

# Law Quarry

## JART COMMENT SUMMARY TABLE- Natural Environment Report- Level 1 & 2 Assessment

### NIAGARA REGION

January 2023

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<p>1. Section 3.4 - Drainage, surface water and hydrogeologic conditions – S. 3.4 notes “A small agricultural swale is mapped by NPCA in the northern portion of the extraction area, discharging north toward the Onondaga Escarpment. [...] Based on air photo interpretation it drains to several isolated wet pockets northeast of the site, but likely contributes ultimately to Biederman Drain.”</p> <p>Appendix 2 (Agency Consultation) notes the following comment from Regional staff: “A high level/general water balance will be required to demonstrate no hydrologic impacts to the wetlands. The report should describe the pre- and post-development surface water drainage patterns and assess impacts to the wetlands.”</p> <p>Based on observations during the site visit, there is a network of intermittent headwater drainage features on the site that conveys surface water toward Wainfleet Bog and Biederman Drain.</p> <p>S. 3.7.7 of the report should acknowledge the presence of the surface water drainage feature network. Additionally, the report should explicitly acknowledge and address any impact associated with changing surface water inputs to Wainfleet Bog and Biederman Drain from an ecological perspective (also see related Fish Habitat comments #5-11 below).</p>	<p>Appendix 5</p>	<p>The report has been updated to include details pertaining to a network of headwater drainage features within the field area that conveys ephemeral flows toward the Wainfleet Bog PSW and Biederman Drain. See discussion provided below under comment #6 and subsequent responses related to hydrologic changes and impact discussion.</p>
<p>2. Section 3.5.1, Figure 4 - Vegetation Communities and Dominant Flora - ELC communities were largely classified to Community Series or Ecosite. Specificity to vegetation community type was not provided. It is understood why this would be done for non-conforming communities (i.e. CUT2), but it is not clear why the FOD or SWT communities were not further refined.</p>		<p>All vegetation communities on this site, including lands adjacent to the proposed license area, are the product of historic and ongoing anthropogenic influence and disturbance. Such disturbances have enabled the establishment of abundant non-native species and dynamic successional assemblages. As such, most of the observed and delineated ELC polygons are non-conforming, and very few are representative of ‘natural’ community assemblages.</p> <p>Like ecosite CUT2 (which the reviewer acknowledges is reasonably non-conforming), SWT polygons contain a high proportion of coverage by non-native shrub species; particularly Common Buckthorn (<i>Rhamnus cathartica</i>), leading to difficulty in assigning an appropriate community classification. However, given the prevalence of Willow species within</p>

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<p>In addition, it would be helpful for the reader to reference unique polygon numbers to distinguish between vegetation communities in the report and on mapping.</p> <p>It is recommended that ELC communities be refined to vegetation type where possible or include a brief rationale why ELC communities were only able to be classified to Community Series or Ecosite level.</p> <p>Please also include ELC polygon numbers on mapping and cross-reference in text.</p>		<p>this polygon, the best fitting community is SWT2-2: Willow Mineral Thicket Swamp Type. This has been revised in the report.</p> <p>While the FOD communities outlined in the report contain a variety of trees species, the dominant species is Black Walnut. It was our opinion that the manual did not provide an accurate community or even ecosite for these polygons. Furthermore, as the FOD polygons were located outside of the proposed license area, with no expectation of direct impact, we were satisfied that a high-level classification was sufficient, relying on in-text descriptions to provide reviewers with required details. In an effort to satisfy the reviewers concern, we have revised the report to apply the ecosite FOD4 to these polygons. Although not ideally suited, this ecosite describes upland deciduous assemblages with less than 10% Sugar Maple and tree species associates that are either relatively uncommon or a result of disturbance or management. Given the clear history of disturbance, this ecosite appears reasonably appropriate and has been applied in the revised report.</p>
<p>3. Section 3.6.4 – Bats - This section notes: “The largest density of snags/cavity trees that were confined to the southeast corner of the surveyed area within the swamp thicket community. Even then these clusters of snags/cavity trees only provide marginal habitat potential due to their later stages of decline.” No further data was provided on the results of these surveys. Notably, the snag density for each community investigated should be provided to determine whether high quality roosting habitat for SAR bats may be present.</p> <p>Please provide the field results from these surveys, including snag density calculations.</p>		<p>The locations of snag trees have been added to Figure 4 with results of the survey and snag density calculations provided in the updated report.</p>
<p>4. Section 3.6 – Wildlife – The intro sentence of S. 3.6 states that one (1) reptile was observed, however S. 3.6.5 indicates Eastern Gartersnake and Dekay’s Brownsnake were observed.</p> <p>Please revise text to note that two (2) reptile species were observed.</p>		<p>The report has been updated to address this error/omission.</p>
<p>5. Section 3.7.1 notes the presence of small wetland pockets in the southeast portion of the subject lands as well as the northern portion of the site. These wetland pockets were determined to be unsuitable for complexing with the Wainfleet Bog PSW due to either the small size or the distance from the PSW. NPCA staff have indicated no objection to this.</p> <p>However, there is no indication in the report of any intent to compensate for the removal of these other wetland features. This should be explored further and a discussion of same included in the report.</p>		<p>Formal compensation for proposed removal of small, non-PSW features has not been explored. The goal with respect to these features has been to assess function and determine if removal can be accomplished in conformity/compliance with relevant planning policies and environmental regulations. From a practical perspective, as these features have not been identified as providing any unique or significant wetland-specific functions, there has been no impetus to propose any formal compensation/offsetting strategy related to the non-PSW features.</p> <p>Notwithstanding, we note that general rehabilitation planning is intended to address re-naturalization of the site in a more comprehensive manner than focusing on replacement of individual, discrete features. Rehab planning focuses on promoting a functioning natural area post-extraction that includes wetland/aquatic features, which we believe is sufficient in this context. Specifically, the Rehabilitation Plan includes the creation of aquatic habitats/shallow shoreline areas along the north extraction limit. Approximately 1.0ha of aquatic habitats/shallow shoreline habitat will be created. The details for the creation of these habitat feature are included on Page 4 of the Site Plan.</p>
<p>6. Section 3.7.7 - Fish Habitat – S. 3.7.7 (Fish Habitat) begins with the statement “No watercourses, surface water features (e.g., rivers, creeks, drainage features, etc.) or other hydrological connections are present within the site or study area.” Based on observations during the site visit, there is a network of headwater drainage features on the site that conveys surface water from/across the site, toward, and presumably to, Biederman Drain. The confluence was not examined during the site visit.</p>		<p>Throughout the field there are a series of headwater drainage features that convey overland flow in a south to north direction before converging within the cultural thicket community (CUT2).</p> <p>For background on why these features were not adequately identified/addressed in the original report, we note that the field is actively worked and planted for cash-crop agriculture on an annual basis. Most of the smaller channels that develop within the field are subject to regular tilling and are not regularly visible on the ground, especially once crop cover is established. Moreover, all channels throughout the field are ephemeral, subject to rapid spring drying and assumed to only be flowing during spring melt and larger storm events. These channels were highly visible and quite</p>

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<p>The presence of the surface water drainage feature network on the site should be acknowledged and considered as appropriate.</p>		<p>pronounced during the Nov 2022 peer review site walk; however, this is not the representative condition and was largely due to a lack of active crop cover and a large precipitation event that occurred in the days leading up to the walk.</p> <p>A follow-up site assessment was undertaken on June 9, 2023 to review the current status of these features. During this visit, channels within the field ranged in width from 35 to 180 cm and a depth of 5 to 28 cm, noting that channel structure is likely highly dynamic from year to year. The width and depth of channels generally increases closer to the CUT2 community; however, based on the uniform shape, depth and width of channels toward the north end of the Site, it is estimated that some of these channels have been intentionally dug to provide outlets and improve field drainage. During the spring 2023 visit, portions of the channels that are shallow in depth had been planted in cash crop cover, while deeper portions of the channel had been avoided. All channels were dry during this site visit, confirming the headwater nature of the features.</p> <p>At the convergence in the CUT2 community, there is a channel with a bankfull width of 140 cm and bank height of 30 cm. Vegetation is present along the length of the feature, both within and adjacent to the channel, including visible root systems from adjacent vegetation. This feature meanders through the CUT2 community before reaching a deciduous swamp community, at which point the defined channel is lost. While there were no abrupt drops along the channel, the feature does descend the steep topography of the Onondaga Escarpment and disperses into a swamp community. The swamp community may support temporary standing water in spring but does not support a persistent surface connection to the Biederman Drain. It is estimated that spring runoff from the headwater feature conveys flow to the swamp during spring flooding conditions, which is then conveyed off site indirectly via the Biederman Drain. However, following spring melt, there is no direct connection to the Biederman Drain.</p>
<p>7. Section 3.7.7 - Fish Habitat - It is currently proposed that all dewatering from the new quarry be directed to Eagle Marsh Drain. Flow that originates from the headwater drainage feature network mentioned above will no longer go to Biederman Drain. Effectively, the drainage network mentioned above will cease to exist. Based on aerial imagery and observations during the site visit, this feature is ephemeral and it probably does not meet the definition of fish habitat within the site. This does not, however, preclude it providing seasonal fish habitat downstream from the site.</p> <p>An assessment of the fish habitat potential of the headwater drainage feature that flows from the site downstream from the site (i.e., between the study area and Biederman Drain) and an assessment of the potential effect of its elimination should be provided.</p>		<p>We concur that the feature does not represent fish habitat within the site. The connectivity between the ephemeral headwater feature and the Biederman Drain is described above in comment 6. The flow path of the tributary crosses over the Onondaga Escarpment and disperses through a swamp community with no open channel. The site visit in June 2023, confirmed that there is no direct connection to the Biederman Drain. On this basis, there is no expectation that the ephemeral feature provides direct fish habitat. In terms of contributions to downstream seasonal fish habitat, the Hydrogeological Report and subsequent discussion provided in this matrix have concluded that there will be no measurable impacts to flow in the Biederman Drain. Changes would not exceed any natural variation in annual precipitation rates. On this basis, we predict no potential negative impacts to fish habitat within the drain.</p>
<p>8. Section 3.7.7 - Fish Habitat – S. 3.7.7 of the report states that approximately 2% of the catchment area of Biederman Drain will be intercepted by the quarry and redirected to Eagle Marsh Drain but it does not discuss the effect of this on the hydrology and ecology of Biederman Drain. The proportion of the total drainage area of Biederman Drain that is redirected has relevance at the watershed scale, but the proportion of the drainage area upstream from where drainage from the site enters Biederman Drain that is eliminated is relevant to assessing the potential impacts of the proposed flow redirection to the proximate reach of Biederman drain. The</p>		<p><b>WSP:</b></p> <p><i>To answer this comment, we again refer to the baseline and full development water balances provided in Tables H.6.2 and H.7.2, Appendix H, of the Level 1 and 2 Water Report (note that groundwater discharge to the watercourses in the Biederman Drain subwatershed is simulated using “drain” boundaries in the tables).</i></p> <p><i>Under baseline conditions, the discharge from the groundwater system to the watercourses is about 98 m<sup>3</sup>/day (1.1 L/s). An average water surplus of 427 mm/year is estimated in Section 2.6 (page 28) of the Level 1 and 2 Water Report. As per Table H.6.2, only about 10 mm/year is estimated to recharge to the groundwater system from direct precipitation and the Wainfleet Bog; therefore, the remainder of about 417 mm/year is inferred to flow as surface runoff in Biederman Drain. Over the subwatershed area, this is equivalent to an average flow rate of about 20,790 m<sup>3</sup>/day</i></p>

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<p>proportion of the drainage area that is eliminated will decrease with distance downstream and where this occurs, based on the size of tributary drainage areas and points of entry, could be useful in predicting the downstream extent of any potential hydrologic impacts. Knowing the portion of the Biederman Drain drainage area that was eliminated by the existing quarry could also be of interest from the cumulative effects standpoint.</p> <p>Please assess the potential hydrologic impacts to the proximate and downstream reaches of Biederman Drain and their potential effect on fish and fish habitat.</p>		<p>(241 L/s). As such, the discharge from the groundwater system to Biederman Drain represents only about 0.5% of the average flow in the drain under baseline conditions.</p> <p>At full extension quarry development, the discharge from the groundwater system to the Biederman Drain is predicted to decrease to 0.1 m<sup>3</sup>/day (&lt;0.01 L/s). Therefore, the predicted change in discharge from the groundwater system to the Biederman Drain is equivalent to the loss of a precipitation event of 2 mm within the subwatershed. As noted in Section 2.6 (page 28) of the Level 1 and 2 Water Report, the average annual precipitation for the study area is 984 mm. The predicted loss of groundwater discharge to Biederman Drain equivalent to 2 mm represents 0.2% of the average annual precipitation and would therefore not be distinguishable from the natural variation in the annual precipitation rates.</p> <p>In summary, under baseline conditions, groundwater discharge to the Biederman Drain represents a very small proportion of the total average flow in the drain. Furthermore, the small predicted loss in discharge would be masked by natural variation in the annual precipitation rates.</p> <p><b>RiverStone:</b> There are no anticipated impact to fish and fish habitat for the Biederman Drain based on the findings of the Hydrogeological Report.</p>
<p>9. Section 3.7.7 - Fish Habitat – S. 3.7.7 states that quarry extension drawdown and effects on the deep bedrock aquifer will not influence the flow regime of Biederman Drain. No information is provided to support this statement.</p> <p>Please support the statement that quarry extension drawdown and effects on the deep bedrock aquifer will not influence the flow regime of Biederman Drain. This might be achieved by integrating the results and discussion from the Level 1 and Level 2 Water Report, which is assumed to be “the hydrogeological investigation”, which is referred to but not referenced. Revise the text to reflect that hydrogeologic impacts are not the only possible impacts.</p>		<p><b>WSP:</b></p> <p>Please see response to JART Comment 8 above. We note that the water balances provided in Appendix H of the Level 1 and 2 Water Report incorporate the effects of the predicted drawdown in the deep bedrock aquifer.</p> <p><b>RiverStone:</b> There are no anticipated impact to fish and fish habitat for the Biederman Drain based on the findings of the Hydrogeological Report.</p>
<p>10. Section 3.7.7 - Fish Habitat - No information is provided with respect to the fish habitat or fish community in Eagle Marsh Drain nor are the potential impacts of increasing discharge to that drain assessed.</p> <p>Please provide information regarding fish habitat and the fish community in Eagle Marsh Drain and assess the potential ecological effects of increased flow.</p>		<p>The Eagle Marsh Drain is a combination of a Class E and F Agricultural Drain that contains critical spawning areas in the southern portion (NPCA Watershed Plan 2010), while areas north of Highway 3 are part of the headwater region. Type E drains have permanent flow, warmwater thermal regime and top fish predator species along with other baitfish/minnow species. Type F Drains are intermittent and dry up more than two months of the year. There is a control structure at the outlet of Eagle Marsh Drain to protect inland properties from flooding.</p> <p>The Hydrogeological Assessment predicts that Quarry Discharge to Eagle Marsh Drain upstream of Highway 3 will increase by 35% over baseline. The most significant change will be in the spring at full development, at which point the discharge rate is only 6% of the Drain capacity and not expected to overwhelm the capacity. The conclusion of the Hydrogeological Assessment indicates that the increased quarry discharge, with the exception of boron, improves the water quality in the drain. Additional input from WSP further clarifies that, <i>although the total flow volume proposed to be discharged to the Eagle Marsh Drain (EMD) is predicted to increase due to the enlarged quarry footprint, the existing sump pump and discharge rate will not be altered once excavation of the extension lands proceeds (i.e., the existing instantaneous discharge flow rate to EMD will not change). Rather, the pump will be run for longer periods to account for the increase groundwater inflows and increased incident precipitation due to the larger quarry footprint.</i></p>

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		<p>Water quality will be monitored as per the recommendations in the Hydrogeological Assessment and notes on the Site Plan.</p> <p>Additional relevant discussion provided below in response to comment #11 &amp; 12.</p>
<p>11. Section 3.7.7 - Fish Habitat - No information is provided with respect to the quality of quarry discharge water as it relates to fish. This should be addressed.</p> <p>An assessment of whether there are potential effects to fish in the receiving watercourse (Eagle Marsh Drain) as a result of the water quality of quarry discharge should be provided.</p>		<p>The Hydrogeological Assessment discusses the existing and predicted water quality in the Eagle Marsh Drain and discharge water from the existing quarry. The report provides that the baseline conditions in the Drain exceed the provincial water quality objectives for total phosphorus and iron and occasionally un-dissociated hydrogen sulphide. The baseline exceedances make the Eagle Marsh Drain a Policy 2 receiver, that should not be degraded further and all practical measures should be taken to improve the water quality. The current discharge improves the existing condition in the Drain with respect to TP, iron and un-dissociated hydrogen sulphide. Boron concentrations are increased above background, but still below the Canadian Environmental Quality Guidelines. In general, the existing and future quarry discharge improves the water quality in the Drain and no negative ecological impacts are predicted.</p> <p>With respect to the temperature, the report indicates that the existing quarry discharge is about 1C warmer than the surface water in the Eagle Marsh Drain, resulting in a downstream temperature increase of less than 0.5C, which is considered marginal and not predicted to negatively impact the ecological function of the Eagle Marsh Drain.</p>
<p>12. Section 3.7.7 - Fish Habitat - The Natural Environment Report does not assess the potential to achieve benefits to fish and fish habitat by managing discharge from the quarry during operations or post-closure.</p> <p>Please assess the potential to achieve benefits to fish and fish habitat by managing discharge from the quarry during operations and post-closure.</p>		<p>See response to #11. Benefits to fish habitat are achieved through quality improvements in quarry discharge to Eagle Marsh Drain. Additionally, increased volume of discharge to Eagle Drain may have a stabilizing effect on upstream baseflow in Eagle Marsh, potentially increasing the extent of direct fish habitat in portions of the drain that presently provide indirect/temporary habitat.</p> <p>Regarding fish habitat in Biederman Drain, there is potential for benefits resulting from a reduction of seasonal sedimentation derived from headwater flows. Under current conditions, the annual formation of headwater channels in the field through surface erosion is assumed to convey substantial sediment loads into the Biederman Drain. Under proposed conditions and diversion of flows from the Biederman Drain, sediment would no longer be conveyed from the field on site into the drain.</p>
<p>13. 5.2 - Provincially Significant Wetlands - The third paragraph notes: "The physical effects that were assessed in detail in the groundwater modeling and analysis included in the Level 1 and Level 2 Water Study Report suggests that because the quarry will be lowering the groundwater elevation in the bedrock, extraction has the potential to "under-drain" the thick clay layer which underlies the bog. However, the under-draining effect is minimal and will take decades to propagate to the surface waters of the bog due to the thickness of the clay Section which underlies it. Therefore, the hydrogeological changes to the bog will be so low as to be "immeasurable" during the operational phase of the quarry. Surface water discharging from the proposed extraction area is intercepted by the Biederman Drain and a minor change in the annual water balance is interpreted to have an immeasurable effect on the wetland."</p> <p>Potential long-term groundwater impacts that will affect the Wainfleet Bog are concerning.</p> <p>Please provide additional rationale to support the conclusion that the impact is 'immeasurable', and/or clarify how this potential long-term impact on the bog will be considered and addressed.</p>		<p><b>WSP:</b></p> <p><i>The water balance for the Wainfleet Bog consists of four components: precipitation as an input and evapotranspiration as an output, neither of which are affected by the proposed quarry extension. The third and fourth components, discharge from / recharge to the groundwater system and surface runoff, are the only components of the water balance for the Wainfleet Bog which could potentially be impacted. Since precipitation and evapotranspiration are fixed, a change in discharge / recharge would yield an equal and opposite change in surface runoff.</i></p> <p><i>The simulated baseline and full development water balances are provided in the Groundwater Numerical Model Documentation (<b>Appendix H</b>) of the Level 1 and 2 Water Report (WSP, March 2022), in <b>Tables H.6.2</b> (page H-37) and <b>H.7.2</b> (page H-41), respectively (note that groundwater discharge to / recharge from the Wainfleet Bog is simulated using "river" boundaries in the tables).</i></p> <p><i>Under baseline conditions, there is a net recharge from the Wainfleet Bog to the groundwater system of about 125 m<sup>3</sup>/day (1.4 L/s). At full extension quarry development, the net recharge from the Wainfleet Bog to the groundwater system marginally increases to about 132 m<sup>3</sup>/day (1.5 L/s). The increase in recharge of 7 m<sup>3</sup>/day equates to a precipitation event of less than 0.01 mm in the Biederman Drain subwatershed and would not be "measurable" when compared to the natural variability in annual precipitation rates. Since there is an increase in the recharge to the groundwater system, this would result in a marginal decrease in surface runoff out of the Wainfleet Bog of about 7 m<sup>3</sup>/day.</i></p>

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		<p>We note that the minimal change predicted in the net recharge from the Wainfleet Bog to the groundwater system is not unexpected given the thick clay deposits underlying the bog and is consistent with previous studies completed by Environment Canada (Crowe et al., 2002).</p> <p><b>RiverStone:</b> per the notes provided above by WSP, the pre- to post-development change in water balance of the Wainfleet Bog is considered immeasurable in comparison to natural variability in annual precipitation rates. We interpret such minor change to be negligible in terms of potential ecological changes. That is, there is no predicted change in vegetation community composition, habitat availability, or long-term viability of the feature.</p>
<p>14. Section 5.2 - Provincially Significant Wetland - The last point notes that a detailed groundwater monitoring program will be undertaken, with annual monitoring reports submitted to NDMNRF or MECP. The duration of monitoring is unclear.</p> <p>Please clarify the duration of the monitoring program.</p>		<p>The Hydrogeological monitoring notes have been updated on Page 3 of the Site Plan to include the monitoring plan outlined in the WSP Hydrogeological Report (Note M3 and Table 1 on Page 3). The Hydrogeological Site monitoring notes are cross-referenced in the updated Natural Environment Site Plan notes.</p> <p>The Hydrogeological Site Plan monitoring notes (Note M3 on Page 3) states the following:</p> <p><i>“The proposed long-term monitoring program outlined in Table 1 to be completed during the quarry extension operational and rehabilitation phases, until stable conditions are observed after quarry decommissioning;</i></p>
<p>15. Section 5.3.2 - Eastern Whip-poor-will - Based on the correspondence provided in Appendix E, it appears that consultation with MECP is on going regarding the need for an Overall Benefit Permit. The results of the permitting process may have implications on the proposed rehabilitation plan.</p> <p>Please confirm the status of this consultation with MECP and when the outcomes will be made available for review.</p>		<p>Consultation regarding Eastern Whip-poor-will and Spoon Leaved Moss has occurred with the MECP. The MECP has agreed that the following new Site Plan note that has been added to Page 3 of the Law Quarry Extension Site Plan addresses the MECPs requirements for species at risk confirmed on site:</p> <p><i>Prior to any development or site alteration occurring within the identified Whip-poor-will Category 2 habitat and within 50m of the outer limit of the identified spoon leaved moss colonies, the Licensee shall consult with the MECP and obtain an authorization under the Endangered Species Act, if required.</i></p> <p>We also note that the results of the permitting process will not necessarily have implications for the rehabilitation plan as benefit to Eastern Whip-poor-will can be demonstrated through payment to the Species at Risk Conservation Fund. This means that while on-site habitat restoration may be a goal of the rehab plan, it is not the only option for obtaining a permit.</p> <p>MECP has no outstanding comments regarding this ARA Licence Application.</p>
<p>16. Section 5.7 - Rehabilitation - This section notes that “vegetation will be added to create terrestrial habitat”.</p> <p>S. 5.7 would benefit from additional details and/or rationale on the target ecological communities proposed within the rehabilitated areas. Long-term water quality of the quarry lake should be a primary concern to be addressed through rehabilitation, given its adjacency to Wainfleet Bog and future wildlife usage.</p> <p>Please provide additional details on the target ecological communities within proposed rehabilitation areas. Please also include a summary of the terrestrial habitat objectives that were considered in the design, and if/how the proposed rehabilitation areas contribute to water quality in the context of ecological features and functions. In addition, please provide an analysis of pre- to post-habitat areas to demonstrate the replacement ratio of natural cover.</p>		<p>The Rehabilitation Plan site plan notes (Page 4) have been revised and updated to provide additional details and requirements for the targeted ecological communities. An updated Species Planting list has also been included on the Revised Site Plan. The updated Rehabilitation Plan identifies the creation of three different types of Habitat Features as described below.</p> <p><b>Additional Information of the Target Ecological Communities to be created through Rehabilitation:</b></p> <p><b>1. Shallow Shoreline / Cliff and Talus Habitat Features</b></p> <p>The shoreline area along the northern portion of the Licence will be rehabilitated to Shallow Shoreline and Cliff &amp; Talus Habitat. The target ecological communities to be created through rehabilitation will be riparian and wetland-type habitats (e.g. MAS, MAM). In addition, areas of exposed quarry face will be left along the northern portion of the extraction area and will be rehabilitated to Cliff &amp; Talus habitat (e.g. CLO and TAO/TAS). These habitats will be strategically located adjacent to the Wainfleet Bog and Onondaga Escarpment Brow.</p>

Due to the presence of the Wainfleet Bog PSW and existing shrub talus habitats in very close proximity to the area to be rehabilitated, it is anticipated that this large, naturalized feature should facilitate sufficient natural dispersion of vegetation material to the shallow shoreline / Cliff & Talus rehabilitation areas along the north end of the extraction area. Natural regeneration of the vegetative communities in these areas will be supplemented with the planting of appropriate riparian, aquatic, and shrub species. Within the shallow shoreline and talus areas, organic substrate (e.g. topsoil) will be placed to support the establishment of aquatic and riparian vegetation. In addition, habitat features such as large boulders, stumps, root wads etc. will be placed to provide cover for aquatic species.

This rehabilitated ecological communities will be an improvement over the predominately agricultural condition of the area, and will add a diversity of ecological communities and wildlife habitat in an ecologically strategic location.

The amount of areas to be rehabilitated to shallow littoral / cliff & talus Habitat will be about 2.0ha.

## 2. Upland Terrestrial Side-slope and Undisturbed Set-back habitat features

The upland restoration sites will be planted, via seed mix and nodal tree/shrub plantings, to create a reforested area over time. The target ecological communities in the upland terrestrial habitat restoration areas will be comparable to the existing forest type in the adjacent lands to the north of the Site. Notably, the Deciduous Forest type (ELC code FOD4) that extends in areas adjacent to the northern Licence boundary along the Onondaga Escarpment Brow.

The intent of the nodal planting suggested in the Upland Terrestrial Side-slope and Undisturbed Set-back habitat feature areas is not to immediately restore the communities to a climax state (e.g. FOD), but rather to establish the conditions by which a target climax community can develop through natural ecological succession processes over time and along a pre-determined ecological trajectory. Plantings in this area with an overabundance of species too early in the process may result in the failure of the foundational community structure to develop.

This Rehabilitation upland habitat will be located within the above-water side-slope rehabilitation areas surrounding the lake and in the northern unextracted area located adjacent to the SWH area to the North of the Licence Boundary. Presently, these areas are in a predominately agricultural condition, and the proposed rehabilitation of these areas to terrestrial upland habitat will result in the creation of approximately 14.4ha of habitat.

## 3. Quarry Islands and Grassland/Prairie Habitat Features

The rehabilitated landform of the quarry includes the creation of three "islands" that will be surrounded by a lake with a water depth of about 7-11m. No extraction or disturbance is permitted in these "island" areas as they contain Archaeological Sites that will be permanently protected. As no ground disturbance, including tree planting, is included in these areas, they will be restored to a native Grassland/Prairie Habitat. The area will be tilled and seeded with a grassland/prairie habitat seedmix. The target ecological community will be CUM with the intention to potentially evolve to CUT and CUS.

The amount of area to be rehabilitated/restored to a Grassland/Prairie Habitat will be 9.8ha.

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		<p>Natural Cover – Pre and Post Extraction</p> <p>Currently, the area that is proposed to be Licenced and extracted is in a predominately agricultural area that is comprised of cash crops.</p> <p>Approximately, 7.3ha of Cultural Thicket and Swamp areas are proposed to be removed as part of the proposed extraction. These communities were not identified as Significant in the Natural Environment Report/EIS and only about 0.2ha of SWT community is located within the Natural Heritage System of the Growth Plan. However, the Rehabilitation Plan proposed to create a total of about 26.2ha of new upland terrestrial, cliff/talus, shallow shoreline, and grassland/prairies habitat.</p> <p>Water Quality</p> <p>As shown on the Rehabilitation Page of the Site Plan, surface water from the rehabilitated areas of the site will flow towards the rehabilitated lake area and not overland towards the Wainfleet Bog. As outlined in the Level 1 and 2 Water Report, there will be no hydrogeological connection between the quarry lake and the Wainfleet Bog to the north. Therefore, the water quality in the quarry lake will have no impact water resources in the Bog.</p> <p>Surface water flow through the retained portions of existing FOD between the Site and the wetland and represent an improvement in the filtration function to the wetland over existing conditions as it will replace a portion of lands currently used for agriculture/row crops.</p> <p>In time, the upland habitat areas proposed for rehabilitation into forest (i.e. FOD target) will add to the area of significant woodland and represents an improvement over the existing agricultural condition of the area, both in terms of woodland size and the expansion of wildlife habitat. Rehabilitation in this location will include ground cover that will filter out sediments from surface flows and contribute to maintaining water quality in the quarry lake and adjacent Bog.</p>
<p>17. Section 5.7 - Rehabilitation - The report and site plans do not mention whether soil reuse and/or transplanting existing native plant material will be considered as part of the rehabilitation efforts.</p> <p>Please comment on whether opportunities to reuse soil on site and/or transplant existing native plant material were, or can be, considered in the ultimate rehabilitation plan.</p>		<p>O.Reg 244/97 under the Aggregate Resources Act requires that all topsoil be stored on-site and used in progressive and final rehabilitation. The Site Plan outlines how topsoil will be stripped, stored and used in progressive and final rehabilitation see Site Plan Notes E on Page 3 and the Note D on the Rehabilitation Plan (Page 4).</p> <p>Although no transplanting on native plant material is proposed, use of the on-site top-soil in progressive rehabilitation will allow for some native vegetation to re-establish from the seedbank contained in the on-site soil resources.</p>
<p>18. Section 6.5 - Provincial Policy Statement (2020), pursuant to the Planning Act, R.S.O. 1990, c. P. 13 - There are incorrect references in this section to the 2014 PPS and Ecoregion 6E.</p> <p>Please update all references to the 2020 PPS and Ecoregion 7E.</p>		<p>The report has been updated to address this error/omission.</p>
<p>19. Figure 4 - Targeted survey locations and ecological communities - Spoon-leaved Moss and Bat Snag survey locations are not shown on Figure 4.</p>		<p>Figure 4 has been updated to provide the locations of documented bat snags; however, no specific survey locations are available as the site was surveyed in a comprehensive manner and not through plot survey approach. This information has also been added to appropriate section of the report. No data is available regarding specific Spoon-</p>



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Please add Spoon-leaved Moss and Bat Snag survey locations to the figure.		leaved Moss survey locations, as these surveys were undertaken using a non-targeted, 'wondering transect' approach within on-site thicket communities following initial incidental observations.
20. Figure 4 - Targeted survey locations and ecological communities - It does not appear that nocturnal amphibian call surveys were undertaken at the northwest SWT community.  Please provide rationale as to why nocturnal amphibian call surveys were not undertaken at the northwest SWT community.		Per Figure 4, Anuran stations #2 and #4 were situated a relatively short distance from the SWT polygon in the NW corner of the Site. The initial survey included a walk along the interface of field/natural cover before determining specific locations at which to focus survey efforts. Survey stations were then established in areas exhibiting prominent calling activity and/or areas with clear availability of suitable conditions (i.e., open water). Surveyors opted not to establish a station at the northwest SWT location during the initial survey due to a lack of either indicator of potential habitat. We note that the two SWT polygons along the northern license boundary are very small and marginal in their wetland conditions, representing subtle inclusions within the surrounding CUT2 ecosite. The comparable SWT polygon adjacent to Anuran station #2 lacked prominent calling activity and was observed to be dry prior to the third survey.
21. Figure 6 - Development Plan, Biophysical Constraints and Recommendations - The Significant Woodlands and Significant Wildlife are shown using the same symbology which is confusing when referring to the buffers for each feature type. Please revise Figure 6 to distinguish between SWH and Significant Woodlands.		The symbology for the adjacent natural heritage features and their required setbacks has been revised on the Site Plan to be clearer. The Significant Woodland Boundary is the same as the PSW Boundary. Figure 6 has been updated with distinct boundaries of Significant Woodlands and Significant Wildlife Habitat.
22. Appendix 2 - Agency consultation - Regional staff note that: "consider adding turtle surveys to their work program to definitively confirm presence/absence. The final Natural Heritage Evaluation should include an assessment of potential turtle habitat within the study area and include appropriate rationale if targeted turtle surveys (following an approved survey protocol) were deemed to not be necessary." It does not appear that turtle surveys were completed, nor was rationale provided in the report as to why they were not completed.  Please provide justification as to why turtle surveys were not undertaken.		Turtle surveys were not conducted largely due to a lack of suitable habitat within the proposed licence area and the Site as a whole. Despite the presence of small swamp thicket ecosites, these features are marginal and functionally equivalent to surrounding upland vegetation communities in terms of their potential value for turtles. On-site SWT2 (now SWT2-2) ecosites provide only shallow areas of standing water over mineral substrates for short periods of the year, drying up by mid spring. We note that a small pond (presumably an excavated farm pond) is present in the SE corner of the Site. A follow-up site visit in June 2023 confirmed that this feature was dry by mid spring, lacking a prolonged hydroperiod, sufficient depth of standing water, or mucky substrates that would be required to support various forms of turtle habitat. On-site SWT2 features also support very dense woody vegetation cover, which generally precludes the ability to conduct effective visual surveys for turtles. Conditions within these wetland features are not supportive of overwintering habitat for turtles, nor do they support conditions that provide seasonal basking, foraging, or nesting functions. While turtles are assumed to occur within the Wainfleet Bog PSW (e.g., Midland Painted Turtle, Snapping Turtle), there would be no practical purpose in conducting surveys to confirm this, as a habitat-based approach is most logical in this scenario.
23. Appendix 3 - Photos - Photo 5 refers to an SWD community, but this does not appear to be present on Figure 4.  Please confirm which community photo 5 is referring to.		This photograph is of the deciduous swamp area located off the property to the north. ELC was not completed for this area. Photograph has been removed from the photo appendix.
24. Appendix 5: Table 1 - Results of desktop screening and on-site assessment for SWH - Column 1 of this table indicates the SWH categories for Ecoregion 6E, however this project location is in Ecoregion 7E.  Please change the reference, and any associated content to that which is relevant to Ecoregion 7E.		The report has been updated with revisions to Appendix 5 Table 1, including correction of the Ecoregion reference.
25. Appendix 5: Table 1 - Results of desktop screening and on-site assessment for SWH - Rare Vegetation Communities - Cliff and Talus Slopes: A TAS1 community is located within the adjacent lands and is not discussed in the table.  Please acknowledge the TAS1 community in Table 1.		The report has been updated with revisions to Appendix 5 Table 1, including discussion on the presence of the TAS1 community on adjacent lands.

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<p>26. Appendix 5: Table 1 - Results of desktop screening and on-site assessment for SWH - Other Rare Vegetation Communities – This category is difficult to assess since the ELC communities were only classified to Community Series or Ecosite. For this reason, it is unclear whether any of the ELC communities are provincially rare.</p> <p>Please clarify if ELC communities can be further refined to Vegetation Type (ref. comment # 2). If so, please re-assess this category of SWH using the most current provincial list for Rare Vegetation Communities (S1-S3).</p>		<p>As discussed regarding comment #2, two high-level ELC classes used in the report have been further refined, with one refined to community level (SWT2-2) and the other to ecosite level (FOD4). Community type SWT2-2 is not considered rare. RiverStone has reviewed the community types under ecosite FOD4 that have a provincial S ranking of between S1-S3/S4, of which there is only one: Dry-Fresh Hackberry Deciduous Forest Type (FOD4-3). Based on the vegetation cover observed within the on-site FOD4 ecosite, there is no potential that the on-site polygon is representative of this provincially-rare community type.</p>
<p>27. Appendix 6 - Flora documented within the study area between 2017 and 2019 - An S2 species Yellow-fruited Sedge (<i>C. annectens</i>) was noted in the vascular plant list and has not been discussed in the remainder of the report. S2 species are considered very rare in Ontario and should be considered under SWH for Special Concern and Rare Wildlife species.</p> <p>Please confirm in which community this species was detected and acknowledge this species under the SWH for Special Concern and Rare Wildlife species category.</p>		<p>The documentation of <i>Carex annectens</i>, Yellow-Fruited Sedge in the report is the result of a misinterpretation of field data, likely a mis-translation of field notes for 'Yellow Sedge' (<i>Carex flava</i>), or misidentification of the very similar <i>Carex vulpinoidea</i> ('Fox Sedge'). There are no records in RiverStone's site data for documented occurrences of <i>Carex annectens</i>, which would have been expected given the experience of the botanist that conducted the surveys.</p>
<p>28. Appendix 7 - List of wildlife species - The wildlife list is missing several key details such as: federal, provincial, regional status information; number of individuals observed; date(s) observed; breeding evidence and corresponding level of breeding (possible, probable, confirmed). Tufted Titmouse, Dickcissel and Tennessee Warbler are interesting observations that warrant more details.</p> <p>Please update the wildlife list to include the following details: federal, provincial, regional significance / status information; number of individuals observed; date(s) observed; breeding evidence and corresponding level of breeding (possible, probable, or confirmed).</p>		<p>Appendix 7 has been updated with federal and provincial significance rankings, with a separate breeding bird table added that included dates of observation and location of observations that correspond with stations provided on Figure 4 of the report. Regional significance rankings have not been added as this is not considered applicable within the context of the application. Numbers of individuals are discussed in the report for relevant species/groups only, where number of individuals influence potential significance status and/or permitting metrics (e.g., calling anurans, Eastern Whip-poor-whil).</p> <p>Regarding the noted bird species, Tufted Titmouse (station 3), Dickcissel (station 8), and Tennessee Warbler, the following explanations are provided:</p> <ul style="list-style-type: none"> <li>• <b>Tufted Titmouse</b> (S3) is acknowledged to be a rare permanent resident of the region (NPCA Natural Areas Inventory). This species was recorded vocalizing at a single point count station (#3) and on route to stations #3 from #2 (likely the same individual). Field notes indicated that the calling originated west of the site near the transition to wetland cover. This species was documented during the second survey only (out of three total surveys). The reasonable interpretation of this data is that the species is not using on-site habitat for breeding, with the single observation likely representing an incidental occurrence or evidence of habitat on adjacent lands. It is our opinion that this does not influence the assessment of the significance of on-site habitat features.</li> <li>• <b>Dickcissel</b> (S2) is described as an 'occasional visitor' to the region per the NPCA Natural Area Inventory. The Site is generally outside of its known breeding range; however, the species is widely described as transient and erratic in its movement patterns. A single female Dickcissel was observed at station #8 and subsequently heard at a distance from station #9 (presumably the same individual), during the second survey only. The reasonable interpretation of this data is that the species is not using on-site habitat for breeding, with the single observation likely representing an incidental occurrence of a ranging individual. It is our opinion that this does not influence the assessment of the significance of on-site habitat features.</li> <li>• <b>Tennessee Warbler</b> is described as a 'common transient' in the region per the NPCA Natural Area Inventory. The breeding range of this species begins much further north, with the Site located within the migratory range. Regardless, upon closer review of field data, it is suspected that translation of written field codes resulted in observations of Yellow Warbler (YEWA) being misinterpreted as Tennessee Warbler (TEWA). This species is not expected to occur on the site and is also not regarded as a rare species. This has been revised in the report data accordingly.</li> </ul>

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		Updates have been provided in the report accordingly.
<p>29. Appendix 7 - List of wildlife species - Species at Risk: Bank Swallow (THR) and Peregrine Falcon (SC) vocalizations are noted but no further explanation is provided in the report. Note that the SWH table in Appendix 6 notes that Bank Swallow was not identified during targeted surveys. This requires clarification.</p> <p>Please provide additional information on breeding status, habitat suitability within the study area, and rationale on why/how these species will not be impacted.</p>		<p>A table had been added to Appendix 7 that outlines results of breeding bird surveys.</p> <p>Discussion related to the suitability of habitat for Bank Swallow is outlined on Appendix 4 of the report, with the conclusion that suitable nesting habitat is not present on the site. The SWH assessment table was correct in stating that no Bank Swallow were observed during targeted breeding bird surveys; however, an incidental observation was recorded during the course of other field surveys. Based on available data, there is no evidence that suitable nesting habitat for this species is available on the Site.</p> <p>Peregrine Falcon has been added to Appendix 5, Table 2. This species is highly unlikely to use the site as nesting habitat due to the lack of tall, steep cliffs or other suitable structures. Observations of this species were incidental in nature, including general perching, but not indicative of active use of the Site.</p> <p>Suitable habitat for both of these species has been made through anthropogenic activities on adjacent lands (existing quarry). This habitat is anticipated to remain and may be expanded through proposed post-extraction rehabilitation measures within the Site.</p>
<p>30. Appendix 8 - Results of 2017 Calling Anuran Surveys - Regarding AN2 – the comments indicate that there were abundant calls coming from the ‘marsh’, however no MA community is present in this area.</p> <p>Please clarify which community these comments are pertaining to and confirm whether abundance thresholds were met for SWH: Amphibian Breeding Habitat.</p>		<p>Based on a review of field notes, it is suspected that this issue is a result of a mistake in translation of field data, i.e., a potential hold-over note from a recycled survey summary document. Field notes for station #2 on the second survey indicate that no calling activity was occurring at this station during the survey. The report has been updated accordingly.</p>
<p>31. Appendix 9 - Site plans (prepared by MHBC) - The site plans appear to show ecological constraints such as Eastern Whip-poor-will habitat and wetlands. However, they do not appear to show the extent of Spoon-leaved Moss locations.</p> <p>Please update site plans to display the extent of Spoon-leaved Moss.</p>		<p>The Site Plans have been revised to identify the Species at Risk habitat locations and constraints.</p>