

Mr. Dave Munro
Harold Sutherland Construction Limited
323545 East Linton Side Rd W, RR#2
Kemble, ON N0H 1S0
(via email)

July 17, 2017

Subject: Karst Hazard Assessment of HSCL's Sarawak Quarry Proposed Expansion Area, Part Lot 36, Concession 2, Township of Georgian Bluffs.

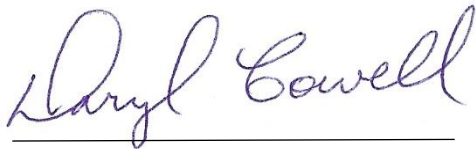
Dear Dave:

Attached is a letter report summarizing my site visit and findings pertaining to potential karst hazards (as defined by the PPS) on the above noted property.

In summary, there are no features or processes on and immediately surrounding the site that, in my opinion, would be considered a karst hazard.

Please call me at any time if you have any questions or concerns.

Yours truly,

A handwritten signature in blue ink that reads "Daryl W. Cowell". The signature is written in a cursive style and is positioned above a horizontal line.

Daryl W. Cowell, P.Ge. (#0791)

Karst Hazard Assessment of HSCL's Sarawak Quarry Proposed Expansion Area, Part Lot 36, Concession 2, Township of Georgian Bluffs.

1.0 INTRODUCTION

Harold Sutherland Construction Limited (HSCL) operates an existing quarry along Grey Road 1 immediately south of Kemble Ontario (Sarawak Quarry, Figure 1). The company is currently preparing an application for a below-the-water table quarry adjacent and south of the existing quarry. Although the license is to permit extraction below the water table, HSCL will limit extraction to approximately 1 m above. The expansion site lies within a "Special Policy Area" (Karst) as per the 2012 (amended) Grey County OP (Policy 2.8.5). This county policy responds to policy 3.1.1 (c) of the PPS that specifically identifies karst ("unstable bedrock") as a type of Hazardous Site requiring assessment.

Although the PPS policy and definition focuses on "stability" of the bedrock surface, when undertaking such Karst Hazard Assessments (KHA), potential hazards associated with groundwater-surface water interactions (flooding/change in regime) and the potential for contaminant movement are also considered in the assessment.

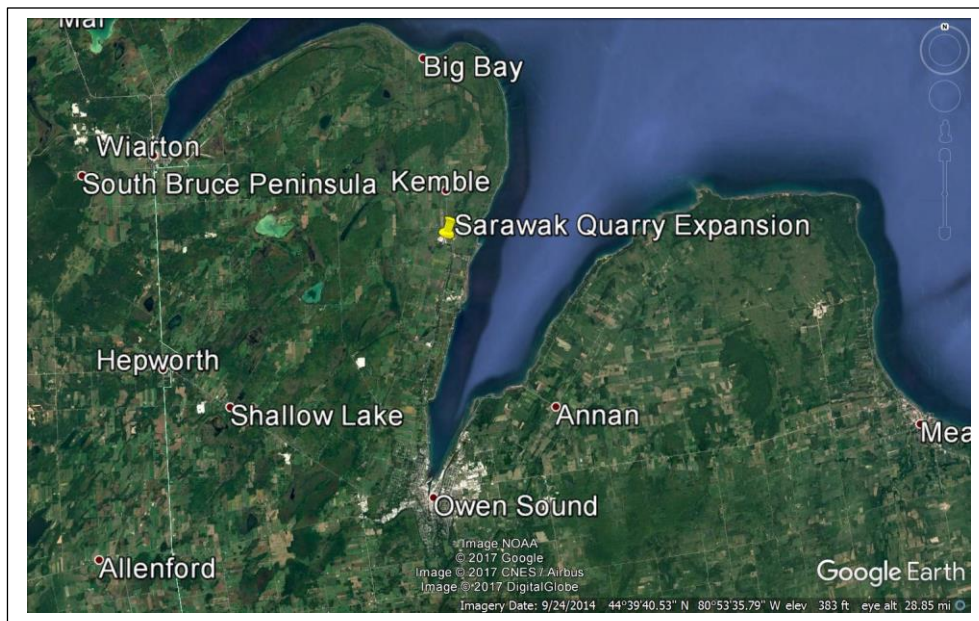


Figure 1. Location of proposed expansion site. Existing quarry visible to north of pin.

2.0 REPORT LIMITATIONS

This Karst Hazard Assessment is based on available information and a brief site visit. It does not depend on sampling or other forms of testing and is not intended to be a detailed karst study, survey or investigation.

3.0 STUDY METHODOLOGY

Background information included the Ontario Base Maps (1:20,000) of the site and surrounding area, surficial and bedrock geology maps¹, a hydrogeological report prepared for the existing quarry by Conestoga-Rovers & Associates Limited² (formerly the “Tolhurst Quarry”), and a map showing the current piezometric surface of the area.

A site visit was undertaken on July 13, 2017 and included observations of the existing quarry floor and walls (particularly the southern wall adjacent to the expansion area), the area of the proposed expansion, and forested areas immediately south, west and east of the proposed expansion. A small intermittent stream that is sourced via intermittent springs at the base of the Manitoulin escarpment (east of Grey Road 1) was examined at its downstream end immediately north of Presqu’île Point.

4.0 SITE GEOLOGY

The site is located on the surface of the Manitoulin Formation which forms a flat-lying plain below the main Niagara Escarpment which is located to the west. The eastern extent of the Manitoulin forms an abrupt escarpment approximately 15m high adjacent to the site along Grey Road 1. The surface of the site is flat (Photo 1) with a shallow westerly to northwesterly slope reflecting the overall bedrock stratigraphic dip. As such, surface drainage is away from the escarpment edge toward Indian Creek which drains southward forming a tributary to Georgian Bay. The groundwater piezometric surface reflects the dominant westerly surface slope with only a minor easterly component reflecting the presence of the Manitoulin scarp.

The Manitoulin Formation is a Lower Silurian “thin- to thick-bedded light grey-brown to blue-grey, buff-brown...calcareous dolostones and minor limestones” (Armstrong 1993). It overlies the Queenston Ordovician shales which outcrop at the base of the escarpment sloping easterly toward Georgian Bay. The lower portion of the Manitoulin contains thin shale beds and partings which limits aggregate extraction depths.

¹ D. Armstrong, Paleozoic Geology of the Southern Bruce Peninsula, OGS, 1993; and Surficial Geology Map of Southern Ontario, OGS, 1996.

² Hydrogeologic Report, Tolhurst Quarry, Conestoga-Rovers & Associates Limited, June 1982.



Figure 2. Existing Sarawak quarry showing area of proposed expansion (hatched area).

5.0 KARST CONDITIONS

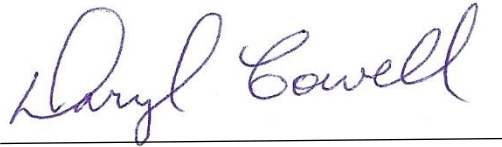
No significant karst features were observed on or adjacent to the expansion lands. Several small very shallow depressions were observed in the forested areas surrounding the site (Photo 2). These are most likely locations of local diffuse recharge to the bedrock via partially open joint planes.

There are no significant surface water features within 500 m or more from the site although one small wetland is shown on the OBM (#10 17 5000 49450) approximately 200 m to the southwest of the expansion boundary.

6.0 CONCLUSION

The proposed expansion lands are not considered to be a hazardous site as defined in Policy 3.1.1(c) of the PPS.

Respectfully submitted,



A handwritten signature in blue ink that reads "Daryl W. Cowell". The signature is written in a cursive style and is positioned above a solid horizontal line.

Daryl W. Cowell, P.Ge. (#0791)
July 17, 2017

PHOTOS



Photo 1. Looking east toward Grey Road 1 across proposed expansion area. Aggregate piles from the existing quarry can be seen in the upper left.



Photo 2. Shallow depression (center) in forested area to west of the site.