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June 5, 2025

SENT BY EMAIL (Elaine.mallory@ulcg.on.ca)

Elaine Mallory, Planner
United Counties of Leeds and Grenville
25 Central Ave. W, Suite 100
Brockville, ON K6V 4N6

Re: **Plan of Subdivision Application (07-T-20252)**
Orchards of River Bend
Parts of Lot A & 1, Concession B and Part of closed road allowance between Lots A & 1
819 County Road 19, Township of Wolford, Village of Merrickville-Wolford
2873633 Ontario Inc. (Bill Kollaard)

This letter acknowledges receipt of the above-noted application circulated by the United Counties of Leeds and Grenville. The materials were received by the Rideau Valley Conservation Authority (RVCA) on April 1, 2025.

RVCA staff have reviewed this application in accordance with the *Conservation Authorities Act*, which requires RVCA to provide programs and services related to the risk of natural hazards within its jurisdiction. With respect to *Planning Act* matters, conservation authorities have a role to ensure that decisions under the *Planning Act* are consistent with the natural hazard policies (Section 5.2) of the Provincial Planning Statement (PPS), 2024.

In addition, RVCA staff have also reviewed this application in accordance with Section 28.1 of the *Conservation Authorities Act*. Where development activity is proposed within a regulated area, a permit is required to ensure that it conforms to the applicable tests for implementation of the Act.

Purpose of the Application

The purpose of the application is to facilitate 29 lots (ranging from 1.02 acres to 4.37 acres) for single detached residential dwellings, including one lot for an existing dwelling. Another lot will contain an existing accessory building (three car garage) which will be converted and/or added to for residential use. New development will be on individual private water and septic services. 2 roads, 2 blocks for parkland, 1 block for stormwater, 1 wetland block, 1 walking path block, and 1 roadblock are also proposed.

Conservation Authorities Act - Section 28

The subject lands are regulated by the Conservation Authority as follows:

- All lands within 15 metres of the floodplain associated with the Rideau River.
- All lands within 15 metres of the Rideau River and associated tributary (Tributary 2).
- All lands identified erosion hazards (slopes) located along the Rideau River

Any future development activity within RVCA's Regulated Area would be subject to a permit pursuant to 28.1 of the *Conservation Authorities Act*. In accordance with Section 28.1 of the *Conservation Authorities Act*, development activity may be permitted in the Regulated Area, where it can be demonstrated to RVCA's satisfaction that the control of flooding, erosion, dynamic beaches, or unstable soils and bedrock will not be affected.

Application-Specific Comments

Based on a review of the submission materials and information noted in Appendix 'A' of this letter the RVCA has identified the following concerns:

a. The subdivision lot layout requires additional verification and revision due to questions about the slope stability assessment, to determine the need to maintain an enhanced hydrologic function related to Tributary 1.

b. The geotechnical investigation related to slope hazards should be extended, particularly in Zone 1, to ensure that the depth and data are adequate to support the provided or revised erosion hazard limits.

c. The stormwater management plan and design should be updated to address the need to control total runoff (in addition to peak flows), potentially using additional Low Impact Development (LID) measures.

d. Limit or explore opportunities to consolidate potential for individual water access in order to avoid exacerbating erosion and slope hazards, including consideration of public common space.

e. The environmental impact assessment identifies non-regulated wetlands on the subject lands that provide contributing factors to natural hazard management and hydrologic function. The proposed block seeks to protect and maintain this function. The RVCA encourages maintenance of this feature with appropriate setbacks be maintained.

Detailed RVCA Technical Review comments have been included as attached to this letter.

Recommendation

The RVCA is seeking that the concerns noted above be addressed prior to making a decision on the Plan of Subdivision.

Should you have any questions, please contact me.

Respectfully,

Eric Lalande, MCIP RPP
Senior Planner
Rideau Valley Conservation Authority
Eric.lalande@rvca.ca
613-692-3571 ext. 1137

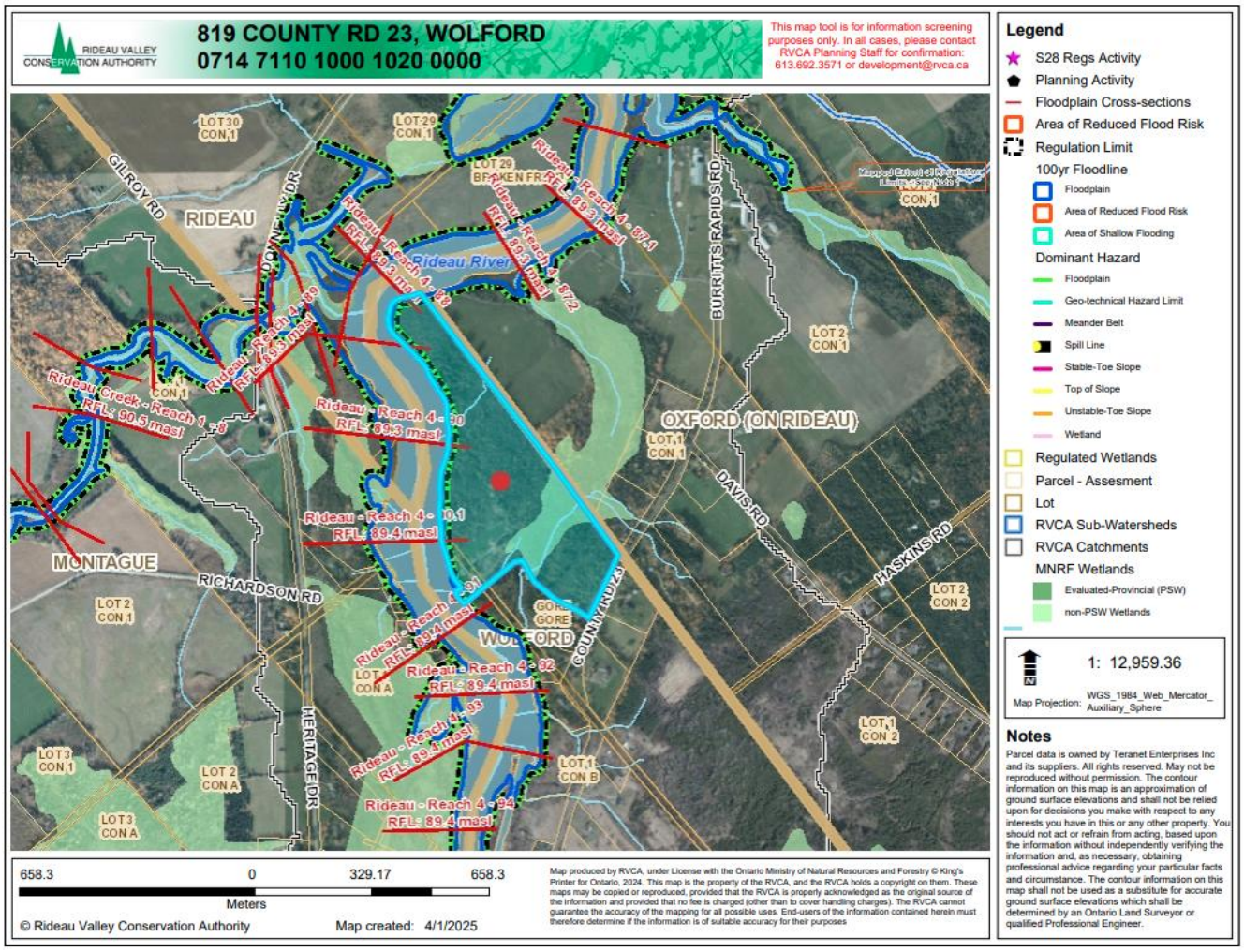
Attach. Technical Comments – Hazardous Lands dated May 9, 2025

Appendix 'A' Materials and Information Reviewed by RVCA

The following materials received on April 15, 2025, were reviewed by RVCA staff:

- Application Form
- Environmental Impact Study and Headwater Assessment
- Floodplain Analysis Brief
- Geotechnical Investigation
- Slope Stability Assessment and Delineation of the Erosion Hazard Limit
- RVCA Geoportal mapping

Excerpt from RVCA Geoportal



Rideau Valley Conservation Authority
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Manotick, Ontario K4M 1A5
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Technical Comments - Hazardous Lands

Recommendations for proposals under the *Planning Act,* in accordance with Ontario Regulation 686/21.

File Information

Project Name	**819 County Road 23 / Burritts Rapids Road Subdivision**
RVCA File ID	25-MWO-SUB-0010
RVCA File Lead	Eric Lalande
RVCA Review Date	5/9/2025
Previous RVCA Review Dates	na

Note: Technical pre-consultation occurred for this application (See related correspondence) **NO**

Recommended Actions

The RVCA recommends that the planning authority ensures the following items are addressed to support the proposed development application. Each item is elaborated upon in the *Discussion* section, below.

A1) The subdivision lot layout requires additional verification and revision due to questions about the slope stability assessment; and the need to maintain an enhanced Tributary 1.

A2) The geotechnical investigation related to slope hazards should be extended, particularly in Zone 1, to ensure that the depth and data are adequate to support the provided or revised erosion hazard limits.

A3) The stormwater management plan and design should be updated to address the need to control total runoff (in addition to peak flows), potentially using additional Low Impact Development (LID) measures.

Proposal / Project

It is understood that the United Counties of Leeds and Grenville, has received a residential subdivision application for 819 County Road 23 (Burritts Rapids Road between Nicholson Lane and Davis Road), within the Village of Merrickville-Wolford. The subdivision proposal would see the 24-ha greenfield site zoned Rural Exception 4, privately serviced, and include the following elements: 29 single detached residences (18.8 ha), 2 roads (2.9 ha), 2 parks (0.5 ha), stormwater management and wetland blocks (1.8 ha), and walking paths.

Reports

It is understood that there are no secondary planning documents that govern servicing at this site.

The comments herein are based on the RVCA's review of relevant aspects of the following technical submissions.

- Slope Stability Assessment and Delineation of Erosion Hazard Limit (Kollaard Associates, April 8, 2024)
- Rideau River Floodplain Analysis Brief (Kollaard Associates, February 5, 2025)
- Conceptual Stormwater Management Report (December 20, 2024)
- Environmental Impact Study (EIS) and Headwater Assessment (BCH Environmental Consulting Inc., July 2022)

Hazardous Lands

The RVCA's technical staff have reviewed the available regional background data and information from the reports listed above and notes the following about hazardous lands and related natural areas at the site.

- The site is located mid-watershed along the eastern banks of the Rideau River.
- The western boundary of the site (riverbank) forms a slope for which development parcels should be separated and for which the existing vegetation must be fully preserved for erosion protection.
- Overburden depths appear to range from 10 to 11 metres above the bedrock surface.
- The floodplain of the Rideau River encroaches only minimally onto the site.
- There are several on-site headwater drainage features (HDFs).
- Small areas of unregulated wetland surround select HDFs. The HDFs and connected wetland lie within a topographic depression that historically would have been a branch of the river. The depression is likely underlain by highly pervious sediments and likely maintains a high water-table.
- The presence of organic deposits within the southern wetland is unknown.

- The slopes surrounding the southern wetland are about 4 to 6.5 m in height but have a gentle slope inclination. The risk of slope instability is lower.
- Karst is unlikely to form a geotechnical hazard at the site.

Discussion

D1) Watercourse Systems and Erosion Hazards

A. Lange, B.Sc., Dipl. and I. Maltais, M. Eng., P. Eng

Overview

It is understood that the proponent intends to remove Tributary 1 while retaining Tributary 2. This approach is consistent with the Headwater Drainage Feature (HDF) management recommendations, which prioritize the conservation of Tributary 2 and indicate that no management actions are required for Tributary 1.

It is important to note that the assessment of these features was conducted well after the major freshet of 2022, which occurred during the first week of April. According to OSAP (2017), the HDF module is most effective when applied immediately after a freshet event, with sampling ideally completed before vegetation exceeds 5 cm in height. The HDF assessment did not take place until May 21, 2022. As a result, the assessment does not fully represent the extent of water movement through these features during periods of high flow.

Tributary 1 appears to be flowing from a farm field which is adjacent to the unevaluated wetland and likely plays an important role in draining water off the subject lands during the spring freshet and large precipitation events. (See Figure 1) This tributary provides important storage to keep water out of the floodplain. The RVCA therefore recommends that the feature is maintained to preserve its hydrologic function and to mitigate the risk of flooding during peak flows.

Tributary 2 serves as a critical link between the swamp and the downstream marsh. Like Tributary 1, it plays an important role in conveying drainage from the swamp, contributing to the hydrological support of the downstream marsh and the Rideau River.

Comments

i) The RVCA recommends that Tributary 1 be maintained to facilitate drainage from the adjacent lands through the subject property and into the Rideau River. To

support the proposed lot layout, channel enhancements will likely be necessary - particularly at the downstream end. This may include modifications to the "crossings" to ensure adequate water passage.

ii) The RVCA supports the recommendation to conserve Tributary 2. Ideally, this would involve channel enhancements guided by natural channel design principles. At a minimum, a 15-metre buffer of native vegetation should be established on both sides of the channel to provide long-term erosion control.

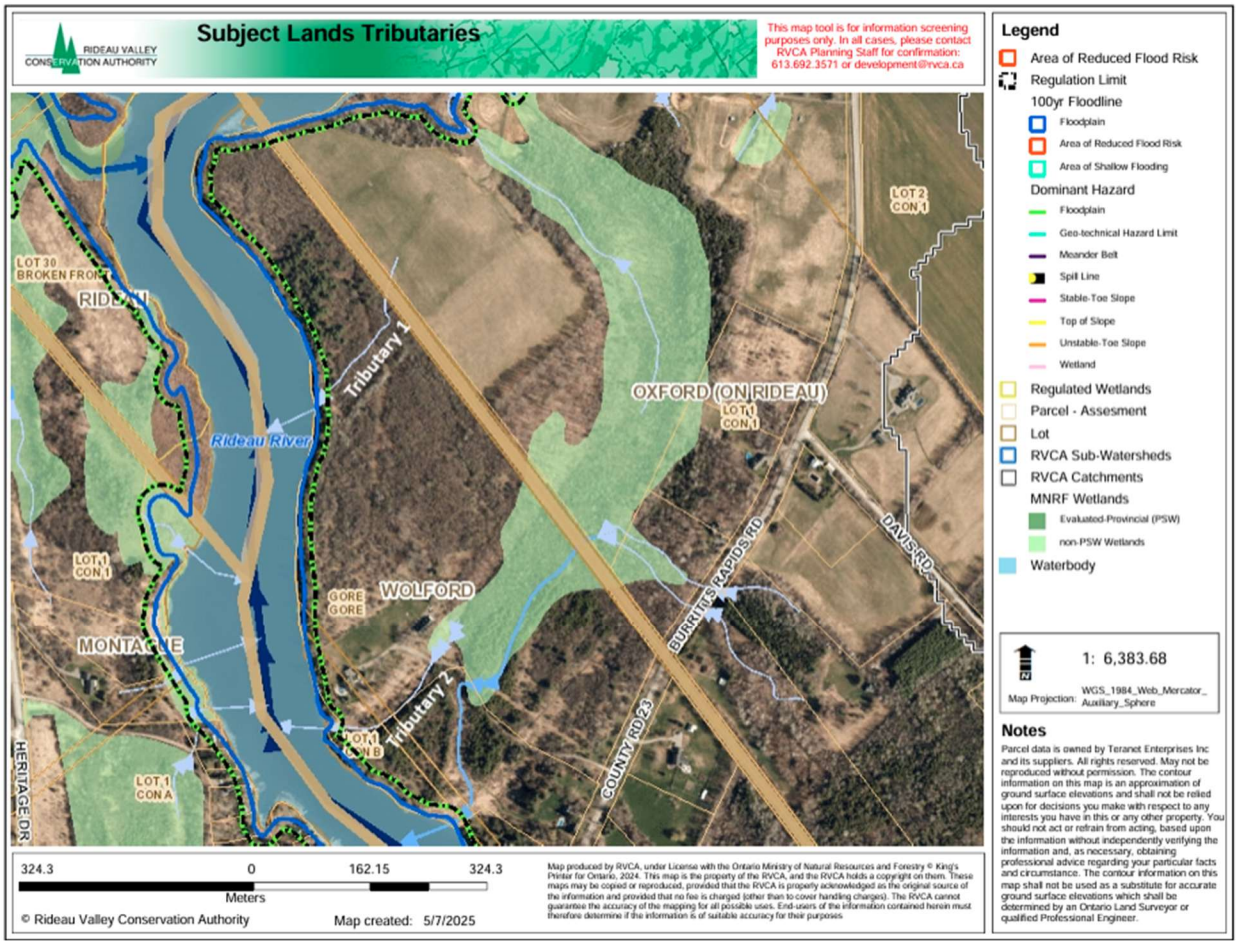


Figure 1. Location and flow path of tributaries on the subject lands.

D2) Flood and Erosion Hazards –Stormwater Management Impacts

E. Liu, M. A.Sc., P. Eng and *C. Milloy, M.Sc., P.Geo.*

Overview

The site is about 24 ha and is split into two areas by an unevaluated wetland. The south portion of the site drains by overland flow to the north towards the wetland. The area with the existing dwelling also drains via overland flow to the wetland. The other portions of the site drain by overland flow to the west towards the Rideau River. The northern area is approximately 12.9 ha and drains toward the Rideau River to the west. The Rideau River changes direction at the northernmost portion of the site from a north-south axis to an east-west axis, abutting the north property line of the site.

The subdivision plan incorporates some aspects of a treatment train approach for stormwater management. The stormwater management plan currently includes collecting runoff in roadside ditches and rear-yard swales, which would be directed towards one of two stormwater management ponds / end-of-pipe facilities. Stormwater would be detained in these areas and released at a controlled rate to either the Rideau River or to the wetland, such that the post-development release rates do not exceed the pre-development flow rates (up to the 100-year storm event).

Comments

i) The site directly contributes to the hydrological functions (water budget) of the Rideau River watershed as well as to the on-site wetland. The site, which is a forested greenfield, currently stores and removes considerable amounts of precipitation, so that it does not become extra flow during the spring flood and erosion period. The RVCA therefore supports the plan to control the post-development stormwater release rates and include some aspects of a treatment train approach to stormwater management.

ii) However, it appears that the current stormwater approach only goes part-way to maintain the water budget / balance, as is mandated by the province. The current plan does not appear to but should control the total amount of water that is flowing into the river during at least the spring flood and high erosion periods (but preferably for all months).

Therefore, a simple water budget / balance assessment should be completed, which produces targets that the stormwater management plan should address through the addition of more Low Impact Development (LID) measures, as to control additional (total) runoff volumes (and not just peak flow rates).

Alternately, the assessment should demonstrate that the total flows during at least the typical flood season for the watershed will be generally maintained via the proposes stormwater system.

iii) The RVCA supports the ND-RIVER designation to maintain the existing vegetation along the riverbank, as this will act not only to maintain the stability of the slope but also remove considerable amount of water from the site, so that it does not flow into the river.

iv) The RVCA supports the plan to include infiltration wherever possible. It is understood that minor infiltration will occur in the end-of-pipe facilities (storage swales). This benefit should be quantified within the simple water budget / balance assessment. The benefits of any infiltration in the conveyance ditches and rear-yard swales (if part of the municipal system) can also be provided.

v) Any feature used to show that the total flows are being controlled should form part of the municipal stormwater management system and should not be a best practice controlled by individual lot owners.

vi) If additional LID measures are required to control the total volume of stormwater draining from the site, the following could be considered.

a. Constructed wetlands can be used for the end-of- pipe stormwater management facilities.

b. The preservation and re-establishment of hearty (native) deep-rooted vegetation, like shrubs and trees, in all public blocks (and on all lots, as feasible) and not just along all slopes should occur. Deep rooted vegetation drinks-up and keeps large amounts of water out of the floodplain via evapotranspiration. Therefore, the SWM blocks, park blocks, and private lots should be treed / vegetated (rather than grassed)

c. Vegetated bio-swales or enhanced swales can be used instead of rural ditches

i. STEP Wiki Enhanced Swales

ii. RVCA Installing Swales

iii. STEP Wiki Grassed Swales

vii) The RVCA also encourages individual homeowners to use sustainable drainage practices throughout the life of their property. Please include the following information with the subdivision agreement: https://www.rvca.ca/stewardship-grants/stewardship-resources/sustainable-drainage/

viii) The report indicates that the swales are to be designed with 0.5 metre minimum bottom widths. However, the drawings show that the swales are V-shaped, with 0 m bottom widths. It is understood that the flat bottom swales are required to allow for part of the stormwater treatment train and related storage and sequestration of runoff. The drawings should be updated accordingly.

ix) Several culverts are presented in the existing condition. What are the functions of these culverts? It appears that the development plans to maintain some of these and remove others. Please provide complete rationales for the approach and designs. Additional information is particularly important for the existing culvert under the gravel road and the proposed culvert under the future access road.

x) Please provide clarification regarding the average depth noted in the "Rideau River Floodplain Analysis Brief." The brief states that "The portion of the development area immediately adjacent the Rideau River has an average depth ranging from 122m to 415m between the east property line and the top of the riverbank."

xi) The proposed outlet to the Rideau River will require a future permit from the RVCA. At that time, a geomorphological study will be required, and the erosion mitigation plan will be reviewed. The report should confirm that no negative erosion impacts will be experienced downstream of the site. We highly advise consulting with RVCA technical staff prior to proceeding.

D3) Slope Hazard

I. Maltais, M. Eng., P. Eng

Overview

From Kollaard Associates slope stability assessment, the field investigations at 819 County Road 23 revealed a two-zone slope system along the Rideau River, with Zone 1 (western bank) showing steeper inclines and active erosion, and Zone 2 (northern bank) having gentler, more stable slopes. Soil conditions consisted mainly of stiff silty clay *(investigation limited to 3 m depth),* with no observed seepage, but evidence of toe erosion, slope steepening, and shallow failures in Zone 1.

Slope stability modelling under both normal and elevated groundwater scenarios showed that while most sections met safety criteria (Factor of Safety ≥1.5 static), sections 1, 4, and 5 in Zone 1 showed marginal stability under elevated groundwater. Based on Ontario MNRF guidelines, the required setbacks were calculated as the sum of a stable slope allowance, toe erosion allowance, and erosion access buffer.

The recommended Erosion Hazard Limits identified in the report are 22.3 m from the top of slope in Zone 1 and 11.0 m in Zone 2.

Comments

i) The acceptance of the boundaries on some lots in the subdivision is premature as the slope hazard requires further investigation. Note that lot boundaries should be established only beyond the limit of the farthest-reaching hazard, which is the slope hazard at this site.
    a. Amongst other reasons, this is required to maintain access to the slope in-perpetuity via the slope access allowance.

ii) The RVCA supports the ND-RIVER designation to maintain the existing stability of the riverbank.

iii) The current geotechnical investigation and slope assessment provide a reasonable preliminary evaluation of the site conditions and sufficient information for Zone 2. However, the investigation is not sufficient for a long-term slope stability assessment to delineate the erosion hazard limit and support permanent development for Zone 1.

iv) The subsurface investigation consisted of test pits and hand augers advanced to depths of approximately 3.0 to 3.6 meters, whereas the slope height reaches up to 7.5 meters in Zone 1. Standard geotechnical practice recommends advancing boreholes to a depth of at least 1.5 to 2 times the slope height in order to adequately characterize all relevant soil strata and potential failure surfaces. Therefore, the current investigation does not sufficiently characterize the full slope profile, particularly at depth in Zone 1.

v) There is a risk that a weaker or softer clay layer may exist at or near the toe of the slope and this critical zone remains largely unexplored due to the limited depth of investigation. If present, such a layer could significantly reduce the slope's factor of safety, particularly under adverse conditions such as elevated groundwater or added loading.

vi) On the other hand, the report uses a conservative undrained cohesion value of 50 kPa, significantly lower than field-measured values that exceed 120 kPa in some areas (at least in the upper clay layer). While conservatism can be appropriate in certain situations, using low strength values without adequate subsurface confirmation may lead to misleading conclusions. This could include inflated hazard setbacks or, as point vi), false assurances of slope safety. As a result, we currently lack sufficient information to support the proposed erosion hazard limits for Zone 1.

Alternately, if a conservative approach is preferred, we recommend adopting the methodology outlined by the Ontario Ministry of Natural Resources and Forestry (MNRF), which defines the erosion hazard limit as a setback calculated using a stable slope projection of 5H:1V (horizontal to vertical), measured from the toe of slope, plus the addition of a toe erosion allowance and a 6-meter erosion access allowance. This method provides a transparent and standardized framework for applying conservatism in the absence of sufficient subsurface data.

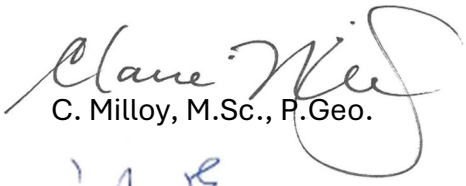
Limitations

In reviewing the technical reports, the undersigned: 1) have not conducted an independent site investigation, nor verified any computations; and 2) are not providing a second opinion to confirm the validity of any data, analyses, interpretations, design, or recommendations; but 3) have determined that related methods, data sources, inputs and outputs, analyses, interpretations, general design, and recommendations, as presented, are reasonable and are in keeping with standard industry practices and applicable technical guidelines.

The undersigned therefore have no technical objections to the proposed development plan, as conveyed by the qualified professionals who have signed / stamped the technical reports, except as discussed in this memorandum.

It is with respect that we offer the advice and information herein. We are available for related discussion.

Regards,



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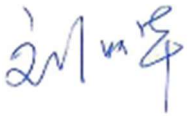

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