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September 16, 2019

Melinda MacRory, M.Pl. Planner
The Biglierri Group
20 Leslie Street, Suite 121
Toronto ON M4M 3L4

Dear Ms MacRory:

Re 505 and 591 Liverpool Road, Pickering
Our File: 19 - 3112

This submission is being prepared at the request of Steve Heuchert of TRCA. We have been provided with a letter dated August 26, 2019 addressed to Cristina Celebre of the City of Pickering outlining the review process of the proposed development of the subject property. One of the requests in the letter is for a shoreline hazard assessment. The discussion regarding the need for a coastal assessment was initiated by the undersigned due to the remoteness of the site from Lake Ontario. We requested consideration of a scoped assessment.

During our discussion, Mr. Heuchert explained the concern of the planning staff of TRCA and the reason for requesting a shoreline hazard assessment. Their concern is with the long term presence of the barrier beach fronting the site and how potential disappearance of the bar could impact the stability of the subject site. It was agreed that the Shoreplan will address this coastal aspect prior to discussing other shoreline hazards and scoped assessment.

Barrier beaches are generally formed in areas of abundant sediment supply and moderate to high wave energy. The barrier beach at Frenchman's Bay appears on the oldest navigational charts for this area dating back to the mid-1800s. The chart show a barrier beach with entrance structures at the location of the present entrance. The barrier beach is approximately 1,800 metres long and, on average, about 30 to 40 metres wide. The crest elevation of the barrier beach varies between approximately 76 and 77 metres, IGLD. Eyles et al. (2003) describe how ground penetrating radar shows stratified layers of sand and gravel that record upward growth and migration of the beach over the last 3,000 years as the level of Lake Ontario slowly raised.

For any shoreline to change its dynamically stable nature requires that a change to the coastal conditions occurs. For barrier beaches, changes that would cause an abnormal development include notable changes in sediment supply, wave climate and/or water levels.

A number of reports completed for TRCA and other agencies identify the sediment transport in this part of Lake Ontario to be in the easterly direction with the node separating the net easterly and westerly transports being in the vicinity of East Point in Scarborough. There have been no projects completed in that shoreline reach that would have caused a fundamental change in sediment supply or sediment transport that could potentially cause such a

change, other than two projects completed by TRCA. The two projects completed in this reach, east of the barrier beach in question, were both subject to either class or full environmental assessments. The reviews concluded that shoreline impacts were negligible and acceptable.

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A change in wave climate over the next 100 year planning horizon cannot be predicted. It is expected that climate changes now underway will result in some changes but quantifying these is not possible. Changes in wave energy may result in a slight shift in beach alignment and possibly in beach profile. There is nothing in these changes that would suggest a destruction of a barrier beach.

Changes in water levels will impact the profile of the beach. The recent water levels in 2017 and 2019 have exceeded design high water levels at this location and have impacted the beach profiles. Although these water levels are unprecedented and may represent future design high water levels, the conditions did not cause any breaches of the barrier beach. Of all of the Great Lakes, Lake Ontario is generally considered to be the one least impacted by climate change.

We reviewed the barrier beach fronting the site and noted over wash of the crest of the beach, but no damage to vegetation on the back side of the barrier beach or any signs that the dynamic processes of the barrier beach impacted the stability of the lagoon behind it during the present high water levels. . We also note that a significant storm occurred on Lake Ontario in March of 2018. Although the water levels at that time were more typical of the seasonal levels, this storm would have also caused changes to the beach profile. Despite these three years of severe conditions, the barrier beach continues to provide protection for the lagoon and the lands beyond.

Please submit this letter to Mr. Stephen Heuchert of TRCA. We hope this will allow him to scope down the requirement for a coastal hazard assessment for your property.

Yours truly
Shoreplan Engineering Limited

M. Sturm. P. Eng.

References:

Eyles, N., M. Doughty, J.I. Boyce, M. Meriano, and P. Chow-Fraser. 2003. Geophysical and Sedimentological Assessment of Urban Impacts in a Lake Ontario Watershed and Lagoon: Frenchman's Bay, Pickering, Ontario. Geoscience Canada Volume 30 Number 3, September 2003.