



PEOPLE | ENGINEERING | ENVIRONMENTS

August 8, 2022
Our File: 222255

Via Email – crhicks96@gmail.com

Carolyn Hicks
102759 Grey Road 18
Rockford, ON N4K 5N6

Re: Karst Topography Assessment
102759 Grey Road 18,
Rockford, ON
Township of Georgian Bluffs

Dear Carolyn,

This letter report provides the findings of the Karst Topography Assessment that was conducted on the property identified as 102759 Grey Road 18, located in the former Township of Derby, Township of Georgian Bluffs, in the County of Grey. The subject property currently contains a single residential dwelling with an attached garage. The majority of the property is primarily cleared with treed areas in the central and northern portions of the property. No municipal sanitary sewer or water services are provided to the property.

The subject property encompasses approximately 0.85 hectares (2.09 acres) and is located on the north side of Grey Road 18, approximately 270 metres west of the main Rockford Intersection of Highway 6 & 10 and Grey Road 18. The location of the property is presented on Figure 1.

We understand that the proponent is in the planning stages of the proposed construction of a detached garage structure situated east of the existing onsite residence. The area of the proposed detached garage development on the Site is presented in Figure 2 for reference.

The footprint of the proposed garage building is to be determined at the time of the permit application and as long as it remains in the general location identified in Figure 2, is not expected to affect the conclusions presented herein.

The Study Area is focused on the proposed development envelope that was determined in consultation with the property owner at the time of the onsite testhole investigation.

The scope of this review includes:

- Review of geologic and physiographic mapping;
- Review of aerial photography;
- A site visit and reconnaissance of the study area on July 29, 2022; and
- The documentation of the nature of soil and bedrock in two (2) excavated test holes (i.e. TH-1 to TH-2).

The scope of work described herein relies on surface and subsurface exploration via excavated testholes. No detailed subsurface exploration (such as drilling) or geophysical work was conducted as part of this Assessment. Further investigation would be required to comment on the potential for Karst in the locations beyond the study area.

Karst – Background

Karst topography is generally found in areas where carbonate rock, such as limestone or dolostone, are exposed at surface or lie beneath shallow surficial sediment or overburden. Karst is generally created through the chemical weathering (i.e., dissolution) of carbonate bedrock, subsequently forming a network of voids. In karstic areas, these voids are sometimes evident as irregular or hummocky rock outcrops, crevasses, or sinkhole patterns.

Geologic Setting

The subject property is located within the physiographic region known as “Bruce Peninsula” (Chapman and Putnam, 1984). The region is characterized by generally flat topography with shallow overburden, primarily as fine-textured till, scattered on grey limestone, dolostone or shale in the vicinity of Georgian Bay. In some areas, bedrock is exposed at ground surface.

From a review of geologic mapping, the surface soil in the study area is generally comprised of the Breypen series, which consists of a thin layer of varying soil types overlying bedrock.

Based on a review of the geologic setting, the potential for karstic features underlying the Site was considered to exist since the area is comprised of dolostone bedrock of the Guelph and Amabel Formations (i.e., carbonate rock). It is noted that the proposed development is approximately situated on the mapped spatial boundary between these two geologic formations. Additionally, according to the *Karsts of Southern Ontario and Manitoulin Island* GIS Mapping (Ontario Geologic Survey, 2008; Brunton, Dodge), the area of the subject property is considered to be an area of known karst. Karst Mapping is enclosed for reference.

A review of the Ministry of Environment, Conservation and Parks (MECP) water well database was also completed as part of this investigation. The well records for nearby wells report that the bedrock surface was typically encountered within 1.5 mbgs in the vicinity of the Site.

Site Setting and Reconnaissance

The Site visit was conducted by Corbin Sweet of GM BluePlan Engineering (GMBP) on July 29, 2022. During the Site visit, GMBP personnel inspected the areas of proposed development and the surrounding land to identify potential areas of subsidence, or depressions, as well as springs or drainage features that may discharge to the subsurface.

The surface in the study area was observed to be consist of a large garden with some decorative bedrock derived boulders at surface. It is our understanding that the area proposed for development has been historically used for residential use. As discussed, the general layout of the area of proposed development is presented in Figure 2.

Based on the onsite observations at the time of the investigation, no significant depressions, areas of subsidence, groundwater springs, or seeps were observed in the vicinity of the study area, or across the rest of the property that would suggest shallow hydraulically active karstic bedrock features. A small, flat surface bedrock outcrop was observed on the south extent of the area of proposed development.

Based on the topography and surficial features observed at the time of the July 29, 2022 field assessment completed by GMBP, the specific areas of proposed development do not show surface evidence of hydraulically active karstic features, such as areas of subsidence or springs, that would limit development.

Testhole Investigation Findings

As part of the field investigations, a series of two (2) testholes were excavated by Chet Ashcroft Excavating (the excavation contractor) prior to the GMBP Site visit. Corbin Sweet of GMBP attended the Site for a Site investigation on July 29, 2022 to document the nature of the subsurface and inspect the exposed bedrock surface in each of the testholes.

As discussed, the footprints of the proposed garage building is to be determined at the time of the planning application. The area of proposed development was determined based on onsite discussions with the owner. As such, the testhole locations were determined to assess the bedrock structure in the overall proposed development area outlined in Figure 2.

The testhole locations in the study area were selected to provide sufficient spatial coverage to allow for a reasonable inference of the overall structure of the bedrock in the area of proposed development.

In the testholes, the bedrock was encountered between approximately 0.3 and 0.85 mbgs. The native soil overlying the bedrock in each of the testholes generally consisted of compact silt and sand to the bedrock surface. It is noted that a layer of organic soil was encountered in TH-1 between 0.45 and 0.65 mbgs, which was underlain by sandy silt soils to the bedrock surface.

Although the bedrock encountered in each of the testholes was generally weathered and hummocky, no significant fractures or evidence of karstic or epi-karstic features were observed (i.e. open or soil-infilled fractures). Photographs of the Site and the testholes are attached for reference.

Conclusions and Recommendations

Based on the findings of this investigation, no evidence of hydraulically active karst features was discovered in the area proposed for detached garage development that would cause a direct risk to the development. Further, no evidence of epi-karst (i.e. geologically historically active karst features) were observed in the testholes or across the surface of the Study Area.

At the time of development, and as is standard under the OBC process, it is recommended that the nature of the bedrock/soils be inspected at the time of the construction of the structure. Where unforeseen fractures or crevasses are uncovered during site preparation for foundations, additional support or adjustments to the foundation design may be required. As per standard requirements under the OBC, we recommend that such a design review/adjustment be completed by a qualified person.

With the implementation of the above noted recommendations, it is our opinion that it is reasonable to expect that a new detached garage can be built in the area outlined in Figure 2 without impacts from bedrock features.

In summary, the following recommendations are made to support the severance with residential developments:

1. That at the time of construction, the bedrock surface be inspected in areas where it is exposed to confirm the nature of the bedrock and the presence or absence of any fractures or dissolution features that would pose structural limitations. Should fractures or crevasses be uncovered during site preparation for foundations, additional support or adjustments to the foundation design may be required. We recommend that such a review be completed by a qualified person (as per the OBC).
2. Development of the property beyond the limits of the proposed development would be subject to further study and inspection prior to approval.

Limitations

The information in this report is intended for the sole use of Carolyn Hicks. GM BluePlan Engineering Limited accepts no liability for use of this information by third parties. Any decisions made by third parties on the basis of information provided in this report are made at the sole risk of the third parties.

The conclusions and recommendations in this report are based on information gathered at the testhole location and on available geological information. Subsurface conditions beyond the testholes may differ from those encountered at the testhole locations and conditions may become apparent during construction, which may not have been detected or anticipated at the time of the investigation.

The conclusions pertaining to the condition of soils and/or bedrock identified at the site are based on the visual observations at the locations of the investigative testhole. GM BluePlan Engineering Limited cannot guarantee the condition of soil and/or bedrock that may be encountered at the site in locations that were not specifically investigated.

Yours truly,

GM BLUEPLAN ENGINEERING LIMITED

Per:

A handwritten signature in blue ink, appearing to read 'Corbin Sweet'.

Corbin Sweet, P.Geo.
CJS

Enclosures:

Figure 1: Site Location Map

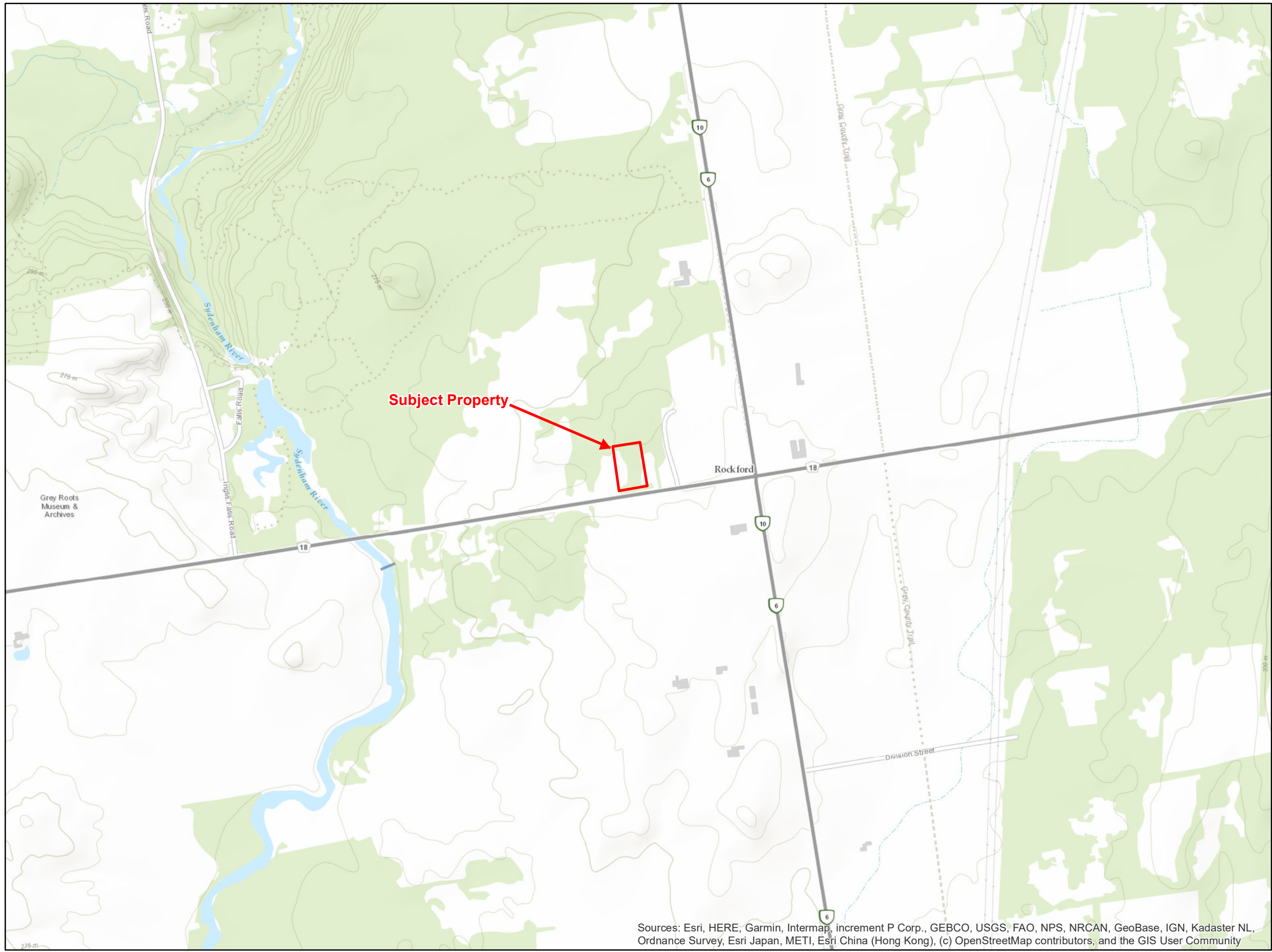
Figure 2: Site Layout and Testhole Location Plan

Site Photographs

Karst Mapping

Grey County Official Plan – Appendix A – Karst Areas

cc: File No. 222255



222255
Karst Topography Assessment
102759 Grey Road 18,
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LEGEND



Approximate Boundary of Subject Property

Scale
1:10,000

July 2022

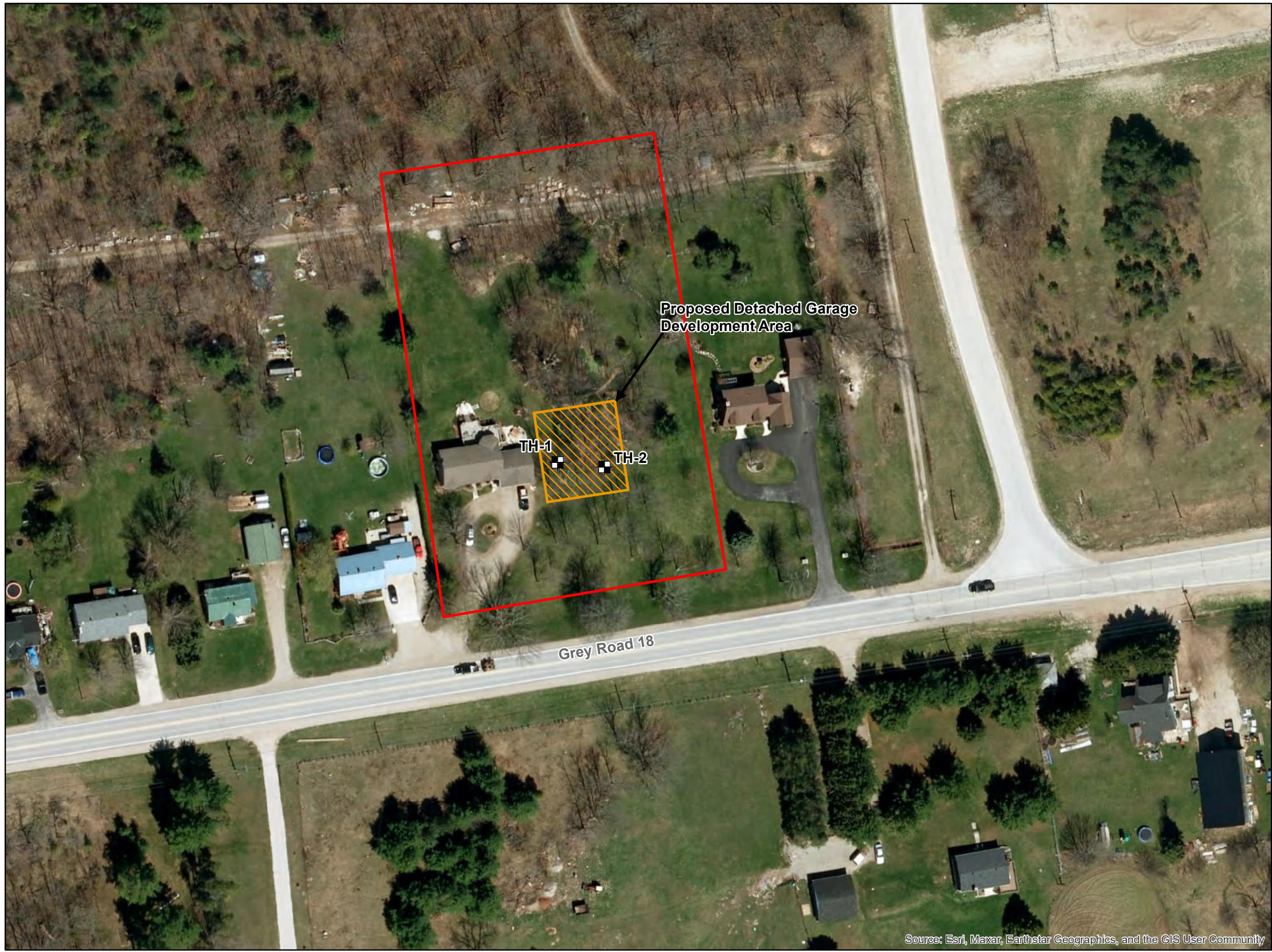
SITE LOCATION MAP

Concession 1, Part Lot 10, RP 16R6368, Part 1
Township of Georgian Bluffs
County of Grey

Figure No. 1



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



222255
Karst Topography Assessment
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LEGEND

-  Approximate Boundary of Subject Property
-  Development Envelope of Proposed Detached Garage Structure
-  Approximate Location of Excavated Testholes

Scale
1:1,000

July 2022

**SITE LAYOUT AND
TESTHOLE LOCATION PLAN**

Concession 1, Part Lot 10, RP 16R6368, Part 1
Township of Georgian Bluffs
County of Grey

Figure No. 2



KARST TOPOGRAPHY ASSESSMENT

102759 Grey Road 18, Rockford, Township of Georgian Bluffs



Photo 1: Area of proposed onsite detached garage building east of the existing dwelling on the subject property.



Photo 2: View of bedrock surface in TH-1

KARST TOPOGRAPHY ASSESSMENT
102759 Grey Road 18, Rockford, Township of Georgian Bluffs



Photo 3: View of weathered, hummocky bedrock surface in TH-2.



Photo 4: View of approximate location of proposed detached garage structure.

Karst Geology

From: Brunton, F.R. and Dodge, J.E.P. 2008. Karst of southern Ontario and Manitoulin Island; Ontario Geological Survey, Groundwater Resources Study 5

Red = Area of Known Karst
Yellow = Area of Potential Karst

Inglis Falls

Rockford

Google Earth

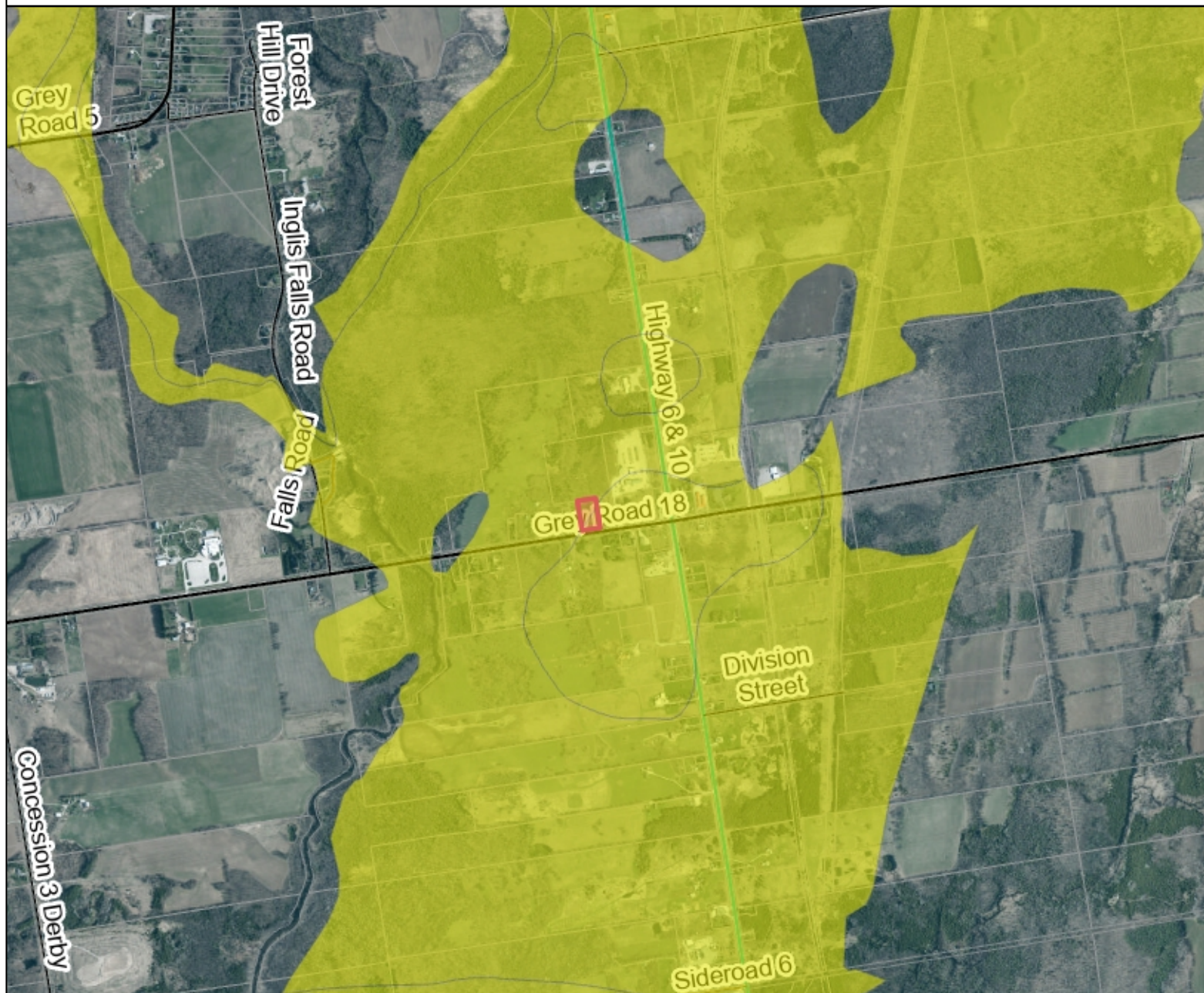
Image © 2022 CNES / Airbus



1 km

Legend

- Karst Area
- Large Scale Roads
 - Provincial Highway
 - County Road
 - Township Road
 - Seasonal Road
- Parcels - Current



1575 0 787 1575 Meters



Notes