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html>).
 - Isolate the work site to exclude fish from within the blast area by using, for example, bubble/air curtains (i.e., a column of bubbled water extending from the substrate to the water surface as generated by forcing large volumes of air through a perforated pipe/hose), cofferdams or aquadams.
 - Remove any fish trapped within the isolated area and release unharmed beyond the blast area prior to initiating blasting
 - Minimize blast charge weights used and subdivide each charge into a series of smaller charges in blast holes (i.e., decking) with a minimum 25 millisecond (1/1000 seconds) delay between charge detonations (see Figure 1).
 - Back-fill blast holes (stemmed) with sand or gravel to grade or to streambed/water interface to confine the blast.
 - Place blasting mats over top of holes to minimize scattering of blast debris around the area.
 - Do not use ammonium nitrate based explosives in or near water due to the production of toxic by-products.
 - Remove all blasting debris and other associated equipment/products from the blast area.

Figure 1: sample blasting arrangement



Per Fig. 1: 20 kg total weight of charge; 25 msecs delay between charges and blast holes; and decking of charges within holes.

- Under section 35 of the *Fisheries Act*, 'No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery'. Serious harm to fish includes the death of fish, or any permanent alteration to, or destruction of, fish habitat. If water flows are predicted to be reduced or eliminated, fish passage is affected, or the quality of fish habitat is affected as a result of the project, the proponent may have to implement additional mitigation and monitoring measures. Any permanent alteration or destruction to a watercourse as a result of the project expansion could be considered serious harm under section 35 of the *Fisheries Act* and a *Fisheries Act* Authorization may be required.
- A section 35 *Fisheries Act* Authorization may also be required if it is determined that serious harm will occur to any wetlands considered to be fish habitat.

Environment

Date: April 26, 2019

To: Manager, Water Management Unit

From: Senior Surface Water Quality Specialist, Water Management Unit

Subject: MacLellans Mountain Quarry Expansion Project Environmental Assessment – Additional Information - Review Comments & Recommendations

Scope of Review

As Senior Surface Water Quality Specialist with the Nova Scotia Environment (NSE) Sustainability and Applied Science Division, the following MacLellans Mountain Quarry Expansion Project Environmental Assessment (EA) – Additional Information review focuses on the following subjects:

- Surface water quality & its management
- General surface and groundwater resources, and fish and fish habitat & their management

The following review considers whether the environmental concerns associated with the above subjects and the proposed mitigation measures have been adequately addressed in the Environmental Assessment – Additional Information submission. The recommendations provided below are meant to supplement the actions outlined in the submission documents.

While general comments on fish and fish habitat, wetlands, surface water quantity, and groundwater quality and quantity may be included below, applicable technical specialists should be consulted for specific review and comment.

Reviewed Documents

The following document was the basis for this EA review:

McCallum Environmental Ltd. 2019. *MacLellans Mountain Quarry Expansion Project Environmental Assessment – Additional Information*. S.W. Weeks Construction Ltd.

Comments

Surface Water Resources

- The proposed quarry site is located within the Stewart Brook subwatershed, which is located within the East River of Pictou watershed. There are four unnamed watercourses and Stewart Brook that are predicted to have their watersheds effected by the development area. The unnamed watercourses are named for this EA additional info submission WC1, WC2, WC3 and WC4.

Surface Water Quality

- The existing settling ponds in the quarry site are proposed to be expanded to receive additional surface water runoff with the outlets re-designed to handle additional flows from the Area A and B quarry developments. These existing settling ponds discharge into WC4 via the quarry discharge channel. Settling ponds can cause thermal charging of receiving watercourses by the discharge of standing water heated up by. Mitigation measures can be included as part of the settling pond design and its outflow channel to reduce potential impacts on the receiving water system, WC4, which was identified as providing potential passage, rearing and foraging habitat for fish.
- Mitigation measures proposed for the project to reduce effects to surface water quality include erosion and sediment control systems and the rock lined settling ponds.

Fish and Fish Habitat

- The watercourses within the quarry footprint were predicted to have either decreases (WC1, WC2 and Stewart Brook [between WC1 and WC4]) or increases (WC4) in flow, based on the estimated losses and gains of drainage catchments.
- Section 4.1, pg. 20 references ecological maintenance flows and the following requirement: *“The EMF requirement is determined to be a reduction of <25% of the median flow during the seasons that the predicted loss (due to catchment loss) is taking place (NSE 2016).”* The less than 25% of existing ecological maintenance flows (EMFs) is from the NS Guide to Surface Water Withdrawals (2016), which is specifically for supporting water withdrawal approval applications. The specific reference within the document is that the ecological maintenance flow requirement is calculated as being 75% of the median flow during the seasons when water withdrawals will take place. Additionally, within the guide the taking of less than 25% of the median flow during the driest month of the withdrawal period is not the only factor in mitigating potential effects on ecological maintenance flows. The guide is specifically developed to support the preparation of surface water withdrawal applications and not changes in local drainage patterns. The proposed changes to drainage areas for the watercourses within and downstream of the Project development area would not be classified as surface water withdrawals, and therefore the referenced document is not applicable. This approach was applied to WC1, WC2, WC4, Wetland 1 and Stewart Brook at the confluence with WC4.
- Additional assessment of fish habitat quality was conducted for WC2 in Section 4.1.3 to expand on the estimated changes to EMF within the watercourse, which included discussion of quality of fish access and habitat.

Surface Water Quantity

- The following statement is made with respect to the drainage area for the project named WC-2 (Section 3.2.2, pg. 15): *“WC2 receives its water from WS-1 and WS-2, therefore losses of drainage area from both watersheds has been considered in the following results.”* Section 3.1 (page 12) states the following about the WC-2 watershed: *“Watershed 1 (WS-1) contributes to WC1 and is located to the northwest of the Development Area. Part of WC1 was GPS field delineated but is not a recorded feature in the NSTDB; Watershed 2 (WS-2) contributes to WC2 and is located within the quarry footprint. Parts of WC2 were GPS field delineated, which closely followed a watercourse record in the*

NSTDB.” The two sections contradict each other with respect to what is the drainage area for WC-2. Based on the mapping provided in Appendix A, Figure 2 the WC-1 (WS-1) watershed is not displayed to drain into WC-2 prior to development.

- Appendix A, Figure 2 displays a portion of the WS-2 watershed and a section of WC-2 being within the project development area for Development Area C. The following statement is made in Section 3.2.2, pg. 16: *“During quarry expansion Phase C (~50 years +) there will be no additional area removed from WC2. In fact, a portion (approximately 4.3 ha) of WS1 will be added to WC2.”* These two sections contradict each other with respect to removal of WS-2 drainage area, as quarry development areas are predicted to either be removed as watershed drainage areas or have reduced runoff due to the change in infiltration within the quarry floor compared to the existing forested land use.
- The following statement is made in Section 3.2.5, pg. 18: *“Calculations were made from the furthest downgradient aquatic contributor of water to Stewart Brook. For the purposes of this assessment, the confluence of WC1 and Stewart Brook was used;”* Is not the confluence of WC4 and Stewart Brook the furthest downstream project impacted watercourse section for the project?
- Section 4.2 discusses potential reductions in surface water runoff from the quarry expansion to Wetland 1 (WL1), including an estimated reduction in inflow of up to 38%. The section describes that WL1 is expected to receive groundwater discharge, but the hydrologic relationship has not been estimated within the original EA and the additional information submissions. Section 4.2.2 proposes to conduct monitoring to assess potential changes to the wetland over the development of Area B for a 50-year period. In conjunction sediment and erosion control mitigation measures are proposed to protect surface water quality, but no measures are proposed to manage potential changes in surface water quantity and hydrologic function. If wetland function is observed to be altered, the Proponent indicates that they will prepare and submit a NSE wetland alteration application. Given the predicted maximum reduction in surface water runoff, and unknown impacts to local groundwater contributions to the system, it would potentially be more prudent to assume that the wetland function will be altered for this Project and that the Proponent should prepare and submit for a wetland alteration application prior to the construction and operation phase for Area B.
- Section 4.2.3 indicates that predicted residual environmental effects to WL1 are predicted to be adverse, but not significant with the implementation of mitigation measures. Sediment and erosion control is proposed as a mitigation measure for WL1, which is not be expected to address changes in surface water runoff to the feature and WC2 downstream. The general statement provided in Section 4.2.3 with respect to residual environmental effects downstream of WL1 within the Stewart Brook watershed seems reasonable given the size of WL1 within the larger brook drainage area.
- WC4 is predicted to have up to an 8% increase in predicted flow from the Project. There is no discussion on potential effects within WC4 and downstream due to this increase and how these effects will be mitigated.
- There are no mitigation measures proposed to reduce effects on surface water quantity within WC1, WC3 and a section of Stewart Brook (between WC1 and WC4) from the quarry development.

Recommendations

Planning/Design

The revised hydrologic assessment provided in this EA additional information submission did not adequately assess the potential impacts to fish and fish habitat due to the use of an inapplicable interpretation of ecological maintenance flows from the NSE Surface Water Withdrawal Guide (2016). As such the interpretation of effects associated with the predicted reductions in flows to WC1, WC2, WC3 and a section of Stewart Brook (WC1 to WC4) requires additional evaluation.

The following are associated recommendations for each of the above listed VECs:

- The predicted reductions in flows to a section of Stewart Brook (between WC1 and WC4), and increased flows to the downstream section of WC4, and their associated effects on the project VECs, should be assessed using additional methods to what is presented in the EA additional information submission. Examples of these methods would potentially include, but not be limited to detailed assessment of predicted flow reductions and increases on fish and fish habitat in each individual watercourse section (e.g., substantiate that a 7% reduction in flow in Stewart Brook is not a significant impact on fish and fish habitat).
- If ecological maintenance flows are to be considered as part of additional assessment, a more detailed analysis than that applied in the EA additional information submission should be developed in consultation with NSE and Fisheries and Oceans Canada (DFO) staff.

The above recommendations could potentially be developed as conditions in support of an Industrial Approval for the Project.

Operational Issues/Other Permitting Processes

Surface Water Quality

- An erosion and sediment control plan developed by a qualified professional should be submitted for NSE review and approval prior to the start of construction and operation activities, including clearing, grubbing and stripping.
- There is an expected increase in surface water runoff being discharged to the settling ponds that currently discharge to WC4. The settling ponds are proposed to be expanded with respect to storage capacity and re-designed with respect to managing discharge. Given that WC4 is classified as fish habitat (Section 2.2.4, pg. 11), mitigation measures related to its discharge should be developed, particularly for sediment loading and thermal charging. Thermal charging measures could potentially include, but not be limited to, discharge outlet controls (e.g., bottom withdrawal), shading and discharge channel aeration.
- The new and expanded existing settling ponds proposed to discharge into WC2 and WC4 should be designed by a qualified professional (e.g., Professional Engineer). Pre- and post-development surface water runoff rates should be considered in the design with the objective of a zero increase in peak discharge from the project development area. Pond design should consider potential scour impacts to the receiving water environment. Appropriate mitigation measures

should be implemented to support surface water management. Consideration of increased outflow rates to receiving watercourses (e.g., WC4) should be considered as part of the design and appropriately mitigated to prevent downstream impacts (e.g., scour, flooding). Pond design criteria, storm event sizing, and effluent discharge concentration and monitoring requirements should be developed in consultation with and reviewed by NSE staff.

- A surface water quality monitoring program should be developed to monitor discharge from the settling ponds, and potential effects to watercourses impacted by the project development. A baseline monitoring site or sites should be established, if feasible. This plan should be submitted to NSE staff for review and approval.
- The reclamation condition changes in surface water quality and quantity within the project area should be estimated and assessed with respect to potential effects on water resources (surface water and groundwater), and fish and fish habitat VECs. Appropriate mitigation measures should be proposed and implemented depending on the results of the evaluation. This could potentially be developed as a condition within an Industrial Approval for the project. This evaluation should be developed in consultation with and submitted for review and approval to NSE (including appropriate staff from the Sustainability and Applied Science division), and DFO staff.

Surface Water Quantity

- As proposed in the additional information submission, a water quantity monitoring program should be developed to monitor discharge from the settling ponds and potential effects on appropriate watercourses, particularly WC2. The sampling frequency and monitoring equipment used should be sufficient to estimate potential surface water quantity changes associated with the project. A baseline monitoring site or sites should be established, if feasible. This plan should be developed in consultation with and submitted for review and approval to NSE (including appropriate staff from the Sustainability and Applied Science division), and DFO staff.
- Given the expected reductions in surface water runoff, and unknown potential changes to local groundwater discharge to WL1, it is recommended a wetland alteration application be developed in consultation with and submitted for review and approval to NSE staff prior to the development of Area B.

Environment

Date: April 26th, 2019

To: Candace Quinn, Environmental Assessment Officer

From: Executive Director, Policy and Corporate Services, Nova Scotia
Department of Agriculture, Fisheries and Aquaculture

Subject: MacLellan Mountain Quarry Expansion Project - Additional Information
Addendum Registration

Thank you for the opportunity to review the Environmental Assessment Registration Document for the MacLellan Mountain Quarry Expansion Project.

The Nova Scotia Department of Fisheries and Aquaculture have the following comments:

There are 24 aquaculture sites and 3 licensed fish processing facilities within approximately 25 km of the project area, however, no potential impacts on the marine seafood sector are anticipated.

With respect to sportfishing, the proponent's assessment of the projected net change to the hydrology of the streams suggests a maximum net loss of discharge to Stewart Brook in the range of 6.8%. These streams are described to not currently support fish due to water depth and intermittent flow.

As any reduction of flow to Stewart Brook could impact fish habitat, it would be advisable for the proponent to contact the Pictou County Rivers Association to discuss potential physical habitat restoration options on Stewart Brook.

Environment

Date: April 26th, 2019

To: Candace Quinn, Environmental Assessment Officer

From: Executive Director, Policy and Corporate Services, Nova Scotia
Department of Agriculture, Fisheries and Aquaculture

Subject: MacLellan Mountain Quarry Expansion Project - Additional Information
Addendum Registration

Thank you for the opportunity to review the Environmental Assessment Registration Document for the MacLellan Mountain Quarry Expansion Project.

The Nova Scotia Department of Agriculture does not have any further comments to add since the original Environmental Assessment review in 2018.

MEMORANDUM

To: Candace Quinn, EA Branch

From: Hydrologist, Industrial Management Unit, Sustainability and Applied Science Division

CC: Paul Currie, Manager, Industrial Management Unit

Date: April 26, 2019

Subject: MacLellans Mountain Quarry EA Addendum Review Comments

Scope of review:

The scope of this Environmental Assessment review from the NSE Sustainability and Applied Science Division Hydrologist is to assess the potential environmental impacts and proposed mitigations of the proposed undertaking on surface water quantity and management. While comments may also include considerations for impacts on general surface water quality, groundwater, freshwater fish habitat, and wetlands, appropriate technical specialists for these areas should be consulted for specific review and comment.

Documents reviewed:

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

- Environmental Assessment – Additional Information – MacLellans Mountain Quarry Expansion Project. Report Prepared by McCallum Environmental Ltd. Dated March, 2019, and accessed from <https://novascotia.ca/nse/ea/MacLellans-Mountain-Quarry-Expansion-Project/>

Review re: MacLellans Mountain Quarry Expansion Additional Information document:

General:

Water quantity: Watercourses and Site Drainage

- It is stated that “The following assessment utilizes the change in drainage area to assess the impact of change in water quantity to all of the receiving water features except Stewart Brook. This approach assumes that all water that falls within the quarry footprint will infiltrate or be lost from the system” (pg. 12). As a result, my understanding of the water balance approach that is used is that it has been assumed that the area of the quarry development within each watershed is removed from the contributing drainage area within each of the watersheds, leading to an assumed reduction of flow to each downstream watercourse equal to the percentage loss in contributing drainage area.
 - A range of % runoff from the quarry are presented in order to assess uncertainty in this area.
 - In Table 4, I disagree with the calculations that are presented. It is stated that “During quarry expansion Phase C (~50 years +) there will be no additional area removed from WC2” (pg. 16). From a review of Figure 2, Development Area C includes a section of WC2’s drainage area (referred to as WS-2 on the figure). As a result, in the 0% runoff from quarry scenario (and potentially others), a reduction of flows greater than 27% would be expected. Please clarify.
 - As the submission does not indicate that surface flow from undisturbed areas will be directed around the Project and/or away from disturbed areas, please clarify why areas upstream of the Development Areas (particularly B and C) who drain to these areas have not been considered as reductions in contributing drainage area in the water balance.
 - It is stated that “WL1 comprises an outflow channel (i.e. WC2), and the rate and frequency of water discharge from WL1 is managed by the elevation of the channel bed at this location (i.e. the weir height elevation)...By way of an example, inundation will be consistent throughout most of the year, but discharge flow from WL1 into WC2 is likely to be reduced (as a result of reduced inflow into WL1)” (pg 23). What will this mean as far as impacts to the lower reach of WC2? The majority of WC2’s drainage area feeds WL1, which requires a certain quantity of flow to discharge to the lower reach. With these reductions, it is possible that reduction of the actual flow in WC2 are greater than what is outlined in the water balance.
- It is stated that “The EMF requirement is determined to be a reduction of <25% of the median flow during the seasons that the predicted loss (due to catchment loss) is taking place (NSE 2016)” (pg 20). There is no reference for NSE 2016 found in the submission. It is likely that the intent was to refer to the Nova Scotia Guidance for Surface Water Withdrawals (the Guide). It is then stated that “As discussed in Section 3.2, modeled losses are within the requirements as determined by EMF for WC1, WC4 and Stewarts Brook...” (pg 20), and the EMF used to support decisions on the significance of the proposed works on fish and fish habitat. I have the following comments on this statement:
 - The definition of EMFs referenced in the submission is specific to the objectives of the Guide, which “describes the submission requirements, supporting documentation, and the criteria used by NSE to evaluate surface water withdrawal applications” (NSE, 2016). The use of this outside of those objectives is not appropriate, and it is not the intent that this calculation be used to determine impacts to fish and fish habitat resulting from

permanent, non-reversible reductions in flow from watershed reduction/diversion, as is the case here.

- For clarity, it is not stated in the Guide that ‘catchment loss’ is an appropriate measure for understanding predicted losses from a watercourse, as may be inferred by the quoted text from the submission above. In addition, for surface water withdrawal applications, additional studies to support assessment of EMFs for Category 3 applications are outlined as submission requirements in the Guide. These studies are reviewed with the other information provided in the application as part of assessing potential impacts on fish and fish habitat and developing appropriate approval conditions for surface water withdrawals. Approvals generated through this process can include conditions that provide limits to what water can be withdrawn and at what time of year, with restrictions to withdrawing water when streamflows drop below certain levels (which, as an aside, are not options in this case).
- What are the impacts associated with a permanent 6.8% reduction of flows in Stewart Brook? What is the significance of this potential change?
- It is stated that “An increase in surface water runoff entering the settling pond is expected during the expansion, therefore the capacity of the settling ponds will increase as per engineered specifications and NSE IA requirements as the quarry expands. Additionally, this system will be designed to ensure that discharge rates and water quantities are protective of the receiving environment (i.e. offsite WC4 and eventually Stewarts Brook). This will involve the design of a settling pond designed to accommodate 1:20 year flows.” (pg 21). Additional clarity surrounding what is meant by the statement that the settling pond will be designed to accommodate 1:20 year flows. What is the rationale for the use of the 20-year return period, what is meant by “designed to accommodate”, and what does this mean for the flows to be discharged downstream? Additional information surrounding settling pond design and the plan for discharges from the facility is required to understand the appropriateness of the mitigations proposed and the potential impacts to WC4, and how they mitigate the concerns raised by the stated potential increase of flows by 8% to this location and also by the statement “Furthermore, managing the local drainage of surface water flows across the landscape (i.e. through use of settling ponds) has the potential to alter natural flow regimes entering downstream aquatic resources” (pg 19) in the submission.
- It is stated that “Data will be collected in WC2 to support the development of a Stage Discharge Curve from which future water levels can be compared to” (pg 22). Stage discharge curves require on-going monitoring and calibration to remain valid.

Reclamation

- It is unclear what is proposed from a water management perspective for the reclamation phase. Without additional details and taking into account the landuse changes and alterations to drainage areas for the watercourses in the project area, it is difficult to understand what the closure phase will look like from a water perspective.

Conclusions & Recommendations:

My opinion is that there remains questions surrounding the potential impacts associated with the works based on the current level of information provided. The submission does provide a clearer picture of the potential impacts, but further detail is recommended to assess the appropriateness of the mitigations currently proposed. Please see below for a summary of issues and recommendations:

Planning/Design Issues:

- Additional clarity is required within the hydrological assessment to understand the potential impacts of the proposed works.
 - It is recommended that further clarity be provided on the approach and results of the water balance assessment, in line with the feedback provided in the comments above, and adjustments made to the expected impacts and mitigations, where necessary.
 - It is recommended that the concerns with the approach taken re: EMF, as outlined in the comments above, be addressed.
 - It is recommended that additional information be provided that assesses the impacts to Stewart Brook associated with a potential permanent reduction of flow of 6.8%, as stated in the submission.
- It is unclear in the submission what the reclamation case will look like from a water perspective, and as a result the potential long-term impacts of the proposed works.
 - It is recommended that a water balance scenario and details surrounding water management for the reclamation case be submitted.
- The above recommendations could potentially be captured through EA conditions that align the requirements for this work with the timing of the development phases of the proposed works, with ties to the contents/objectives of the surface water monitoring plan outlined in the recommendations in the section below.

Operational Issues/Other Permitting Processes

- Details related to final settling pond design by a qualified professional is required as part of any industrial approval application for the works, including a plan to monitor compliance during the different operational phases of the year. It is also recommended that discharges from the settling ponds be monitored and recorded as part of assessing changes to downstream surface waters resulting from the proposed works.
- A detailed sediment and erosion control plan is to be developed by a qualified professional and is required to be submitted as part of any industrial approval application for NSE review and approval prior to construction activities, including clearing, grubbing, and stripping, take place.
- A surface water monitoring plan is required to be submitted for NSE (including appropriate staff from the Sustainability and Applied Science division) and DFO review and approval prior to the works taking place, with a focus on quantifying discharges from settling ponds and impacts to the watercourses affected by the project.

MEMORANDUM

DATE: April 26, 2019

TO: Candace Quinn

FROM: Director of Protected Areas and Ecosystems

SUBJECT: MacLellans Mountain Quarry Expansion Project

Protected Areas and Ecosystems Branch has reviewed the Environmental Assessment for the **MacLellans Mountain Quarry Expansion Project**

Wetland comments:

Based on the additional information presented within the hydrological assessment source water to WL1 is expected to reduce by 38% of current peak flows as a result of the proposed quarry expansion. While the loss of water is expected to occur over the proposed 50 yr development plan, and mitigations to divert surface flows to lower reaches of the associated watercourses have been proposed, statements relating to requirement of approvals only when a wetland function is altered is inconsistent with current wetland policy. A loss of wetland area because of project activities should also be considered and addressed.

Direct loss of surface water inputs and lack of certainty/assessment of groundwater interactions with site features could lead to changes to soil, hydrology and vegetation characteristics of the wetland, as discussed in the associated reports, which could alter the quality/quantity of wetland habitat supported by surface water and groundwater interactions. Approval would be required prior to creating these changes and monitoring, in association with collection of representative baseline conditions and progressive development of the quarry.

Compensation for loss of wetland area and functions could be required in the future based on results of on-going water quantity/quality monitoring at quarry discharge locations and routine assessment of changes observed to the wetland habitat as a result of the quarry expansion. As the predicted residual environmental effects of the project on WL1 were determined to adverse, and will be permanent if quarry development proceeds, it would be more prudent to require a wetland alteration approval prior to development of Phase B where the cumulative loss of source water to WL is greater.

Consideration should be given to:

- Maintaining the proposed 50 m setback of quarry activities to watercourses/wetland;

- Restrictions on activities permitted within Development Area C (i.e. Blasting and aggregate removal) that have not been included in this assessment; and
- Ensuring that a water quality and quantity monitoring program be designed and implemented at quarry discharge locations to assess predictions made in hydrological assessment and identification of conditions that require action/mitigations

Protected Areas:

This project will have little impact to the Nova Scotia protected areas network. The proposed project is a quarry expansion of 32 ha over a period of 50 years in Pictou County. The proposed project is about 20 km north of St. Marys River conservation lands and 25 km northeast of Upper Stewiacke pending wilderness area.

Given the small size, juxtaposition within the landscape and the long period of time, there will likely be minimal impact to protected areas in this landscape. The proposed project is small enough that it will have little influence on the travel of animals in the landscape and likely there is little movement between the nearest protected areas and this project site. There is also little evidence to indicate any patterns of interacting ecological processes. For example, surface water movement is to the north, away from neighboring protected areas. There were few species of conservation concern found on the project site sensitive ecosystems were not identified using remote data.