Michalski Nielsen
ASSOCIATES LIMITED

March 10, 2020

Mr. Matt Holmes, Manager of Planning Services
Town of Bracebridge
1000 Taylor Court
Bracebridge, Ontario P1L 1R6

Re: Addendum Number 2 to our Environmental Impact Study for Muskoka Royale College, Responding to the July 14, 2019 Peer Review Comments; Our File 3517

Dear Mr. Holmes:

Attached please find our Addendum Number 2 (draft) to our Environmental Impact Study (EIS) for Muskoka Royale College, replying to the July 4, 2019 peer review comments from Hutchinson Environmental Services Limited (HESL). Our letter dated May 28, 2019, entitled "Clarification and Supplementary Technical Information on our Environmental Impact Study for Muskoka Royale College" serves as the first addendum to our report; these two addendums compliment the information in the original EIS and are considered the best means of updating that EIS. **This addendum is being provided to Town staff and the peer reviewer as a draft, to allow for an initial review, then a meeting to clarify any potential outstanding matters, prior to it being finalized.**

The July 4, 2019 peer review from HESL spoke to 32 original recommendations from their firm on our EIS, 8 of which were considered by HESL to have been fully resolved through our May 28, 2019 correspondence (Addendum Number 1). An additional 9 comments were matters also considered resolved but on which they had suggested we update the EIS with our response; in subsequent discussion with the peer reviewer, it was agreed that the original report plus the two addendums to it provided a more transparent means of updating the EIS, therefore no further response to those particular comments is required either. There are therefore 15 of the original 32 comments requiring further response.

Table 1 provides all of the updated recommendations from HESL. Michalski Nielsen Associates Limited's (MNAL's) response to each is then provided. Where more detailed technical information forms part of that response, that information is provided in the referenced appendices (**Appendices A – H**, which are attached). To facilitate a final response from the peer reviewer, space has been left in the table for sign off or any final comments HESL may have.

Several of our comments make reference to the Site Plan Control process which will accompany each phase of development as the approval process advances. This staged Site Plan Control approval process will

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allow for details on mitigation measures to be refined. That process is important, as this is a development which will occur over many years, perhaps decades, and which will be driven by market demand. All development will be restricted to the locations of the identified development precincts and associated access roadways.

The EIS that was prepared for this project included 18 specific recommendations which serve as an environmental blueprint, if you will, for the build out of the school. This addendum provides clarification on some of those recommendations, and nine new recommendations to address the peer review comments, bringing the total number of recommendations of the EIS to 27. The Site Plan Control process, which includes a commitment to the preparation of an EIS to accompany each phase of the development, provides the opportunity to demonstrate to municipal planning staff of exactly how each of these environmental commitments will be fulfilled.

For the purposes of clarity, **Appendix A** provides all of the original recommendations from the EIS, with any amendments or additional recommendations provided in blue text. It is this list of recommendations which will help guide the Site Plan Control process for each project phase, and which will be specifically addressed in the EIS report to accompany that phase.

Further to a meeting held with the Town of Bracebridge and its peer reviewer on February 25, 2020, and subsequent discussions between Town planning staff and the planner for Muskoka Royale College, the Town has noted that a holding provision will be applied to each precinct; the removal of that holding provision for each phase of development will be subject to, amongst other matters, the Town's acceptance of the EIS completed for that phase, including specific justification within that EIS of any portion of a buffer which is to be less than 30 m. The Town has also noted that the institutional zoning that is being applied to each development precinct will establish a maximum 50% lot coverage and a minimum 30% landscaped area within the precinct, the latter including areas left in a natural state.

I trust this addendum is complete and, together with our first addendum of May 28, 2019, appropriately responds to all of the peer review comments. Please do not hesitate to contact the undersigned should you have any questions or comments.

Yours truly,

MICHALSKI NIELSEN ASSOCIATES LIMITED
Per:

Gord Nielsen, M.Sc.
Ecologist
President

ATTACHMENTS

Table 1. Peer Review Response

APPENDIX A – CONSOLIDATED RECOMMENDATIONS FROM EIS

APPENDIX B – FURTHER JUSTIFICATION OF PROPOSED WETLAND BUFFERS

APPENDIX C – RECOMMENDED ENVIRONMENTAL PROTECTION AREAS, AND DESCRIPTION OF REQUIRED ENCROACHMENTS INTO THESE

APPENDIX D – RESULTS OF ADDITIONAL VERNAL POND SURVEYS COMPLETED IN 2019

APPENDIX E – RESULTS OF ADDITIONAL SURVEYS COMPLETED FOR COMMON NIGHTHAWK AND WHIP-POOR-WILL IN 2019

APPENDIX F – SUPPLEMENTARY INFORMATION ON THE DEER YARD AS A WHOLE, AND DISCUSSION OF POTENTIAL LOSSES IN FUNCTION, INCLUDING CUMULATIVE IMPACTS OF OTHER POTENTIAL DEVELOPMENT WITHIN IT

APPENDIX G – UPDATED COPY OF TABLE 9 FROM THE EIS REPORT, INCLUDING A CORRECTION FOR THE MATHEMATICAL ERROR IN THE MNRF PROTOCOL

APPENDIX H – UPDATED COPY OF FIGURE 4 FROM THE EIS REPORT, PROVIDING A LEGEND FOR THE ELC CODES

Table 1. Peer Review Response.

HESL Peer Review Recommendation #	Updated Recommendation From HESL	MNAL Response	Additional Comments from HESL
1	Please clarify what the maximum cleared area around all development within precincts would be at full build-out and provide this % footprint.	This development will be phased over many years. The maximum cleared area around buildings and other facilities will be determined at the detailed design stage for each phase of development as part of the Site Plan Control process. However, it will generally average no more than 10 m. The updated recommendations in **Appendix A** include that there be an EIS prepared for each phase of the development, to be submitted as part of the Site Plan Control process. The municipality is required to approve Site Plans before any works can proceed. The Site Plan Control process, and associated completion of an EIS for each such application, provides an opportunity to confirm that the total extent of clearing for each area of development, as well as on full build-out of this property, is kept to a minimum. A majority of the property will remain undisturbed over the long term. The cumulative extent of development, including all associated clearing and site disturbance, will be included with each Site Plan Control application. The EIS has demonstrated that development at the scale that is proposed on this property can be accommodated with no negative impacts. We appreciate the acknowledgment in Section 3.0 of the peer review that this development footprint is relatively modest.	
2	Original comment related to request for additional details on intended civil works within each development precinct, with response having been that this was a Site Plan detail. Resolved.	No further response required.	
3	Please clarify whether effects are calculated from the edge of each precinct or from the edge of the development footprint.	This development will be phased over many years, with the exact limits of development (beyond being restricted to the identified precincts and roadways) not having been finalized. A site-specific EIS will be submitted in support of each Site Plan Control application as part of this staged development process. As part of that exercise, impacts will be determined from the edge of the final development footprint, which is to be calculated as the clearing limit. The clearing limits will specifically consider the provision of buffers to wetlands and watercourses, which are targeted to be 30 m wherever feasible, and with a variable buffer approach to ensure a minimum average buffer of 30 m around every wetland.	
4	We recommend a minimum 30 m buffer around all wetlands and watercourses. If the 15 m buffer width is to be applied, we reiterate the need to provide ecological justification as per our original recommendation.	Further justification of the opportunity to use buffer averaging, with a minimum 30 m buffer adjacent to Henry Marsh and an average buffer of minimum 30 m, but with possible area-specific reductions to a minimum 15 m adjacent to other wetlands and warmwater watercourses, is provided in **Appendix B**. New mapping in that appendix demonstrates that very large buffers, much broader than 30 m, will be applied in a majority of circumstances. Exact limits of buffers will be determined and justified through the detailed design stage and Site Plan Control process. Per the recommendations included in **Appendix A**, a minimum 30 m buffer will be provided wherever that is feasible. However, there may be some instances where this cannot be achieved; in such instances, any reduction in buffer width to less than 30 m will be justified through the site-specific EIS which is to be completed in support of that Site Plan Control application. Further, and as included in the consolidated recommendations in **Appendix A**, **there is a commitment to ensure a variable width buffer width of a minimum 30 m average around every wetland within this property**. Variable width buffers are commonly employed throughout the Province. **Appendix C** includes a figure providing clarity on the minimum buffers around each wetland and watercourse. Purple shaded areas are wetlands or riparian corridors with wetland attributes. The blue lines are the better-defined intermittent or permanent tributaries on the subject lands, including all having any potential as fish habitat. The pink line is the minimum 30 m buffer that we have recommended around Henry Marsh, with the green line being the minimum 15 m buffer limit we have recommended around the	

HESL Peer Review Recommendation #	Updated Recommendation From HESL	MNAL Response	Additional Comments from HESL
		remainder of the wetland and watercourse features; all areas within these identified limits have been zoned Environmental Protection (EP). There will be very limited development within the protected EP zones, but this will include road segments, identified as 1 to 4 in the figure in **Appendix C**. A justification for each of these encroachments into the EP zones is also provided in **Appendix C**.	
5	We recommend that the EIS be revised to read that all buffers will be zoned as Environmental Protection.	The proposed Zoning By-law amendment has incorporated minimum buffers within the EP Zone. The Site Plan Control process provides a mechanism to add to these minimum buffer dimensions and to ensure the long-term protection of all such additional buffers.	
6	Original comment related to alternative routing of internal road within deciduous swamp, south of Precinct D, which has been done. Resolved.	No further response required.	
7	Please clarify the route of the road into Precinct D and explain why mapping shows it within the 15 m wetland buffer and outside the defined Precinct Development Area.	**Appendix C** includes an updated figure which provides clarity on the revised road at the entrance into Precinct D, showing it outside of the minimum 15 m buffer.	
8	We recommend that the table summarizing field survey effort be included in an updated version of the EIS.	That information was included in the MNAL letter of May 28, 2019, which forms an addendum to the EIS and is part of the public record. As this document provides transparency around the peer review process that was completed, it is appropriate that it remains an addendum to the EIS, and that the original study not be updated. No further response is therefore required.	
9	We recommend that additional surveys for amphibians be completed or a conservative approach be used which assumes the presence of Significant Wildlife Habitat and factors that presence into determination of buffer widths.	All wetlands providing amphibian habitat will be protected and buffered. As stated in our letter of May 28, 2019, a minimum buffer of 30 m is to be provided adjacent to Henry Marsh and an average buffer of minimum 30 m, but with some latitude for site-specific adjustment down to 15 m, will be provided adjacent to all other wetland features. The final buffer configurations and widths will need to be justified through the site-specific EIS to be prepared in support of each individual Site Plan Control application. The updated EIS recommendations included in **Appendix A** provide clarity on how buffers are to be addressed in those EIS reports. We believe this approach to be very conservative, and one which provides robust protection for all wetland functions, including amphibian breeding habitat. Possible impacts on amphibian breeding habitat will be considered in relation to any site-specific reductions of wetland buffers below 30 m. As such, we do not believe additional amphibian surveys are warranted at this time.	
10	We recommend that an updated version of Figure 2, which labels survey locations, be included in an updated version of the EIS.	That information was included in the MNAL letter of May 28, 2019, which forms an addendum to the EIS and is part of the public record. Therefore, no further response is required.	
11	Original comment requested explanation of why amphibian surveys were not completed in the eastern portion of the property, with response being that no habitat was present within that area. Resolved.	No further response required.	

HESL Peer Review Recommendation #	Updated Recommendation From HESL	MNAL Response	Additional Comments from HESL
12	We recommend that the results of the additional 2019 vernal pool surveys be included in an updated version of the EIS. Any vernal pools that are identified in these surveys as amphibian breeding habitat should be located outside the development footprint, with at least a 30 m buffer around them.	The results of the additional 2019 surveys of the vernal pools is provided in **Appendix D**. No amphibians were heard in these features in 2018. Despite the very wet spring conditions in 2019, none were large enough to qualify as Significant Wildlife Habitat for woodland amphibians. None of the vernal pools had egg masses or tadpoles in them in 2019.	
13	Original comment requested additional information on breeding bird survey methodology and locations, which was provided. Resolved.	No further response required.	
14	We recommend that the results of the additional 2019 Common Nighthawk surveys be included in an updated version of the EIS.	Information on additional night-time surveys completed during 2019 for Common Nighthawk, as well as Whip-poor-will, are included in **Appendix E**. These were completed at both the eastern and western ends of the property. There were no recordings of either species during these surveys.	
15	We recommend that the detailed methods and survey locations of deer wintering habitat be included in an updated version of the EIS.	The MNAL letter of May 28, 2019 serves as an addendum to the EIS and is part of the public record. Therefore no further response is required.	
16	We recommend that the results of the deer wintering habitat surveys be included in an updated version of the EIS.	The MNAL letter of May 28, 2019 and the present correspondence form addendums to the EIS and are part of the public record. Note that information that is supplementary to this is included in A**ppendix F**.	
17	Please discuss the quality of the remaining MNRF identified Stratum 2 deer wintering area that occurs outside the property and assess its condition in terms of cumulative effects that might exist, such as other development pressures, road fragmentation etc.	Supplementary information on the deer yard as a whole is provided in **Appendix F**. This demonstrates that there are substantial areas of good winter cover outside of the portion of this deer yard within the subject property, and that access to retained areas of good winter cover within the subject property will remain viable upon development. The Site Plan Control process provides an opportunity to confirm that access to retained areas of good winter cover within the property is being maintained. As such there are no warrants for additional winter deer surveys. The District of Muskoka confirmed in the meeting of May 17, 2019 that they do not ever request more than a single year of surveying for winter deer cover, notwithstanding MNRF's advice in their "Deer Habitat Assessment 101", which is only a guidance document and has no official status in relation to the assessment of significant wildlife habitat.	
18	We recommend that the commitment to obtain supplementary information on aquatic habitat conditions at crossing locations as part of the Site Plan process be documented in the EIS.	The MNAL letter of May 28, 2019 forms an addendum to the EIS and is part of the public record. Therefore no further response is required.	

HESL Peer Review Recommendation #	Updated Recommendation From HESL	MNAL Response	Additional Comments from HESL
19	We recommend that the commitment to obtain supplementary information on rare vegetation as part of the Site Plan process be documented in the EIS.	The MNAL letter of May 28, 2019 forms an addendum to the EIS and is part of the public record. Therefore no further response is required.	
20	We recommend that the commitment to undertake bat maternity habitat surveys within Precinct E, as part of the Site Plan process, be documented in the EIS.	The MNAL letter of May 28, 2019 forms an addendum to the EIS and is part of the public record. Therefore no further response is required.	
21	We recommend that the locations and numbering of surveys for bat maternity habitat be included in an updated version of the EIS.	The MNAL letter of May 28, 2019 forms an addendum to the EIS and is part of the public record. Therefore no further response is required.	
22	Please explain how criteria provided in **Table 8** of the EIS are used to rank the quality of snag trees within individual plots.	As indicated in the EIS, the assessment is qualitative, but is dependent on the number of the criteria met within a certain plot, out of the ten criteria, generally as follows: 7 to 10 criteria met = high 4 to 6 criteria met = medium 1 to 3 criteria met = low This approach has been developed by MNAL, in conjunction with our sub-consultant Palmer, in order to provide a more standardized means of assessing the quality of woodlands, in the absence of any such standardized approach in the literature; it is an approach that our two firms have also employed on several other projects within the District of Muskoka.	
23	We recommend that the revised calculation on snag tree densities in **Table 9** be included in an updated version of the EIS.	An updated copy of **Table 9** is provided in **Appendix G**, and includes an updated snag density value in the final column, correcting for the mathematical error in MNRF's protocol.	
24	We recommend that further explanation of animal movement corridors be provided.	The MNAL letter of May 28, 2019, together with the present correspondence, form an addendum to the EIS and are part of the public record. Additional information on deer movement is included in **Appendix F**.	
25	Please reword text to clarify that wetlands on the property have not been evaluated for provincial significance.	Per our comments in our response of May 28, 2019, the wetlands on and adjacent to the property have not been evaluated for provincial significance. These wetlands have not been evaluated by MNRF and therefore have no designation as locally or provincially significant. Wetland evaluations can't be done at a property level, but must be done at a watershed level; in this jurisdiction, that is typically done by MNRF. It is our opinion that the status of wetlands on the property is immaterial to this application as all wetlands are to be protected with robust buffers which are sufficient to maintain the functions of these wetlands and which are consistent with what would be required for a PSW. Buffer averaging, as is to be employed in the protection of wetlands on this property, is commonly employed in establishing buffer limits around Provincially Significant Wetlands. **Appendix B** includes a detailed justification of the proposed buffer widths.	

HESL Peer Review Recommendation #	Updated Recommendation From HESL	MNAL Response	Additional Comments from HESL
26	Original request was that further detail on mitigation measures associated with watercourse crossings be provided, including possible use of exclusion fencing. Such information was provided. Resolved.	No further response required.	
27	Original request was that language of recommendations be strengthened, which was done. Resolved.	No further response required.	
28	Please clarify **Figure 4** so that the ELC codes can easily be read and interpreted with a legend.	**Appendix H** includes an updated copy of Figure 4.	
29	Original comment related to whether or not buffers were included in mapping of constraints; it was explained that minimum buffer requirements were included. Resolved.	No further response required.	
30	Please update EIS with the more recent references.	The MNAL letter of May 28, 2019 forms an addendum to the EIS and is part of the public record. Therefore no further response is required.	
31	Original comments related to whether there was information on where wildlife had been observed on site in 1999; it was explained that such data was not available. Resolved.	No further response required.	
32	Please update the scientific names of warbler species. Please explain breeding codes.	With respect to the scientific names of the warblers, this change was acknowledged in our earlier response of May 28, 2019. That document forms an addendum to the EIS and is part of the public record. Therefore no further response is required. With respect to the breeding evidence codes, these are as follows: x Observed. Species observed in its breeding season (no evidence of breeding). Presumed migrants should not be recorded. s Possible breeding. Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat.	

APPENDIX A – CONSOLIDATED RECOMMENDATIONS FROM EIS (NEW RECOMMENDATIONS, AND MODIFICATIONS TO PREVIOUS RECOMMENDATIONS, ARE PROVIDED IN BLUE FONT)

Site Plan Control Process

- **All future development within the development precincts, and on the identified roadways providing access to those precincts, is to be phased, with the specific requirements of each phase to be dictated by such factors as school build out objectives and market demand. Each phase of development will be subject to a Site Plan Control process. Amongst the municipal requirements for review and approval of those development phases will be a requirement for a site-specific Environmental Impact Study (EIS) for that phase. It is important to recognize that this is similar to many other larger scale, longer term projects which are developed in phases and which have Site Plan Control requirements.**

- **A biologist will provide input to the detailed design and implementation details associated with each development phase. The site-specific EIS, providing the guiding principles for development and including information on how each of the objectives of the original EIS, including all of the recommendations included herein, have been addressed. Any additional recommendations specific to that phase of development will be highlighted in each EIS.**

- **Detailed development plans will specify the total limits of site clearing and disturbance for each phase. The acreage of that clearing/site disturbance will be included in the EIS, together with the cumulative extent of clearing/site disturbance associated with all project phases to date, ensuring the objective of maintaining a majority of the site in a natural state is being adhered to.**

- **As part of each EIS, there will be specific discussion of the width of buffers to be retained adjacent to wetlands and watercourses. Additional buffer is to be provided beyond the minimum buffers already zoned Environmental Protection. Efforts will be made to provide a 30 m buffer wherever this can be achieved. Where this can't be achieved, there will be: (1) a rationalization of why a 30 m buffer cannot be achieved; (2) a demonstration that a minimum average 30 m buffer is still being provided around that specific wetland as a whole, as part of a variable width buffer approach; and (3) discussion on how ecological functions of the wetland will be retained with the final buffer dimension that is being provided. As with other aspects of the Site Plan, the rationalization of buffer widths will be subject to municipal review, an iterative process with municipal staff that could result in there being adjustments to the buffer dimensions.**

- **Additional materials that will be submitted with the site-specific EIS as part of each Site Plan Control application will, as a minimum, include:**

- **Detailed plans and drawings of all works; and**
- **A servicing report, providing details on grading, sedimentation and erosion controls, stormwater management facility design and location, and other servicing details.**

Additional Survey Work to Be Completed

- **For each intended road crossing, or for areas where roadways are otherwise very proximal to a watercourse, an updated aquatic habitat survey is to be completed in accordance with the MNRF Stream Assessment Protocol. That information will be used to inform the detailed design of the road or road crossing. Results of this survey work, and its implications on road and road crossing designs, are to be included in the site-specific EIS for that project phase;**

- **An additional survey for rare flora is to be conducted within each development precinct. Should any such vegetation be identified, the locations of such vegetation will be used to inform the location and detailed design of facilities to be built. Results of this survey work, and any implications it may have on facility locations and design, are to be included in the EIS for that project phase;**

- **A snag survey will be performed in Precinct E, to inform the Site Plan Control process associated with any works in that precinct. Additionally, because the extent of bat roosting habitat changes over time, updated snag surveys will be completed for any Site Plan Control application that is made subsequent to 2023. Results of such survey work, and the resultant calculation of the number of bat boxes to be installed as replacement habitat for bats, will be included in the EIS for all appropriate project phases.**

Internal Road Construction

- **The project biologist and engineer are to work together on a road layout which minimizes the extent of encroachment into the area of deciduous swamp south of Precinct D, and which ensures a sensitive design through this area. The alignment of this road is to be adjusted as far north as possible, to skirt along the north edge of that feature. The final design for this road is to be addressed as part of the EIS for that project phase.**

- **For the internal road following the Western By-pass alignment, the crossing of the permanent tributary at the east limits of the subject property is to be designed by the project engineer, with input from the project biologist, to avoid interference with fish passage, and to minimize impacts on fish habitat.**

- **All watercourse crossings are to be designed and implemented to avoid any short-term or longer-term impacts on water quality.**

- **As part of the final design of all roadways, the benefits of installing lengths of wildlife exclusion fencing will be considered, wherever this may be warranted, based on such factors as:**
  - **proximity to wetland features;**
  - **the volume of anticipated road traffic; and**
  - **the likelihood of amphibians or reptiles crossing the road at those locations.**

  Other measures to minimize impacts on reptiles, including low speed limits and signage, will also be considered. Discussion on whether or not there are warrants for exclusion fencing, or other measures to mitigate impacts on amphibians and reptiles will be included in the EIS for each phase of development. Should there be areas where exclusion fencing is installed, site visits will be subsequently completed to ensure it is being effective, or whether any adjustments to it are warranted. Likewise, ongoing site visits by biologists over the many years over which this project will be implemented provide an opportunity to review whether there are additional lengths of exclusion fencing warranted, based on any observed basking or crossing activity, or road mortality.

Construction Phasing and Management

- **Species at Risk sensitivity training is to be provided to all contractors before they commence any clearing, grubbing, grading, servicing and other heavy construction activities on this property. That training will focus on those species which they might potentially encounter, dependent on the nature and seasonality of work they are undertaking.**

- **All tree cutting, including that associated with internal roadways, is to be undertaken between September 30 and April 15, so as to avoid impacts on breeding birds and potential bat roosting and maternity habitat. Tree clearing is also to be phased, to avoid clearing more area than will be worked on during the subsequent construction season.**

- **Within Precinct B, which encroaches into an area of identified Stratum 2 deer winter yard, tree cutting is to be completed during the October – November period, before deer are yarding. This additional precaution will minimize the influence of heavy construction activity on any deer yarding in the broader area.**

- **Prior to any phase of tree-cutting, a site meeting is to be held with the tree removal**

contractor, architect, project engineer and project biologist to determine the specific limits of these works, and any associated requirements for staging and tree harvesting. A visible barrier, consisting of sediment fence, flagging or snow fencing, is to be used to delineate the specific limits of these works and avoid accidental encroachment into adjacent lands.

- **In clearing along the future permanent boundaries of new forest edges, staggered edges are to be created, through the selective removal of larger trees, and by maintaining saplings/young trees along these new edges. This is intended to make such new edges more resistant to windthrow and sun-scalding.**

- **At the time of determining tree removal requirements associated with individual phases of this development, the biologist must calculate, on the basis of the acreage of land to be impacted, the forest community types impacted, and the results of the previous inventories completed on snag tree density, the approximate number of snag trees that will be removed. One bat box is to be installed at a suitable location within/adjacent to this precinct for every four snag trees that will be removed. Calculations on required bat box numbers will be included in the EIS for each project phase. Bat boxes are to be constructed or purchased and are to be a minimum two chamber, 10" x 10" x 36" sized (or equivalent capacity). Literature on commercial bat boxes indicates that this size of bat box should accommodate up to 300 individuals. There is to be an effort to ensure some variations in the size and design of the bat boxes, while respecting this minimum size standard. Bat boxes are to be installed on either the trunks of mature trees or on poles, all at a height of 15' or higher (at top of box). Bat boxes are to generally be oriented to have some exposure to sun from the south. A biologist will oversee the implementation of these bat boxes, with every effort made to install all or a majority of bat boxes prior to April 15 of the season immediately following tree removals, such that an alternate habitat is available for any bats returning to the site that spring.**

- **At the onset of tree grubbing, and prior to any other earthworks, a heavy-duty silt fence is to be properly installed around the downgradient perimeter of all such works. Sediment fence is to consist of a minimum 4' high heavy duty filter fabric cloth, supported by paige wire affixed to t-bars. The sediment fence is to be properly trenched into the ground, with clear stone used to bury the bottom of the fencing where rock does not allow for such trenching. A qualified individual is to provide certification that the silt fencing has been properly installed. It is noted that by installing sediment fence in this manner, it will also serve as at least a partial barrier against the entry of species such as snakes and turtles into the work area.**

- **Additional sediment and erosion controls are to be installed, as deemed appropriate by the project engineer, as may be required, including temporary or permanent check**

dams at appropriate locations on any ditching associated with new roadways, and in areas adjacent to any watercourse crossings.

- **Sediment and erosion controls are to be inspected daily by the contractor, and at least monthly by qualified members of the project team. Any deficiencies in these controls are to be remedied immediately.**

- **Once an area has been grubbed, works are to progress as quickly as possible, with all disturbed areas to be stabilized by grading, then by seeding or sodding, as soon as can be practically achieved.**

- **Sediment and erosion controls are to be left in place and regularly monitored and repaired until such time as the lands which have been disturbed are certified by a qualified individual as being stable**.

Stormwater Management

- **The project biologist and engineer are to work together in the final design of stormwater management controls for each precinct, taking maximum advantage of the physical setting, which includes areas of gentle slope, retained forested lands, retained wetlands and retained stream buffers, all of which can be used to compliment and enhance other stormwater controls.**

- **Consideration is to be given to the components of a treatment train approach that provide quantity control benefits, which could include such measures as roof leaders draining to soakaway pits, additional topsoil depth in all yard areas; conveyance of flows through shallow ditching and bioswales which promote infiltration wherever possible, and discharging the stormwater management pond/wetland via level spreaders or rock fans, into either wetland areas or riparian buffers, both of which will provide detention.**

- **These same techniques are to be used to ensure that an equivalent of Enhanced (Level 1) water quality treatment is achieved through the treatment train approach.**

Precinct D – Elementary School

- **The project biologist is to work with the project engineer and architect in designing a crossing of this stream corridor which addresses the function of this stream as a wildlife corridor, including potentially for Blanding's Turtle. A small bridge structure is preferable to a culvert at this location.**

APPENDIX B – FURTHER JUSTIFICATION OF PROPOSED WETLAND BUFFERS

All wetlands and well-defined watercourses within the subject property have been zoned Environmental Protection and, with the exception of four identified roadway crossings, three of which capitalize on the District's future Western By-pass alignment, will never be disturbed as a consequence of the Muskoka Royale College development. Each of the proposed wetland road crossing locations is explained and justified in **Appendix C**.

At some point in the future, additional disturbance of some of the wetlands may occur as a consequence of the District's proposed Western By-pass road, an alignment that was approved through a Class Environmental Assessment process. That proposed road is a District project which is fully independent of the Muskoka Royale College project. As the intent of that road is to ease congestion through Bracebridge only in the event that the traffic volume of vehicles passing through town roads en-route to or from cottage areas ever reaches a point where it is creating too much congestion, it is possible it will never be built. Even if it is built, the warrants for its construction are likely decades away. While we cannot speak for District or provincial requirements at such a future time, it is difficult to imagine a situation where this road would not undergo further environmental scrutiny, quite potentially resulting in less encroachment into wetlands within the Muskoka Royale College property than is presently proposed. Regardless, none of that is within the control of the owners of the Muskoka Royale College property and the District has stipulated that an easement over this road alignment be granted to them as a condition of project approval. They have also required that the roadway into this property follow that alignment.

The Environmental Protection zoning that has been recommended for wetlands and well-defined watercourses on this property includes buffering. For Henry Marsh, a 30 m buffer has been zoned as the minimum limits of protection. For all other wetlands and well-defined watercourses, a minimum 15 m buffer has been zoned for protection. However, the protections to be afforded to these wetlands and watercourses does not end there; as indicated in the updated recommendations that are provided in **Appendix A**, **there is a commitment to ensure an average buffer width of minimum 30 m is provided around every wetland and well-defined watercourse on this property over the long term**. The achievement of that objective is to be ensured through the Site Plan process which accompanies each phase of development, each of which includes a requirement for a separate, site-specific EIS report which, amongst other matters, must include specific discussion of how this is to be achieved and site-specific justification for any portion of the buffer which is to be less than 30 m (i.e., for wetlands other than Henry Marsh and all well-defined watercourses in which the Site Plan shows a portion of the buffer to between 15 m and 30 m width).

Buffers are important to the protection of wetlands and stream corridors. These provide a variety of important functions, including:

A. providing flow attenuation (water quantity) benefits;

B. providing water quality treatment benefits for runoff;

C. screening against human disturbance/changes in land use;

D. providing hazard mitigation; and

E. providing for core habitat protection.

Literature Recommendations Regarding Buffer Requirements to Protect Wetland Values

A review has been completed of the references cited in the annotated bibliography of the Natural Heritage Reference Manual (MNRF 2010), prepared in support of the natural heritage policies in the Provincial Policy Statement, as well as other pertinent references, regarding wetland buffers.

Vegetated buffers to wetlands to protect wetlands from the impacts of adjacent land uses (typically agriculture or urbanization) have been under discussion in the scientific and technical literature since the mid-1990's (e.g., Norman 1994; Woodard and Rock 1995). One particularly useful reference is a document prepared by Beacon Environmental for Credit Valley Conservation, entitled Ecological Buffer Guidelines Review (BEL 2012). This document summarizes the overall function of a buffer as follows: "to try to insulate a protected natural area from the impacts of adjacent land uses (usually land use changes) so that this area can continue to provide the same, or a comparable range of ecological goals and services, as it did prior to the change in land use."

There is wide variation in the literature on buffer requirements for wetlands, ranging from 10 m to several hundred metres. Larger buffers are deemed most important in situations where the lands adjacent to a wetland serve a variety of supportive functions for wetland wildlife and are seen as part of core habitat areas for wildlife protection. As indicated in the Natural Heritage Reference Manual (MNRF 2010), "the physical separation of development from natural features boundaries using vegetated protection areas or vegetation protection zones is one of the most widely used mechanisms for softening or reducing (i.e., buffering) the impacts of land use changes on adjacent natural features." As noted in the review document prepared by Beacon Environmental (BEL 2012), the Natural Heritage Reference Manual "shies away from any specific recommendations because appropriate widths for buffers can vary depending on the sensitivity and functions of the features, and proposed adjacent land uses." With respect to adjacent land uses, it must be recognized that the determination of buffer widths for wetlands is most usually done in areas of urbanization, such as within Southern Ontario, where generally virtually all of the landscape adjacent to whatever buffer is established will be fully developed; our experience in working on Secondary Plans and other land development initiatives in the GTA has demonstrated a consistent pattern in which a buffer limit is established, that limit is staked off, then all of the adjacent lands to that buffer are cleared, regraded and developed. **This is a very different situation from the current proposal where much of the landscape outside of wetlands and their buffers will be retained in a natural state**, and where large portions of the intervening landscape are to be protected, ensuring that wildlife connections between wetlands, and wildlife habitat functions which are ancillary to those provided by the wetlands themselves, are being preserved for the long-term. As noted in the Beacon Environmental review (BEL 2012), "due to the number of intrinsic and extensive factors that need to be considered in appropriate buffer determination, there is no 'silver bullet' for buffer determination." **That document goes on to state that "while some plans and policies have opted to set prescribed buffers to simplify the planning process and help ensure natural heritage**

protection, the more prescriptive a buffer, the less it considers site-specific conditions and sensitivities, which can be very variable." **Table 7** from the Beacon Environmental review, which is copied herein, provides a summary of buffer functions, and how well these may be achieved by different buffer widths, categorizing these by either a high, medium or low risk of not achieving the desired buffer function. As the authors point out, "clearly, as buffer widths increase within the given range, their effectiveness also tends to increase. However, application of only the widest recommended buffers (i.e., 'low risk') without consideration for the site-specific conditions, or sensitivity of receiving attributes, might equally result in the identification of a buffer that is unnecessarily wide." Site-specific conditions must, of course, take into consideration the nature and intensity of proposed adjacent land uses.

The Beacon Environmental review (BEL 2012) summarizes the results of **Table 7** in relation to wetlands and watercourses as follows:

- for all natural features types, even narrow buffers (i.e., less than 5 m) have been shown to provide some functions related to water quality and screening against impacts associated with adjacent land uses;

- for watercourses and wetlands, the recommended ranges are the same and most "high-risk" buffer widths fall between 1 m and 10 m; and

- for most buffer function categories and most habitat types, "medium risk" buffers range from 11 m to 30 m.

In reviewing various planning approaches towards the determination of buffer widths for an Ontario setting, the Beacon Environmental review recommends an approach as follows:

Identification of BASE BUFFER WIDTH

(derived from the "high risk" range from the science identified in the risk-based guidelines provided in **Table 7**)

+

ADDITIONAL BUFFER width, as appropriate

(identified based on site-specific biophysical and land use considerations identified through an EIS with consideration for the current science)

Of note, they recommend a BASE buffer width of only 10 m. This is exactly the approach that has been taken on the Muskoka Royale College project, where a more conservative standard has been taken in zoning 30 m from Henry Marsh and 15 m from other wetlands and well-defined watercourses (i.e., the BASE buffer width), but where an ADDITIONAL buffer is being recommended, with the aggregate buffer to average at least 30 m around every individual wetland feature and well-defined watercourse, and with specific justification for its final dimension to be determined through an EIS to accompany each Site Plan application.

Table 7. Ranges for buffer widths to natural heritage features based on the current science.

Natural Heritage Feature Category	Buffer Function Category	< 5 m	5 – 10 m	11 – 20 m	21 – 30 m	31 – 40 m	41 – 50 m	51 – 60 m	61 – 70 m	71 – 80 m	81 – 90 m	91 – 100 m	101 – 110 m	111 – 120 m	> 120 m
WATERCOURSES and WATER BODIES															
	A. Water Quantity	data indicate that this is not mitigated by site specific buffer													
	B. Water Quality														
	C. Screening of Human Disturbance / Changes in Land Use														
	D. Hazard Mitigation Zone	should be based on consideration of hazards, but may overlap with buffers													
	E. Core Habitat Protection														
WETLANDS															
	A. Water Quantity	data indicate that this is not mitigated by site specific buffer													
	B. Water Quality														
	C. Screening of Human Disturbance / Changes in Land Use														
	D. Hazard Mitigation Zone	should be based on consideration of hazards, but may overlap with buffers													
	E. Core Habitat Protection														
UPLAND WOODLANDS and FORESTS															
	A. Water Quantity	insufficient data													
	B. Water Quality	insufficient data													
	C. Screening of Human Disturbance / Changes in Land Use														
	D. Hazard Mitigation Zone	should be based on consideration of hazards, but may overlap with buffers													
	E. Core Habitat Protection														
MEADOWS															
	A. Water Quantity	insufficient data													
	B. Water Quality	insufficient data													
	C. Screening of Human Disturbance / Changes in Land Use	insufficient data													
	D. Hazard Mitigation Zone	insufficient data													
	E. Core Habitat Protection*														

*data available for area-sensitive grassland birds only

Note 1: In all cases the buffer is to be applied from the Critical Function Zone limit, not strictly the feature boundary.

Note 2: Supporting literature is identified in Appendix A.

Key: Risk of Not Achieving the Desired Buffer Function

HIGH

MODERATE

LOW

The Beacon Environmental review (BEL 2010) recognizes that the determination of buffer widths in relation to development must have a practical element, despite the general tenant of "more is better" from their literature review. To this end they conclude that "in most cases, it is expected that the final buffer width fall within the 'medium risk' zone (as identified in **Table 7**) and thereby represent a reasonable balance between achieving natural heritage protection and efficient land use planning objectives. Furthermore, using an additive approach which is based on the current science and is also responsive to site-specific conditions (i.e., BASE derived from the 'high risk' end of a risk-based assessment of the science + ADDITIONAL buffer from site-specific considerations, with consideration for the related science) will help ensure that the final recommended buffer is defensible, appropriate for the given site, and supportive of good land use planning." Again, this is precisely the approach which has been taken on this project, except that we have recommended a larger BASE width for the buffer than is recommended in that review.

Finally, and important to the determination of the buffer dimensions for this project, the Beacon Environmental review (BEL 2012) states that "it is also important to keep in mind that buffers need not be uniform" in width. This can include situations where a larger buffer is warranted because of such factors as steep slopes which may decrease the effectiveness of a narrower buffer, or where hydrologic conditions, such as the presence of seepage zones, may specifically warrant a wider buffer. Equally, it may be based on practical considerations. As a good example, buffer averaging is commonly employed in the protection of wetlands, including Provincially Significant Wetlands, in Ontario. In this regard, while a 30 m buffer has become a fairly standard prescription for urban development adjacent to Provincially Significant Wetlands in Southern Ontario, variable buffers are often employed around such wetlands, which average at least 30 m but may, for example, range in width between 15 m and 45 m to take into account such practical considerations as the need for straight lot lines or linear roads adjacent to the curved boundary of a wetland. A variable buffer width, within reason, and particularly in situations where a minimum BASE buffer width is employed, does not take away from the functionality of the buffer.

Justification of Proposed Buffers

With the above considerations in mind, a site-specific review of the functions provided by wetland buffers for the Muskoka Royale College project is provided in tabular form in **Table 1**. On the basis of this review outlined in **Table 1**, the development of the Muskoka Royale College project poses little risk with respect to either water quantity or quality impacts on the wetlands within this property. In consideration of all of the attributes of the proposed development and the associated mitigation measures which have been recommended, there are no concerns that wetlands will not be appropriately screened from the changes in adjacent land use and associated human disturbance. There are no concerns with hazard mitigation. Core wildlife habitat features and other ancillary wildlife functions associated with lands both adjacent to, and further removed, from the wetland will be well protected, in fact far more so than is the case with a majority of development applications (as broad swaths of forest and other natural areas will remain connected to wetlands to facilitate wildlife habitat use and dispersal). Accordingly, the proposed strategy to buffer

wetlands within this property, as described in the recommendations in **Appendix A**, is fully appropriate to the long term protection of all wetland functions.

Table 1. Summary of buffer functions, and the extent to which these will be protected with the recommended buffer widths of minimum 30 m adjacent to Henry Marsh and a minimum 15 m, but average minimum 30 m, adjacent to all other wetland features on the Muskoka Royale College property.

Buffer Function	Comments on Ability of Recommended Buffer to Protect This Function
A. Water Quantity	• development will only occupy a small portion of the subject lands, so overall changes in landscape permeability will be limited • buildings, roads, parking areas and other hard surfaces will drain to stormwater facilities which will provide peak flow attenuation to pre-development lands up to the 100 year storm event, and safe conveyance of storm events in excess of the 100 year storm event; • stormwater will be addressed on a catchment by catchment basis, with wetlands presently receiving flows from development precincts to continue to receive such flows post-development (after these flows are attenuated in stormwater facilities); • broad dispersal of treated storm flows into wetland buffers provides an opportunity for additional attenuation; • given these development parameters, wetlands within this property will not experience adverse flow impacts with the variable width buffer approach that has been recommended. The average minimum 30 m buffers adjacent to all wetland features provides a very robust level of protection against water quantity impacts.
B. Water Quality	• development will only occupy a small portion of the subject lands, with much of the drainage area to wetlands to remain undeveloped; • during construction, sediment fencing will be established around the limits of all development, which will typically be a minimum 30 m from any wetland resources but in all cases (other than the identified wetland road crossings) will be a minimum 15 m. This, in combination with other construction best management practices to be employed as part of required sedimentation and erosion plans will provide a high level of protection against sedimentation and turbidity; • post-construction buildings, roads, parking areas and other hard surfaces will drain to stormwater facilities which will provide water quality treatment to an Enhanced (Level 1) protection level; this is the highest quality of treatment described in the Province's Stormwater Management Planning and Design guidelines; • broad dispersal of treated storm flows into wetland buffers provides an opportunity for further water quality polishing of already treated stormwater; • given these development parameters, wetlands within the property will not experience adverse water quality impacts with the variable width buffer approach that has been recommended. Buffers of only 15 m provide good opportunities for water quality polishing; the average minimum 30 m buffers adjacent to all wetland features provides a very robust level of protection against water quality impacts.
C. Screening of Human Disturbance/ Changes in Land Use	• buffers provide an important role in screening against human impacts, including light, noise, trampling, dumping, the introduction of invasive plants, disturbance of wildlife through activities like ATV and bicycle traffic, and wildlife disturbance or destruction by pets;

Buffer Function	Comments on Ability of Recommended Buffer to Protect This Function
	• the nature of the proposed development is quite different from a housing development, where there is usually intensive development adjacent to wetlands and where there are often issues with rear yard encroachment, dumping of lawn wastes, indiscriminate trail creation, and the introduction of pets. While a school will introduce new sources of light and noise, it will not occupy the entire perimeter of any of the wetlands on the property. Further, it is much easier to maintain designated buffers over the long term and protect against indiscriminate trail creation. Lawn wastes are not a concern; • Beacon Environmental's review (BEL 2012) indicates a moderate level of risk from human disturbance to wetlands with buffers of between 10 m and 30 m, and a low level of risk with buffers of 30 m or more. Given the nature of proposed development, the recommended buffer adjacent to all wetlands of an average 30 m or more is considered robust; • flushing distances for waterbirds range from 15 m to 45 m (Norman 1994), indicating most birds will be tolerant of land uses which are a minimum 15 m away, and on average more than 30 m away. However, much more robust buffers than that will occur around Henry Marsh, the only wetland on this property with larger open water areas suitable for waterbirds and the only wetland within this property having potential to support Least Bittern, a Threatened species which is quite secretive and benefits from larger buffers.
D. Hazard Mitigation Zone	• Beacon Environmental's review (BEL 2012) notes that an additional potential benefit of buffers is to provide a setback from hazards, such as steep slopes, however also notes that "managing risk related to hazard is typically more of a management and safety issue rather than an ecological function"; • the constraints analysis completed as part of the EIS for Muskoka Royale College did map areas of steep slope. Development has generally been proposed outside of such areas, negating any benefit of further considering this matter as part of the wetland buffer determination process.
E. Core Habitat Protection	• one of the benefits of buffers is in protecting lands adjacent to a wetland which have wildlife habitat functions that are ancillary to the wetland itself. Some of those lands may perform functions which are critical to the survival of wetland-dependent species, and therefore, together with the wetland, constitute what Beacon Environmental (BEL 2012) refers to as "core" habitat. As an example, turtles will travel from wetlands to areas of suitable nesting habitat, which may be in close proximity to a wetland. Some waterfowl may utilize land adjacent to wetlands for nesting; • the concept of core habitat values adjacent to wetlands overlaps to a degree with the fact that many species of wildlife which are dependent on wetlands for a portion of their life cycle requirements may disperse quite broadly across a landscape for some of their other habitat requirements. For example, Blanding's Turtle may nest hundreds of metres away from wetlands in which they overwinter and species such as Wood Duck may find nesting habitat that is hundreds of metres away. **Table 2** provides a brief literature review of the ancillary habitat requirements of various wetland-dependent wildlife; • the Beacon Environmental review (BEL 2012) indicates that moderate core habitat protection is provided with wetland buffers of between 20 m and 60 m, and that a high level of protection is provided with buffers of 60 m in width. This, of course, has to be balanced with practical considerations;

Buffer Function	Comments on Ability of Recommended Buffer to Protect This Function
	• the Muskoka Royale College development is quite unique amongst development applications in that the development footprint will only occupy a small percentage of the property. Following development, there will be broad swaths of forest, which are contiguous with the wetland and stream buffers being maintained, allowing for wildlife to disperse from wetlands into the broader landscape. Much of the landscape within 150 m or more of Henry Marsh, for example, will remain undisturbed. A very broad mixture of natural habitats will be protected within this landscape over the long term; • given these development parameters, it is our opinion that the core habitat/ancillary wildlife functions provided by lands adjacent to wetlands within this property will be maintained with the variable buffer width approach that has been recommended.

Table 2. Species-specific guidance towards ancillary habitat requirements.

Blanding's Turtle	Distance travelled from nearest water to nest varies, with some references indicating average 135 m (Boyd, 2001). MNRF general habitat descriptions – *Category 1:* Nest or overwintering area and 30 metres surrounding is critical for life processes (low tolerance to alteration). *Category 2:* All suitable wetlands up to 2 km from an occurrence are considered to have a moderate tolerance to alteration. *Category 3:* Area between 30 meters and 250 meters around suitable wetlands are considered to have a high tolerance to alteration. These areas are used as overland movement corridors and provide access to the surrounding wetland complex.
Massasauga Rattlesnake	MNRF general habitat descriptions – *Category 1:* overwintering sites (wetlands), and the area within 100 m; gestation sites and the area within 30 m. *Category 2:* Along Georgian Bay shoreline open and semi-open areas with microclimates as well as forest edge habitat within 1.2 km of an occurrence (more tolerant to alteration). This species has not been confirmed in the Tobies Bay Wetland; if it were portions of the redevelopment zone may classify as *Category 2.*
Painted Turtle	Nest distance from water varies, with some references indicating an average 60 m. (Boyd, 2001).
Common Snapping Turtle	Move up to 13.8 km from resident wetland to nest. Nesting distance average from water is 37 m (Boyd, 2001).
Northern Water Snake	Found within 10 m of water's edge (Boyd, 2001).
Amphibian daily movements	As examples: Spring Peepers travel up to 40 m in daily movements from wetland edge; American Toads 85 m to 120 m; Bull Frogs range of up to 11 m; wood frogs average 50 m (Boyd, 2001).
Waterfowl, general	As examples: Green-winged Teal nest 400 m or more from water's edge, but average 1 m − 91 m; Wood Duck <500 m (Boyd, 2001).
Habitat for mammals, general	General − 5 m to 30 m considered to provide low protection of ecological function. Minimum 50 m recommended for good protection (Norman, 1994). Recommended minimum core habitat buffer width is 120 m with an optional width approximately 270 m to provide the best ecological value.
Amphibians and reptiles	5 m to 15 m buffers provide low protection of ecological function. 30 m to 50 m considered to provide medium protection, with 100 m considered to provide good protection (Norman, 1994). 75 m to 100 m, including large areas of upland habitat, considered optimal (Gomez and Anthony 1996; NHRM, 2010).

Table 2 (Cont'd).

	275 m buffer is required to protect all nest and hibernation sites for certain freshwater turtles (Burke and Gibbons 1995; NHRM, 2010).
Habitat for birds	Nesting ducks buffer widths from 5 m to 50 m provide for low protection. 100 m to 300 m is considered good for protection of ecological function (Norman, 1994). For edge species, 5 m provides low protection, 15 m to 30 m medium protection. 50 m is considered good for protection of ecological function (Norman, 1994). For short distance migrants, 5 m to 30 m provides low protection, 50 m medium. 100 m is considered good for protection of ecological function (Norman, 1994). For neotropical migrants, 5 m to 50 m provides low protection, 100 m medium. 200 m is considered good for protection of ecological function (Norman, 1994).

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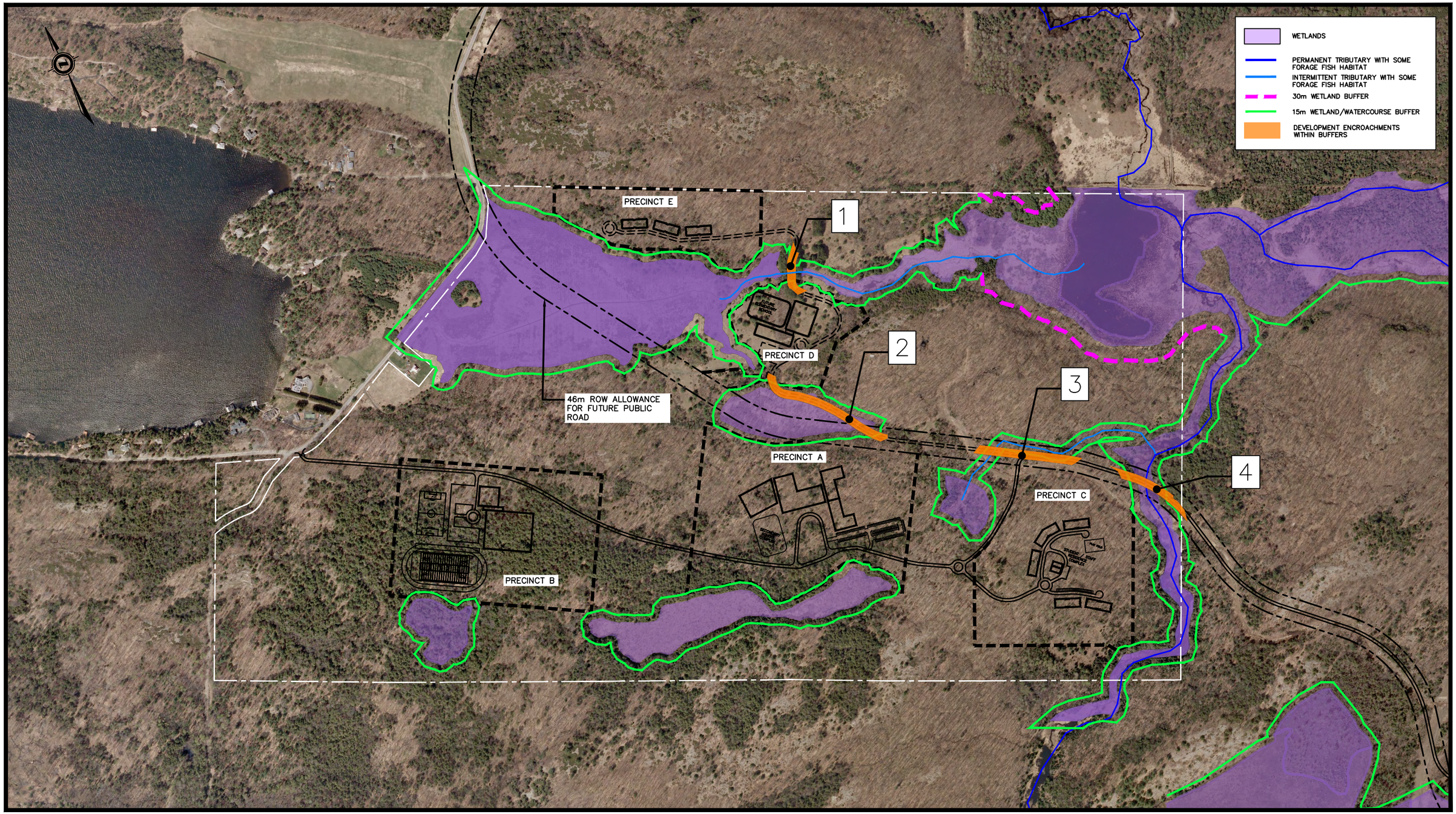
APPENDIX C – RECOMMENDED ENVIRONMENTAL PROTECTION AREAS, AND DESCRIPTION OF REQUIRED ENCROACHMENTS INTO THESE



Michalski Nielsen
ASSOCIATES LIMITED

MUSKOKA ROYALE COLLEGE

RECOMMENDED ENVIRONMENTAL PROTECTION AREAS

PROJECT NO. 3517

SCALE: 1:4000

DATE: JANUARY 2019

APPENDIX C

Explanation of Wetland Encroachments and Watercourse Crossings.

Location	Description of Area and Rationalization of Encroachment
1	• riparian wetland along a warmwater stream providing forage fish habitat; stream is well-defined and typically about 1 m wide at crossing location; • west side of crossing contains a broadening area of willow swamp thicket, with east side consisting of meadow marsh along a narrower riparian corridor; • adjacent upland areas consist of conifer plantation, deciduous forest and meadow; • located in an area characterized by gentle slopes and deeper, fine-textured soils; • wetland corridor provides wildlife connectivity between wetlands to the west and Henry Marsh; • a driveway between the elementary school (Precinct D) and its residence (Precinct E) is required. Vehicle use of this driveway will generally be restricted to deliveries and staffing. The paved surface width of the road is expected to be 6.5 m; • the selected location consists of a narrow stream corridor, grading to upland within about 5 m of the stream. This location ensures minimal interference with wetland functions; • a small bridge structure is likely to be constructed at this location to maintain an opportunity for wildlife passage, to keep the crossing width as narrow as possible; • work will require careful attention to sedimentation and erosion controls, temporary exclusion fencing during construction, timing restrictions for the warmwater fishery, and Species at Risk training for construction personnel; • with the implementation of these measures, the functions of the watercourse and riparian wetland can be maintained; • note that the detailed design of this crossing will be subject to further evaluation and review closer to the time of that work, as part of the Site Plan process, with an EIS required in support of it.
2	• deciduous treed/thicket swamp of moderate size, with adjacent upland deciduous and mixed forest; • located in an area characterized by gentle slopes and deeper, fine-textured soils; • wetland provides some wildlife opportunities, although does not have enough standing water to support amphibians. It is considered to be of low sensitivity from a hydrological and wildlife perspective; • the roadway to access the elementary school (Precinct D) and associated residence (Precinct E) is required through this area. The roadway is anticipated to have a paved width of 6.5 m. This roadway will be primarily for deliveries to and staffing of these two precincts; • while the District had asked that this roadway follow their right-of-way for the Western By-pass, they have conceptually agreed to allowing the roadway to skirt along the north edge of this wetland, where it will follow an existing laneway associated with earlier agricultural uses of these lands; • while portions of the roadway will be able to be installed outside of the wetland, some portions of it will extend into the wetland edge; terrain conditions to the north are steep and limit the opportunities for moving the road far in that direction;

Location	Description of Area and Rationalization of Encroachment
	• work will require careful attention to erosion and sediment controls and Species at Risk training for construction personnel; • with the implementation of these measures, the loss of wetland area can be limited and impacts on wetland function will be minimized; • note that the detailed design of this portion of the roadway will be subject to further evaluation and review closer to the time of that work, as part of the Site Plan process, with an EIS required in support of it.
3	• a small watercourse, averaging no more than 0.5 m in width, crosses and runs parallel to a small existing laneway in this location. There are portions of this adjacent watercourse which are more poorly channelized. This watercourse provides very limited to no opportunities for forage fish; • watercourse flows through deciduous forest and has a narrow riparian corridor; • surrounding lands are of moderate slope, with varying soil depths; • the road crossing is required to service the elementary school (Precinct D) and associated residence (Precinct E). Vehicle use of this roadway will primarily be for deliveries to and staffing of these two precincts. The roadway is anticipated to have a paved width of 6.5 m; • the District has required that this road follow their right-of-way for the Western By-pass; • the nature of this drainage course will likely only warrant a culverted crossing; • work at this crossing, and also within the adjacent reach where the watercourse will be close to the road alignment, will require careful attention to erosion and sediment controls and timing restrictions for the warmwater fishery; • with the implementation of these measures, impacts on watercourse functions will be minimized; • note that the detailed design of this portion of the roadway will be subject to further evaluation and review closer to the time of that work, as part of the Site Plan process, with an EIS required in support of it.
4	• riparian wetland along a small, warmwater stream with some potential as forage fish habitat. Stream is generally well-defined and typically about 0.8 m wide at crossing location; • there is a band of riparian wetland along this watercourse, typically extending 10 m to 15 m from either bank, and including both shallow organic marsh and thicket swamp; • adjacent uplands consist of deciduous and mixed forest; • located in an area characterized by moderate to steep slopes and variable soils; • wetland corridor provides some wildlife connectivity; • crossing is for a roadway to all school precincts, and as such will include vehicle use that is generally associated with deliveries to and staffing of all precincts. The roadway is anticipated to have a paved width of 6.5 m; • the District has required that this road follow their right-of-way for the Western By-pass;

Location	Description of Area and Rationalization of Encroachment
	• the design of this crossing has yet to be determined but may include either a small bridge span or multiple culverts; • works at this crossing will require careful attention to erosion and sediment controls, temporary exclusion fencing during construction, timing restrictions for the warmwater fishery, and Species at Risk training for construction personnel; • with the implementation of these measures, the functionality of the watercourse and riparian wetland can be maintained; • note that the detailed design of this crossing will be subject to further evaluation and review closer to the time of this work, as part of the Site Plan process, with an EIS required in support of it.

APPENDIX D – RESULTS OF ADDITIONAL VERNAL POND SURVEYS COMPLETED IN 2019

Muskoka Royale College – Vernal Pool Survey Results (2018-2019)

1. Introduction

Amphibians are common and widespread across Muskoka. Several species were recorded at wetlands on the subject property during the evening auditory surveys and other day time surveys. Amphibians will congregate to breed in woodland pools and wetlands with standing water that persists into early summer or long enough for tadpoles to emerge. Based on the Significant Wildlife Habitat Criteria Schedule for Ecoregion 5E (MNRF 2015), Candidate SWH for woodland amphibian breeding habitat is described as the "*presence of a wetland or pond >500m^2 (about 25m diameter) within or adjacent (within 120m) to a woodland (no minimum size). The wetland, lake or pond and surrounding forest, would be the Candidate SWH*." The minimum size criterion is a key consideration. For vernal pools of a suitable size, the presence of the number of species and abundance of individuals identified in the SWH Criteria Schedule is used to identified Confirmed SWH.

2. Field Investigations

In addition to fall season day time surveys in 2017 and spring nocturnal auditory surveys in 2018, a day time assessment of the vernal pools in the forested areas on the property was conducted concurrently with the Ecological Land Classification (ELC) survey on June 6, 2018 of the development precincts on the property. A supplemental survey was conducted on June 25, 2019 to record any additional locations and allow further characterization of vernal pools (e.g., size, water depth and clarity, vegetation and woody debris, amphibian presence) on the property in Precinct Area A and B, the only precincts supporting such features. Vernal pools were assessed to determine the potential breeding habitat for amphibians and the permanence of the pools. The goal was to survey for occurrences and abundance of egg masses, tadpoles, and adults, as well as standing water levels and pool permanency.

3. Results

The vernal pools and small wetland inclusion areas in Precincts A and B were surveyed on the evening of May 29, 2018 and no calling amphibians were recorded. There were three vernal pools that were assessed on June 6, 2018 in the Coniferous Forest (CF1) community and are shown on the attached **Figure A**. During the June 6, 2018 day time survey, there were no amphibians, tadpoles or eggs observed in those vernal pools. The water was not deep enough for amphibians to use the pools for breeding (**Photo 1** and **2**). These results indicate that those identified vernal pools do not provide breeding amphibian habitat.

At the request of the peer reviewer, additional surveys were completed on June 25, 2019 survey during the day time. The timing of this visit was appropriate in that it was before the eggs of early breeding amphibians would have hatched out or when their tadpoles would have reached a development stage where they were no longer dependent on these pools. There were a total of 13 vernal pools identified in Precincts A and B. A detailed description and characterization of each vernal pool is provided in **Table 1**, with locations shown on **Figure B**. All of the surveyed vernal pools are smaller than the identified size criterion in the Significant

Wildlife Habitat Criteria Schedule for Ecoregion 5E (required >500 m^2). The majority of the pools are very small, ranging from 12 m^2 to 375 m^2. Therefore, the vernal pools are not designated as Significant Wildlife Habitat for Amphibian Breeding Habitat (Woodland) as they are all under the minimum size threshold for Candidate SWH designation. Furthermore, **none of the pools where observed to support egg masses, tadpoles or adult amphibians**. **Photos 3 – 15** provide additional views of the vernal pool features in 2019.

The greater snow load, late arrival of spring and generally wetter conditions in the spring of 2019, appears to have resulted in a longer duration of standing water in many of the vernal pools than may often be the case. Nevertheless, water levels were very shallow, precluding conditions for breeding amphibians, and as confirmed by the lack of amphibian observations.

Based on an interpretation of the hydrological function of the vernal pools in the context of the topography, soil depth and underlying bedrock, it is our opinion that functional breeding amphibian habitat in Precincts A and B is simply not present. Although the undulating bedrock controlled topography with shallow soils, particularly in Precinct B, results in the presence of several vernal pools that were observed to support water to varying degrees through the field season, and many of these do occasionally support deeper pools over short periods of time they do not hold this water for any length of time. These pools were observed to only support "saturated" conditions (i.e., very wet moss and soils substrate), or were otherwise lacking sufficient standing water during the June 2018 survey the successful development and emergence of tadpoles. During subsequent site visits in late July 2018 following heavy rains, some standing water was again present. These conditions can be attributed to factors that include:

- localized depressions on shallow soils over bedrock with small catchments that allow for short term capture of surface water run off (e.g., during spring melt and heavy rain events); and
- fractured bedrock that allows for slow drainage of the pools combined with small catchments that do not provide for sustained surface water levels.

It is our opinion that these factors preclude the necessary conditions for the development of functional vernal pools that would allow for successful breeding amphibian habitat in that the permanency of the pools is not sufficiently long enough to allow for successful development of tadpoles and emergence of juveniles.

Table 1. Vernal Pool Survey Results.

Development Precinct	Vernal Pool Number	Size (length x width) (m)	Water Depth (cm)	Water Clarity/color	Vegetation	Woody Debris	Frogs/Egg Masses Observed/Heard	Notes
B	1	10 x 5	2-3	Amber	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Scattered fallen logs and sticks	None	Size does not qualify for SWH. Surrounded by coniferous forest.
B	2	12 x 8	2	Amber	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Abundant fallen trees and sticks	None	Size does not qualify for SWH. Surrounded by coniferous forest.
B	3	6 x 2	1	Amber	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Abundant fallen logs and sticks	None	Size does not qualify for SWH. Surrounded by coniferous forest.
B	4	7 x 3	1-2	Amber	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Scattered fallen logs and sticks	None	There were about 5 small pools (1 m wide) adjacent to this vernal pool that contained 0.5 - 1 cm of water. Size does not qualify for SWH. Surrounded by coniferous forest.
B	5	15 x 6	2-3	Amber	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Abundant fallen trees and sticks at north end of pool	None	Size does not qualify for SWH. Surrounded by coniferous forest.
B	6	10 x 7	1-2	Amber	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	One large fallen tree and scattered branches	None	Size does not qualify for SWH. Surrounded by coniferous forest.
B	7	7 x 2	1	Amber	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Scattered sticks	None	Size does not qualify for SWH. Surrounded by coniferous forest.
B	8	8 x 4	2	Amber	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter, lots of moss in pool and surrounding	Abundant sticks	None	Size does not qualify for SWH. Surrounded by coniferous forest.
B	9	25 x 15	0.5-1	Amber	Abundant moss and ferns on fallen logs. No emergent vegetation or shrubs.	Pool covered by mossy fallen trees	None	There is an even shallower extension of this vernal pool, which contained no water and was covered in grasses at the time of this survey. Size does not qualify for SWH. Surrounded by coniferous forest.

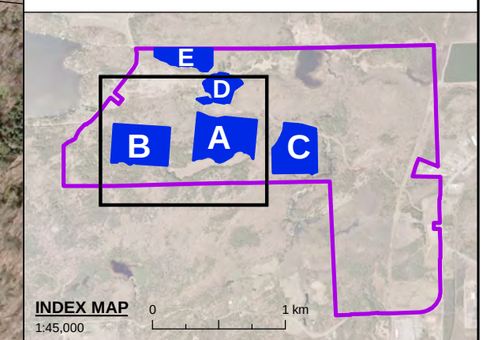
Table 1. Vernal Pool Survey Results.

Development Precinct	Vernal Pool Number	Size (length x width) (m)	Water Depth (cm)	Water Clarity/color	Vegetation	Woody Debris	Frogs/Egg Masses Observed/Heard	Notes
A	10	30 x 10	0.5	Amber	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Abundant sticks	None	This pool is long, with tiny scattered pools (0.5 cm depth) adjacent to areas of wet depressions that are drying up. Size does not qualify for SWH. Surrounded by mixed forest.
A	11	20 x 15	0	N/A	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Scattered sticks	None	Damp vernal pools with no standing water. Size does not qualify for SWH. Surrounded by mixed forest.
A	12	8 x 2	0	N/A	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Scattered sticks	None	Damp vernal pools with no standing water, drying up. Size does not qualify for SWH. Surrounded by mixed forest.
A	13	12 X 3	0	N/A	No shrubs surrounding pool or emergent vegetation in pool, abundant leaf litter	Scattered sticks	None	Damp vernal pools with no standing water, drying up. Size does not qualify for SWH. Surrounded by coniferous forest.

Figure A. Three vernal pool locations observed on June 6, 2018 in CF1.

LEGEND

- Study Area
- Development Area
- Site Plan
- Vernal Pool



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CLIENT: Gord Nielsen

PROJECT: Muskoka Royale

PROJECT NO.	160337	REVISION:	1
DATE:	Jul 17/19	SCALE:	1:3800
DRAWN:	BE	DATUM:	NAD83
CHECKED:	RA	PROJECTION:	UTM 17

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Vernal Pool Locations

Figure B

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Muskoka Royale College
Vernal Pools – Precincts A and B
(2018 and 2019 Surveys)

Photo 1. Vernal Pool in CF1 (June 6, 2018).

Photo 2. Vernal Pool in CF1 (June 6, 2018).

Photograph 3. Vernal Pool 1 – Precinct B (June 25, 2019).

Photograph 4. Vernal Pool 2 – Precinct B (June 25, 2019).

Photograph 5. Vernal Pool 3 – Precinct B (June 25, 2019).

Photograph 6. Vernal Pool 4 – Precinct B (June 25, 2019).

Photograph 7. Vernal Pool 5 – Precinct B (June 25, 2019).

Photograph 8. Vernal Pool 6 – Precinct B (June 25, 2019).

Photograph 9. Vernal Pool 7 – Precinct B (June 25, 2019).

Photograph 10. Vernal Pool 8 – Precinct B (June 25, 2019).

Photograph 11. Vernal Pool 9 – Precinct B (June 25, 2019).

Photograph 12. Vernal Pool 10 – Precinct A (June 25, 2019).

Photograph 13. Vernal Pool 11 – Precinct A (June 25, 2019).

Photograph 14. Vernal Pool 12 – Precinct A (June 25, 2019).

Photograph 15. Vernal Pool 13 – Precinct A (June 25, 2019).

APPENDIX E – RESULTS OF ADDITIONAL SURVEYS COMPLETED FOR COMMON NIGHTHAWK AND WHIP-POOR-WILL IN 2019

Additional evening surveys for Whip-poor-will and Common Nighthawk were completed by two biologists experienced in undertaking such surveys on two dates in 2019. The first survey was completed on June 17, between 11:40 p.m. and 12:40 a.m., on the night of a full moon and in the middle of the mid-season (optimal timing) survey window for Whip-poor-will. The second survey was undertaken on July 15, between 10:00 p.m. and 11:00 p.m.; this survey date was in advance of the July 19 full moon and at the end of the late (breeding season) survey window for Whip-poor-will. These survey dates were also within the recommended timing window for Common Nighthawk surveys.

Weather conditions on these evenings were as follows:

June 17, 2019: Air temperature 11.4 °C; wind speed of 0 on the Beaufort Scale; partially overcast (40% cloud cover); moon visible; no background noise to interfere with survey

July 15, 2019: Air temperature of 21.5 °C; wind speed of 2 on the Beaufort Scale; partially overcast (30% cloud cover); moon visible; no background noise to interfere with survey

In both cases, surveys were completed at two locations, the first at the west end of the subject lands on Stagecoach Road, approximately 300 m south of Stephens Bay Road, the second, beyond the southeast corner of the property, on the TransCanada pipeline corridor, approximately 450 m north of Muskoka Beach Road. This second location is within 650 m of Precinct C, and the closest location to the Precinct which could be safely accessed for night time surveys; its location satisfies the request from the peer reviewer to ensure surveys are within one kilometre of rock barrens, with the peer reviewer having raised a concern that the surveys completed in 2018 on Stage Coach Road were too far away from rock barrens in the southeast portion of Precinct C.

On both survey nights and at both survey locations, the two biologists stood a distance from one another and completed auditory surveys, facing towards the Muskoka Royale College property. Each survey was completed for a 20 minute duration.

No Whip-poor-will or Common Nighthawk were heard on either survey occasion at either location. This result is consistent with the survey results from 2018 and confirms that there are no concerns with the use of rock barrens on the Muskoka Royale College property by these species.

APPENDIX F – SUPPLEMENTARY INFORMATION ON THE DEER YARD AS A WHOLE, AND DISCUSSION OF POTENTIAL LOSSES IN FUNCTION, INCLUDING CUMULATIVE IMPACTS OF OTHER POTENTIAL DEVELOPMENT WITHIN IT

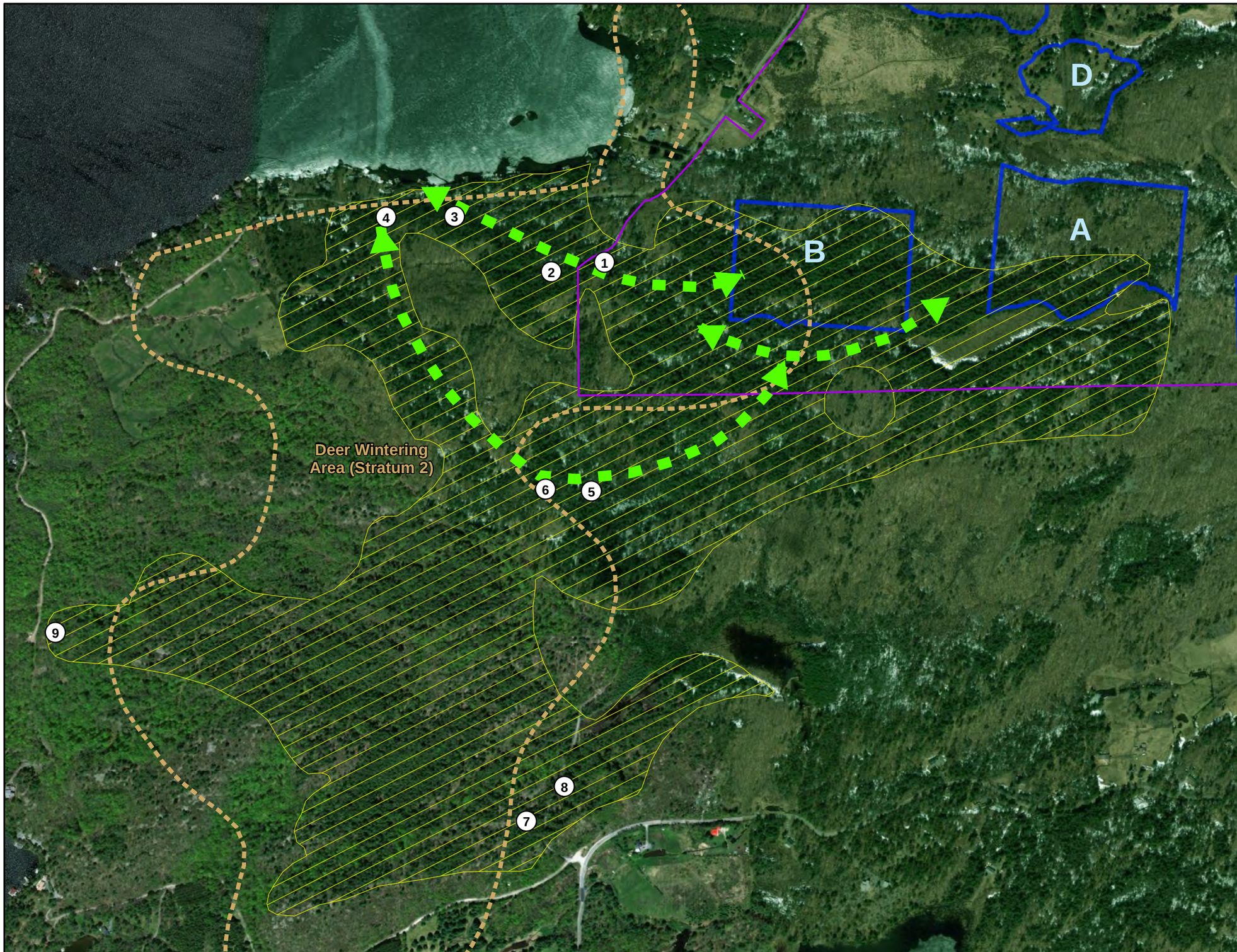
Deer Wintering Habitat Assessment for Muskoka Royale College

MNRF deer habitat mapping is quite broad based, and often includes areas of better and poorer quality within its boundaries. Further, areas of good quality habitat may well extend beyond its identified boundaries. With that in mind, and prior to completing additional survey work, ecologists examined aerial photography for the lands within and adjacent to MNRF's mapped deer yard to identify areas of higher quality conifer cover in order to determine which areas within and adjacent to the Muskoka Royale property appeared most suitable as winter cover for deer. The results of that assessment, as confirmed through targeted ground truthing, are provided in **Figure A**, with the yellow-hatched area providing our interpretation, based on aerial photography, of the areas of best quality cover, superimposed over MNRF's identified deer yard, outlined in the dashed orange line. This mapping demonstrates, as was discussed in the EIS, that areas of good conifer cover that could support deer overwintering extend beyond the MNRF-identified deer yard within the subject property; the same is also true within some of the surrounding landscape.

On July 22 and 26, 2019, ecologists surveyed areas that were accessible along roadways within this area for potential deer wintering habitat. This included 9 new stations in and adjacent to the MNRF-identified deer yard, all in areas which were identified as having good potential cover characteristic based on our aerial photo interpretation exercise (**Figure A**). The roadside survey included an assessment of six areas along Stagecoach Road (Stations #1, 2, 5, 6, 7 and 8) and three areas along Stephens Bay Road (Stations #3, 4 and 9), as shown on **Figure A**. The information recorded at each station included the species composition (plant species and cover), evidence of deer activity and a general ranking of habitat quality. That information is summarized in **Table 1**. **Photographs 1 – 9** provide representative views from these visits.

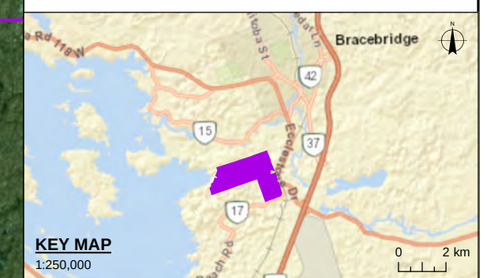
This additional survey illustrates that there are many areas of high quality deer habitat within or adjacent to the MNRF deer yard which are outside of Development Precincts A and B of the Muskoka Royale property. Further, it shows that the locations of those precincts does not interfere with deer movement through areas of good quality cover that is to be fully retained within and adjacent to the Muskoka Royale property. In this regard, the green dashed lines on **Figure 1** illustrate how deer movement opportunities into and out of this property will be maintained, and how deer can continue to move between the property and the shoreline of Lake Muskoka, as they commonly do in either foraging trips or in seeking out shelter.

With respect to concerns about potential cumulative impacts on this deer yard, it must first be pointed out that development within Precincts A and B will still retain considerable areas of cover for deer within those precincts. Further to that, good cover opportunities for deer extend beyond these precincts within the Muskoka Royale property, and will be minimally impacted by the proposed works (the road connection between these two precincts does not bisect this habitat and there are many productive deer yards close to areas of human habitation). Looking beyond the property limits, it must be remembered that the subject property is the only portion of this deer yard which is within the urban area boundary of Bracebridge, with



LEGEND

- Study Area
- Development Area
- Suitable Deer Wintering Area = 190 ha
- Deer Wintering Area (MNRF)
- Winter Movement Corridor
- Photo 1: Representative Conifer Cover



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CLIENT: Gord Nielsen

PROJECT: Muskoka Royale

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DATE:	Aug 01/19	SCALE:	1:9000
DRAWN:	BE	DATUM:	NAD83
CHECKED:	DJ	PROJECTION:	UTM 17

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Deer Movement

Figure A

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the remainder of this landscape being shoreline residential or rural. As is evident from **Figure 1**, the existing scale and intensity of development within those lands adjacent to the subject property is low. While there could be some future rural severances, localized increases in the scale of rural property use, and localized increases in the scale of individual cottage property use, there are no concerns that the broader landscape will be extensively developed or fragmented over time. Accordingly, there are no concerns that cumulative impacts of land use within and/or outside of the Muskoka Royale College project will negatively impact on the quality or viability of deer wintering habitat opportunities in this area.

Based on this assessment, it is our opinion that while there will be a localized loss of overwintering habitat as part of the proposed development, we anticipate that there will be no negative impacts to landscape level representation of available habitat and that the functional provision and quality of such habitat will be maintained.

Table 1. Results of Additional Deer Habitat Assessment.

Station Number	Species Composition	Deer Evidence	Deer Habitat Quality Ranking
1	This station provides a mix of Sugar Maple (*Acer saccharum*), Eastern Hemlock (*Tsuga canadensis*) and White Birch (*Betula papyrifera*), providing 60% cover (**Photograph 1**). The conifer and deciduous cover in the canopy are both 50%. The understorey is composed of 10% cover from American Beech (*Fagus grandifolia*).	Several deer tracks observed.	Moderate
2	This station is dominated by Eastern Hemlock with occasional Yellow Birch (*Betula alleghaniensis*) and Sugar Maple in the canopy, providing greater than 60% cover (**Photograph 2**). The conifer cover in the canopy is 80% and less than 20% for deciduous species. The understorey is composed of 10% cover from occasional young American Beech.	Deer tracks observed.	High
3	This station is dominated by Eastern Hemlock with occasional Sugar Maple, providing greater than 60% cover (**Photograph 3**). The conifer cover in the canopy is 75% and the deciduous cover is 25%. A steep rock barren is located at this station and slopes towards the road.	Not observable from road.	High
4	This station is dominated by Eastern Hemlock with occasional Sugar Maple and White Birch, providing greater than 60% cover (**Photograph 4**). The conifer cover in the canopy is greater than 75% and the deciduous cover is less than 25%. The understorey is sparse with scattered tree sapling (15% cover).	Not observable from road. Talked with landowner on north side of Stephens Bay Road (north of Station 4) and she said deer access the lake from her property.	High
5	This station is dominated by Eastern Hemlock with occasional Sugar Maple, providing greater than 60% cover (**Photograph 5**). The conifer cover in the canopy is 60% and the deciduous cover is less than 40%. The understorey is composed of young Eastern Hemlock and American Beech, providing 20 to 30% cover. There are some open areas at this station and it has a dense deciduous subcanopy.	Scattered deer tracks.	Moderate
6	This station is dominated by Eastern Hemlock with occasional Sugar Maple and Yellow Birch, providing greater than 60% cover (**Photograph 6**). The conifer cover in the canopy is greater than 75% and the deciduous cover is less than 25%. The understorey is composed of young Eastern Hemlock, providing 25 to 50% cover. There is an open meadow located southwest of this forest.	Abundant deer tracks and scat.	High
7	This station is dominated by 80% Eastern Hemlock with about 15% deciduous cover of Yellow Birch and Red Maple. Some representation (5%) of White Pine is also present, (**Photograph 7**). The understorey is composed of young Eastern Hemlock, providing 25 to 50% cover with sparse ground and shrub cover.	No tracks or scat.	High

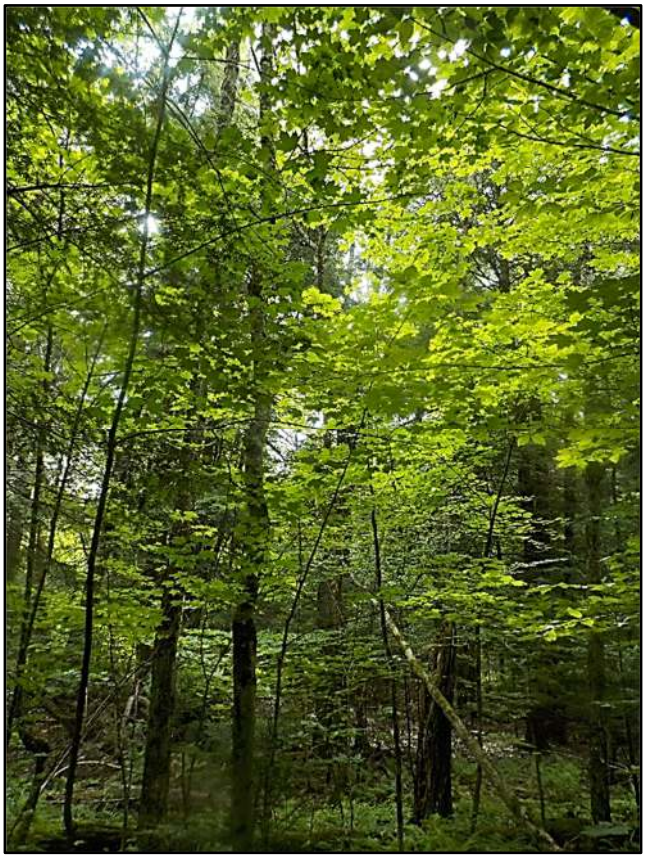
Station Number	Species Composition	Deer Evidence	Deer Habitat Quality Ranking
8	This station is dominated by about 75% Eastern Hemlock cover with 10% White Pine, 10% Red Maple and 5% Yellow Birch, (**Photograph 8**). There are gaps in the canopy resulting from past wind throw of trees. Dense regeneration of understorey hemlock is advancing. The site is moist with scattered sedges and ferns.	No tracks or scat.	High
9	This station consists of a dry site mixed forest with limited underground and a dense canopy. Eastern Hemlock representation is about 70%, with 15% cover of White Oak (*Quercus alba*) and 15% mix Sugar Maple and Red Maple, (**Photograph 9**).	Tracks observed and potential deer trail towards lake.	Moderate

Photograph 1. Station 1, located adjacent to Stagecoach Road.

Photograph 2. Station 2, located adjacent to Stagecoach Road.

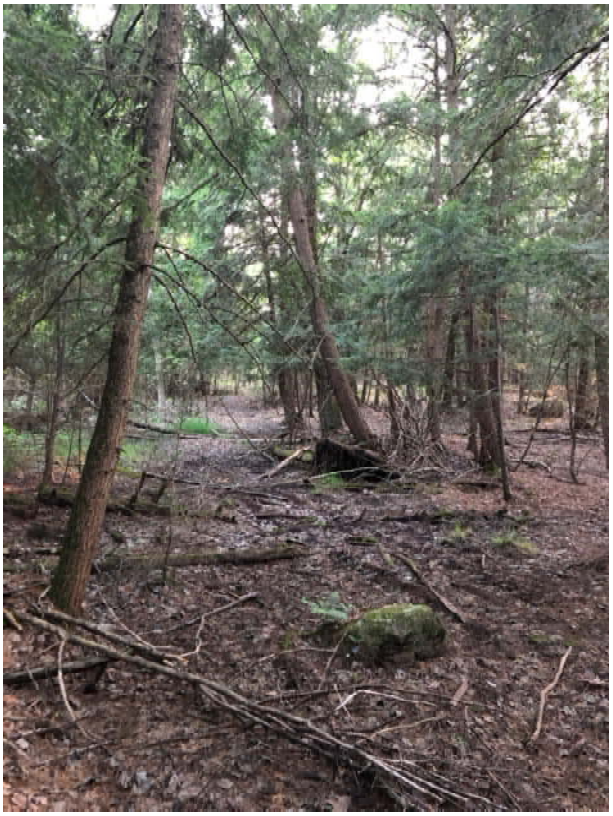
Photograph 3. Station 3, located along Stephens Bay Road.

Photograph 4. Station 4, located along Stephens Bay Road.



Photograph 5. Station 5, located adjacent to Stagecoach Road.

Photograph 6. Station 6, located adjacent to Stagecoach Road.



Photograph 7. Station 7, located adjacent to Stagecoach Road.

Photograph 8. Station 8, located adjacent to Stagecoach Road.

Photograph 9. Station 6, located adjacent to Stagecoach Road.

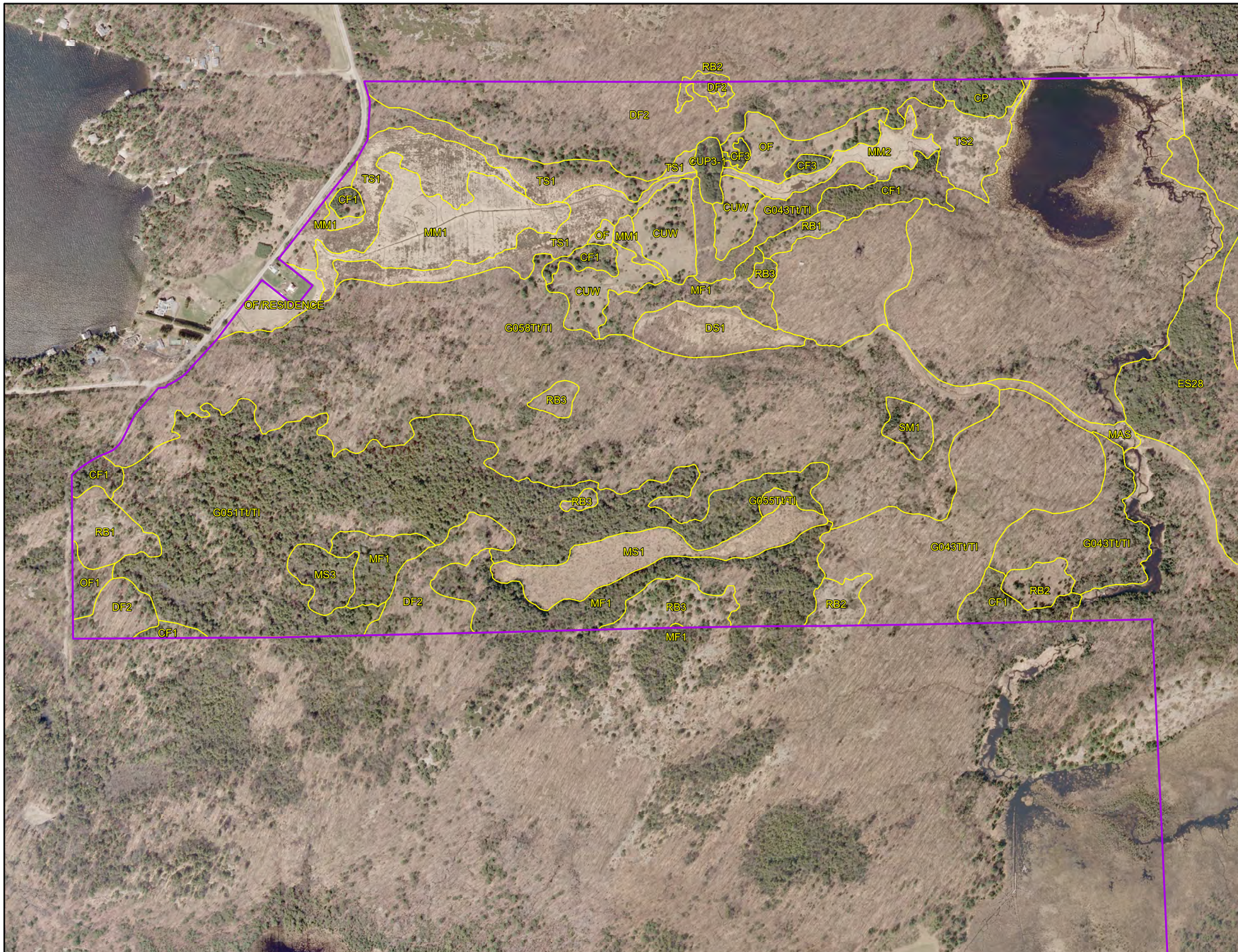
APPENDIX G – UPDATED COPY OF TABLE 9 FROM THE EIS REPORT, INCLUDING A CORRECTION FOR THE MATHEMATICAL ERROR IN THE MNRF PROTOCOL

Table 9 of our EIS report followed the approach outline in the Ministry of Natural Resources and Forestry's **Survey Protocol for Species at Risk Bats Within Treed Habitats** (MNRF 2017). That survey protocol includes a mathematical error in its calculation of snag density in snags/ha. The calculation of snag density in our EIS report used MNRF's methodology, which resulted in an underestimate of the actual number of snags/ha. The updated table below corrects for this error.

Table 9. Snag Tree Densities for Each Development Precinct

Development Precinct A							
Assessment Area (ha)	**# of plots**	**# of snags**	**Average # of snags/plot**	**Plot radius (m)**	**Individual plot area (m^2)**	**Total plot area (ha)**	**Snag density (snag/ha)**
Approximate Area (7.57 ha)	11	8	0.7	12.6	500	0.55	14.5
Development Precinct B							
Assessment Area (ha)	**# of plots**	**# of snags**	**Average # of snags/plot**	**Plot radius (m)**	**Individual plot area (m^2)**	**Total plot area (ha)**	**Snag density (snag/ha)**
Approximate Area (5.56 ha)	9	6	0.7	12.6	500	0.45	13.3
Development Precinct C							
Development Precinct B	**# of plots**	**# of snags**	**Average # of snags/plot**	**Plot radius (m)**	**Individual plot area (m^2)**	**Total plot area (m^2)**	**Snag density (snag/ha)**
Approximate Area (2.4 ha)	4	3	0.8	12.6	500	0.2	15.0
Development Precinct D							
Assessment Area (ha)	**# of plots**	**# of snags**	**Average # of snags/plot**	**Plot radius (m)**	**Individual plot area (m^2)**	**Total plot area (m^2)**	**Snag density (snag/ha)**
Approximate Area (4.22 ha)	7	9	1.3	12.6	500	0.35	25.7

APPENDIX H– UPDATED COPY OF FIGURE 4 FROM THE EIS REPORT, PROVIDING A LEGEND FOR THE ELC CODES



LEGEND

Study Area

ELC Community

Terrestrial System

Forest

CF1 – Coniferous Forest, Dry to Fresh, Coarse: Hemlock – Cedar Conifer (G051Tt/Tl)

MF1 – Mixed Forest, Dry to Fresh, Coarse: Maple Hardwood (G058Tt/Tl)

MF1 – Mixed Forest, Dry, Sandy: Mixedwood (G043Tt/Tl)

DF1 and DF2 – Deciduous Forest, Dry, Sandy: Mixedwood (G043Tt/Tl)

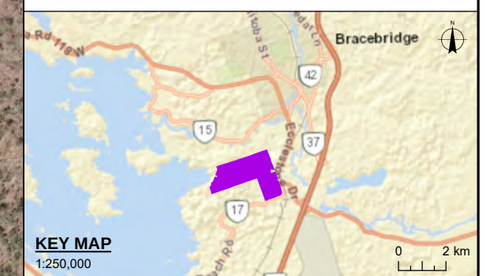
Cultural (CU)

CP1 - Coniferous Plantation, Red Pine Coniferous Plantation Type (CUP3-1)

OF – Open Field, Cultural Woodland (CUW)

Rock Barren

RB1, RB2 and RB3 – Rock Barren (G164Tt/Tl and G164S)



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CLIENT: Gord Nielsen

PROJECT: Muskoka Royale

PROJECT NO.	160337	REVISION:	0
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DRAWN:	BE	DATUM:	NAD83
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2019 ELC Survey

Figure 4

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