February 16, 2016

Dan Kingsbury, MCIP, RPP
Planner
County of Simcoe
Midhurst, Ontario
L0L 1X0

Dear Mr. Kingsbury:

Re: Official Plan Amendment No. 18
1000 Strawberry Island
County File No.: RA-OPA-1418 (Strawberry Island Resort Inc.)
Township of Ramara, County of Simcoe

Thank you for consulting with the Lake Simcoe Region Conservation Authority (LSRCA) with regard to this Official Plan Amendment (OPA). This letter constitutes our formal response to the approval authority (County) on this OPA. It should be noted that the LSRCA provided written comments on this application by multiple letters dated August 18, 2014 through to November 27, 2015. We have also participated in various meetings between the Township, developer and consultants, and County on this matter including site investigations.

Background

The Township of Ramara adopted this Official Plan Amendment (OPA No. 18) in July of 2015. It is our understanding that the purpose and effect of this Amendment would re-designate the property (Strawberry Island) from "Rural" to "Island Accommodation (Strawberry Island)" and "Natural Area Protection". This Amendment would allow for a mixed use seasonal residential and resort accommodation facility on the Island to a maximum of 80 dwelling units. The Official Plan Amendment would be implemented through subsequent applications to amend the Zoning By-Law and applications for site plan and condominium approval.

Context

Legislative

Subsection 3(6) of the *Planning Act* states that comments or submissions provided by an agency of the government such as the conservation authority shall be consistent with the provincial policy statements and shall conform to the provincial plans. On this basis, the LSRCA has reviewed this Official Plan Amendment application in the context of the following:

- Provincial Policy Statement (PPS) under the *Planning Act*
- Lake Simcoe Protection Plan (LSPP) under the *Lake Simcoe Protection Act*
- Growth Plan for the Greater Golden Horseshoe under the *Places to Grow Act*
- Ontario Regulation 179/06 under the *Conservation Authorities Act*

Inter-agency

In addition, the LSRCA (in association with the NVCA and SSEA) has a ratified Memorandum of Understanding (MOU) with the County of Simcoe as it relates to providing technical environmental advice on matters under the *Planning Act*. As a result, we have reviewed this OPA and development proposal from the following policy objectives in accordance with our MOU:

- ✓ Maintaining and where possible enhancing the ecological health of Lake Simcoe
- ✓ Protecting people and property from natural hazards
- ✓ Maintaining water quality and quantity
- ✓ Conserving natural heritage features and their ecological function

Further, it should be noted that conservation authorities have been delegated the responsibility to represent the provincial interest as it relates to Policy 3.1 (natural hazards) of the PPS. This delegated responsibility has been formalized through the establishment of a MOU between Ontario's conservation authorities and the Ministry of Natural Resources.

Environmental

Based on existing mapping, technical studies prepared in support of this application, and previous site inspections, it has been determined that the subject property contains natural hazard lands associated with Lake Simcoe including flood plain and wave uprush areas. From a natural heritage perspective, the Island contains key natural heritage and hydrologic features as defined by the Lake Simcoe Protection Plan such as significant woodland and wetland, and other natural heritage features (eg. significant wildlife habitat) in accordance with the PPS. It should also be noted that the property contains the habitat of endangered species (eg. barn swallow) and is governed by the *Endangered Species Act* as administered by the Ministry of Natural Resources and Forestry.

Analysis

Natural Hazards

The subject property is a 10.4 ha island within Lake Simcoe. As a result, the Island is exposed to shoreline coastal hazards related to flooding, erosion, ice piling, and other water-related hazards as identified in the *Ministry of Natural Resources Technical Guide for Large Inland Lakes (1996)*. Given the effect of this OPA would permit seasonal residential development with primary access from Lake Simcoe through a dock facility, it must be demonstrated that there will be safe access to the site for occupants and emergency services in relation to the shoreline hazards.

While Shoreplan Engineering provided a general coastal engineering evaluation in support of the development, we believe that greater detail should be provided. For example, the LSRCA has retained the services of Baird & Associates to conduct a peer review of this coastal engineering evaluation. Based on this peer review, it has been determined that insufficient information has been provided that would substantiate appropriate access to the Island as it relates to the Island's coastal hazards.

The peer review (February 9, 2016) conducted by Baird & Associates is attached and forms part of our official response on this Official Plan Amendment application.

Natural Heritage

In March 2013, a draft guideline titled *Technical Definitions and Criteria for Identifying Key Natural Heritage Features and Key Hydrologic Features for the Lake Simcoe Protection Plan* was posted on the Environmental Registry (EBR) for public comment. These guidelines (January 20, 2015) were subsequently finalized and posted on the Registry in March 2015. We understand based on discussions and correspondence with the Ministry of Municipal Affairs and Housing and Ministry of Natural Resources and Forestry that these guidelines should be used as a basis for identifying key natural heritage and hydrologic features within the Lake Simcoe watershed including Strawberry Island.

Based on these guidelines, the Island contains key natural heritage and key hydrologic features including significant woodland, natural areas abutting Lake Simcoe, and wetlands as defined by Designated Policy (DP) 6.21 and 6.22 of the Lake Simcoe Protection Plan. Other natural heritage features in accordance with the PPS include the habitat of endangered and threatened species, significant wildlife habitat, and fish habitat associated with Lake Simcoe. Together, these features and their ecological function form part of the Island's terrestrial and aquatic ecosystem.

Designated Policies 6.23 and 6.24 of the LSPP state that development and site alteration is not permitted within a key natural heritage or hydrologic feature and within the related minimum vegetation protection zone of 30 metres. Based on Schedule "A-1" of OPA 18, it appears that parts of key natural heritage and hydrologic features and their minimum vegetation protection zones will be designated "Island Accommodation (Strawberry Island)" which would permit incompatible land uses such as single detached and multiple dwelling accommodation units. As such, Schedule "A-1" should be amended accordingly by designating the key natural heritage and hydrologic features and their minimum vegetation protection zones "Natural Area Protection". It should also be demonstrated that 80 units can be accommodated in a sustainable way within the remaining developable area. It should be noted that Schedule "A-1" appropriately designates the minimum vegetation protection zone (30 metres) from Lake Simcoe for shoreline built-up areas in accordance with 6.2-DP of the Lake Simcoe Protection Plan.

In addition, a Natural Heritage Evaluation (Environmental Impact Study) has been prepared in support of this application and land use proposal. This Study has been prepared in accordance with 6.3-DP and 6.25-DP of the Lake Simcoe Protection Plan and the applicable policies of the PPS. The LSRCA has reviewed this study and we have provided detailed comments in Appendix B.

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Sewage Treatment

It is proposed that the development will be serviced with a private on-site communal sewage disposal system. Based on correspondence with the Ministry of Environment and Climate Change (MOECC), it has been determined that the proposed sewage disposal system would not be classified as a non-municipal sewage treatment plant as per the LSPP and that Designated Policy 4.15 of the Protection Plan would apply. As a result, a new on-site sewage system or subsurface sewage works shall not be permitted within 100 metres of the Lake Simcoe shoreline.

Subsurface sewage works is defined by the Lake Simcoe Protection Plan as any works for the collection, transmission, treatment and disposal of sewage or any part of such works excluding plumbing to which the *Building Code Act* applies. Based on the proposed land use designations and concept plan, it appears that the single detached dwelling units will be located approximately 30 metres from Lake Simcoe. On this basis and given that the transmission of sewage from these units to the communal disposal system will be located within 100 metres from the shoreline, we believe that Policy 4.15 of the LSPP has not been met. You may wish to contact the MOECC in order to clarify the proper interpretation of DP-4.15 as it relates to this development and proposed sewage disposal system.

Stormwater Management

The proposed development is subject to Designated Policies 4.8 to 4.11 of the Lake Simcoe Protection Plan. These policies include the need for a phosphorus budget, water balance and integrated treatment train approach that achieves the Enhanced Protection level specified in Chapter 3 of the MOE's "Stormwater Management Planning and Design Manual 2003".

Further, Policy 1.6.6.7 of the Provincial Policy Statement states that planning for stormwater management shall:

a) minimize, or, where possible, prevent increases in contaminant loads;
b) minimize changes in water balance and erosion;
c) not increase risks to human health and safety and property damage;
d) maximize the extent and function of vegetative and pervious surfaces; and
e) promote stormwater management best practices, including stormwater attenuation and re-use, and low impact development.

Based on our review of the stormwater management report and hydrogeological study prepared in support of this application, we believe that these policies have not been met. Detailed comments related to the review of the stormwater management study and associated water balance can be found in Appendices C and D.

Recommendation

Based on our review of this application and related support studies, we believe that consistency with the Provincial Policy Statement and conformity with the Lake Simcoe Protection Plan has not been demonstrated. As such, we recommend that these comments be addressed to our satisfaction prior to any final approval of this Official Plan Amendment.

If you have any questions with regard to these comments, please contact Lisa-Beth Bulford, Development Planner, or the undersigned.

Sincerely,

Charles F. Burgess, MCIP, RPP
Manager of Planning

Copy: Planscape, Rick Hunter
County of Simcoe, Nathan Westendorp
Township of Ramara, Janice McKinnon and Mark Dorfman
MMAH, Darryl Lyons
LSRCA, Michael Walters, Rob Baldwin, Tom Hogenbirk

LIST OF APPENDICES

APPENDIX A – Coastal Engineering Peer Review by Mark Kolberg P.Eng. of Baird and Associates

APPENDIX B – Natural Heritage Review by Shauna Fernandes, LSRCA Ecologist
Michalski Nielsen Associates Limited, Environmental Impact Study, revised July 2015

APPENDIX C – Hydrogeology Review by Shelly Cuddy P.Geo., LSRCA Hydrogeologist
Pinestone Engineering, Functional Servicing Report, May 2, 2014
Azimuth Environmental Consulting, Hydrogeology Study, December 2014

APPENDIX D – Stormwater Management Review by Kenneth Cheney P.Eng., LSRCA Engineer
Pinestone Engineering Ltd., Functional Servicing Report, May 2, 2014 (revised January 8, 2015)

February 9, 2016

APPENDIX 'A'

Lisa-Beth Bulford, M.Sc.
Development Planner
Lake Simcoe Region Conservation Authority
120 Bayview Parkway
Newmarket, ON L3Y 3W3

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Baird

oceans
engineering
lakes
design
rivers
science
watersheds
construction

Dear Ms. Bulford:

Re: Peer Review of Strawberry Island Coastal Review prepared by Shoreplan (2015/01/20)

Introduction

We have completed an independent review of the *Strawberry Island Coastal Review* letter prepared by Shoreplan Engineering Ltd (dated January 20, 2015). As requested, the objective of our review was to assess if the Shoreplan letter adequately addressed the policies and practices outlined in the *Lake Simcoe Protection Plan* (2009) with respect to shoreline processes and is otherwise generally consistent with the *Provincial Policy Statement 2014* (*3.1 Natural Hazards*) and other accepted practices and guidelines, such as the MNR *Technical Guide for Large Inland Lakes*, which was prepared to support the *Provincial Policy Statement*. We also considered the *Guidelines for the Implementation of Ontario Regulation 179/06* (Lake Simcoe Region Conservation Authority, April 24, 2015).

Limitation of Review

Our review was not an exhaustive check of all the details of the Shoreplan assessment and our comments are not intended as directions to Shoreplan Engineering, their client, or any other party, to make changes to their report. Shoreplan Engineering retains all responsibility and liability for the content of their report and for all decisions and any revisions made as a result of this review. Our review is not to be used by Lake Simcoe Region Conservation Authority for any purpose other than an appraisal of Shoreplan Engineering's assessment report.

Summary

Shoreplan clearly states that their assignment was limited in scope to a review of wave uprush and the proposed docks and breakwaters. Shoreplan states that they did not undertake a site visit due to the timing of the review and that they did not complete any detailed analysis. They acknowledge that a site visit would be required to provide a more detailed assessment of the coastal aspects of the development. Shoreplan did not investigate the project with respect to the requirements of the *Lake Simcoe Protection Plan*. Their only reference to the *Provincial Policy Statement 2014 (PPS)* and the supporting *Technical Guide for Large Inland Lakes* was with respect to the generic 5 m wave uprush value. The *Guidelines for the Implementation of Ontario Regulation 179/06* were released after Shoreplan's review.

While the observations made by Shoreplan regarding the wave uprush limit appear reasonable, they acknowledge that the scope of their report is insufficient to address the policies and practices outlined in the *Lake Simcoe Protection Plan* (2009) and other guidelines, such as the *PPS* and MNR *Technical*

Baird

Guide for Large Inland Lakes. This is of particular relevance with regards to potential impacts of the proposed docks and breakwaters on the natural flow of water along the shoreline and to fish habitat.

Wave Uprush

The *Provincial Policy Statement 2014* sets out policies for directing development away from natural hazards, including hazardous lands adjacent to the shorelines of the Great Lakes - St. Lawrence River System and large inland lakes which are impacted by flooding hazards, erosion hazards and/or dynamic beach hazards (PPS 3.1.1.a). The MNR *Technical Guide for Large Inland Lakes* is used to support the interpretation and application of the natural shoreline hazard policies contained in the *Provincial Policy Statement 2014.*

The shoreline flooding hazard includes the 100-year flood level and an allowance for wave uprush and other water related hazards. Shoreplan reports that the wave uprush limit was determined by another engineering firm using the 1981 Marshall Macklin Monaghan study for a shoreline sector located north of Strawberry Island. Shoreplan provides a reasoned opinion that this wave uprush limit is "unrealistically high". They further note that the data is over 30 years old and correctly point out that methodologies for estimating wave uprush have advanced over that time.

Shoreplan suggests that in absence of a more detailed study, an estimate of the 100-year flood level derived by Shoreplan for another site on the south shore of Lake Simcoe could be used along with the generic 5 m wave uprush value outlined in the MNR *Technical Guide for Large Inland Lakes*. It appears that the preliminary estimate of the 100-year flood level (219.66 m) provided by Shoreplan may be a reasonable value. However, while it was apparently outside the scope of Shoreplan's assignment, for a development of this scale and scope it would be appropriate to expect a modern estimate of the 100-year flood level specific to Strawberry Island.

Shoreplan clearly states they did not undertake a site visit due to the timing of the assignment. Application of the generic 5 m wave uprush allowance was made based on assumptions regarding the slope of the shore. The shore conditions should be confirmed by a site visit, as acknowledged by Shoreplan.

It appears reasonable for Shoreplan to conclude that a refined value of the 5 m wave uprush allowance likely would not impact the development setback due to the *Lake Simcoe Protection Plan* requirement for a 30 m setback from the current water level. Note that the *Guidelines for the Implementation of Ontario Regulation 179/06* (Lake Simcoe Region Conservation Authority, April 24, 2015) require all development to be setback a minimum distance of 30 metres from the *normal high watermark* of Lake Simcoe.

The Shoreplan review does not address other water related hazards, which would primarily include ice action. Ice piling on Lake Simcoe is known to occur and this should be addressed.

Baird

Dock Facility

The proposed dock facility is comprised of floating docks, floating breakwaters and fixed breakwaters on the north side of the Island. Shoreplan states that they *have not investigated the status of this project with respect to that* [*Lake Simcoe Protection*] *Plan."* It has also not been demonstrated that the dock facility meets the requirements of the *Provincial Policy Statement 2014* (Policies 3.1.7.c) and d)) which states that development or site alterations may be permitted in those portions of hazardous lands "*where the effects and risk to public safety are minor, could be mitigated in accordance with provincial standards, and where all of the following are demonstrated and achieved: c) new hazards are not created and existing hazards are not aggravated; and d) no adverse environmental impacts will result.*"

Site data (e.g., bathymetry, substrate description, littoral zone) and analysis (e.g., nearshore wave conditions, currents, sediment erosion, transport and deposition) should be provided and the potential impacts of the proposed dock facility on the ecological function of the shore, the natural flow of water, coastal processes and fish habitat should be determined, as required by the *Lake Simcoe Protection Plan* (e.g., 6.2-DP, 6.4-DP, 6.7-DP, 6.8-DP) and the *Guidelines for the Implementation of Ontario Regulation 179/06* (e.g., 6.1.2(a), 6.1.2(d), 6.4.1(a), 6.4.1(b), 6.1.6, 6.1.9, 6.1.10, 6.6.1).
The *Guidelines* state that satisfactory engineering studies are required for shoreline alterations (6.6.1(c)) and that an environmental assessment or site specific studies, which are applicable based upon the scale and scope of the proposed works are required (6.1.2(a)). A natural heritage evaluation to the satisfaction of the LSRCA, outlining how the proposed alteration will not impact the ecological function of the shoreline is required (6.1.9(f)). For example, aerial photographs indicate a spit/shoal feature extending from the north side directly under one of the fixed breakwaters. The ecological function of this feature should be described and assessed. The potential effects where the fixed breakwaters cover the bottom substrate need to be determined, along with the impacts to existing habitat areas in updrift or downdrift areas (e.g., potential to be covered by sediments or removed due to changes in erosion/depositional patterns) and construction impacts (e.g., turbidity).

Shoreplan indicates that the floating breakwater concept is likely inadequate for the estimated wave conditions. Further, they report that the manufacturer of the floating breakwater is unable to substantiate their performance. On this basis, it would seem prudent to either 1) remove the docking facility as shown from the plan; 2) assume the docking facility concept will require fixed breakwaters in place of the floating breakwaters; or 3) as recommended by Shoreplan, undertake proper, detailed analysis of the wave conditions and floating breakwaters to confirm they are feasible. Shoreplan also recommends that the detail analysis include an assessment of the effects of ice on the docking facility.

The docking facility includes two fixed rock breakwaters. They are described as an important component of the plan that should be retained. However, Shoreplan states they are "*uncertain about the ability of these structures to be built under the requirements of the Lake Simcoe Protection Plan. We have not investigated the status of this project with respect to that plan.*"

Baird

It has not been demonstrated, as required by the *Provincial Policy Statement 2014*, that the docking facility will not create new hazards or aggravate existing hazards and that it will not create adverse environmental impacts. Clearly, the proposed dock facility would have to be evaluated in greater detail in accordance with the *Lake Simcoe Protection Plan*, the *Provincial Policy Statement 2014* and the *Guidelines for the Implementation of Ontario Regulation 179/06*.

If you have any questions, please do not hesitate to contact me.

Sincerely,
Baird & Associates

Mark Kolberg
Principal

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APPENDIX B

General Comments

The EIS is written in a perspective that acknowledges the area as an island but is subject to the same impact review as a mainland feature. The consultant does not review the importance of the features from a rarity perspective of being a secluded island. It does not consider the impacts on island species colonization and species diversity. With large scale removal of the habitat, as is proposed with the woodland, species that are water locked would reduce in population size or may disappear when resources are no longer available. The area sensitive birds will no longer exist on the property due to the increased openness and we will see very common generalist species increase.

This island demonstrates significant wildlife habitat for breeding amphibians, small mammal, evidence of large mammals for migration stopovers (evidence of black bear), and breeding and stop over habitat for a considerable amount of avian species including many that are area sensitive. There are approximately 6 different Ecological Land Classification (ELC) habitats on the property and larger features include wetland, woodland, shoreline, and Lake Simcoe which have complex relationships that are not well-defined in the EIS.

Specific Comments

1. The context map located between page 2 and 3 identifies the proposed parking area. Impacts and policy conformity related to this proposal and the adjacent inland water feature have not been assessed.

2. Endangered species (bats and barn swallow) - It appears that consultation is still underway between the MNRF and consultant to resolve any issues as per the *Endangered Species Act*. The LSRCA should be notified of any decisions if habitat is considered within a natural area on the Island.

3. Fish Habitat - Potential lake trout and lake whitefish spawning shoals are located offshore of the southern shoreline of the Island. The EIS does not demonstrate how fish habitat will be impacted with the installation and use of the proposed dock features, including navigation routes, sediment disturbance etc.

4. Significant woodland - Based on the EIS and the guideline *Technical Definitions and Criteria for Identifying Key Natural Heritage Features and Key Hydrologic Features for the Lake Simcoe Protection Plan* (2015), the woodland on the Island would be considered "significant". As a result, this significant woodland would be classified as a key natural heritage feature as per the LSPP.

5. Wetlands - All four wetland features on the Island would be considered key natural heritage or hydrologic features based on *Technical Definitions and Criteria for Identifying Key Natural Heritage Features and Key Hydrologic Features for the Lake Simcoe Protection Plan* (2015).

6. Natural areas abutting Lake Simcoe – By definition and based on the *Technical Definitions and Criteria for Identifying Key Natural Heritage Features and Key Hydrologic Features for the Lake Simcoe Protection Plan* (2015), natural areas abutting Lake Simcoe (key natural heritage feature as per 6.21-DP of the LSPP) exist on the Island.

7. Section 6.3.1 states that a 30 metre buffer to Lake Simcoe will be maintained; however the buffer is not "no touch". Limitations to woodland or tree removal have not been discussed or justified in the EIS.

8. Significant wildlife habitat – Based on the EIS and technical guidelines that help implement the natural heritage policies of the PPS, parts of the Island contain significant wildlife habitat. As a result, the EIS has not demonstrated that the proposed development will not cause a "negative impact" in accordance with Policy 2.1.5 of the PPS.

APPENDIX C

The existing site servicing (sewage and water supply) has been determined to be inadequate to service the proposed development. The purpose of the hydrogeology study was to investigate soil and groundwater conditions for the proposed septic bed and evaluate potential drinking water options.

1. Other than the FSR indicating that three quarters of the property is covered with deciduous forest, there is no discussion on what if any natural heritage features are on the island and how they would be supported by drainage and/or infiltration on the island. A feature based water balance should be provided to ensure any natural heritage and hydrologic features will not be negatively impacted by the proposed development.
2. Soil testing has been conducted in the central portion of the island to determine the suitability of proposed sewage works. The testing indicates the soils to be sandy silt and clay mixtures and it is estimated that they become finer grained as the elevation decreases towards the lake. It is unclear how that was determined as testing was confined to the central portion of the island. Please provide additional information on the soils across the site as it relates the water balance and proposed infiltration trenches.
3. The hydrogeology report indicates a number of infiltration trenches will be used for stormwater control on the site where the infiltration rate is >15mm the water table is >1 metre below the bottom of the trench. The report indicates that this criteria can be met in most cases, with the percolation rates between 15-20 min/cm and the water table being at least 2 metres below ground surface. There is no indication on where these infiltration trenches will be on the site and if they correspond to where the soil samples have been collected? Please indicate:
    a. The location of the proposed infiltration trenches;
    b. Infiltration rates of the soils at those locations with appropriate infiltration testing;
    c. Groundwater levels at those locations; and
    d. The estimated infiltration volumes (per CVC 2010 stormwater manual).
4. The functional servicing report indicates that a Permit to Take Water is not required due to the use of the taking being domestic, which the MOECC has confirmed is exempted from a PTTW. It was also identified that some of the water will be used for commercial purposes but would be under the 50,000L/day. It is unclear how the volume of water being used for 'commercial use' will be regularly measured to ensure it does not exceed 50,000L/day and a PTTW is not needed. Please identify the appropriate measurement technique.
5. It should be noted that although the communal drinking water system will not be subject to a PTTW it will however be subject to the Safe Drinking Water Act, 2002, O.Reg. 170/03 Drinking Water Systems which require regular sampling and inspections. In addition, the MOECC inspector will require that the volume of water being used for commercial purposes be demonstrated.

APPENDIX D

General

1. Based on the information provided in Section 1.1 of the FSR, the proposed development is to be phased. Please provide information related to the phasing.

Flood Elevations

2. The average yearly high water level in the lake is 219.15masl. Any basements must be set above this elevation.
3. Please show the average yearly high water level, wind setup elevation and proposed basement elevations and basement drainage details on the drawings once these values have been determined.

Water Quality

4. For purposes of evaluating the total suspended solids removal, Table 8 should include the proposed stormwater treatment measures, not the land uses. For example, infiltration trenches, enhanced swales, vegetated buffers should be summarized for their technical effectiveness. Each of the proposed treatment measures should be evaluated based on the contributing drainage area. For example, given a 10ha development, with 5ha draining to quality control feature that has a 50% TSS removal efficiency and the other 5ha draining without quality controls, the overall TSS removal efficiency for the development would be 25%. Please revise Table 8 to show the efficiency of the proposed stormwater quality treatment measures.
5. According to Section 7.7 of the FSR, the cart path runoff will be pretreated by the vegetated swale prior to discharging to the vegetated buffer. Drawing SWM-1 shows the cart path drainage being directed to the outlet on the northeast shore of the island. Please review and confirm the proposed approach and update the FSR and drawings accordingly so that the FSR and drawings are consistent. Credit for a treatment train approach cannot be granted if the vegetated swales discharge as a point source directly to the lake.
6. An online wetpond is proposed and shown on the drawings. However, no calculations or rational for the wetpond have been provided. LSRCA would encourage the exploration of alternate means of providing stormwater quality treatment.
7. The treatment train approach indicates a 95% phosphorus removal rate. Please justify how this rate was determined. Without additional details on the proposed stormwater management plan, a 95% phosphorus reduction credit is not justified. Please provide additional details to justify the selected rate and to demonstrate that the proposed plan will be able to be implemented during the detailed design phase.
8. Reference was made in the FSR to using rain gardens and LIDs. LSRCA encourages rain gardens and LIDs provided that calculations and documentation is provided to show that they will function and can be implemented on the proposed site as part of the SWM plan.

Water Balance

9. It appears that the potential evapotranspiration was used instead of the actual evapotranspiration. Please confirm if this is the case and justify the rationale.
10. The evapotranspiration value for buildings/open water/paved/hard surface/ buildings is set at 209. Please provide supporting calculations and justification for this value.

11. There appears to be a slight discrepancy in the surplus and deficit calculations (-4.9mm appears as a surplus, for example). Please verify and update the numbers accordingly.
12. The runoff from the buildings was not calculated for the pre-development water balance assessment. Please update the calculations to include this runoff.

Drainage Patterns

13. Section 7.7 of the FSR indicates that roof drainage will be directed overland in the form of sheet flow to the 30m shoreline vegetated filter strip. However, based on the information provided on the preliminary grading plan (drawing SWM-1), it appears that it is only the outer ring of cottages that will drain as sheet flow to the buffer strips. It appears that the inner ring of cottages will be intercepted by the proposed enhanced vegetated swale that runs along the inner edge of the proposed cart path and drain to the flow spreader on the northeast shore of the island. The text of the FSR should be updated to describe the proposed drainage patterns in greater detail.

Sediment and Erosion Control

14. Based on the information provided in Section 1.1 of the FSR, the proposed development is to be phased. Appropriate sediment and erosion control plans will need to be provided prior to the commencement of each phase to the satisfaction of the LSRCA. Additionally, LSRCA will require demonstration that construction of later phases will not impact on the stormwater controls of established phases.
15. Rip-rap is shown in the swales where the gradient exceeds 0.7%. Alternate, more natural forms of erosion protection should be explored and specified during the detailed design phase.

Other Technical Comments

16. IDF curves for Orillia were referenced in Section 7.3. None were provided. Please provide the supporting IDF curves and calculations for the a,b, and c parameters.
17. The post-development catchment should be separated into catchments based on the ultimate drainage outlet(s). Please revise the post-development catchments to reflect the proposed drainage patterns.
18. Supporting calculations and documentation for all hydrologic and hydraulic parameters are required. Please provide this information.
19. Please provide calculations for the percent impervious for both the pre-development and post-development conditions.
20. Please provide the calculations for pre-development and post-development slope. Please clarify why there is a 1.5% difference in slope between the two conditions.
21. A consistent runoff approach is needed. Pre-development target flows appear to have been generated using the CN method while post development flows appear to have been generated using the Horton's Equation Method. In order to compare pre-development and post-development flows, the runoff generation methods need to be consistent. Please revise accordingly.
22. Please provide justification for the selected CN values.
23. The modelling of peak flows for the Regional event is to be done assuming AMCIII conditions. Please revise the modelling to reflect AMCIII conditions for the Regional event.
24. It appears that the Rational Method was used to size the ditches. As per Section 3.3.1 of the LSRCA Technical Guidelines for SWM Submissions, the runoff coefficients are to

be adjusted as per MTO design chart 1.07. Please revise the runoff coefficients and update the ditch sizing calculations.

25. The modelling output for Culvert 201B and 201D appears to be out of order. Please verify and correct as necessary.
26. Please remove the sentence "The lake basin will provide natural attenuation of the flow rate increases." On page 28, Section 7.9.

Drawings

In general, the drawings are difficult to read. The thick grey line work of the conceptual plan makes the text difficult to read. For future submissions, it would be appreciated if the conceptual plan could be a lighter shade of grey to allow the text to be more easily read.

CP-1

27. The Phase 1 boundary shown on the drawing appears to encompass the entire island. This appears to contradict Section 1.1 of the FSR that states the development is to be phased. Is there a plan for subsequent phases? Please provide additional information and clarify.

SWM-1

28. The line type used for the limit of grading on drawing SWM-1 appears to conflict with the legend that indicates 30m shoreline setback. Please correct the legend and drawing as necessary.
29. Some of the line weights appear to differ between the legend and the drawings. Please double check the line weights to ensure consistency.