

January 13, 2021

Peer Review of Level 1 and Level 2 Natural Environment Technical Report

Natural Heritage Impact
Assessment and Adaptive
Management Plan

Prepared for
Region of Halton



north-south
ENVIRONMENTAL

Project Study Team

North-South Environmental Inc.

Sarah Mainguy: review

Sal Spitale: review input and editing

Table of Contents

1. Introduction	- 1 -
2. General Comments on Natural Environment Report	- 1 -
3. Specific Comments on Level I and II Natural Environment Technical Report	- 6 -
3.1. Section 2: Background Review	- 6 -
3.1.1. Section 2.1: Natural Heritage Policy Overview	- 6 -
3.1.2. Section 2.2. Background Data Collection.....	- 7 -
3.2. Section 3. Physiographic Conditions.....	- 8 -
3.3. Section 4. Field Investigations and Methods.....	- 8 -
3.3.1. Section 2.2. Wildlife Surveys	- 8 -
3.3.2. Section 5. Field Survey Results.....	- 10 -
3.3.3. Section 6. Natural Heritage Feature Assessment	- 11 -
3.3.4. Section 7. Level II: Impact Assessment	- 12 -
4. Comments on Site Plan.....	- 16 -
5. Comments on Surface Water Assessment Report.....	- 16 -
6. Comments on Progressive and Final Rehabilitation Monitoring Plan.....	- 17 -
7. General Comments on Adaptive Management Plan	- 17 -
8. Detailed Comments on Adaptive Management Plan.....	- 17 -
9. References	- 18 -

Review Comments for Level 1 and Level 2 Natural Environment Technical Report, Nelson Quarry

1. Introduction

North-South Environmental Inc. (NSE) was commissioned by the Region of Halton in April, 2020 to review the Terms of Reference (TOR) for the Level 1 and Level 2 Natural Environment Technical Report (NETR) that addresses a proposed extension to the Nelson Quarry, authored by Savanta (dated January 2020). NSE was also commissioned to review the TOR for the Adaptive Management Plan. NSE is part of an extensive Review Team that includes several firms, each for different disciplines. NSE was also part of the team that reviewed the previous application for the Nelson Quarry Extension in 2011.

Subsequently, NSE was commissioned to review the NETR completed by Savanta. This review provides general comments on the EIA, followed by individual comments on specific sections. Each specific comment is listed under the section number provided in Savanta's NETR.

It should be noted that while NSE provided preliminary comment on the fisheries aspects of the TOR, in the current review the review of fisheries issues is addressed by another member of the Study Team.

2. General Comments on Natural Environment Report

1. Discussion of the site's ecoregion, ecodistrict and physiographic context is missing, as is a discussion about the relationship with significant Regional features such as the Mount Nemo Plateau. The previous hearing raised concerns about the variable local groundwater setting within discrete areas of the Mount Nemo Plateau, with concerns that groundwater flows were currently affected by the existing quarry and these impacts could extend further because of the cumulative impacts of the existing quarry plus the extension. There is the potential for significant harm to the off-site Jefferson's Salamander breeding habitat pools (the "wetland vernal pool" and "woodland vernal pool" shown on Figure 4.0), through impacts on their hydroperiod, if the groundwater inputs to the ponds are significantly affected by the extraction. The 2012 decision by the Joint Board noted that monitoring of water levels in the salamander breeding ponds (which are off-property) is critical because of the uncertainty regarding the impacts of lowering the groundwater table. The concern associated with the

accuracy of assessment of groundwater inputs to the Jefferson's Salamander breeding habitat ponds was an important issue to the 2011 Joint Board and it is not clear what additional work has been done to address these concerns. Concerns that the connection between groundwater and surface features has been underestimated in the current application have again been noted by many technical experts in their review of this application.

2. Golf course ponds were omitted from salamander trapping. The report states this is because they have predatory fish in them but the only pond that was electrofished was the northernmost pond. Other ponds were surveyed visually. Largemouth Bass were observed only in the main irrigation pond, the uppermost irrigation pond and the golf course irrigation channel. No fish were observed in the three smaller ponds. The author of this review has personal experience with Jefferson's Salamanders breeding in human-made ponds (and salamanders would be more likely to breed in smaller ponds that might be without fish). Salamander trapping should be conducted in the smaller golf course ponds, particularly smaller ponds that do not contain predatory fish.
3. Additional surveys should also be conducted for:
 - a. Blanding's Turtle, according to provincial Blanding's Turtle protocols,
 - b. turtle nesting areas, and
 - c. snakes, according to the protocols for Milksnake.
4. Weather conditions were omitted from the table summarizing field investigations. Though there are general notes about weather conditions in the text describing the field methods, the weather conditions should be shown for each date for amphibian, reptile and bird surveys.
5. The significant Woodlands analysis resulted in several woodlands (E, F and G) identified as Key Natural Heritage Features in the Regional Natural Heritage System being evaluated as non-significant. More discussion should be provided to explain the difference between the Region's and Nelson's analysis of these features. The discussion should include the rationale behind removing from the NHS both the features and the intervening restoration areas that provided a connected north-south linkage between these woodlands.
6. The function of woodlands E and F, particularly as stepping stones that link Woodland D to adjacent features, should be discussed. This is particularly important for Woodland E, which appears to be less than 20 m from Woodland D on the basis of on-line aerial photography, and would therefore meet the criterion for inclusion as a continuous part of woodland D, as stated in Section 6.2.1 (last paragraph on page 50). Since Woodland E meets the criteria for Significant Wildlife Habitat, its contributing function to Woodland D should be assessed.
7. There is almost no discussion of impacts other than surface water on Woodland D: the area of woodlands that will be retained between the existing quarry and the western extension. This area will become fragmented as it will be surrounded by existing and proposed quarry land. There is a strong north-south emphasis in the Regional Natural Heritage System through the extension lands, and this linkage will be eliminated throughout the extraction. The phasing of

the extraction and the placement of the infiltration pond do not mitigate fragmentation. In addition, a note on the Operational Plan regarding the western edge of the existing quarry states that this edge is “*subject to separate Site Plan Amendment to reduce setback to 0 m*”, which would isolate the woodland completely. Clarity is required to describe exactly what changes are proposed to the existing plan, when they will occur, and to assess the cumulative impacts of the increased setback and the extension.

8. It is my opinion that fragmentation will in effect create a literal island with no physical connection. Impacts of fragmentation should be described, and appropriate mitigation proposed so sufficient corridors are provided to allow movement of wildlife. Provincial and Regional policies require that the test of no negative impact be met. These two policies will not be met if there is no physical linkage/connection with the woodland to the south. According to the Niagara Escarpment Plan, diversity and connectivity between key natural heritage features must be maintained and/or enhanced. The Regional Official Plan Guidelines’ Aggregate Resources Reference Manual also notes that it should be demonstrated that the long-term ecological function and biodiversity of the natural heritage system can be maintained, restored or where possible improved. While the rehabilitation plan shows that the southern linkage will be restored in the final rehabilitation plan, the time frame to restoring this linkage is unclear. Section 4 of the Final Rehabilitation and Monitoring Study (page 14) appears to indicate that it could be more than 30 years before this linkage is restored.
9. Exposure to wind and high light levels in Woodland D will likely increase. The population of Large Toothwort (*Cardamine maxima*), a provincially rare plant species with a status of S3, is particularly adapted to cool, moist, sheltered forests and would likely be affected by the increase in exposure as it is on the eastern side of Woodland D. The two wetlands within Woodland D that are collectively numbered 13200 (the wetlands between the existing quarry and western extension, which will become physically isolated) are discussed only to say that since the catchment will be removed, mitigation such as discharge of quarry water will have to be used to maintain these wetlands. There should be further discussion of impacts, including isolation, fragmentation of surrounding habitat, noise, drying winds and light, etc., in addition to impacts of pumping quarry water.
10. The discussion of wetlands should include Wetland 13203, which is the only wetland identified that provides Significant Wildlife Habitat for breeding amphibians, as well as habitat for Painted Turtle.
11. There is no discussion of potential cumulative impacts of the existing quarry and the extensions (only a very brief mention of cumulative impacts).
12. Discussion of mitigation is incomplete: there should be a discussion about the mitigation of impacts in the short term (in addition to impacts related to erosion and sediment control) as extraction progresses (as required by the Aggregate Resources References Manual) – impacts of the quarry will not be addressed by the rehabilitation for many years.

13. Mitigation should include a discussion of Wetland 13203.
14. The only mitigation proposed for the loss of a unit of Significant Wildlife Habitat (Woodland E) is compensation through the rehabilitation plan. As noted in Halton's EIS guidelines, section 3.7.2., *"It is important to note that compensation for feature removal or anticipated negative impacts is not acceptable under the ROP."* Thus, removal of this woodland would result in negative impacts to the Natural Heritage System.

Avoidance is preferred over compensation. As noted previously, the function of Woodland E to provide linkage and other benefits to the Natural Heritage System should be further examined, particularly as this woodland is considered part of the Regional NHS and is in very close proximity to Woodland D. In on-line aerial imagery, the closest distance between Woodland D and Woodland E appears to be approximately 10-15 m (i.e. it is not greater than the 20 m considered to be the threshold for considering Woodland E separately), and so the function of Woodland E as a potential part of Woodland D should also be examined. The role of Woodland E in contributing to Eastern Wood-pewee and bat maternity roost habitat (for example in terms of numbers of nest sites, habitat area, foraging habitat, etc., as well as the potential importance of this area in the future when the connections to the north and south are removed) should also be considered in more detail. The rationale for avoidance of, rather than compensation for, impacts should be considered.

15. Section 11.2 (Paragraph 1) notes that: *"despite that no direct or indirect impacts will occur to Jefferson Salamanders or their habitat, habitat creation and enhancement opportunities have been identified for this species."* It is proposed to restore 4 ha of agricultural land between the eastern woodland south of the quarry, where Jefferson Salamander has been noted breeding, to an adjacent woodland to the west, where Jefferson Salamander has not been observed despite repeated surveys in several years, and despite apparently suitable habitat. I provide the following comments on the context for the proposed compensation.
 - a. The objective of the habitat creation is stated in paragraph 3 of this section: *"This would enhance JESA habitat by providing increased coverage of summer refuge and overwintering habitat and improve connectivity between the two existing woodlands... The design of this restoration could also increase opportunity for JESA breeding by incorporating pit and mound construction techniques."*
 - b. Though it is not stated in the NETR, it is clearer in the Progressive and Final Rehabilitation and Monitoring Study that the proposed restoration is to address Section 110 of the Regional Official Plan, especially C:

"C) Priorities for restorations or enhancements to the Greenbelt and/or Regional Natural Heritage Systems through post-extraction rehabilitation shall be based on the following in descending order of priority:

- i. *[i] restoration to the original features and functions on the areas directly affected by the extractive operations,*
 - ii. *[ii] enhancements to the Greenbelt and/or Regional Natural Heritage Systems by adding features and functions on the balance of the site,*
 - iii. *[iii] enhancements to the Greenbelt and/or Regional Natural Heritage Systems by adding features and functions in areas immediately surrounding the site,*
 - iv. *[iv] enhancements to that part of the Greenbelt and/or Regional Natural Heritage Systems in the general vicinity of the site, and*
 - v. *[v] enhancements to other parts of the Greenbelt and/or Regional Natural Heritage Systems in Halton.*
 - vi. *D) Restorations or enhancements shall proceed immediately after extraction in a timely fashion.*
- c. Comments on the proposed restoration and enhancement are as follows:
- This proposal is speculative, without even rudimentary detail to support feasibility. There is no certainty that created ponds would provide a sufficient hydroperiod and water quality for Jefferson Salamander to breed. There are no goals or objectives that drive the restoration, so no assurance that the restoration would create persistently suitable habitat for the long term.
 - Jefferson Salamander has a high fidelity to its habitat, and is a notable habitat specialist. If Jefferson Salamanders are not present in the western woodland, there is no basis to speculate that they would use the restored habitat. The western woodland may not be suitable for Jefferson Salamander. There are many habitat needs that must be met for this species that have not been explored, such as the presence of breeding ponds with suitable hydro period and water quality, small mammal burrows to provide overwintering habitat, invertebrate prey populations, and downed woody debris to provide refuge for post-breeding adults and transforming juveniles.
 - Salamander breeding and overwintering habitat is associated with mature woodlands, with their associated attributes of deep shade, leaf litter, high soil humidity, small mammal populations to provide burrows and abundant ground dwelling invertebrates to provide prey. It would take decades for the restored area to provide sufficient shade, humidity and hibernation sites to become suitable for Jefferson Salamander. If the quarry extensions had impacts on groundwater, the restoration site (even if it were feasible) would likely be too late to restore sufficient habitat to ensure Jefferson Salamander survival in this area.

- Jefferson Salamander movements are difficult to predict without movement studies. There is no evidence to show that salamanders would move in this western direction so that it could function as a linkage.
 - The potential for creating an ecological sink should be considered. The western woodland and restoration site would be within 120 m of the southern extension boundary, with the potential that these could be affected by the quarry.
 - This proposal does not address the primary recommendation in the Jefferson Salamander Recovery Strategy (2018): The short-term recovery approaches should focus on the protection of existing populations of the Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) by minimizing further loss or degradation of known habitat or potential recovery habitat. Recovery approaches should also focus on verifying, documenting, and monitoring the distribution and habitats used by extant, historic, and potential subpopulations. Developing and evaluating mitigation and restoration techniques, actively conducting research, and developing long-term management activities should also be prioritized to ensure the recommended recovery goal will be achieved
- d. There is no evidence that this proposed restoration would enhance habitat for Jefferson Salamander. The restored area would likely function as a small patch of disturbed forest habitat. Sufficient baseline detail should be supplied to show that it is at least potentially feasible. Goals and objectives should be provided to guide the restoration. Even as a preliminary suggestion, the restoration should be proposed according to “SMART” principles: the restoration goals should be “specific, measurable, agreed-upon, realistic and timebound”.

3. Specific Comments on Level I and II Natural Environment Technical Report

3.1. Section 2: Background Review

3.1.1. Section 2.1: Natural Heritage Policy Overview

Savanta states: *“An assessment of the quality and extent of natural heritage features found on, and adjacent to, the Subject Lands and the potential impacts to these features from the proposed aggregate application will be undertaken in association with the following legislation and policies.”* It should be clear that the significance of each feature will be evaluated according to the criteria provided by the Province and Region.

Two pieces of legislation should be added to the list of policy and legislation in this section:

- the Migratory Birds Convention Act and
- Fish and Wildlife Conservation Act.

3.1.1.1. Section 1.3. Halton Regional Official Plan

Policy 110 (7.2) should be specifically discussed in this section, as it addresses the requirement for a systems-based approach to the assessment of impacts as follows: *"In accordance with Section 118(3)d), apply the following systems based approach in the assessment of the impact of a new or expanded mineral aggregate operation on the Region's Natural Heritage System..."*

3.1.2. Section 2.2. Background Data Collection

The background data collection should have included Citizen Science databases such as eBird and iNaturalist.

The report notes that in the NHIC background search, four 1 km² "squares" were examined. In fact, six squares are needed to encompass the site: 17NJ 8805, 8905, 9005, 9105, 9104 and 9004. If the search is broadened to include the immediately surrounding habitat (as is the usual approach), approximately 12 squares should have been selected. This larger study area is justified because the locations of significant species are often not known exactly, and many wildlife species are mobile enough to roam more widely within the landscape than where they were reported.

This section should be summarized by a more inclusive table listing all the SAR that have been noted by an extensive review of background sources in the general area, with their habitat requirements. This should have directed Savanta's survey methodology and focus. In addition, several Species at Risk were left out of the analysis. The following additional species, noted in the two Ontario Reptile and Amphibian Atlas squares that encompass the site, were omitted from the sources mentioned:

Ontario Herpetofaunal Atlas:

- Western Chorus Frog (latest record 2019) - Threatened federally, Not at Risk provincially.
- Blanding's Turtle (latest record 2017) - Threatened provincially and federally
- Midland Painted Turtle (latest record 2018) - Special Concern federally
- Map Turtle (latest record 2018): - Special Concern provincially and federally
- Milksnake (latest record 2019) - Special Concern federally, Not At Risk provincially.

3.1.2.1. Section 2.2.1: Natural Features Desktop Summary

Features on or within the Study Area (bottom of Page 15 and top of page 16) should have included a discussion of the Mount Nemo Plateau. This is a landscape feature that is not mapped *per se* as an ecological feature - however, it has been identified as an important area for wildlife connectivity and it was identified as a significant recharge zone by the previous study team.

Previous findings of groundwater connection with the wetlands in the previous hearing should be addressed.

3.2. Section 3. Physiographic Conditions

This section should have included a description of the Ecoregion and Ecodistrict context of the site.

3.3. Section 4. Field Investigations and Methods

Section 4.1.2: In addition to considering individual Coefficients of Conservatism, Floristic Quality Analysis (FQA) should be included to provide an assessment of vegetation quality in each community as a whole.

Section 4.1.4: A sampling plot radius of 5 m is smaller than that generally accepted for sampling of woodlands (e.g. the sampling method for determining whether there are enough trees with cavities to meet the threshold for bat maternity colony habitat is 12 m). This small sampling radius could have influenced the assessment of Significant Woodlands, if the small radius was used in the smaller woodlands as noted.

A description of how the location of sampling plots were selected should be provided. It would be easy to unconsciously select areas with fewer trees for sampling if plots were selected in the field.

3.3.1. Section 2.2. Wildlife Surveys

General Comment

The golf course ponds should have been included in salamander surveys (Figure 4a, Appendix A) and aquatic turtle surveys. Though these are human-made, there is the potential that one or more of them may provide habitat for SAR, including Jefferson's Salamanders (I have personally observed this and other *Ambystoma* species in human-made ponds).

There is no detail on time or weather during amphibian, bird, turtle and snake surveys, to permit a full assessment of whether wildlife survey methods were appropriate. Appropriate weather conditions (generally relatively warm, with no precipitation and low winds) are essential for reptile, amphibian and bird surveys. Inappropriate weather conditions can lead to the false conclusion that the species is not present.

Surveys did not conform to the MNRF protocols for Blanding's Turtle, for which five visits are required prior to June, in highly specific weather conditions.

3.3.1.1. *Section 4.2.2: Salamander Habitat Assessment and Hydro-period Monitoring Methodology*

It is not clear that MNRF/MECP were involved in selection of sampling sites; only that they were consulted regarding survey protocols. This should be clarified. Conservation Halton should also have been consulted regarding survey locations and methods.

As noted above, we have had experience with Jefferson's Salamanders and other *Ambystoma* species use of human-made ponds, so golf course ponds should have been included in trapping.

3.3.1.2. *Section 4.2.3.: Salamander Minnow Trapping Survey Methodology*

It is not clear whether tail-tip samples were obtained for genetic testing.

3.3.1.3. *Section 4.2.6: Turtle Basking Habitat and Nesting Surveys*

This section states: "Survey protocols were created in consideration of MNRF (2012) and Toronto Zoo (Caverhill et al. 2011) turtle survey methods." This is imprecise language as it is unclear what "consideration" means: whether MNRF protocols were followed, or whether they were just given "consideration". If a variation in the protocols was followed this must be fully described. Clear times and weather conditions for each visit have not been provided.

The final paragraph in this section notes that turtle nesting surveys were not completed due to absence of suitable habitat. However, turtles are frequently observed to nest on lawns (personal experience of the author), and turtles frequently nest at long distances from their basking habitat. Turtle nesting surveys should have been conducted at the appropriate time of year.

There is no indication that methods for surveying non-basking turtles were used. As noted above, Blanding's Turtle (Threatened) have been noted within the Ontario Amphibian and Reptile Atlas "squares" in the vicinity of the site in addition to Midland Painted Turtle (recently evaluated as Special Concern) and Snapping Turtle (Special Concern). Blanding's Turtles bask less often than other turtle species, and must be surveyed particularly early in the year, in ideal weather conditions, as detailed by Blanding's Turtle survey protocols (MNRF 2013).

3.3.1.4. *Section 4.2.7.: Snake Habitat and Visual Encounter Methodology*

Times and weather conditions for snake surveys are important, but have not been provided for each survey. It is noted that visual encounter surveys were conducted on mild spring mornings, but the following sentence says they were conducted between 8:00 a.m. and 5:00 p.m., which means not all were conducted in the morning.

The first sentence notes that survey methods are based on MNRF species at risk protocols, but the final sentence on the first paragraph of this section notes that specific protocols were not applied as

no threatened or endangered snakes have been recorded in the area based on the species desktop summary. Milksnake (a species of federal Special Concern) has been recorded in this area by the Ontario Herpetofaunal Atlas, so the MNRF protocol for Milksnake surveys (which are often used to guide surveys for non-SAR species generally) could have been followed.

3.3.1.5. *Section 4.2.8.: Breeding Bird Surveys*

It is stated that the MNRF Guidelines for Bobolink and Eastern Meadowlark point counts were followed. These guidelines state that 3 surveys should be conducted, in the early, mid and late season. A third survey date for these species is not listed.

3.3.1.6. *Section 4.2.9: Bat Habitat Assessment Survey Methodology*

It is noted in this section that survey methods targeted habitat for Little Brown Myotis, Northern Myotis and Tri-colored Bat, but that surveys were conducted in leaf-off condition, focusing on tree cavity assessment. However, surveys for Tri-colored bat habitat must be conducted in leaf-on condition, as Tri-colored Bats nest in leaf clusters.

3.3.1.7. *Section 4.2.10: Bat Acoustic Survey Methodology*

It is noted on page 29 that “any calls with a positive identification were manually vetted by a wildlife ecologist with training in bat species identification by sonagram.” Calls noted as “NoID” should also be vetted by an ecologist with training, as *Myotis* sp. calls are frequently recorded without identification to species. The three *Myotis* species that occur in southern Ontario (as well as the Tricoloured Bat *Perimyotis subflavus*) have very similar calls that cannot always be identified by auto-ID algorithms, but all *Myotis* and *Perimyotis* species are considered Endangered.

3.3.1.8. *Section 4.3. Headwater Drainage Feature Assessment:*

Typically, an assessment of potential HDF is done prior to going on site using orthoimage interpretation or ArcHydro analysis to look for drainage features that have a catchment of 2.5 ha or larger. The report should describe how this was completed.

3.3.2. Section 5. Field Survey Results

3.3.2.1. *Section 5.2.1 Insects*

Giant Swallowtail (S3) was not included in the mapping of significant species on Figures 7a and 7b. It was omitted because its host plant, Prickly Ash, was not observed within the areas where the butterfly was observed. However, nectaring habitat is important for butterfly species and this species should have been added to the mapping in order to inform mitigation.

3.3.2.2. Section 5.2.6 Turtle Basking Habitat and Nesting Survey Results

It should be noted that Midland Painted Turtle's S4 status does not indicate "common and secure" as stated on page 36. The S4 status definition, according to NatureServe Conservation Status Ranks (which are used by NHIC) is: "Apparently Secure– At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors."

In addition, Midland Painted Turtle has recently been evaluated by the Committee on the Status of Species at Risk in Canada (COSEWIC, 2018) as a Species at Risk in Canada with a status of Special Concern, indicating a greater level of concern about its status.

On page 27, it was stated that turtle nesting surveys were not completed due to absence of suitable habitat, so this section should not refer to nesting survey results. It is possible that both turtles observed on the golf course (Snapping Turtle and Midland Painted Turtle) nest on the golf course or in the southern extension study area and surveys should be conducted for nesting habitat.

The finding of a Snapping Turtle walking on land from one irrigation pond to another on June 11, 2019 (and described as an observation of a turtle "moving through the area"), is within the nesting window for this species and this was just as likely to have been an observation of a turtle searching for nesting habitat.

Locations of turtle observations should have been shown on Figure 7a (Significant Wildlife Habitat and Species at Risk Observations).

3.3.3. Section 6. Natural Heritage Feature Assessment

3.3.3.1. Section 6.2: Significant and Other Woodlands

This section should include a detailed discussion of why the analysis came to a different conclusion regarding the significance of woodlands E, F and G from the Regional Natural Heritage System's analysis. The potential functions of these woodlands to provide connectivity (i.e., stepping stone function) of Woodland D to adjacent features should be discussed. Review of aerial photography for this area indicates that Woodland E is less than 20 m from Woodland D, and should be investigated as a continuous part of Woodland D, as it is noted in Section 6.2.1 that woodlands within 20 m should be treated as a continuous unit.

3.3.3.2. Section 6.4: Significant Wildlife Habitat

This section notes that species of conservation concern include "species listed as S1 to S3 or SH by SRANKS and those listed on the Species at Risk in Ontario List as Special Concern."

However, neither the Natural Heritage Reference Manual nor the Ecoregion Schedules state that the species of Special Concern must be on the Species at Risk in Ontario List. As noted in Section 7.4.2.2, Midland Painted Turtle has been evaluated as a Species at Risk in Canada by COSEWIC, and should have been discussed here; its location should also be shown on Figure 7b.

The location of the Snapping Turtle (a Species of Special Concern) should have been shown on Figure 7a. This species should have been discussed, as it can rely on human-made habitat. While human-made habitat is excluded from some SWH (such as turtle overwintering habitat) it is not excluded as SWH for species of conservation concern.

3.3.3.3. *Section 6.7: Habitat of Endangered and Threatened Species*

As noted in Section 7.2 above, there are additional species that are listed in the background review sources that should be discussed in this section. Of these, there is the potential for two of these species to occur in the study area:

- Blanding's Turtle
- Jefferson Salamander

In addition, Snapping Turtle should be added to the discussion of SAR within the Limit of Extraction.

3.3.4. Section 7. Level II: Impact Assessment

3.3.4.1. *Section 7.2.1: Wetlands (Specifically Units SWD3-2a (Wetland 13200))*

This section discusses indirect impacts to this wetland, but the discussion is restricted to the hydroperiod. This wetland (and the surrounding woodlands) will become isolated from the surrounding landscape; they will be surrounded by the existing quarry to the east, and the quarry extension to the north, west and south. The removal of stepping-stone connections provided by Woodlands E and F will exacerbate the isolation of Woodland D containing the wetlands. Connections to the west will be severed. The remaining patch of natural habitat will be perched above the quarry floor on all sides. The impacts of fragmentation on this wetland should be discussed.

Impacts to wetland unit within this area would likely include a more rapid rate of drying in wetland and woodland soils, as well as increased temperature extremes because of increased winds, the increased heat island effect induced by the quarry's exposed rock, and increased ambient sunlight. This would likely affect Significant Woodlands and Significant Wildlife Habitat (Eastern Wood-pewee and Large Toothwort) as well as the wetland environment. A 15 m buffer would likely not mitigate this impact, as physical edge effects can be seen at a distance of greater than 15 m from the edge. Additional mitigation (in addition to the 15 m buffer) and monitoring for this impact should be discussed.

3.3.4.2. Section 7.2.2: Woodlands

As discussed with wetlands, the woodlands within the West Extension will be physically isolated and fragmented by the cumulative effect of the surrounding quarries, especially since the woodlands will become perched above the quarry floors. Woodland D, in particular, will be subject to high levels of drying winds, increased albedo from the surrounding quarries, and their function will decline. In turn, these impacts will likely lead to declines in insect populations that are important as prey species.

Connections to the Medad Valley (identified as a Regional linkage) to the west are severed, and this connection would be highly important to animal movement through the landscape and persistence of meta-populations within Woodland D.

3.4. Section 9. Regional Official Plan

The only mitigation proposed for the loss of a unit of Significant Wildlife Habitat (Woodland E) is compensation through the rehabilitation plan. As noted in Halton's EIS guidelines, section 3.7.2., *"It is important to note that compensation for feature removal or anticipated negative impacts is not acceptable under the ROP."* Thus, removal of this woodland would result in negative impacts to the Natural Heritage System.

Avoidance is preferred over compensation. As noted previously, the function of Woodland E to provide linkage and other benefits to the Natural Heritage System should be further examined, particularly as this woodland is considered part of the Regional NHS and is in very close proximity to Woodland D. In Google imagery, the closest distance between Woodland D and Woodland E appears to be approximately 10-15 m (i.e. it is not greater than the 20 m considered to be the threshold for considering Woodland E separately), and so the function of Woodland E as a potential part of Woodland D should also be examined. The role of Woodland E in contributing to Eastern Wood-pewee and bat maternity roost habitat (for example in terms of numbers of nest sites, habitat area, foraging habitat, etc., as well as the potential importance of this area in the future when the connections to the north and south are removed) should also be considered in more detail. The rationale for avoidance of, rather than compensation for, impacts should be considered.

3.5. Section 11.2. Jefferson Salamander Habitat Creation and Enhancement Opportunities

This section notes (Paragraph 1) that: *"despite that no direct or indirect impacts will occur to Jefferson Salamanders or their habitat, habitat creation and enhancement opportunities have been identified for this species."* It is proposed to restore 4 ha of agricultural land between the eastern woodland south of the quarry, where Jefferson Salamander has been noted breeding, to an adjacent woodland to the

west, where Jefferson Salamander has not been observed despite repeated surveys in several years, and despite apparently suitable habitat.

The objective of the habitat creation is stated in paragraph 3 of this section: *“This would enhance JESA habitat by providing increased coverage of summer refuge and overwintering habitat and improve connectivity between the two existing woodlands... The design of this restoration could also increase opportunity for JESA breeding by incorporating pit and mound construction techniques.”*

Though it is not stated in the NETR, it is clearer in the Progressive and Final Rehabilitation and Monitoring Study that the proposed restoration is to address Section 110 of the Regional Official Plan, especially C:

C) Priorities for restorations or enhancements to the Greenbelt and/or Regional Natural Heritage Systems through post-extraction rehabilitation shall be based on the following in descending order of priority:

[i] restoration to the original features and functions on the areas directly affected by the extractive operations,

[ii] enhancements to the Greenbelt and/or Regional Natural Heritage Systems by adding features and functions on the balance of the site,

[iii] enhancements to the Greenbelt and/or Regional Natural Heritage Systems by adding features and functions in areas immediately surrounding the site,

[iv] enhancements to that part of the Greenbelt and/or Regional Natural Heritage Systems in the general vicinity of the site, and

[v] enhancements to other parts of the Greenbelt and/or Regional Natural Heritage Systems in Halton.

D) Restorations or enhancements shall proceed immediately after extraction in a timely fashion.

Comments on the proposed restoration and enhancement are as follows:

- This proposal is speculative, without even rudimentary detail to support feasibility. There is no certainty that created ponds would provide a sufficient hydroperiod and water quality for Jefferson Salamander to breed. There are no goals or objectives that drive the restoration, so no assurance that the restoration would create persistently suitable habitat for the long term.
- Jefferson Salamander has a high fidelity to its habitat, and is a notable habitat specialist. If Jefferson Salamanders are not present in the western woodland, there is no basis to speculate that they would use the restored habitat. The western woodland may not be suitable for

Jefferson Salamander. There are many habitat needs that must be met for this species that have not been explored, such as the presence of breeding ponds with suitable hydro period and water quality, small mammal burrows to provide overwintering habitat, invertebrate prey populations, and downed woody debris to provide refuge for post-breeding adults and transforming juveniles.

- Salamander breeding and overwintering habitat is associated with mature woodlands, with their associated attributes of deep shade, leaf litter, high soil humidity, small mammal populations to provide burrows and abundant ground dwelling invertebrates to provide prey. It would take decades for the restored area to provide sufficient shade, humidity and hibernation sites to become suitable for Jefferson Salamander. If the quarry extensions had impacts on groundwater, the restoration site (even if it were feasible) would likely be too late to restore sufficient habitat to ensure Jefferson Salamander survival in this area.
- Jefferson Salamander movements are difficult to predict without movement studies. There is no evidence to show that salamanders would move in this western direction so that it could function as a linkage. More detailed studies of salamander movements and habitat needs should be conducted.
- The potential for creating an ecological sink should be considered. The western woodland and restoration site would be within 120 m of the southern extension boundary, with the potential that these could be affected by the quarry.
- This proposal does not address the primary recommendation in the Jefferson Salamander Recovery Strategy (2018): *The short-term recovery approaches should focus on the protection of existing populations of the Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) by minimizing further loss or degradation of known habitat or potential recovery habitat. Recovery approaches should also focus on verifying, documenting, and monitoring the distribution and habitats used by extant, historic, and potential subpopulations. Developing and evaluating mitigation and restoration techniques, actively conducting research, and developing long-term management activities should also be prioritized to ensure the recommended recovery goal will be achieved*

There is no evidence that this proposed restoration would enhance habitat for Jefferson Salamander. The restored area would likely function as a small patch of disturbed forest habitat. Sufficient baseline detail should be supplied to show that it is at least potentially feasible. Goals and objectives should be provided to guide the restoration. Even as a preliminary suggestion, the restoration should be proposed according to "SMART" principles: the restoration goals should be "specific, measurable, agreed-upon, realistic and timebound".

4. Comments on Site Plan

- Details should be provided on the timing and extent of amendments to the existing license.
- Removal of all habitat surrounding Woodland D and its accompanying wetlands, as well as removal of the linear strip that creates a setback to the existing quarry, will mean that Woodland (and associated wetland) D will effectively become an island. Linkage of key natural heritage features is essential to maintain their ecological integrity, and maintenance and enhancement of linkage is required by the Niagara Escarpment Plan.
- The requirement for exclusion barriers has not been stated. Two turtle SAR are known to occur in the area of the west extension and south extension. Mitigation for turtles should have been included (barriers to prevent turtles from entering the construction area and to prevent them from falling into the quarry following excavation). This would apply even if they were only “moving through”, as was stated in the report.

5. Comments on Surface Water Assessment Report

1. Surface water thresholds for wetland hydroperiod are proposed in this report (Section 6.4). It is noted on Page 86 that *“If the wetland water level drops to zero at a monitoring location (0.0 water level staff gauge reading) before the hydroperiod threshold stipulated in the previous table, the applicable mitigation measures described in Section 6.5 are to be implemented while the cause of the potential impact is evaluated to determine if it has been caused by extraction and/or quarry dewatering.”* These thresholds are therefore critical for maintaining wetland functions related to hydroperiod.

The thresholds are not sufficiently conservative to protect the function of these ponds should the quarry affect their hydroperiod. Pond functions such as amphibian breeding rely on “good” years (years where water remains late into spring and summer) to make up for years where ponds dry up unusually early. The individual monitoring results for each wetland shown in Tables 32 to 35 show that these wetlands generally dry up in late spring or early summer, while the monitoring thresholds in Table 42 show thresholds in the early spring, generally the end of April or beginning of May. Wetlands that consistently dry up in early spring have low capacity to support amphibian breeding and other functions. Later thresholds should be established to ensure standing water is maintained for long enough to promote amphibian breeding and other functions.

Wetland 13023 (the wetland immediately to the west of the south extension, which supports SWH for breeding amphibians as well as Painted Turtle), is not included in these analyses. The report should discuss monitoring and thresholds for this wetland, even though it is supported by quarry discharge.

6. Comments on Progressive and Final Rehabilitation Monitoring Plan

1. The rehabilitation monitoring plan includes only monitoring of surface and ground water - no terrestrial monitoring of habitat or monitoring of wildlife to determine if the rehabilitated wildlife habitat features are functioning according to their specified purposes. Monitoring of biota should be included.
2. The Plan relies heavily on pumping of water from the quarry to replace any surface water deficits that may affect wetlands in the future. This is discussed below in Section 8 (last paragraph).

7. General Comments on Adaptive Management Plan

1. A general comment is that the groundwater triggers should be more clearly explained by a graphic such as a flow chart. A clear indication of timelines between the trigger and the remedial action should be provided, as it appears from this analysis that the timeline could be a year or more.
2. The AMP does not contain any monitoring of anything other than groundwater and surface water. Biological monitoring of remaining features should be proposed.
3. The AMP chart should clearly identify targets for monitoring (which should include biota), thresholds against which monitoring will be measured, and concrete, meaningful actions to be taken should there be a clear indication that the quarry is affecting biota through impacts on surface or groundwater. The actions should include potential cessation of extraction.
4. The most important, central mitigation technique proposed by the Adaptive Management Plan to mitigate future surface water deficits in wetlands or streams is to maintain them by pumping water from the quarry. This means that if there is uncertainty as to the ability to maintain the pumping in perpetuity then it affects the entire mitigation plan. We have concerns about the uncertainty of relying so heavily on the ability to maintain pumping, considering uncertainty regarding so many factors (e.g. continued water supply and its quality, land ownership, financial viability) decades in the future.

8. Detailed Comments on Adaptive Management Plan

Page 8 (4th para): It is noted that *"trigger values set based on the traditional approach have caused numerous false positive trigger exceedances"*. Have these "false positives" been noted within the existing Nelson Quarry itself or is this a comment that applies to quarries in general?

It would be helpful if the groundwater triggers could be more clearly explained by a graphic.

Page 8 (5th Para): It is stated that *"Prolonged climatic changes mean sustained periods of departure from "normal" precipitation amounts, for example droughts."* Climatic changes that result in greater rainfall, or more extreme rainfall events, have also been predicted as a result of climate change. Both these eventualities should be referenced. It is stated that short-term trends (seasonal) *"should not cause a concern if an exceptionally dry year results in water levels that drop below a minimum reported or predicted water level"*.

As noted previously, breeding amphibians depend on "good" years that allow high levels of reproduction that compensate for bad years, and so the number of years with extreme low levels of water in breeding ponds must not increase. This should be taken into account when providing thresholds.

It appears that several years would be needed to determine the thresholds that would indicate whether there are impacts on groundwater. This means the potential period of inaction would likely be much longer than one year. If groundwater is increasingly affected by the quarry extensions, there is the possibility that the known salamander pond southeast of the quarry could be affected before any action is taken. A clear graphic of the timelines should be provided, and scenarios, based on potential impacts on Jefferson Salamander and taking into account climate change impacts, should be provided to help resolve triggers as quickly as possible.

Triggers described here refer only to groundwater and surface water parameters. Since the objectives from the Region's guidelines specifically refer to terrestrial features and functions, the triggers should go beyond surface water and groundwater and include monitoring of biota. The objectives of the Aggregate Resources Reference Manual (Section 4, page 34) specifically require that "features and functions (including implications on terrestrial systems) be identified and that meaningful observation data should be collected relative to each to ensure that the observed data are evaluated relative to effects on these features and functions" (Region of Halton, undated).

It is noted in Section 7.3 on Page 38 that should pumping cease in the West Arm of the West Branch of the Mount Nemo Tributary of Grindstone Creek, fish habitat would be affected. It should also be noted that the small amphibian breeding pond associated with this tributary meets the criteria for Significant Wildlife Habitat. This breeding pond must also be maintained. Water quality of quarry water as a mitigation measure needs to be monitored, as quarry water may have high conductivity, and amphibian larvae are highly sensitive to increased conductivity. Conductivity should be monitored in ponds maintained by quarry discharge.

9. References

Region of Halton. Undated. Aggregate Resources Reference Manual Regional Official Plan Guidelines.