

TOWN OF CALEDON  
PLANNING  
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**AGRICULTURAL IMPACT ASSESSMENT  
FOR  
CBM CALEDON PIT / QUARRY**

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## **EXECUTIVE SUMMARY**

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) is applying to the Ministry of Natural Resources and Forestry (MNRF) for a Class A Licence (Pit and Quarry Below Water) and to the Town of Caledon for an Official Plan Amendment and Zoning By-law Amendment to permit a mineral aggregate operation. Colville Consulting Inc. has been retained by CBM to complete an Agricultural Impact Assessment for the proposed CBM Caledon Pit / Quarry in accordance with the Terms of Reference found in Appendix A.

CBM owns / controls approximately 323 hectares of land located at the northwest, northeast and southwest intersection of Regional Road 24 (Charleston Sideroad) and Regional Road 136 (Main Street). Of these lands, approximately 262 hectares are proposed to be licenced under the Aggregate Resources Act and designated / zoned under the Planning Act to permit the proposed CBM Caledon Pit / Quarry. These lands are mapped as a Caledon High Potential Mineral Aggregate Resource Area (CHPMARA) in the Town of Caledon Official Plan and High Potential Mineral Aggregate Resource Area (HPMARA) in the Region of Peel Official Plan and are protected for their aggregate potential.

The remaining approximately 61 hectares of land owned / controlled by CBM are not subject to the application. These lands are referred to as “CBM Additional Lands” and these lands include approximately 36 hectares of land that is located adjacent to the minor urban centre of Cataract. As part of the application, CBM is proposing to create an upland forest and meadow grassland on these lands and is exploring the potential of conveying them permanently to a public authority for long term protection.

The lands proposed to be licenced under the Aggregate Resources Act are referred to as the “Subject Site” and are legally described as Part of Lots 15-18, Concession 4 WSCR and Part of Lot 16, Concession 3 WSCR (former Geographic Township of Caledon). The Subject Site is approximately 262 hectares and extraction is proposed on approximately 204 hectares. These lands are referred to as the “Extraction Area”. The remaining approximate 58 hectares within the Subject Site and outside of the Extraction Area are referred to as the “Setback / Buffer Lands”. The Setback / Buffer Lands are used to provide setbacks to surrounding land uses and natural heritage features and the majority of these lands include a 5 metre visual / acoustic berm and visual plantings. For the purpose of this study, “Adjacent Lands” are defined as lands within 120 m of the Subject Site and the Study Area for this assessment includes lands within 1000 m of the Subject Site.

The proposed Extraction Area includes approximately 80 million tonnes of a high quality bedrock resource and approximately 5 million tonnes of a high quality sand and gravel resource. Testing has confirmed that the mineral aggregate resource found on-site is suitable for the production of a wide range of construction products, including the use for high performance concrete. The bedrock resource provides some of the strongest and most durable aggregate material in Southern Ontario. The primary market area for the proposed CBM Caledon Pit / Quarry is the Greater Toronto Area, including the Town of Caledon and the Region of Peel. This site represents a close to market source of a high quality mineral aggregate resource.

The proposed tonnage limit for the proposed CBM Caledon Pit / Quarry is 2.5 million tonnes per year and on average CBM anticipates shipping approximately 2.0 million tonnes per year. The proposed CBM Caledon Pit / Quarry is proposed to be operated in 7 phases. Phases 1, 2A, 3, 4, 5 are located to the northwest of the intersection of Regional Road 24 and 136. This area is referred to as the "Main Area". Phase 2B is located to the northeast of the intersection of Regional Road 24 and 136. This area is referred to as the "North Area". Phase 6 and 7 are located to the southwest of the intersection of Regional Road 24 and 136. This area is referred to as the "South Area".

Operations would commence in the Main Area and Phase 1 would include the permanent processing area (crushing, screening and wash plant), aggregate recycling area and the entrance / exit for the quarry. Until such time as sufficient space is opened up to establish the permanent processing area, a temporary mobile crushing and processing plant is proposed to be used in Phase 1. The entrance / exit for the CBM Caledon Pit / Quarry is proposed to be located onto Regional Road 24, approximately 775 m west of Regional Road 136. The entrance / exit is proposed to be controlled by a new traffic light and the installation of taper lanes and acceleration lanes on Regional Road 24 at CBM's expense. The primary haul route for the proposed CBM Caledon Pit / Quarry is trucks will travel eastward on Regional Road 24 and then southward on Highway 10. The proposed haul route is an existing aggregate haul route and is designated as an aggregate haul route in the Town of Caledon Official Plan.

Access to the North Area for aggregate extraction is anticipated approximately 10 years after the start of the operations in the Main Area. There will be no processing in the North Area and aggregate extracted from the North Area is proposed to be transported to the Main Area through a proposed tunnel underneath Regional Road 136 or a truck crossing. Access to South Area is anticipated approximately 30 years after the start of the operations in the Main Area. There will also be no processing in the South Area and aggregate extracted from the South Area is proposed to be transported to the Main Area through a proposed tunnel underneath Regional Road 24 or a truck crossing. Aside from the establishment of a 1 hectare stormwater settling pond on the easternmost portion of the North Area in the initial year of operation, the North and South areas will be maintained in their current state and agricultural uses until they are required for preparation for aggregate extraction.

The CBM Caledon Pit / Quarry is proposed to operate (extraction, processing and drilling) 7:00 am to 7:00 pm Monday to Saturday, excluding statutory holidays and shipping is proposed from 6:00 am to 7:00 pm Monday to Saturday consistent with other mineral aggregate operations in Caledon. CBM is also proposing to permit limited shipping in the evening (7:00 pm to 6:00 am) to support public authority contracts that require the delivery of aggregates during these hours to complete public infrastructure projects. These activities will be limited to only highway trucks and shipping loaders and no other operations will be permitted during evening hours. Site preparation and rehabilitation is proposed to be permitted 7:00 am to 7:00 pm Monday to Friday.

The proposed CBM Caledon Pit / Quarry involves stripping topsoil and overburden from the subject site to create perimeter berm and any excess soil will be temporarily stored in the northern portion of the Main Area or used for progressive rehabilitation of the site. The proposed Extraction Area includes extracting

both sand and gravel below the water table and the site will be dewatered to allow operations in a dry state. The site will be extracted in sequence of the proposed phases (Phase 1 to 7) and following extraction of Phase 7 the permanent processing plant in Phase 1 will be removed and this will be the final area to be extracted and rehabilitated. The phasing of the proposed mineral aggregate operation has been designed to reach final extraction limits and depths within each phase so progressive rehabilitation of the side slopes can be completed.

The overall goal of the final rehabilitation plan is to create a landform that represents an ecological and visual enhancement and provides future opportunities for conservation, recreational, tourism and water management. Overall, the progressive and final rehabilitation plan for the Site includes the creation of lakes, vegetated shorelines, hectares of islands, wetlands, upland forested areas, riparian plantings adjacent to the existing watercourse, nodal shrub and tree planting on upland areas, grassland meadows and specialized habitat features for bats and turtles. The proposed rehabilitation has been designed to use of all of the on-site topsoil and overburden and does not require the importation of additional soils.

The Agricultural Impact Assessment Study assessed the proposed CBM Caledon Pit / Quarry and based on the implementation of the recommendations found in Section 9 of this report, this assessment concluded the following:

- ◆ The proposed site is a reasonable choice of location and utilizes lower priority agricultural lands;
- ◆ The proposed CBM Caledon Pit / Quarry operation will have minimal effect on the surrounding land uses;
- ◆ The proposed CBM Caledon Pit / Quarry will utilize existing haul routes minimizing the potential traffic related impacts;
- ◆ It is expected that minimal impact to water supply for farming operations will occur; and
- ◆ Licencing of the proposed CBM Caledon Pit / Quarry will be consistent with the agricultural-related policies provided in provincial, regional and local planning documents regarding mineral extraction in prime agricultural areas.

The proposed Aggregate Resources Act Site Plans includes all of the technical recommendations from this report to ensure that the site operates in accordance with applicable provincial standards and the applicable policy requirements of the Provincial Policy Statement, Places To Grow Plan, Greenbelt Plan, Region of Peel Official Plan and Town of Caledon Official Plan.

## **1. INTRODUCTION**

Colville Consulting Inc. was retained by Golder Associates Ltd., on behalf of CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) to complete an Agricultural Impact Assessment (AIA) for the properties located on Part of Lots 15-18, Concession 4 WSCR and Part of Lot 16, Concession 3 WSCR (former Geographic Township of Caledon), in the Regional Municipality of Peel. This irregularly shaped site, hereby referred to as the Primary Study Area (PSA) or Subject Site, is generally located north of Cataract Road, east of Mississauga Road, west of Willoughby Road and south of Beech Grove Side Road. Main St. divides the PSA into eastern and western blocks. Charleston Side Road divides the PSA north and south.

The proposed CBM Caledon Pit / Quarry is predominately located in a prime agricultural area. As per provincial policies, aggregate extraction applications in prime agricultural area need to include an AIA (A Place to Grow Growth Plan for the Greater Golden Horseshoe, 2020). Policies direct that the AIA be completed in accordance with the Ontario Ministry of Agriculture, Food and Rural Affairs' Draft Agricultural Impact Assessment Guidance Document (2018). The AIA prepared for CBM's proposed Caledon Pit / Quarry follows the format and requirements of the draft AIA guidelines, and the approved Terms of Reference (ToR) prepared for this study.

### **1.1 Description of Proposed Development**

CBM's land holdings in this area total approximately 324 ha (800.62 acres). Of this, CBM is proposing to licence approximately 262 ha (647.4 acres) for a Class A licence which permits below groundwater extraction and more than 20,000 tonnes of aggregate materials annually. The proposed Extraction Area is approximately 204 ha (504.1 acres).

It will not be practical to rehabilitate the lands to an agricultural after use due the depth of extraction below the groundwater table. Therefore, following aggregate extraction activities, the majority of the lands will be flooded and will form a lake. Agricultural rehabilitation of the lands is not a requirement for below groundwater extraction licence applications.

### **1.2 Study Area**

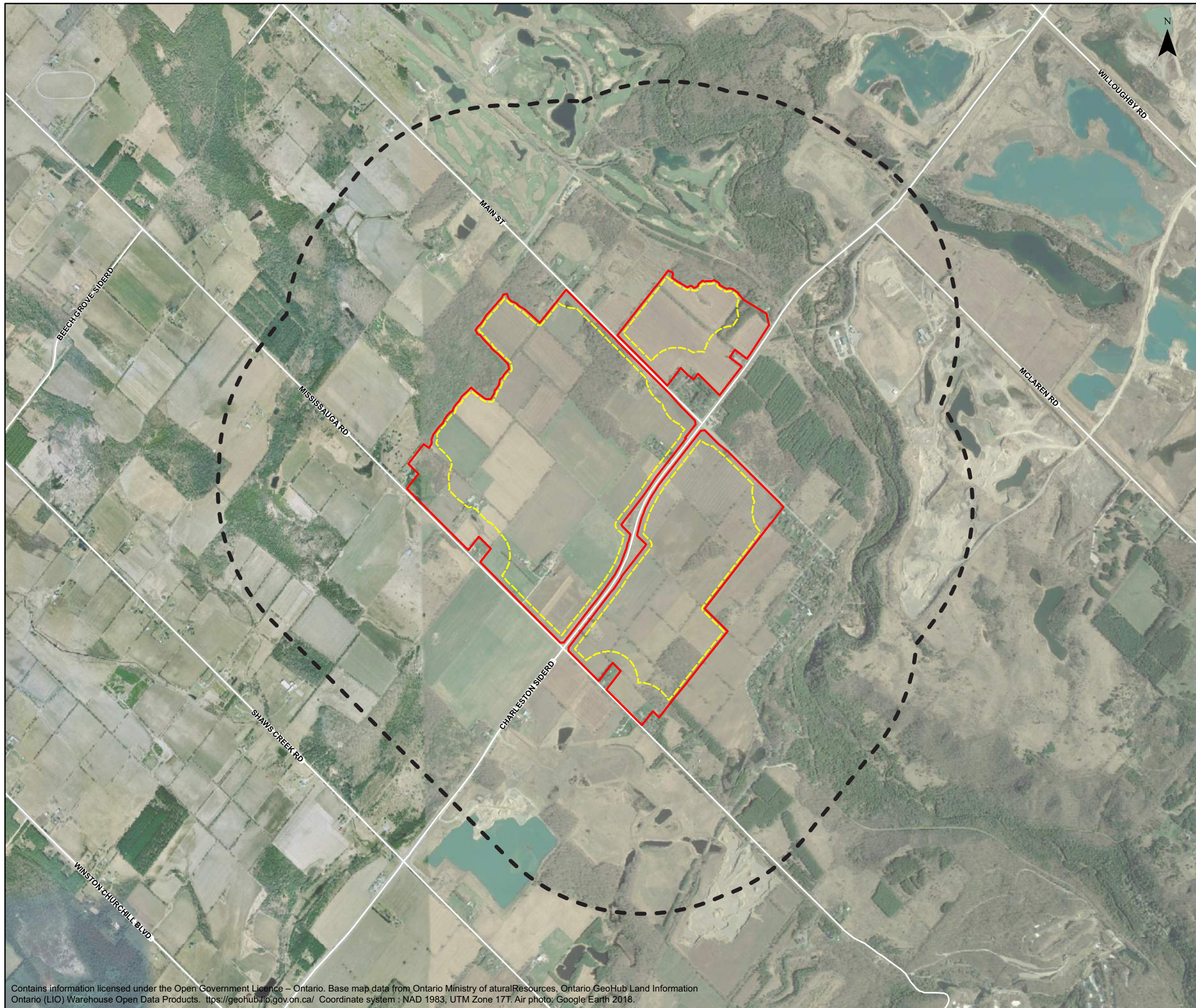
The Draft Agricultural Impact Assessment Guidance Document requires that a Primary Study Area (PSA) and a Secondary Study Area (SSA) be identified. The study areas and Subject Site area shown in Figure 1.

#### **1.2.1 Primary Study Area**

The PSA, or Subject Site, is a large, irregularly shaped area consisting of several parcels which total approximately 262 ha. The PSA is essentially the proposed licenced area and the primary area of investigation subject to the ARA Licence application.

The PSA consists predominantly of agricultural fields that are in common field crop production. In addition, there are also several hedgerows and forested areas within the PSA. There are two active agricultural operations, one remnant agricultural operation, and one non-farm residence located within the PSA.





**Legend**


- Primary Study Area
- Proposed Extraction Area
- Secondary Study Area (1000 Metres)

Figure 1  
Location Map

**Agricultural Impact Assessment for  
CBM Caledon Quarry**

Prepared for:  

Prepared by: 

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1:20,000

Date: November 2021  
Rev: November 2022

FILE: C19065

Contains information licensed under the Open Government Licence – Ontario. Base map data from Ontario Ministry of Natural Resources, Ontario GeoHub Land Information Ontario (LIO) Warehouse Open Data Products. <https://geohub.lio.gov.on.ca/> Coordinate system : NAD 1983, UTM Zone 17T. Air photo: Google Earth 2018.

The PSA is designated “General Agricultural Area” and “Rural Lands” in Schedule A of the Town of Caledon Official Plan. The Subject Site and surrounding area are located within the “Bedrock Resource” designation and identified as “Caledon High Potential Mineral Aggregate Resource Area (CHPMARA) Aggregate Resource Lands” (Schedule L). The lands are designated “Prime Agricultural Area” west of Main St. and “Rural Land” east of Main St. (Schedule D-1) and identified as “High Potential Mineral Aggregate Resource Areas” (Schedule D-2) within the Region of Peel Official Plan (April 2022). The PSA is located within the Greater Golden Horseshoe’s agricultural land base and is part of a prime agricultural area.

### **1.2.2 Secondary Study Area**

The Secondary Study Area (SSA) includes Adjacent Lands and all lands within approximately 1000 m (1 km) of the PSA boundaries. The SSA is generally bounded to the north by Beech Grove Sideroad, to the west by Shaws Creek Road, to the east by Willoughby Road and to the south by Garage Road. Figure 1 shows both the location of the PSA and SSA.

## **1.3 Purpose of the Study**

The purpose of the AIA is to identify and evaluate potential impacts of the proposed CBM Caledon Pit / Quarry on the local *Agricultural System* and to recommend mitigation measures that avoid, minimize and/or eliminate identified potential adverse impacts to the extent feasible. The AIA is required to satisfy provincial and municipal requirements for new, non-agricultural land uses proposed in agricultural areas.

## **1.4 Study Scope**

The AIA characterizes the agricultural operations and agricultural resources within the PSA and SSA (i.e., Primary Study Area, Adjacent Lands, and Study Area) through a review of available background information, field studies and consultation. The AIA assesses both the direct impacts on the PSA and indirect impacts on the broader SSA. Mitigation measures were then developed to avoid and/or reduce any adverse impacts. The evaluation of net impacts assumes all recommended mitigation measures are implemented. This AIA does not include recommendations for agricultural rehabilitation to restore the lands to an agricultural condition because extraction will occur below the water table making restoration to an agricultural after use unfeasible. Furthermore, the Minimum Distance Separation (MDS) criteria do not apply to aggregate operations and have not been addressed within this report.

The AIA includes an alternate site evaluation to determine whether the proposed location for the CBM Caledon Pit / Quarry is a reasonable location compared to other areas within the High Potential Mineral Aggregate Resource Areas that minimizes adverse impacts on agricultural operations and resources.

The AIA ensures conformity with applicable agricultural policies and provides an assessment of agricultural land base and the agri-food network in the PSA and SSA, and an assessment of any potential conflicts with surrounding agricultural operations within the SSA.

Specifically, the AIA includes:

### **Review of Background Information**

One of the first tasks undertaken was to collect and review all relevant information required to meet the Study objectives. The information reviewed included:

- ◆ soils information from the provincial digital soil resource database, published reports (Soil Survey of Peel County, Report No. 18), and provincial on-line data sources;
- ◆ the Growth Plan for the Greater Golden Horseshoe (2020); the Implementation Procedures for the Agricultural System in Ontario's Greater Golden Horseshoe (2020) and the Draft Agricultural Impact Assessment Guidance Document (2018);
- ◆ the Region of Peel Official Plan (2022) and the Town of Caledon Official Plan (2018) policies and land use designations;
- ◆ OMAFRA's Agricultural Information Atlas and the Agricultural Systems Portal mapping to obtain agricultural resources information; and
- ◆ aerial photographic imagery to review the type and extent of agricultural operations on site and in the surrounding area and to identify potential sources of conflict.

### **Field Work**

Field work involved a reconnaissance level land use survey to:

- ◆ identify the mix of land uses observed in the PSA and SSA and where possible verify interpretation of aerial photographic imagery;
- ◆ identify the agricultural crops grown in the study areas;
- ◆ identify agricultural investments in infrastructure and land improvements;
- ◆ identify the type and status (active vs. non-active) of farm operations potentially impacted by proposed aggregate extraction operations;
- ◆ identify farm buildings (including empty livestock and/or retired farm infrastructure) and other key permanent facilities and other components of the agri-food network;
- ◆ identify neighbouring farm communities and transportation network upon which the farm community relies on; and
- ◆ Other aggregate operations.

### **Analysis of Impacts**

To be consistent with the draft AIA Guidelines, potential negative effects of the proposed aggregate extraction operation on agriculture was evaluated through an assessment of:

- ◆ the quality and quantity of agricultural land impacted;
- ◆ fragmentation of agricultural lands and operations;
- ◆ the type of agricultural, agriculture-related or on-farm diversified uses being impacted and their significance for supporting other agricultural production in the surrounding area;

- ◆ the loss of existing and future farming opportunities;
- ◆ the loss of infrastructure, services or assets important to the surrounding agricultural community and agri-food sector;
- ◆ the loss of agricultural investments in structures and land improvements (e.g. artificial drainage);
- ◆ the disruption or loss of function to artificial drainage and irrigation installations;
- ◆ changes to the soil drainage regime;
- ◆ changes to surface drainage features which could have an effect on adjacent lands;
- ◆ changes to landforms, elevations and slope that could alter microclimatic conditions (e.g. modification to slopes that may reduce or improve cold air drainage opportunities and changes to elevation may have an impact on diurnal temperatures);
- ◆ changes to hydrogeological conditions that could affect neighboring municipal or private wells, sources of irrigation water and sources of water for livestock;
- ◆ disruption to surrounding farm operations, activities and management (e.g. temporary loss of productive agricultural lands, cultivation, seeding, spraying, harvesting, field access, use of road network);
- ◆ the potential effects of noise, vibration, dust, and traffic on agricultural operations and activities
- ◆ potential compatibility concerns such as normal farm practices facing challenges with e.g. nuisance complaints, vandalism and trespassing that may occur with the new development being established; and
- ◆ the inability or challenges to move farm vehicles and equipment along roads due to increased traffic caused by haul routes, changes in road design.

#### **Alternative Site Assessment**

The AIA includes an alternative site assessment to be consistent with the PPS Section 2.5.4.1 c) to demonstrate that other alternatives have been considered and that the Subject Site are a reasonable location for the proposed CBM Caledon Pit / Quarry.

The Study Area for this component of the AIA is defined as those areas within the Region's High Potential Mineral Aggregate Resource Areas (Schedule C) within the Town of Caledon. The alternative site assessment relied predominantly on a comparison of the CLI land classifications within the HPMARA. A more complete discussion of the study area and related analysis is provided in Section 5.11 of the AIA.

#### **Mitigation Measures and Net Impacts**

Impacts on the agricultural system resulting from new non-farm development proposed in prime agricultural areas should be avoided whenever possible. When impacts cannot be avoided, mitigation measures have been prepared to minimize or mitigate the potential impacts of the proposed aggregate operation. The net impacts of the proposed aggregate operation are then assessed based on the assumption

that the proposed mitigation measures will be put in place. The AIA has assessed both the direct and indirect impacts of the proposed CBM Caledon Pit / Quarry and mitigation measures have been provided.

## 2. AGRICULTURAL POLICY

### 2.1 Provincial Policy Statement

Land Use Policy and development in the province of Ontario is directed by the Provincial Policy Statement (PPS), which was issued under the authority of Section 3 of the Planning Act. Section 3 of the Planning Act states that decisions affecting planning matters “shall be consistent with” policy statements issued under the Act.

The PPS was last updated on May 1, 2020. Section 2.3 of the PPS specifically deals with proposed development in prime agricultural area. Section 2.3.1 states that “Prime agricultural areas shall be protected for long-term use for agriculture”. The PPS defines prime agricultural areas as areas where prime agricultural lands predominate. Prime agricultural lands include specialty crop areas and Canada Land Inventory (CLI) Classes 1, 2 and 3 soils, in this order of priority for protection. As per the definition of prime agricultural areas in the PPS, “prime agricultural areas may be identified by the Ontario Ministry of Agriculture and Food using guidelines developed by the Province as amended from time to time. A prime agricultural area may also be identified through an alternative agricultural land evaluation system approved by the Province”. The Region of Peel and Town of Caledon have undertaken an alternative agricultural land evaluation system (a LEAR). The LEAR has identified portions of the Subject Site to be part of a prime agricultural area.. However, the majority of the Subject Site consist of non-prime agricultural lands (i.e., CLI Classes 4-7).

Section 2.3.6 states that:

“Planning authorities may only permit non-agricultural uses in prime agricultural areas for:

- a) extraction of minerals, petroleum resources and mineral aggregate resources, in accordance with policies 2.4 and 2.5; or
- b) limited non-residential uses, provided that all of the following are demonstrated:
  1. the land does not comprise a specialty crop area;
  2. the proposed use complies with the minimum distance separation formulae;
  3. there is an identified need within the planning horizon provided for in policy 1.1.2 for additional land to be designated to accommodate the proposed use; and
  4. alternative locations have been evaluated, and
    - i. there are no reasonable alternative locations which avoid prime agricultural areas; and
    - ii. there are no reasonable alternative locations in prime agricultural areas with lower priority agricultural lands.

Impacts from any new or expanding non-agricultural uses on surrounding agricultural operations and lands are to be mitigated to the extent feasible.”

Section 2.5.4 of the PPS addresses mineral aggregate resources and extraction in prime agricultural areas. Section 2.5.4.1 states that:

“In prime agricultural areas, on prime agricultural land, extraction of mineral aggregate resources is permitted as an interim use provided that the site will be rehabilitated back to an agricultural condition.

Complete rehabilitation to an agricultural condition is not required if:

- a) outside of a specialty crop area, there is a substantial quantity of mineral aggregate resources below the water table warranting extraction, or the depth of planned extraction in a quarry makes restoration of pre-extraction agricultural capability unfeasible;
- b) in a specialty crop area, there is a substantial quantity of high quality mineral aggregate resources below the water table warranting extraction, and the depth of planned extraction makes restoration of pre-extraction agricultural capability unfeasible;
- c) other alternatives have been considered by the applicant and found unsuitable. The consideration of other alternatives shall include resources in areas of Canada Land Inventory Class 4 through 7 lands, resources on lands identified as designated growth areas, and resources on prime agricultural lands where rehabilitation is feasible. Where no other alternatives are found, prime agricultural lands shall be protected in this order of priority: specialty crop areas, Canada Land Inventory Class 1, 2 and 3 lands; and
- d) agricultural rehabilitation in remaining areas is maximized.”

The licence application being prepared will involve a substantial quantity of aggregate extraction below the water table. Therefore, as per 2.5.4.1a) an agricultural rehabilitation plan for the Subject Site is not feasible and will not be required.

It is also worth noting that the majority of the Subject Site do not consist of prime agricultural lands. They are predominantly CLI Class 4 lands.

## **2.2 Aggregate Resources Act**

The Aggregate Resources Act (ARA) issued by the Ministry of Natural Resources and Forestry (MNRF) provides direction for the management of aggregate resources in Ontario, regulates aggregate operations in the province, lays out requirements for the rehabilitation of extracted land, and aims to minimize adverse impacts on the environment. The Act includes rules regarding issuing of licenses and permits, changes to approvals, inspections, complaint response, compliance and rehabilitation monitoring. The ARA was most recently updated on June 1, 2021. The proposed CBM Caledon Pit / Quarry must comply with the ARA.

## **2.3 Greater Golden Horseshoe Growth Plan**

### **2.3.1 Growth Plan Policies**

In May 2019, the updated Growth Plan for the Greater Golden Horseshoe (GGH) came into effect and was most recently updated in August 2020. The objective of the plan is to provide a long-term plan that works to manage growth, build complete communities, curb urban sprawl, and protect the natural environment.

The Province has identified an Agricultural System for the GGH which is discussed in Section 4.2.6 of the Growth Plan. Section 4.2.6.3 states:

*Where agricultural uses and non-agricultural uses interface outside of settlement areas, land use compatibility will be achieved by avoiding or where avoidance is not possible, minimizing and mitigating adverse impacts on the Agricultural System. Where mitigation is required, measures should be incorporated as part of the non-agricultural uses, as appropriate, within the area being developed. Where appropriate, this should be based on an agricultural impact assessment.*

A definition of an agricultural impact assessment is provided in the GPGGH.

*A study that evaluates the potential impacts of non-agricultural development on agricultural operations and the Agricultural System and recommends ways to avoid or, if avoidance is not possible, minimize and mitigate adverse impacts. (Greenbelt Plan)*

The Implementation Procedures for the Agricultural System for the Greater Golden Horseshoe (GGH) were prepared by the Province to guide municipalities to identify prime agricultural areas and to implement policies for the agricultural system. Mapping has been completed for the GGH and is shown on-line using the Agricultural System Portal. The Agricultural Systems Portal and the Implementation Procedures for the Agricultural System for the GGH were reviewed to assess impacts the proposed development may have on the Agricultural System.

The Agricultural Systems mapping for the GGH shows that the Subject Site are part of the agricultural land base and considered to be within a prime agricultural area.

### **2.3.2 Agricultural System for the Greater Golden Horseshoe**

The Province has introduced an Agricultural System approach to land use planning across the agricultural land base within the Greater Golden Horseshoe. The purpose is “to identify and protect a continuous, productive land base for agriculture across municipalities, as well as provide support for the agri-food supply chain the sector depends on”. The agricultural system is comprised of two components: the agricultural land base and the agri-food network.

As shown in the Agricultural Systems Portal, the PSA and the majority of the SSA are located within the agricultural land base as well as candidate lands for the agricultural lands base and are part of a prime agricultural area. Lands included within prime agricultural areas are intended to be part of a much larger, continuous, productive agricultural land base that provides for farming and farm-related business opportunities that support the local agri-food industry.

The Agricultural System includes a continuous and productive land base, comprised of prime agricultural areas, including specialty crop areas, and rural lands, as well as a complementary agri-food network that together enable the agri-food sector to thrive. The agri-food network includes many agricultural related features such as regional infrastructure and transportation networks, on-farm buildings and infrastructure, agricultural services, farm markets, distributors and primary processing, as well as small towns and hamlets that are supportive of agriculture and are important to the viability of the agri-food sector. To ensure the long-term viability of a healthy agricultural system, land use planners must ensure that there are opportunities within the agricultural land base for key infrastructure, services and assets which support



the agricultural industry. This includes agri-food network (AFN) features such as cold storage facilities, abattoirs, food processors, grain dryers, distribution centres, and food hubs/co-ops.

## 2.4 Greenbelt Plan

The Greenbelt Plan was first introduced in 2005 to help shape the future of the Greater Golden Horseshoe. It was most recently updated in 2017 and builds on the PPS to establish land use planning framework for environmental and agricultural protection. The lands within the PSA are designated Protected Countryside in the Greenbelt Plan. Section 3.1.3 deals with prime agricultural area policies for lands falling within prime agricultural areas of the Protected Countryside.

Section 4.3.2 of the Greenbelt Plan addresses non-renewable resource policies and states:

“For lands within the Protected Countryside, the following policies shall apply:

1. Non-renewable resources are those non-agriculture-based natural resources that have a finite supply, including mineral aggregate resources. Aggregates, in particular, provide significant building materials for our communities and infrastructure, and the availability of aggregates close to market is important for both economic and environmental reasons.
2. Activities related to the use of non-renewable resources are permitted in the Protected Countryside, subject to all other applicable legislation, regulations and official plan policies and by-laws. The availability of mineral aggregate resources for long-term use shall be determined in accordance with the PPS, except as provided below.
4. In prime agricultural areas, applications for new mineral aggregate operations shall be supported by an agricultural impact assessment and, where possible, shall seek to maintain or improve connectivity of the Agricultural System.”

The AIA will address 4.3.2 of the Greenbelt Plan.

## 2.5 Region of Peel Official Plan

The Subject Site are designated “Prime Agricultural Area” and “Rural Land” (Schedule D-1) and identified as “High Potential Mineral Aggregate Resource Areas” (Schedule D-2) within the Region of Peel Official Plan (April 2022). Section 3.3 of the Region of Peel Official Plan (2022) contains the Region’s Agricultural System policies and objectives. Section 3.3 states:

- “3.3.14: Permit non-agricultural uses in the Prime Agricultural Area without the requirement for an amendment to the Region of Peel Official Plan and subject to a local official plan amendment only for:
- a) Extraction of minerals, petroleum resources and mineral aggregate resources, in accordance with Section 3.4.
- 3.3.15: Require that, where a new or expanding non-agricultural use is proposed in the prime agricultural area:

- a) An agricultural impact assessment be prepared in accordance with provincial and municipal guidelines; and
- b) Adverse impacts on agricultural operation shall be avoided or, if avoidance is not possible, shall be minimized mitigated. Where mitigation is required, the mitigation measures should be incorporated as part of the non-agricultural uses, as appropriate, within the area being developed.

3.3.19: In Prime Agricultural Area, applications for new mineral aggregate operations will be supported by an agricultural impact assessment and, where possible, will seek to maintain or improve connectivity of the Agricultural System.”

Section 3.4 of the Official Plan provides policies for Mineral Aggregate Resource. Section 3.4 states:

“3.4.5: Protect the High Potential Mineral Aggregate Resource Areas (HPMARA), as generally identified on Schedule D-2 for possible use. These areas shall be reflected in local municipal official plan, and may be refined in those plans, having regard for local environmental, cultural, social and other planning considerations. An amendment to Schedule D-2 to reflect local refinements shall not be required, as long as the local refinements respect the intent of this Plan.

3.4.6: Permit mineral aggregate extraction sites, inside or outside of the area identified as High Potential Mineral Aggregate Resource Areas (HPMARA), only where extraction is permitted in an local municipal official plan and only in conformity with this Plan, the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan, the Greenbelt Plan and the Provincial Policy Statement where applicable. An amendment to Schedule D-2 will not be required for the establishment or expansion of a mineral aggregate extraction site.”

Section 5.7 of the Official Plan provides policies for the Rural System, containing diverse natural and rural landscapes and attractive communities. The Rural System as mapped in Schedule D-1 includes lands outside the 2031 Regional Urban Boundary and Prime Agricultural Areas. Section 5.7.13 states:

“Where proposed non-agricultural uses interface with agricultural uses:

- a) Land use compatibility shall be achieved by avoiding or, if avoidance is not possible, minimizing and mitigating adverse impacts on the Agricultural System;
- b) Where mitigation is required, the mitigation measures should be incorporated as part of the non-agricultural uses, as appropriate, within the area being developed; and
- c) Where appropriate, an agricultural impact assessment should be required to identify and evaluate potential impacts on the Agricultural System and measures to avoid, minimize and mitigate adverse impacts.”

Section 5.7.19.7 states:

“Permit the following uses in Rural Lands without the requirement for an amendment to the Region of Peel Official Plan, subject to the other policies of this Plan and the applicable local official plan:

- g) Other rural uses that are compatible with the rural landscape and surrounding uses, can be sustained by rural service levels and will not adversely affect adjacent agricultural operations and other resource-based uses such as mineral aggregate operations.”

The AIA will consider the potential impacts of the proposed CBM Caledon Pit / Quarry on the Rural System.

## **2.6 Town of Caledon Official Plan**

The proposed CBM Caledon Pit / Quarry is designated “General Agricultural Area” and “Rural Lands” (Schedule A) and identified as “Bedrock Resource” and “CHPMARA Aggregate Resource Lands” (Schedule L) in the Town of Caledon Official Plan (OP). Section 5.11 of the OP states “The High Potential Mineral Aggregate Resource Areas (HPMARA) are identified on Schedule C in the Peel Regional Official Plan. The HPMARA is not a land use designation; it is a mechanism for identifying and protecting significant areas of mineral aggregate resources. The Regional HPMARA has been further refined at the local level to reflect the Town of Caledon’s local environmental, cultural, social, and other planning considerations to create the Caledon HPMARA (CHPMARA), as identified in Schedule L of this Plan.”

Section 5.1. of the OP deals with the Prime Agricultural Area and General Agricultural Area land use designations. Section 5.1.1.2 states “the Town acknowledges the overlap between Caledon’s High Potential Mineral Aggregate Resource Areas and the Prime Agricultural Area. Aggregate extraction can only occur in conformity with Section 5.11 of the Town’s Official Plan and subject to re-designation.”

Section 5.2 deals with Rural Lands. Section 5.2.4, Permitted Uses states that “permitted uses in the Rural Lands shall include uses permitted in the Prime Agricultural Area and General Agricultural Area noted in Section 5.1. Section 5.11 addresses Mineral Resources. Section 5.11. states:

“5.11.2.1.2 Those areas identified as CHPMARA have been prioritized as Aggregate Resource Lands and Aggregate Reserve Lands as shown on Schedule L. New pits and quarries are encouraged to locate in Aggregate Resource Lands as those lands have been determined to be suitable for aggregate extraction subject to Sections 5.11.2.4.1, 5.11.2.4.2 and 5.11.2.4.3 and shall be designated to Extractive Industrial A Area or Extractive Industrial B Area subject also to Sections 5.11.2.4.1, 5.11.2.4.2 and 5.11.2.4.3. New pits and quarries will be considered in Aggregate Reserve Lands. It is the intent of this Plan that Aggregate Reserve Lands will be considered for Extractive Industrial A Area or Extractive Industrial B Area subject to the Applicant providing a planning justification having regard to the potential impacts that affect the broader community, that the location is suitable for aggregate extraction and subject to meeting the requirements of Section 5.11.2.4.4.

5.11.2.2.2 The establishment of new licensed extractive industrial operations or extensions to existing licensed areas will require an amendment to this Plan and an amendment to the Zoning By-law unless the property is designated for extractive purposes in which case on an amendment to the Zoning By-law will be required.

5.11.2.2.9 Mineral aggregate extraction may be permitted as an interim use in prime agricultural areas on prime agricultural land as defined in the Region of Peel Official Plan and/or the Town of Caledon Official Plan, subject to the policies of this Plan, and provided that rehabilitation of the site will be carried out whereby substantially the same areas and same average soil quality for agriculture are restored. On these prime agricultural lands, complete agricultural rehabilitation is not required if:

- a) There is a substantial quantity of mineral aggregates below the water table warranting extraction; or
- b) The depth of the planned extraction in a quarry makes restoration of pre-extraction agricultural capability unfeasible;
- c) Other alternatives have been considered by the Applicant and found unsuitable; and,
- d) Agricultural rehabilitation in remaining areas will be maximized.”

A significant portion of the Subject Site consist of non-prime agricultural lands. The proposed CBM Caledon Pit / Quarry will result in substantial aggregate extraction below the water table and restoration of the pre-extraction capability will be unfeasible. The final rehabilitation will not include plans for a return to an agricultural condition.

### **3. PROCESS**

Colville Consulting Inc. was retained to complete the AIA by Golder Associates Ltd., on behalf of CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada).

Colville Consulting Inc. was established in 2003 and provides agricultural and environmental consulting services to both private and public sector clients throughout Ontario. Colville Consulting Inc. has extensive experience working in and around the Town of Caledon on a number of agricultural-related projects including the preparation of AIAs for settlement area expansions and other proposed non-agricultural uses in prime agricultural areas. The CVs of Sean Colville, Ellise Baeza, Brett Espensen, and Maren Nielsen are included in Appendix B.

This study was led by Sean Colville, who has over 30 years of experience preparing Agricultural Impact Assessments in Ontario and is very familiar with the requirements of the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) draft Agricultural Impact Assessment Guidance Document (2018). Colville Consulting assisted the OMAFRA in the preparation of guidelines for AIA relating to aggregate extraction in prime agricultural areas and helped develop methodologies for progressive agricultural rehabilitation of pits and quarries in prime agricultural areas.

Ellise Baeza and Brett Espensen were responsible for completing the field investigations and the preparation of the AIA. Ellise and Brett have over seven years of experience preparing AIA's with Colville Consulting Inc. Maren Nielsen also assisted with the technical analysis and preparation of the AIA. Maren has over two years of experience preparing AIA's with Colville Consulting Inc.

#### **3.1 Pre-consultation**

Pre-consultation with stakeholders is an important part of the completion of an AIA process. A Terms of Reference for the AIA was prepared and submitted to municipal planning authorities for their input to the study scope. Based on the comments we received from these agencies, the Terms of Reference for the AIA was finalized and submitted on August 18, 2022 to David Hanratty of CBM Aggregates.

It is expected that through the formal planning process, (OPA, rezoning & ARA Licence), that additional consultations will be undertaken. Any new information or issues that arise as a result of further consultations and public consultations, which substantially affect the AIA, will be addressed in an addendum to the AIA.

## 4. METHODOLOGY

The study methodology for the AIA was prepared in accordance with OMAFRA's draft AIA Guidance Document as well as Colville's AIA Guidelines for Aggregate Extraction Applications. It includes a review of relevant Provincial, Regional, and Local agricultural policies, other agricultural-related sources of information and the completion of field inventories. Upon compilation and assessment of the data, the potential impacts of the proposed community development will be considered and recommendations to avoid and/or minimize potential impacts will be made. The AIA also assesses the development's conformity with the Provincial, Regional, and local agricultural policies.

### 4.1 Background Data Collection

The following information sources were among those reviewed for this study.

- ◆ The Provincial Policy Statement (2020);
- ◆ Places to Grow: Growth Plan for the Greater Golden Horseshoe (2020);
- ◆ Region of Peel Official Plan (April 2022);
- ◆ The Town of Caledon Official Plan (2018);
- ◆ Draft Agricultural Impact Assessment (AIA) Guidance Document, Ontario Ministry of Agriculture and Rural Affairs. March, 2018;
- ◆ Guidelines on Permitted Uses in Ontario's Prime Agricultural Areas, OMAFRA Publication 851, 2016;
- ◆ OMAFRA's digital soil resource database to obtain soil series and CLI agricultural capability mapping and data;
- ◆ Soil Survey of Peel County (1953);
- ◆ OMAFRA's Artificial Drainage Systems mapping;
- ◆ OMAFRA's AgMaps and Agri-Systems databases;
- ◆ The Physiography of Southern Ontario (Chapman & Putnam 1984);
- ◆ Agricultural System Portal for agricultural land base and agri-food network (OMAFRA, 2017); and
- ◆ Consultation with members of Study Team.

A list of materials reviewed is also provided in the Section 10 of this report.

### 4.2 Field Inventories

The field inventory completed for this study included a reconnaissance level land use survey of the surrounding area to identify agricultural operations, relative levels of agricultural investment, cropping patterns and mix of land uses.

Prior to completing the land use survey, the Region of Peel and Town of Caledon land use schedules designation were reviewed. In addition, OMAFRA's agricultural systems mapping was reviewed to

identify components of the Agri-Food Sector. Possible farmstead locations were identified, and agri-food businesses were noted on mapping prior to survey.

The land use survey was carried out on Thursday October 7<sup>th</sup>, 2021. Information gathered during the land use survey included the type of land uses observed (both agricultural and non-agricultural), the cropping pattern observed (i.e., the type of field crops and non-agricultural land cover), the location of farm operations (including both livestock and other agricultural operations) relative to the PSA. Recent investments in agricultural lands or facilities were also noted. Findings from the land use survey are provided in Section 5.6.

## **5. STUDY FINDINGS**

### **5.1 Physiography**

The study areas are mapped within the Spillways physiographic region (Chapman and Putnam, 1984). Spillways otherwise known as glacial meltwater drainage channels are entrenched and typically occupied by streams. Spillways are usually in the shape of a broad trough and partially or entirely floored by gravel beds at one or more levels, often with a cedar swamp in the lowest part of the valley. In this area, it is common to find spillways unoccupied by any streams. On the upland west of the Niagara Escarpment the spillways mostly, but not always, run along the front of the moraines. This particular moraine was built by the Lake Simcoe ice lobe pressing against the Niagara Escarpment northeast of Caledon Village.

The study areas are part of the Singhampton moraine which is the northern limb of the Port Huron Moraine system in Ontario and runs through rough stony land composed of loose stony loam where dolostone predominates. It is a single-crested till ridge running across the drumlinized plain where Kames appear at frequent intervals.

From Singhampton to Caledon Village this moraine lies on the summit of the Niagara escarpment. Between Orangeville and Caledon Village several drumlins of the Guelph group lie to the west of it. From Orangeville the moraine extends down the path of the Credit River to Cataract. This area is generally located in the headwaters of the Credit River and drains south to the Credit River and eventually to Lake Ontario. The West Credit River and its tributaries traverse the SSA and are within the southern portion of the PSA.

### **5.2 Climate**

Climate data is available through Environmental Canada's National Climate Data and Information Archive's online database. Climate Normals and Extremes for the Orangeville station (1971-2000) were obtained from the online database (Appendix C). Environment Canada's Orangeville station provides the most up to date climate data and is approximately 11.23 km from the PSA. Records show that this area receives an average of 891.7 mm of precipitation annually; 731.5 mm of rainfall and 160.2 cm of snowfall. The daily average temperature ranges from a high of 19.1°C to a low of -8.0°C.

The Ministry of Agriculture, Food and Rural Affairs Factsheets provide data on crop production and growing seasons across Ontario. The rate of development of crops from planting to maturity is mainly dependent upon temperature. Regions within the Caledon area begin to experience average temperatures greater than 10°C starting May 7 before reaching temperatures greater than 12.8°C for 3 consecutive days around May 19<sup>th</sup>. During this time and up until the season's average ending date, September 30<sup>th</sup>, the area accumulates an average of 2680 crop heat units (CHU). On average, the last spring frost in the Caledon area occurs on May 10<sup>th</sup>. The first fall frost is expected on September 30<sup>th</sup>. This provides the surrounding area with a growing period of approximately 140-150 days. The climate in the Caledon area provides a good overall growing period that can support a wide range of crops, including specialty crops.



### 5.3 Agricultural Crop Statistics

Agricultural crop statistics are available through Statistics Canada's Agriculture and Food Statistics Census of Agriculture. The PSA are located within the Census Western Ontario Region, Peel Region. Data from Statistics Canada has been compiled by the Ontario Ministry of Agriculture, Food and Rural Affairs. Agricultural crop statistics for Peel Region and Town of Caledon were obtained from the online database (Appendix D). The County and Township Agricultural Profile for Peel Region includes data from the 2011, 2016 and 2021 census periods. The majority of the statistics are relevant primarily to the Town of Caledon since there is very little agricultural activity in the other Peel municipalities (i.e., Brampton and Mississauga).

The total number of farms in Peel Region decreased from 440 to 408 between 2011 and 2016, and to 377 in 2021. Total cropland decreased from 74,193 acres to 67,408 acres from 2011 to 2016 but increased to 80,409 acres in 2021. Field crops in Peel Region include winter wheat, oats, barley, mixed grains, corn for grain, corn for silage, hay, soybeans, and potatoes. Field crop production decreased marginally between 2011 and 2021, while oats, corn for grain, and soybean production increased. Fruit crops in Peel Region include apples, grapes, strawberries, and raspberries. Total fruit crop production decreased from 429 acres to 284 acres from 2011 to 2021. Vegetable crops include sweet corn, tomatoes, green peas and green or wax beans. Total vegetable production increased from 484 acres to 519 acres from 2011 to 2021.

### 5.4 Specialty Crop Area

The PPS defines a specialty crop area as: "areas designated using guidelines developed by the Province, as amended from time to time. In these areas, specialty crops are predominantly grown such as tender fruits (peaches, cherries, plums), grapes, other fruit crops, vegetable crops, greenhouse crops, and crops from agriculturally developed organic soil, usually resulting from:

- a) soils that have suitability to produce specialty crops, or lands that are subject to special climatic conditions, or a combination of both;
- b) farmers skilled in the production of specialty crops; and
- c) a long-term investment of capital in areas such as crops, drainage, infrastructure and related facilities and services to produce, store, or process specialty crops.

There are two specialty crop areas recognized by the Province, the Niagara Fruit Belt, and the Holland Marsh. The Subject Site are not located in one of these specialty crop areas and no significant areas of specialty crop production were observed in the study areas.

### 5.5 Soil Resources

#### 5.5.1 Regional Soil Survey

The soil mapping in the *Soil Survey of Peel County* (Hoffman and Richards, 1953) includes a soil map that shows the distribution of the various soil series mapping in the Region. The digital Provincial Soil Resource Database is compiled and administered by OMAFRA and includes most of the soil surveys completed in Ontario. Much of this information is accessible from the Province's Agricultural Information Atlas and, in

the GGH, the Agricultural Systems Portal. These interactive online applications enable users to obtain agricultural information for Ontario such as soils and drainage, as well as data layers from other Government of Ontario ministries (e.g., lot boundaries). The database was last accessed in September 2022.

*The Soil Survey of Peel County* includes a soil map that shows the distribution of the various soil series in the Region. This mapping shows that the soils on the PSA are predominantly comprised of Caledon Loam (26.64%), Dumfries Loam (62.55%), Gilford Loam (8.14%) and Bottom Lands (2.67%) soils. The regional soil series data for the PSA is included in Table 1. The soils are shown in Figure 2.

<b>Table 1: Regional Soil Series for Primary Study Area</b>			
<b>Soil Series</b>	<b>CLI Class</b>	<b>Area (Ha)</b>	<b>% of PSA</b>
Dumfries Loam		164.15	62.55%
Slope Class E	4PT	114.90	43.78%
Slope Class C	2P	49.25	18.76%
Caledon Loam	2FM	69.93	26.64%
Gilford Loam	4W	21.37	8.14%
Bottom Land	5I	6.99	2.67%
<b>Totals</b>		<b>262.44</b>	<b>100.00%</b>

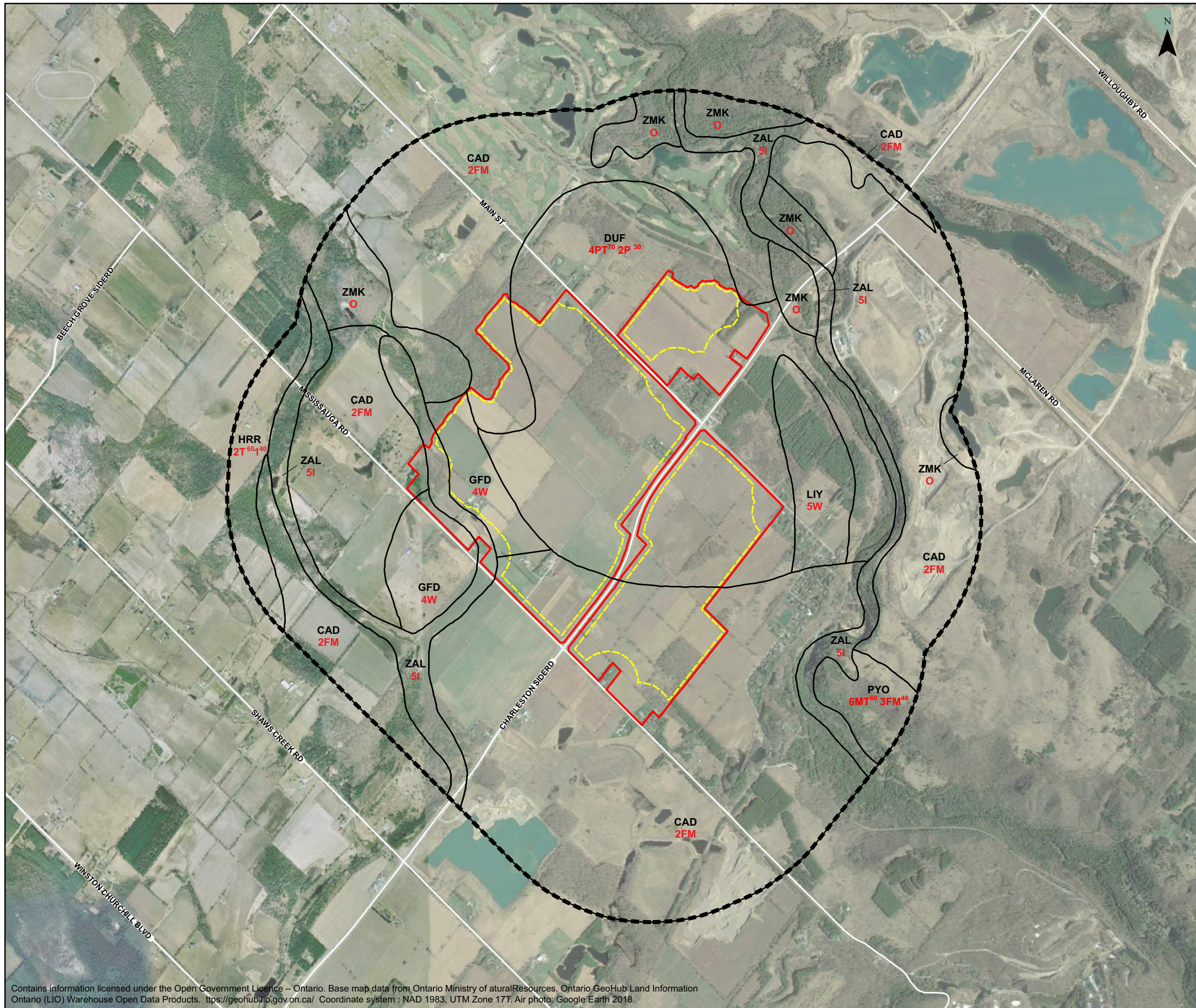
### **Caledon Loam**

Caledon Loam soils are classified as Brunisolic Grey Brown Luvisols. These soils have developed on well sorted gravelly materials derived from shale and limestone materials. Caledon Loam soils are well drained and occur on smooth and moderately sloping sites. The surface horizon consists of a very dark greyish brown loam with a fine granular structure. Subsequent layers are a lighter yellowish brown sandy loam with a neutral soil reaction. The B horizon is dark brown clay loam that is typically very stony and has a firm consistency. The C horizon is a brown, a calcareous, well sorted gravel with a loose consistency. These soils are mapped on approximately 69.93 ha (26.64%) of the PSA.

These are generally considered to be CLI Class 2FM lands which have moderate limitations for common field crop production. The limitations are related to inherently low fertility levels and droughtiness. On steeper slopes these soils often experience moderate levels of erosion.

### **Dumfries Loam**

Dumfries soils are classified as Brunisolic Grey Brown Luvisols. These soils have developed from a well drained, coarsely textured till and occur on the hummocky, often steeply sloping, irregular slopes typical of the Gault and Paris moraines. Gravelly kame deposits, small, poorly drained, depressional areas and organic soils are often found in close association with Dumfries soils. The surface horizon consists of a dark coloured loam to sandy loam and a neutral soil reaction. The B horizon is dark brown and to reddish brown and often consists of a loamy Bm horizon and finer textured Bt horizon. These soils are easily eroded on

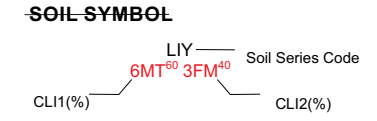


**Legend**

- Primary Study Area (Licenced Boundary)
- Proposed Limit of Extraction
- Secondary Study Area (1000 Metres)
- Soil Boundary

**SOIL SERIES**

- CAD** Caledon Loam
- DUF** Dumfries Loam
- GFD** Gilford Loam
- HRR** Harriston Loam
- LIY** Lily Loam
- PYO** Pontypool Sandy Loam
- ZAL** Bottom Land
- ZMK** Muck



**CLI AGRICULTURAL CAPABILITY CLASSES**

- Class 1** Soils in this class have no significant limitations to use for common field crops
- Class 2** Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices.
- Class 3** Moderately severe limitations that reduce the choice of crops, or require special conservation practices.
- Class 4** Severe limitations that restrict the choice of crops, or require special conservation practices and very careful management, or both.
- Class 5** Very severe limitations that restrict their capability to produce perennial forage crops, improvement practices are feasible.
- Class 6** Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible.
- Class 0** Organic Soils (not placed in capability classes).

**CLI AGRICULTURAL CAPABILITY SUBCLASSES**

- W** Excess Water - limitations for agriculture due to poor drainage; improvements not feasible.
- T** Topography - limitations from both the percent of slope and the pattern or frequency of slopes in different directions.
- F** Low Fertility - soils having low fertility; limitations may be due to lack of plant nutrients.
- M** Moisture Deficiency - Lower moisture holding capacities and are more prone to droughtiness.
- I** Inundation by streams or lakes - Soil subject to periodic flooding by streams and lakes.
- P** Stoniness- Indicates soils sufficiently stony to hinder tillage, planting and harvesting operations.

**Figure 2**  
**Provincial Soil Series Mapping**

**Agricultural Impact Assessment for  
CBM Caledon Quarry**

Prepared for:

Prepared by:

0 500 M  
  
 1:20,000

Date: November 2021  
 Rev: November 2022

FILE: C19065

Contains information licensed under the Open Government Licence – Ontario. Base map data from Ontario Ministry of aturalResources, Ontario GeoHub Land Information Ontario (LIO) Warehouse Open Data Products. <https://geohub.lio.gov.on.ca/> Coordinate system : NAD 1983, UTM Zone 17T. Air photo: Google Earth 2018.

steeper slopes. Under eroded conditions, the soil reaction at the surface is often alkaline and the underlying B horizons may be missing. The parent material is a calcareous, gravelly, sandy loam. Dolostone stones and boulders are common throughout the soil profile.

Where these soils occur unimpeded by steep slopes, stoniness, and bedrock outcrops, they are often rated as CLI Class 2 to 3. On the Subject Site, the majority of the Dumfries soils (43.78%) are mapped on Class E (10-15%) slopes and are rated CLI Class 4PT (severe stoniness and topographic limitations). Approximately 18.76% of the Dumfries soils are mapped on C – Class slopes and rated CLI Class 2P (moderate stoniness limitations).

### **Gilford Loam**

The Gilford soil series is the poorly drained member of the Caledon catena and is classified as an Orthic Humic Gleysol. These soils occur on gentle slopes with limited steep topography. They are a result of glaciofluvial deposits, mainly occurring in outwash plains, deltas, kames, eskers and kame terraces. They have a very coarse texture and are moderately to strongly calcareous. The surface layers are a very dark brown with a fine granular structure and few stones. The B horizon is a mottled dark greyish brown and can be very stony. The C horizon is a brown gravelly outwash with a grainy, loose consistency.

These soils are poorly drained and have low fertility, therefore limiting crop production. Where drainage is improved and fertility levels are maintained, some limited common field crops can be produced. But they are still rated as CLI Class 4W (wetness limitations). These soils are mapped on approximately 8.14% of the PSA.

### **Bottom Lands**

Bottom Land belongs to the Alluvial Great Soil Group and has variable drainage. Bottom Land soils generally lie along stream courses and are often subject to periodic flooding, erosion and/or sedimentation. This results in the development of highly variable soil profiles consist of successive layers of silt, sand, and clay intermixed with layers of organic matter. This map unit represents approximately 2.67% of the PSA.

## **5.5.2 CLI Agricultural Land Classification**

The Canada Land Inventory (CLI) is an interpretative system for assessing the effects of climate and soil characteristics on the limitations of land for growing common field crops. The CLI system has seven soil classes that descend in quality from Class 1, which has few limitations, to Class 7 soils which have no agricultural capability for common field crops. Class 2 through 7 soils have one or more significant limitations, and each of these are denoted by a capability subclass. There are thirteen subclasses described in CLI Report No. 2 (1971). Eleven of these subclasses have been adapted to Ontario soils. More information regarding the CLI Classification system is provided in Appendix E.

Prime agricultural lands include specialty crop lands, and CLI Classes 1, 2 and 3. Non-prime agricultural lands include CLI Classes 4-7, most organic lands and Not Mapped lands. Table 2 shows that the majority of the PSA is comprised of non-prime agricultural lands. Approximately 54.59% of the area is CLI Class 4 (51.93%) and 5 (2.67%).

Figure 2 shows that the majority of the PSA is mapped as CLI Class 2F Caledon Loam (26.64%), the complexed CLI Class 4PT and 2P Dumfries Loam (43.78% and 18.76%, respectively), and to a lesser extent the CLI Class 4W Gilford Loam (8.14%) and CLI Class 5I Bottom Land soils (2.67%).

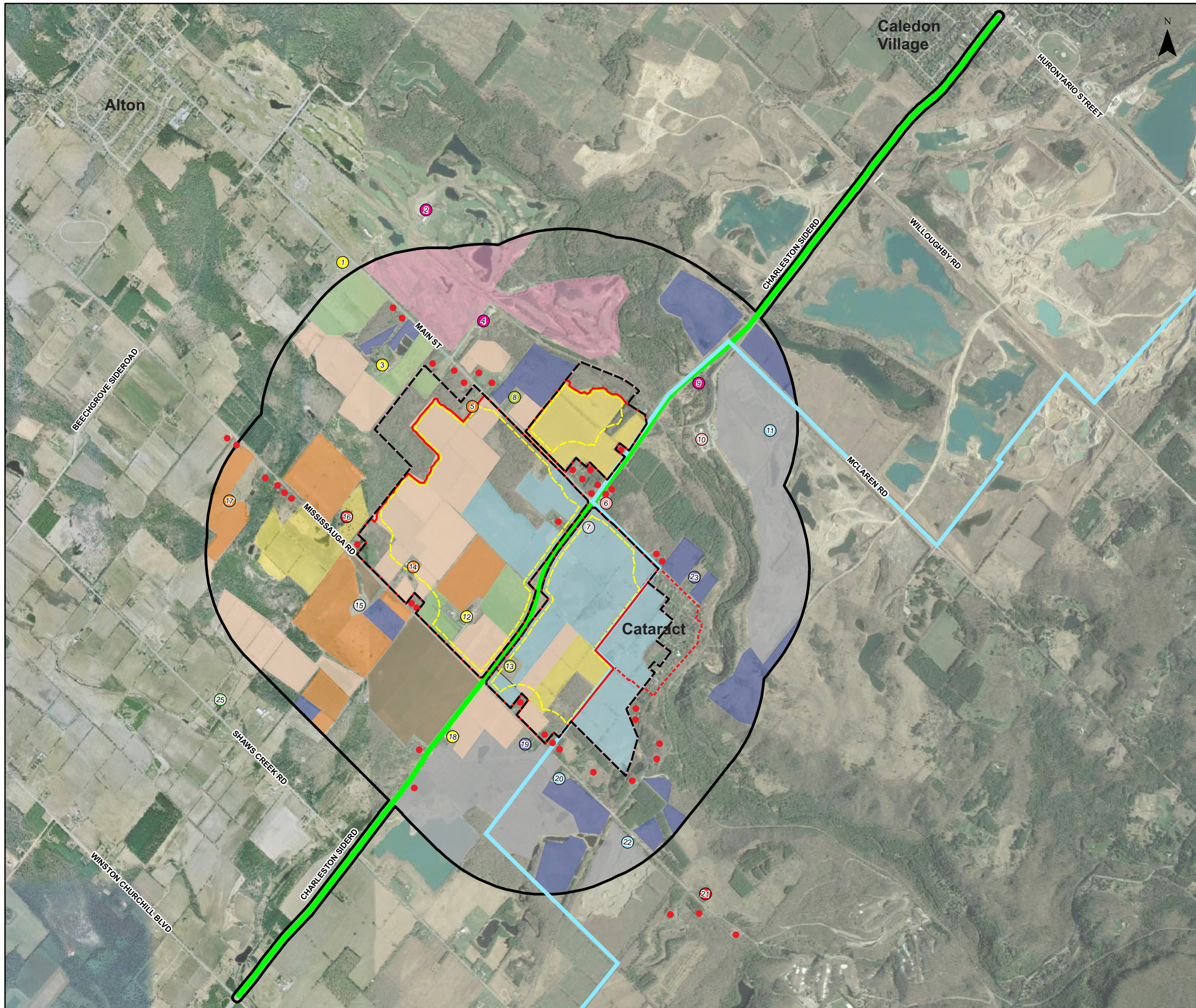
<b>Table 2: CLI Capability Classes</b>			
	<b>CLI Class</b>	<b>Area (Ha)</b>	<b>% of PSA</b>
<b>Prime Agricultural Lands</b>			
	Class 2	119.18	45.41%
<b>Non-Prime Agricultural Lands</b>			
	Class 4	136.27	51.93%
	Class 5	6.99	2.67%
<b>Total Prime Agricultural Lands</b>			<b>45.41%</b>
<b>Total Non-Prime Agricultural Lands</b>			<b>54.59%</b>

## 5.6 Land Use

A reconnaissance level, land use survey was completed for this study on Wednesday October 7<sup>th</sup>, 2021. The land use survey concentrated on all lands outside of urban areas (e.g., the hamlet of Cataract). The number and type of land uses were identified and described. These include agricultural operations (both existing and retired), agricultural-related uses and on-farm diversified uses within the PSA and the SSA. Non-farm land uses were also characterized. The crop types observed within the SSA were recorded and mapped. Photographs taken during the land use survey are provided in Appendix F. The purpose of the land use survey is to document the mix of agricultural and non-agricultural uses in the PSA and SSA; identify agricultural operations that may be sensitive to the introduction of new land uses and describe features of the local agri-food network. As shown in Figure 3, the land uses observed are numbered. Short descriptions of these land uses are provided in Appendix G. Site photographs for the land uses observed are provided in Appendix F.

Land use survey identified thirteen agricultural uses within the PSA and SSA; these uses include four active livestock operations, two hobby farms, two cash crop operations, three retired operations, and two remnant operations.

Ten non-agricultural uses were identified within the PSA and SSA. These include two commercial uses, three recreational uses, three industrial aggregate uses, and two non-farm residential dwellings.



**Legend**

- Primary Study Area
- Land Holdings
- Proposed Extraction Area
- Secondary Study Area (1000 Metres)
- Niagara Escarpment Plan Boundary
- Designated Haul Route

**Cropping Pattern**

<span style="border: 1px dashed red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Settlement Boundary	<span style="display: inline-block; width: 15px; height: 10px; background-color: blue; margin-right: 5px;"></span> Idle
<span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Winter Wheat	<span style="display: inline-block; width: 15px; height: 10px; background-color: orange; margin-right: 5px;"></span> Corn
<span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; margin-right: 5px;"></span> Pasture/Forage	<span style="display: inline-block; width: 15px; height: 10px; background-color: pink; margin-right: 5px;"></span> Recreational
<span style="display: inline-block; width: 15px; height: 10px; background-color: tan; margin-right: 5px;"></span> Cultivated	<span style="display: inline-block; width: 15px; height: 10px; background-color: grey; margin-right: 5px;"></span> Aggregate
<span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue; margin-right: 5px;"></span> Soybean	
<span style="display: inline-block; width: 15px; height: 10px; background-color: brown; margin-right: 5px;"></span> Hay	

**Agricultural Use**

<span style="display: inline-block; width: 10px; height: 10px; background-color: yellow; border-radius: 50%; margin-right: 5px;"></span> Active Livestock	<span style="display: inline-block; width: 10px; height: 10px; background-color: grey; border-radius: 50%; margin-right: 5px;"></span> Cash Crop
<span style="display: inline-block; width: 10px; height: 10px; background-color: orange; border-radius: 50%; margin-right: 5px;"></span> Retired Livestock	<span style="display: inline-block; width: 10px; height: 10px; background-color: lightgreen; border-radius: 50%; margin-right: 5px;"></span> Remnant
<span style="display: inline-block; width: 10px; height: 10px; background-color: purple; border-radius: 50%; margin-right: 5px;"></span> Hobby Farm	<span style="display: inline-block; width: 10px; height: 10px; background-color: blue; border-radius: 50%; margin-right: 5px;"></span> Equestrian

**Agriculture-related Use**

- Brewery

**Non-Agricultural Uses**

<span style="display: inline-block; width: 10px; height: 10px; background-color: red; border-radius: 50%; margin-right: 5px;"></span> Non-farm Residence	<span style="display: inline-block; width: 10px; height: 10px; background-color: lightblue; border-radius: 50%; margin-right: 5px;"></span> Aggregates
<span style="display: inline-block; width: 10px; height: 10px; background-color: pink; border-radius: 50%; margin-right: 5px;"></span> Commercial	<span style="display: inline-block; width: 10px; height: 10px; background-color: magenta; border-radius: 50%; margin-right: 5px;"></span> Recreational

Figure 3  
Land Use Mapping

**Agricultural Impact Assessment for  
CBM Caledon Quarry**

Prepared for:

Prepared by:

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Date: November 2021  
 Rev: November 2022

FILE: C19065

### 5.6.1 Agricultural Uses

The PPS definition of agricultural uses: “means the growing of crops, including nursery, biomass and horticultural crops; raising of livestock; raising of other animals for food, fur or fibre, including poultry and fish; aquaculture; apiaries; agro-forestry; maple syrup production; and associated on-farm buildings and structures, including, but not limited to livestock facilities, manure storages, value-retaining facilities and accommodation for full-time farm labour when the size and nature of the operation requires additional employment.”

Farm types were noted and identified as either active or retired (i.e., inactive), livestock, cash crop or hobby farms. Livestock operations include dairy, beef, cow-calf and equestrian operations. Those inactive or retired farm operations were evaluated to determine whether they should be considered as either an empty livestock operation or as a remnant farm. Remnant farms have no infrastructure that is suitable for housing livestock whereas the infrastructure for an empty livestock facility is still in a condition that could permit the keeping of livestock with minimal investment.

#### Primary Study Area

Within the PSA, five agricultural uses were identified. These include one active livestock operation (#12), a cash crop operation (#7), two retired livestock operations (#5, and #14), and a remnant livestock operation (#13).

Field crops being grown within the PSA include corn, soybeans, cereal grains (e.g., winter wheat) and pasture/forage crops. Forage crops typically consist of hay and haylage. These crops are typically associated with traditional cash crop and livestock operations.

#### Secondary Study Area

Within the SSA, we identified eight agricultural uses. They include one cash crop (#15), two hobby farms (#19 and #23), three livestock operations (#1, #3, and #18), one remnant operation (#8) and one retired livestock operation (#17).

### 5.6.2 Agriculture-Related Uses

Agriculture-Related Uses are farm-related commercial and industrial uses. As defined in the PPS, these are uses “that are directly related to farm operations in the area, support agriculture, benefit from being in close proximity to farm operations, and provide direct products and/or services to farm operations as a primary activity”. These uses may include uses such:

- ◆ as retailing of agriculture-related products (e.g., farm supply co-ops, farmers’ markets, and retailers of value-added products like wine or cider made from produce grown in the area);
- ◆ livestock assembly yards;
- ◆ farm equipment repair shops;
- ◆ industrial operations that process farm commodities from the area such as abattoirs, feed mills, grain dryers, cold/dry storage facilities and fertilizer storage facilities, which service agricultural area;
- ◆ distribution facilities;

- ◆ food and beverage processors (e.g., wineries and cheese factories); and
- ◆ agricultural biomass pelletizers

One Agricultural-Related Use was identified just outside of the SSA along Shaws Creek Road. Goodlot Farmstead Brewing Co. (#25) offers beer gardens adjacent to the hop yards, a patio and offers live music. The facility has trails, offers outdoor recreation and an area with sheep (seasonally). The fields associated with this operation extend into the SSA.

### 5.6.3 On-Farm Diversified Uses

The PPS defines On-Farm Diversified uses as “uses that are secondary to the principal agricultural use of the property and are limited in area. On-farm diversified uses include, but are not limited to, home occupations, home industries, Agri-tourism uses, and uses that produce value-added agricultural products”.

No On-Farm Diversified land uses were identified within the study areas.

### 5.6.4 Non-Agricultural Uses

Non-farm land uses include non-farm residences, residential clusters, hamlets and settlement areas, municipal utilities, commercial and industrial operations, recreational and institutional uses.

Non-farm residences were observed throughout the study areas. The hamlet of Cataract lies within the SSA boundaries. The largest clusters of non-farm residences outside of the hamlet were observed near Greenwood, and in the southern portion of the SSA near the hamlet. Non-farm residences were not included in non-agricultural land use counts.

Fifty-two (52) non-farm land uses were identified in the study areas. Land uses include three aggregate operations (#11, #20, and #22), two commercial uses (#6, and #10), three recreational uses (#2, #4, and #9), and 44 non-farm residential uses, two (#16 and #21) confirmed to be residential during the land use survey.

### 5.6.5 Land Use Summary

Table 3 below summarizes the types of land uses observed within the study areas.

Table 3: Land Use Summary			
	Total Number	Active	Retired or Remnant
Agricultural Use	14	Cash Crop – 2 Hobby Farm – 2 Livestock Operation – 4	Retired Operation – 3 Remnant Operation – 3
Agriculture-related Use	1	Brewery - 1	-
On-farm Diversified Use	0	-	-
	Total Number	Type	
Non-Agricultural Use	52	Aggregates – 3, Commercial – 2 , Recreational – 3 Residential – approximately 44	



### **5.6.6 Greater Golden Horseshoe Agricultural System**

A review of the Greater Golden Horseshoe Agricultural System Portal mapping also reveals a relatively low level of agricultural investment and few agriculture-related land uses within the study areas. The mapping for the study areas is shown in Appendix H.

#### **Agricultural Production – Spatial Densities**

A review of all layers of the agricultural systems map, the spatial density for the agricultural systems is characterized as follows:

- ♦ Vegetable Fields (AAFC);
- ♦ Corn, Wheat and Soy Fields (AAFC);
- ♦ Poultry farms is moderate to high;
- ♦ Cattle and pig farms moderate to low; and
- ♦ Strawberry production is low to moderate.

The spatial data analysis helps to characterize the local agricultural system in the study areas. It shows that there are a number corn, wheat and soy fields, a moderate density of poultry farms and a moderate to low density of cattle, pig farms and most other forms of agricultural in the study area. The Agricultural Systems Portal shows two areas mapped as vegetable fields. These are mapped in an existing pit to the east. Their presence has not been confirmed.

#### **Agri-Food Services**

There are some agri-food businesses that support Caledon's agricultural community but these are all located outside of the study areas. The GoodLot Farmstead Brewing Co. is located just outside the SSA along Shaws Creek Road. This agri-food business appears to have hop yard on site and could bring agri-tourism to the area and produce other value-added agricultural products. It is not anticipated that the proposed CBM Caledon Pit / Quarry will have a direct impact on this business and any indirect impacts such as dust, and noise should be reduced with mitigation measures in place.

The proposed CBM Caledon Pit / Quarry operation will not have a significant impact on the agricultural system in the Town of Caledon. The impact on the agricultural system will be limited to the loss of agricultural land over time as extraction activities progress.

### **5.7 Land Improvements**

Investment in agricultural land improvements is common in high priority prime agricultural areas. Land improvements often include investment in artificial tile drainage installations and major investments, such as the construction of municipal drains, which benefit the broader agricultural community. In imperfectly and poorly drained areas the installation of artificial drainage can significantly improve the productivity of the soil. However, where there are no suitable outlets for tile drains and/or where the soils are slowly permeable, it may not be feasible for a landowner (farmer) to make this investment. Without suitable

drainage outlets, such as those provided by municipal drains, tile drainage installations are not effective, particularly in low lying and areas with nearly level topography.

The soils within the PSA and in the surrounding area are predominantly well drained. However, there are poorly drained soils mapped and there does not appear to have been any investment in improving these lands by installation of tile drainage. As shown in Figure 4, there are no municipal drains in the SSA or the PSA. Additionally, the OMAFRA drainage mapping does not show any random or systematic tile drainage installations within the SSA.

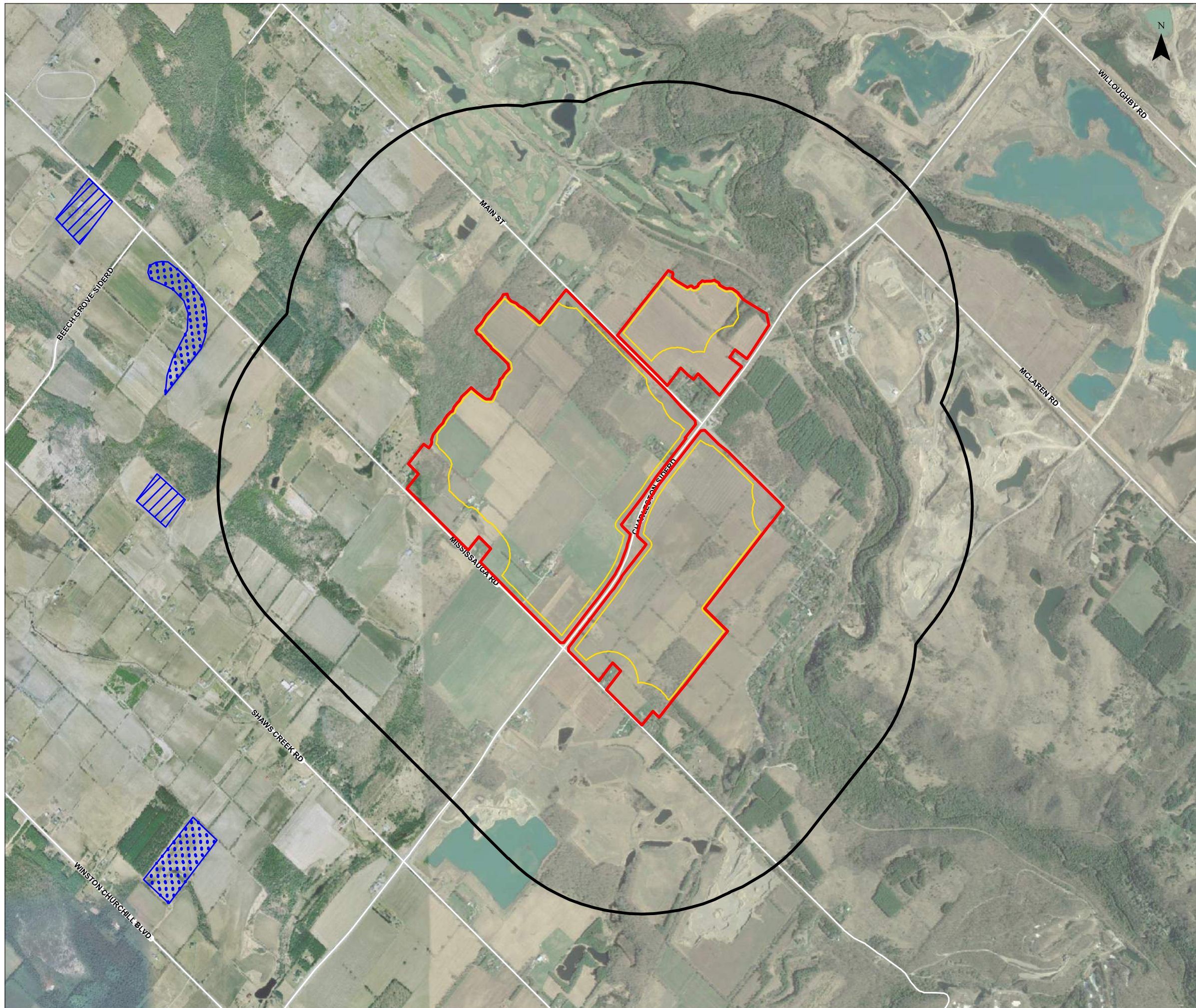
There are no investments in tile drainage in the study area. Nor were other land improvements observed in the PSA.

## **5.8 Fragmentation of Agricultural Lands**

Fragmentation of agricultural lands can have a negative impact on the viability of agricultural lands and its long-term preservation for agricultural purposes. Fragmentation of farm lands as a result of severance and lot creation has the potential to reduce the economic viability of farm parcels by reducing the size and efficiency of which lands can be farmed. This can result in an increase in operating costs for farms requiring several smaller and scattered parcels. Small farm parcels are often uneconomical and cannot support a farm family and an outside (off farm) source of income may be required to maintain the agricultural operation. Agricultural areas which have been fragmented also often have a higher occurrence of non-farm land uses which in turn means that there is a greater potential for conflict arising between farm and non-farm land uses.

Areas with relatively low levels of fragmentation are considered to be more viable economically, with fewer sources of non-farm land use conflicts. In most cases, these areas have a higher priority for protection. Generally, the more fragmentation experienced in an agricultural area the lower the areas agricultural priority.

The lot fabric in this area is shown in Figure 5. The majority of the parcels in this area are relatively large and not limited for agricultural uses by their size. Fragmentation of the lands within the study areas is related mainly to lot creation associated with non-farm dwellings, natural features such as the Credit River and woodlands (both natural and plantations), recreational areas, such as the Osprey Valley Golf Course, and several licenced aggregate operations.



**Legend**

- Primary Study Area
- Secondary Study Area
- Proposed Extraction Area
- Tile Drainage (Random)
- Tile Drainage (Systematic)

Contains information licensed under the Open Government Licence – Ontario. Base map data from Ontario Ministry of Natural Resources, Ontario GeoHub Land Information Ontario (LIO) Warehouse Open Data Products. <https://geohub.lio.gov.on.ca/> Coordinate system : NAD 1983, UTM Zone 17T. Air photo: Google Earth 2018.

**Figure 4**  
**Land Improvements**

Agricultural Impact Assessment for  
CBM Caledon Quarry

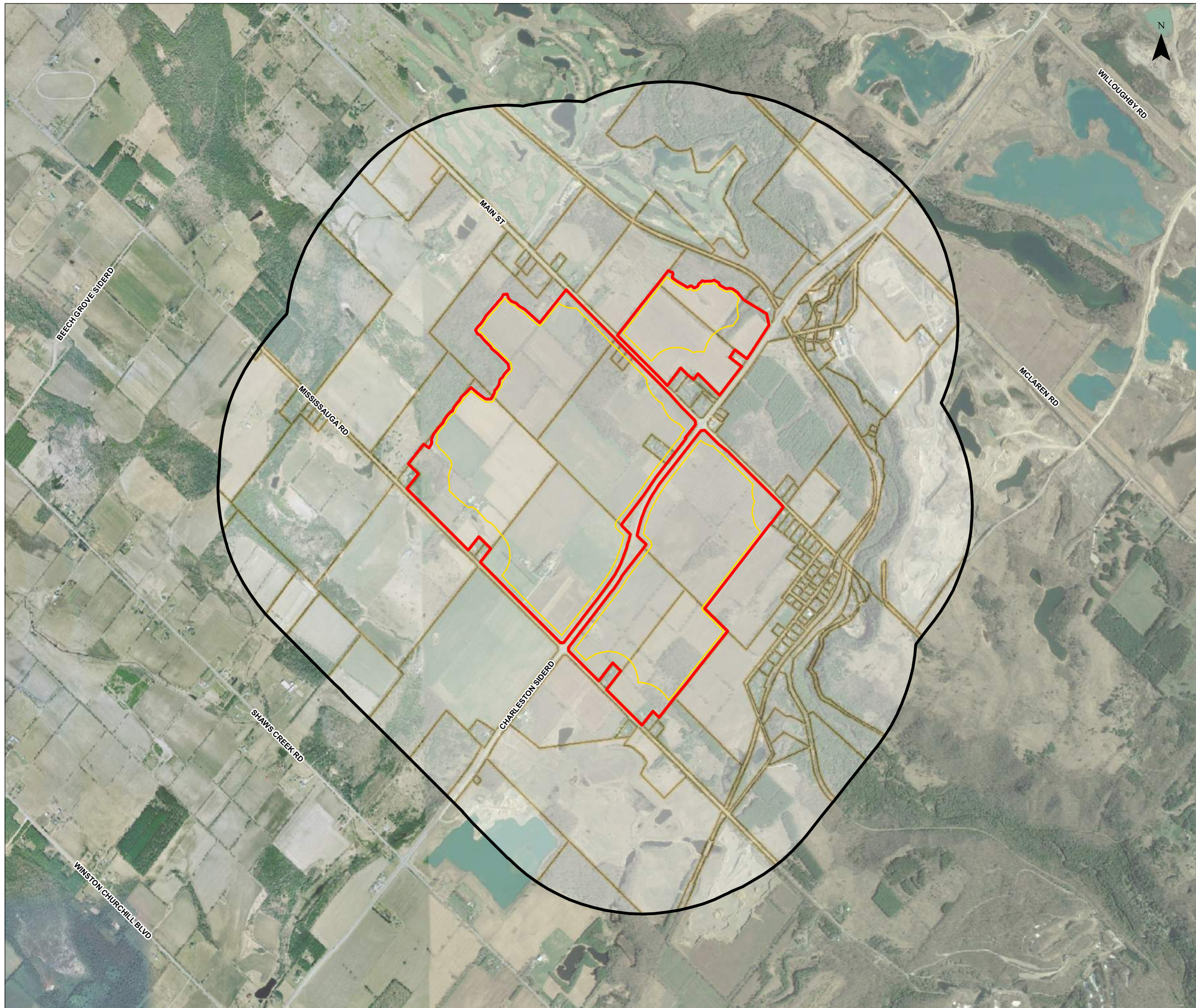
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- Legend**
- Primary Study Area
  - Secondary Study Area
  - Limit of Extraction
  - Fragmentation

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**Figure 5**  
Land Fragmentation

Agricultural Impact Assessment for  
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## 5.9 Economic and Community Benefits of Agriculture

Understanding the economic and community benefits associated with agricultural in the PSA and SSA are important in assessing the impacts associated with the proposed CBM Caledon Pit / Quarry. Peel Region and the Town of Caledon has a large agricultural economy, with cash crop operations, common field crop, fruit and vegetable production, dairying operations, cattle operations, equestrian operations, and some specialty crop operations. The area also employs local residents and actively contributes to the agri-food network. The PSA is located in close proximity to natural heritage features and a limited number of agricultural land uses compared to central areas of Caledon and Peel Region.

According to the 2016 Census of Agriculture data, the agriculture, forestry, fishing and hunting industry employs approximately 1,710 individuals within Peel Region and 600 individuals within the Town of Caledon. Agri-food employment in the crop and animal production category employs roughly 1,645 individuals within Peel Region and approximately 590 within the Town of Caledon.

In 2021, there were a total of 377 farms in Peel Region. Of the 377 farms 11 farms are worth under \$200,000, five farms are valued between \$200,000 and \$400,000, 40 farms are worth between \$500,000 and \$999,999, and 321 farms are worth over \$1,000,000.

Based on our land use survey, it is evident that the amount and distribution of agricultural and agriculture-related uses within the SSA does not reflect the abundance of active farming, crop production and agri-food network employment characteristic of the Region. Only four active livestock operations, two cash crop operations and two hobby farm operations were observed in the SSA. It is unlikely that the active livestock operations significantly contribute economically to the Region.

With the implementation of mitigation measures to minimize indirect impacts on surrounding farm operations, it is expected that the proposed CBM Caledon Pit / Quarry will have minimal negative effects on farm operations and other components of the agri-food network in the SSA.

## 5.10 Environmental Assets

There are natural heritage features located within the PSA and SSA. These natural features may provide important functions related to flood mitigation, carbon storage and opportunities for biodiversity. It is understood that the natural heritage features on adjacent lands will not be impacted by the proposed CBM Caledon Pit / Quarry. Additional information regarding environmental matters on site and adjacent to the PSA are addressed in other studies being prepared for this application. These include (but not limited to):

- ◆ Air Quality Impact Assessment - Golder Associates GlobalTraffic Impact Study – T.Y. Lin International;
- ◆ Noise (Acoustical) Impact Study – Golder Associates Ltd.;
- ◆ Water Resources Impact Assessment – Golder Associates Ltd.;
- ◆ Natural Environment Report – Golder Associates Ltd.; and
- ◆ Blasting (Vibration) Impact Assessment - Golder Associates Ltd.

## 5.11 Alternative Site Assessment

### 5.11.1 Provincial Policy – Extraction in Prime Agricultural Areas

Although the proposed site is located within the agricultural system and is part of a prime agricultural area, the lands are identified as “Bedrock Resource” and identified as “CHPMARA Aggregate Resource Lands” in the Town of Caledon Official Plan. The Region of Peel has included these lands within the “High Potential Mineral Aggregate Resource Areas” (HPMARA).

Whenever possible, provincial policy directs that aggregate operations restore lands in prime agricultural areas to an agricultural condition. However, this application is for a Class A Licence (Pit and Quarry Below Water) and it will not be feasible to rehabilitate the lands back to an agricultural condition. The PPS in Section 2.5.4 requires the applicant to consider alternative locations for proposed extraction based on soil resources.

### 5.11.2 Identification of Lower Capability Lands (Non-prime Agricultural Lands)

Policy directs applicants to consider lands on lower capability lands rather than on prime agricultural lands. As has already been discussed, the majority of the PSA already consists of lower capability lands (CLI Classes 4 & 5) which are common in the HPMAPA. To determine whether there are other locations upon which the proposed CBM Caledon Pit / Quarry can be situated in this area on lower capability lands, the AIA assessed the CLI Capability of all lands within the HPMARA shown in Appendix I.

Most of the soil polygons mapped in the HPMARA are complex soil units, meaning there are at least two soil series within a soil polygon, or a polygon may have a common soil series but two different slope classes. In the latter case, soil polygons have the same soil series but different limitations for agricultural production of common field crops and result in a soil polygon having two different CLI Classes. The Hoffman Productivity Indices (HPI) are used to assign a single value for each soil polygon. The value relates to the agricultural productivity of the soil map unit. The HPI value is determined by the relative percent of each soil capability class present in the soil map unit and provides an equivalent CLI capability class. The equivalent CLI capability class was determined for each of the soil map units for the HPMARA Site. A similar process was completed for the PSA. The HPI Method is described in more detail in Appendix J.

As shown in Table 4, the HPI for the larger HPMARA is higher than that of the PSA. The HPMARA lands have an HPI of 0.73 which is equivalent in productivity to CLI Class 2 lands. The PSA has an HPI of 0.63 which is the equivalent in productivity to CLI Class 3 lands. CLI Class 3 lands have the lowest priority for preservation among the prime agricultural lands.

<b>Table 4: Relative Agricultural Productivity for HPMARA Sites</b>				
<b>Site</b>	<b>Area (HA)</b>	<b>Percentage</b>	<b>HPI</b>	<b>Total Productivity Index Range</b>
HPMARA	1484.83	100.00%	0.73	CLI Class 2
PSA	262.44	100.00%	0.63	CLI Class 3

Based on this analysis, it is unlikely that other alternative sites exist within the HPMARA that will have a lower productivity and lower agricultural capability than the proposed location. The PSA is a reasonable choice of location for the proposed use.

## **6. ASSESSMENT OF IMPACTS TO AGRICULTURE**

The PPS requires that impacts from any new or expanding non-agricultural uses on surrounding agricultural operations and lands should be mitigated to the extent feasible. The AIA considers impacts to include the loss of prime agricultural land and agricultural investments and disruption to agricultural operations in the surrounding area as a result of encroachment of non-farm land uses.

These disruptions can result from an increase in nuisance complaints from non-farm land uses as well as an increase in non-farm traffic and trespass and vandalism. Some of the methods used to mitigate impacts is through ensuring that the movement of farm machinery through prime agricultural areas continues safely and unimpeded through proper design and implementation of a regional transportation plan which considers the needs of the agricultural community.

### **6.1 Direct Impacts**

#### **6.1.1 Prime Agricultural Land**

The licenced area is comprised primarily of non-prime agricultural lands (54.59%). However, the proposed CBM Caledon Pit / Quarry will, over the long-term, remove approximately 119.18 ha (45.41%) of prime agricultural land (CLI Class 2 lands) from the agricultural land base.

#### **6.1.2 Loss of Crop Land**

Of the 323 ha owned/controlled by CBM, the cultivated area was measured to be approximately 258 ha. This includes the areas of additional land owned by CBM outside of the proposed licence boundary. Some of these areas outside of the licenced boundary will eventually be converted for ecological enhancement areas. For example, the “CBM Additional Lands” in the southern portion of Subject Site will be converted to meadow and woodland. However, the agricultural capability of these lands will not change. They would still be available for future farming opportunities.

Extraction within the PSA will not likely have any direct impact on future farming opportunities on adjacent lands in the SSA.

#### **6.1.3 Agricultural Infrastructure**

There are two active agricultural operations located within the PSA; one livestock (#12) and one cash crop operation (#7). The infrastructure associated with these farms will be directly impacted by the proposed CBM Caledon Pit / Quarry and eventually retired.

The agricultural infrastructure associated with the farm operations in the SSA will not be directly impacted by the proposed CBM Caledon Pit / Quarry.

#### **6.1.4 Land Improvements**

According to OMAFRA’s Artificial Drainage Systems mapping there is no tile drainage within the PSA. No other agricultural land improvements were observed on site. Therefore, no agricultural land improvements will be lost due to the proposed resource extraction.



### **6.1.5 Changes to Drainage Features & Groundwater**

#### **Surficial Drainage Features**

Surficial drainage features (e.g., ponds) can provide sources of drinking water for livestock or for irrigation of crops. There are some small water features on and adjacent to the proposed CBM Caledon Pit / Quarry. Those located within the PSA will certainly be impacted as a result of excavation. However, it does not appear that these drainage features are being used as sources of drinking water for livestock.

The crops grown in the area are predominantly common field crops which in this area are typically not irrigated. No irrigation infrastructure was observed during the land use survey in the PSA. Therefore, it is unlikely that there will be any direct impact resulting from a loss of irrigation ponds within the PSA.

#### **Groundwater**

Farm operations often rely on well water as a source of drinking water for the farmstead (for both human and animal consumption) and water is needed as part of the day-to-day operation of the farm for a variety of uses. Any impacts to the groundwater table which will negatively impact the use of the well water are to be addressed in the Hydrogeological and Water Resources Impact Assessment and mitigation measures provided.

## **6.2 Indirect Impacts**

### **6.2.1 Disruption to Agricultural Operations**

Farm operations can be adversely impacted by new non-farm development on adjacent lands. The proposed CBM Caledon Pit / Quarry is not expected to have a significant impact on adjacent farm operations in terms of potential for creating disruptions to the farm operations. Although the occurrence of trespass and vandalism on adjacent farm operations can sometimes result from the introduction of new land uses to an area. The proposed use is not new to the area and agricultural operations will be familiar with the operations of a quarry. It is unlikely that there will be any disruption to farm operations in the SSA.

Access within the aggregate extraction area is restricted and it is expected to be highly monitored. The opportunities for the general public and employees to trespass on to adjacent farm lands is limited by internal access control and perimeter fencing as a requirement of the licence for extraction.

### **6.2.2 Changes to Drainage Features & Groundwater**

#### **Surficial Drainage Features**

Surface water features in the SSA that may be used as a source of drinking water for livestock or sources of irrigation water may be impacted if the groundwater table is lowered as a result of extraction.

#### **Groundwater**

Farm operations relying on well water in the SSA may be impacted if there is a drawdown of the water table. The Water Resources Report submitted as part of the application includes a well supply impact assessment.

### **6.2.3 Alterations to Microclimatic Conditions**

Landforms and elevation can influence microclimatic conditions. Some specialty crops, such as tender fruit and grape crops, rely on unique microclimatic conditions to provide suitable growing conditions and yields. The crops commonly grown in the study areas do not rely on unique microclimatic conditions. Therefore, the proposed changes to the landform and elevations post extraction, will not result in significant impacts on common field crop production in the SSA.

### **6.2.4 Transportation Impacts**

Truck traffic volumes are expected to increase as a result of the CBM Caledon Pit / Quarry expansion. The Haul Route and Transportation Impact Study completed by T.Y.Lin concluded that the proposed truck distribution includes 95% of truck traffic heading east on Charleston Sideroad towards Hurontario Street and the remaining 5% truck traffic heading west on Charleston Sideroad. The haul route assessment considered several site access considerations including existing haul route restrictions, impact to existing residents, access spacing requirements, physical constraints, and safety considerations. It was determined that the preferred location of the proposed site access is along Charleston Sideroad between Mississauga Road and Main Street. The Haul Route and Transportation Impact Study concluded that the adjacent road network can accommodate the proposed CBM Caledon Pit / Quarry development.

### **6.2.5 Noise, Vibration, and Dust**

The proposed CBM Caledon Pit / Quarry has the potential to increase the level of noise, vibration, dust and truck traffic within the PSA and, to a lesser extent, the SSA. These potential impacts have been addressed in detail in separate reports which will be included as part of this application.

Noise, vibration, and dust will be minimized and kept within provincial standards. As a result, impacts related to noise, vibration, and dust will not likely have a significant impact on agricultural operations or other agri-food components.

Sudden noise and vibration associated with blasting has the potential to startle or upset domestic livestock. The closest livestock operation is approximately 300.0 metres from the proposed licenced area. However, livestock become acclimatized to blasting and it is unlikely that noise associated with the CBM Caledon Pit / Quarry will adversely impact livestock.

## **6.3 Economic and Community Impacts**

### **6.3.1 Loss of Available Farmland**

Over the life of the proposed CBM Caledon Pit / Quarry there will be a permanent loss of agricultural land and some limited agricultural infrastructure. The lands and infrastructure not immediately required for resource extraction, can continue to be used for agricultural purposes. This will soften impact of the proposed extraction.

The adjacent agricultural lands will not be directly affected by the proposed CBM Caledon Pit / Quarry. The proposed aggregate extraction operation will have a negligible effect on the larger farming community in the Town of Caledon and broader Peel Region.

### **6.3.2 Removal of Investments in the Agri-food Sector**

There are no agri-food operations located within the SSA and therefore no investments will be removed or otherwise impacted. However, as stated in subsection 5.6.6 GoodLot Farmstead Brewing Co. is located just outside of the SSA along Shaws Creek Road. The brewery is more than a kilometer away from the proposed CBM Caledon Pit / Quarry, therefore, noise, dust and vibration not likely have any impact their operation.

### **6.3.3 Loss of Community Benefits**

Community benefits include things such as the community use of infrastructure or land improvements which support the local agri-food businesses, opportunities for agri-tourism, agriculture-related retail business and education opportunities. The loss of such benefits can have a negative impact on the community and on the economic viability of the agri-food industry in the area.

With the exception of the farm operations identified, no agri-food related businesses or infrastructure were identified in the PSA or SSA. The proposed CBM Caledon Pit / Quarry is unlikely to have any impact on agri-food services that provide community benefits.

## 7. Mitigation Measures

Mitigation measures recommended to avoid, reduce, or eliminate the impacts identified in the preceding sections are discussed in Table 5 below.

<b>Table 5: Summary of Impacts</b>			
<b>Potential Impact</b>	<b>Potential Degree of Impact</b>	<b>Recommended Mitigation Measure</b>	<b>Anticipated Net Impact</b>
<b>Direct Impacts</b>			
Loss of prime agricultural land	High	<ul style="list-style-type: none"> <li>Impacts on the Agricultural System are unavoidable as it will not be feasible to restore the lands to an agricultural condition.</li> </ul>	Eventual loss of 119.18 ha (45.41%) of CLI Class 2 lands.
Loss of agricultural infrastructure	Moderate	<ul style="list-style-type: none"> <li>For active farm operations, the existing agricultural infrastructure should remain in place until their removal prior to extraction</li> </ul>	Eventual retirement of facilities
Loss of agricultural land improvements	None	<ul style="list-style-type: none"> <li>None</li> </ul>	No Impact
Loss of cropland	High	<ul style="list-style-type: none"> <li>Continue to cultivate the lands until they are required for quarry extraction. The lands not directly impacted by extraction activities to be made available for future agricultural use as there is no impact to their CLI capabilities.</li> </ul>	Eventual loss or conversion of approximately 258 ha of crop land.
Loss of Surface Waters as Source of Drinking Water	Low	<ul style="list-style-type: none"> <li>None required.</li> </ul>	No impact
Disruption to Farm Wells	Low	<ul style="list-style-type: none"> <li>Ensure that farm operations within the PSA have sufficient well water needed for their operation until retirement.</li> </ul>	Minor, short-term impact.

<b>Table 5: Summary of Impacts (cont.)</b>			
<b>Potential Impact</b>	<b>Potential Degree of Impact</b>	<b>Recommended Mitigation Measure</b>	<b>Anticipated Net Impact</b>
<b>Indirect Impacts</b>			
Non-farm traffic	Low	<ul style="list-style-type: none"> <li>• CBM will determine haul routes based on the associated Traffic Impact Study. Mitigation measures will be provided through the traffic assessment and study.</li> <li>• Proposed haul routes should consider utilizing regional roads which are intended for the movement of goods including large trucks and are maintained by the Region. Routes chosen should be intended for use by heavy traffic including trucks. It is anticipated that when the haul routes are determined they will not have a significant impact on the movement of agricultural equipment or products.</li> </ul>	Adverse impacts unlikely
Disruption to Farm Operations	Low	<ul style="list-style-type: none"> <li>• Aggregate operations are considered to be “non-critical” edges and can be moderately compatible with agricultural uses adjacent if properly mitigated.</li> <li>• In this case, appropriate buffer techniques are recommended, such as vegetated berms, which can offer both visual and physical buffers, dust suppression techniques, and noise management according to appropriate regulations.</li> </ul>	Adverse impacts unlikely
Wells, Irrigation, water bodies	Low	<ul style="list-style-type: none"> <li>• Undertake hydrogeological study to ensure that farm wells are not negatively impacted.</li> <li>• Implement mitigation measures to restore impacted wells</li> <li>• Groundwater monitoring program will be implemented for the proposed CBM Caledon Pit / Quarry in order to identify and monitor any changes related to groundwater resources surrounding the quarry operation.</li> <li>• If mitigation is required, CBM should ensure that adequate water supply is available for adjacent farm operations.</li> </ul>	No Impact

**Table 5: Summary of Impacts (cont.)**

Potential Impact	Potential Degree of Impact	Recommended Mitigation Measure	Anticipated Net Impact
<b>Indirect Impacts</b>			
Noise, Dust and Vibration	Low	<ul style="list-style-type: none"> <li>• Ensure that Ministry of the Environment and Climate Change (MOECC) guidelines and conditions of licence are adhered to.</li> <li>• Adjust operational procedures to accommodate agriculture in the area.</li> <li>• Operations in close proximity will be consulted regularly, with open communication to address complaints caused by the quarry operation and ensure they are investigated.</li> <li>• Dust suppression will be maintained at levels at or better than regulatory requirements as set out by the Air Quality Assessment.</li> </ul>	No Impact

## **8. NET IMPACTS**

The proposed CBM Caledon Pit / Quarry is applying for a licence to permit below water extraction. It will not be feasible to rehabilitate the lands back to an agricultural after use. Therefore, over time there will be a permanent loss of CLI Class 2, 4 and 5 lands (approximately 262 ha) within the extraction area.

No reasonable alternatives were identified in the surrounding prime agricultural area.

Most of the potential indirect impacts identified can be mitigated to the extent that there will be no significant impact assuming the recommended mitigation measures are put in place.

## 9. STUDY RECOMMENDATIONS AND CONCLUSIONS

### 9.1 Agriculture Technical Recommendations

The Agricultural Impact Assessment provides the basis for the following technical recommendations to be included in the Aggregate Resources Act Site Plans for the proposed Caledon Pit / Quarry:

- ◆ Lands that are currently in agricultural production and not required for immediate extraction and site preparation shall be kept in agricultural production for as long as possible.
- ◆ The Licensee shall document any complaints involving the local agricultural community and as part of the annual Compliance Assessment Report shall provide information to MNRF on the nature of the complaint and actions taken by the licensee to address the issue.

### 9.2 Conclusions

The purpose of the AIA is to characterize the agricultural land base and agricultural operations within the PSA and surrounding SSA and to identify potential impacts of the proposed CBM Caledon Pit/ Quarry. In cases where impacts cannot be avoided, the AIA recommends mitigation measures to minimize potential impacts to the extent feasible. In summary the AIA concluded:

- ◆ The Caledon Pit / Quarry proposes to extract substantial volumes of high quality aggregate material both above and below the water table.
- ◆ The portion of the proposed Caledon Pit / Quarry's licenced area west of Main St. is located in a designated prime agricultural area. The lands to the east of Main St. are designated rural land. The PSA is 262 ha in size of which approximately 119.18 ha is comprised of prime agricultural land. Mineral aggregate operations are permitted within both prime agricultural areas and rural areas. Agricultural rehabilitation is not required on these lands for several reasons:
  - a) the lands are not within a specialty crop area;
  - b) there is a substantial quantity of high quality aggregate located below the water table and the depth of planned extraction makes restoration of pre-extraction agricultural capability unfeasible;
  - c) other alternatives have been considered by the applicant and found to be unsuitable; and
  - d) there are no remaining areas for agricultural rehabilitation to be maximized.
- ◆ With the implementation of the recommended mitigation measures, the proposed Caledon Pit / Quarry operation will have minimal effect on surrounding agricultural operations. The proposed aggregate operation will utilize existing haul routes to minimize potential traffic related impacts. It is expected that noise, vibration, and dust will be kept at provincial standard. It is also expected that there will be no impacts to surrounding wells, including farm wells. Groundwater monitoring will occur and if a farm well was affected, there is a mitigation measures in place to quickly restore an adequate water supply to farming operation(s).



Licensing of the proposed Caledon Quarry will be consistent with the agricultural-related policies provided in provincial, regional and local planning documents regarding mineral extraction in prime agricultural areas.

If there are any questions regarding the content of this AIA, please do not hesitate to contact the undersigned at 905-935-2161 or [sean@colvilleconsultinginc.com](mailto:sean@colvilleconsultinginc.com) or [ellise@colvilleconsultinginc.ca](mailto:ellise@colvilleconsultinginc.ca).

Sincerely,

Sean Colville, B.Sc., P.Ag.  
Colville Consulting Inc.

Ellise Baeza, EPt, EMA.  
Colville Consulting Inc.

## 10. REFERENCES

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**APPENDIX A**  
**AIA TERMS OF REFERENCE**

**TECHNIAL MEMORANDUM**

**Date:** August 18, 2022  
**Client Project No.:** 19129150  
**To:** David Hanratty, P.Geo., CBM Aggregates  
**CC:** Jennifer Deleemans, Mike Lebreton  
**From:** Sean Colville  
**Email:** Sean@colvilleconsultinginc.ca  
**Re:** Proposed CBM Caledon Quarry Terms of Reference – Agricultural Impact Assessment

Colville Consulting Inc. (Colville) has been retained by Golder Associates Ltd., on behalf of CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) to complete an Agricultural Impact Assessment (AIA). The Greenbelt Plan (2017) defines an AIA as: A study that evaluates the potential impacts of non-agricultural development on agricultural operations and the Agricultural System and recommends ways to avoid or, if avoidance is not possible, minimize and mitigate adverse impacts.

The AIA is just one of several technical studies to accompany an application to the Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNR) for a new Class A Quarry Below Water licence under the *Aggregate Resources Act* (ARA). This AIA is also being undertaken as part of Planning Act approval and Town of Caledon Official Plan and Zoning By-law amendments. The properties to be licensed are located on Charleston Sideroad and Mississauga Road, Town of Caledon, Region of Peel, Ontario (the site). The site, henceforth referred to as the Subject Lands is approximately 262.4 ha in size (Figure 1) and is the preliminary area of investigation subject to an ARA Licence application. The total area of land in CBM's interest and subject to various applications is approximately 324 ha in size.

This Terms of Reference (TOR) includes a summary of the assessment and deliverables associated with the Agricultural Impact Assessment. Where relevant, the AIA shall be shared with other technical experts completing studies for the application to avoid internal inconsistencies.

**AGGREGATE EXTRACTION POLICIES**

Land Use Policy and development in the province of Ontario is directed by the Provincial Policy Statement (PPS), which was issued under the authority of Section 3 of the Planning Act and which came into effect on May 1, 2020. Section 3 of the Planning Act states that decisions affecting planning matters “shall be consistent with” policy statements issued under the Act.

Section 3 of the *Planning Act* states that decisions affecting planning matters “shall be consistent with” policy statements issued under the Act. Section 2.3 of the PPS deals specifically with agricultural policy. Section 2.3.1 states that “Prime agricultural areas shall be protected for long-term use for agriculture”. The PPS defines prime agricultural areas as, “areas where prime agricultural lands predominate. Specialty crop areas shall be given the highest priority for protection, followed by Canada Land Inventory Class 1, 2, and 3 lands, and any associated Class 4 through 7 lands within the prime agricultural area, in this order of priority.”



**Figure 1**  
**Location of Subject Lands**

Agricultural Impact Assessment for  
CBM Caledon Quarry

Prepared for:  **CBM Aggregates**

Prepared by: 

DATE: December 2021  
Revised: August 2022

FILE: C19065

The Province of Ontario recognizes the importance of the mineral aggregate industry and the need to balance these resources with agricultural resources. The PPS in Section 2.5.4.1 States that:

“In prime agricultural areas, on prime agricultural land, extraction of mineral aggregate resources is permitted as an interim use provided that the site will be rehabilitated back to an agricultural condition.

Complete rehabilitation to an agricultural condition is not required if:

- a) outside of a specialty crop area, there is a substantial quantity of mineral aggregate resources below the water table warranting extraction, or the depth of planned extraction in a quarry makes restoration of pre-extraction agricultural capability unfeasible;
- b) in a specialty crop area, there is a substantial quantity of high-quality mineral aggregate resources below the water table warranting extraction, and the depth of planned extraction makes restoration of pre-extraction agricultural capability unfeasible;
- c) other alternatives have been considered by the applicant and found unsuitable. The consideration of other alternatives shall include resources in areas of Canada Land Inventory Class 4 through 7 lands, resources on lands identified as designated growth areas, and resources on prime agricultural lands where rehabilitation is feasible. Where no other alternatives are found, prime agricultural lands shall be protected in this order of priority: specialty crop areas, Canada Land Inventory Class 1, 2 and 3 lands; and
- d) agricultural rehabilitation in remaining areas is maximized.”

The licence application being prepared is for extraction below the water table and therefore, it is understood that an agricultural rehabilitation plan for the Subject Lands will not be required. It is our understanding that some areas within the Subject Lands are excluded from the extraction area, and the quarry may be allowed to flood after extraction activities are complete. This would eventually result in the formation of a lake. Rehabilitation measures to restore the lands to an agricultural condition would not be feasible under this scenario.

To assess the level of impact on the agricultural land base, the regional soils mapping and the provincial soil resource database will be used to identify soil series type and interpret the agricultural capability of the Subject Lands and surrounding area. Site specific soil sampling to obtain baseline conditions (soil morphological and nutrient information) as recommended in the draft Agricultural Impact Assessment Guidance Document is not required for Class A Quarry Below Water licence applications as the lands will not be rehabilitated to an agricultural condition.

The agricultural impact assessment will address Section 2.5.4.1 c) to demonstrate that other alternatives have been considered and a preferred location identified. In addition, the PPS in Section 2.3.6.2 states that “Impacts from any new or expanding non-agricultural uses on surrounding agricultural operations and lands are to be mitigated to the extent feasible.”

### Greenbelt Plan (2017)

Section 4.3.2 of the Greenbelt Plan identifies policies related to Non-Renewable Resources. The Subject Lands are located within the Protected Countryside and are therefore required to address policy 4.3.2.4 which states:

“In prime agricultural areas, applications for new mineral aggregate operations shall be supported by an agricultural impact assessment and, where possible, shall seek to maintain or improve connectivity of the Agricultural System.”

The agricultural impact assessment will address policy 4.3.2.4 to demonstrate that impacts to the connectivity of the Agricultural System are minimized to the extent possible.

### Region of Peel and Town of Caledon Official Plans

Although the provincial policies and plans are expressions of the provincial interest in aggregate resource areas and operations, it is important that the Studies associated with the ARA license application balance the Caledon and Peel interests and requirements as expressed in the Official Plans that are to be in effect at the time when the Planning Act and the ARA applications are formally submitted by CBM. This includes the Town of Caledon Official Plan policies regarding the implementation of Rehabilitation Master Plans.

This study will provide an assessment of the application taking into consideration the applicable in-effect policies contained in the relevant Provincial Plans, Region of Peel Official Plan and Town of Caledon Official Plan.

### Agricultural Impact Assessment Guidelines

The Draft Agricultural Impact Assessment (AIA) Guidance Document (March 2018) prepared by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) provides guidance on how to prepare an agricultural impact assessment and guidelines for progressive agricultural rehabilitation in prime agricultural areas. Since the proposed application is for below water table extraction agricultural rehabilitation will not be feasible. OMAFRA was contacted to confirm that the collection of baseline soil conditions and the preparation of a rehabilitation plan are not required for below water extraction applications and do not need to be considered as part of the AIA.

To be consistent with other components of the Guidance Document, the AIA will include:

- ♦ a statement of study purpose and objectives;
- ♦ a description of the proposed aggregate extraction operation;
- ♦ a description of and rationale for the study area being evaluated;
- ♦ outlining the regulatory framework (provincial and municipal) and explain why the AIA is required;
- ♦ identifying the applicable land use designations within the study area and Subject Lands;
- ♦ the methodology used including a description of the background information collected and review and the field inventories completed;
- ♦ A description of agricultural resources, including resources such as the site’s physiography and the soil and CLI capability classes; and

- ♦ Identifying and describing the mix of land uses and the types of farm operations and agricultural practices, informed by local farm landowners where possible.

Once this information is collected the lands will be evaluated in terms of their potential agricultural productivity and the agricultural priority. Potential impacts of the proposed quarry will be identified and where impacts cannot be avoided, mitigation measures will be developed to minimize negative effects to the extent possible. Where avoidance is not possible or practical, measures that minimize the extent and severity of the impacts will be recommended and net impacts will then be addressed.

### **STUDY AREA**

To be consistent with the draft Agricultural Impact Assessment Guidance Document, the AIA will identify a Primary and Secondary Study Area. The Primary Study area will be the Subject Lands (licenced limits). The Secondary Study area will include all lands within a 1 km radius from the Subject Lands. The secondary study area may extend beyond 1 km radius and include the proposed haul routes. The inclusion of haul routes will be determined as the study proceeds.

### **METHODS AND APPROACH**

To address the requirements of the Draft AIA Guidance Document, a summary of the scope of work to be undertaken has been completed is provided below.

#### **Background Information**

One of the first tasks undertaken will be to collect and review all relevant information required to meet the Study objectives. The background review will include at a minimum:

- ♦ a review of the regional soils information for the Subject Lands (provincial digital soil resource database);
- ♦ the A Place to Grow: Growth Plan for the Greater Golden Horseshoe, the Implementation Procedures for the Agricultural System in Ontario's Greater Golden Horseshoe and the draft Agricultural Impact Assessment Guidance Document;
- ♦ a review of the Regional Municipality of Peel and the Town of Caledon's Official Plan policies, land use schedules and the Town's policies regarding the implementation of Rehabilitation Master Plans;
- ♦ a review of the parcel fabric in the Study Area to assess the level of fragmentation of agricultural lands;
- ♦ a review OMAFRA's Agricultural Information Atlas, and Provincial Agricultural Systems Portal to obtain agricultural resources information;
- ♦ a review aerial photography to review the type and extent of agricultural operations on Site and in the surrounding area and to identify potential sources of conflict; and
- ♦ a review of all public consultations undertaken by the proponent.

#### **Field Work**

The collected field data will include:

- ♦ A reconnaissance level land use survey to:
  - Verify the background data collected pertaining to agricultural land uses;
  - Identify the mix of land uses in the study areas;



- Identify the type and status (active vs. non-active) of farm operations potentially impacted by proposed aggregate extraction operations;
- Identify farm buildings (including empty livestock and/or retired farm infrastructure) and other key permanent facilities and other components of the agri-food network;
- Neighbouring farm communities; and
- Other aggregate operations.

### **Impact Analysis**

To be consistent with the AIA guidelines (draft), potential negative effects of the proposed aggregate extraction operation will be evaluated through an assessment criteria such as:

- ◆ Interim or permanent loss of agricultural land, including the quality and quantity of farmland lost;
- ◆ Fragmentation of agricultural lands and operations;
- ◆ The type of agricultural, agriculture-related or on-farm diversified uses being lost and the significance this has for supporting other agricultural production in the surrounding area;
- ◆ The loss of existing and future farming opportunities;
- ◆ The loss of infrastructure, services or assets important to the surrounding agricultural community and agri-food sector;
- ◆ The loss of agricultural investments in structures and land improvements (e.g., artificial drainage);
- ◆ The disruption or loss of function to artificial drainage and irrigation installations;
- ◆ Changes to the soil drainage regime;
- ◆ Changes to surface drainage features which could have an effect on adjacent lands;
- ◆ Changes to landforms, elevations and slope that could alter microclimatic conditions (e.g., modification to slopes that may reduce or improve cold air drainage opportunities and changes to elevation may have an impact on diurnal temperatures);
- ◆ Changes to hydrogeological conditions that could affect neighboring municipal or private wells, sources of irrigation water and sources of water for livestock;
- ◆ Disruption to surrounding farm operations, activities and management (e.g., temporary loss of productive agricultural lands, cultivation, seeding, spraying, harvesting, field access, use of road network);
- ◆ Changes to the connectivity of the Agricultural System;
- ◆ The potential effects of noise, vibration, dust, and traffic on agricultural operations and activities;
- ◆ Potential compatibility concerns such as normal farm practices facing challenges with e.g., nuisance complaints, vandalism and trespassing that may occur with the new development being established;
- ◆ The inability or challenges to move farm vehicles and equipment along roads due to increased traffic caused by haul routes, changes in road design;

- ♦ Review and consideration of findings in other technical studies prepared for the application to understand potential impacts and develop mitigation measures and recommendations; and
- ♦ Other potential impacts identified through public consultation process and our investigations.

### **Mitigation Measures and Net Impacts**

Whenever possible, recommendations to avoid adverse impacts will be provided. Where avoidance is not possible or practical, mitigation measures will be prepared that will minimize or mitigate the potential impacts to the extent feasible. The net impacts of the proposed aggregate operation will then be assessed based on the assumption that the proposed mitigation measures will be put in place.

### **DELIVERABLES**

The report will include data and analysis of study findings and provide recommendations and a study conclusion to minimize potential impacts. This report will contain appendices with the Curriculum Vitae of the qualified study team, as well as all relevant resources and data. The report will be provided in digital format (an Adobe Acrobat PDF file).

### **CLOSURE**

We trust that this technical memorandum meets your current needs. Please contact Colville or CBM with any questions or comments.

Yours sincerely,



Sean Colville B.Sc., P.Ag.

Colville Consulting Inc.

**APPENDIX B**  
**CURRICULUM VITAE**

**SEAN M. COLVILLE, B.Sc., P.Ag.**

Colville Consulting Inc.  
404 Queenston St., St. Catharines, ON L2P 2Y2  
Tel: 905 935-2161 Email: [sean@colvilleconsultinginc.com](mailto:sean@colvilleconsultinginc.com)

**EDUCATION**

B.Sc. Geology, Acadia University, 1986  
Soil Science, University of Guelph, 1984

**PROFESSIONAL AFFILIATIONS**

Ontario Institute of Agrology  
Agricultural Institute of Canada

**POSITIONS HELD**

2003 – Present	Colville Consulting Inc., St. Catharines, Ontario. President
2001 – 2003:	ESG International Inc., St. Catharines, Senior Project Manager/Office Manager
1998 – 2001:	ESG International Inc., Guelph, Senior Project Manager
1988 – 1998:	ESG International Inc., Guelph, Project Manager
1984 – 1988:	MacLaren Plansearch Ltd., Halifax, Nova Scotia, Soil Scientist
05/1982 - 09/1983:	Nova Scotia Department of Agriculture and Marketing, Nova Scotia, Assistant Soil Scientist

**EXPERIENCE**

Mr. Sean M. Colville, B.Sc., P.Ag., President of Colville Consulting Inc., has 30 years of agricultural consulting experience primarily in agricultural resource evaluation, land use planning, impact assessment and soil and climatic rehabilitation/restoration. Sean is a Professional Agrologist, a member of the Ontario Institute of Agrology and has been recognized by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) as an expert in the identification of Prime Agricultural Areas, Minimum Distance Separation and as a consulting pedologist (Soil Scientist) capable of preparing soil capability assessments based on the Canada Land Inventory (CLI) Soil Capability Classification for Agriculture (ARDA, 1965).

**Agricultural Rehabilitation and Monitoring**

Sean has prepared a number of rehabilitation plans for the aggregate industry and for highway and pipeline construction projects. Sean also has experience assessing the economic impacts for compensation related to the temporary or permanent loss of use of agricultural land often associated with the construction of linear facilities. Specific examples agricultural rehabilitation and monitoring studies include:

- ♦ Development and implementation of a soil reclamation plan for TransCanada Pipelines. This involved an investigation as to the extent of contamination and debris along a section of the pipeline easement located in a Specialty Crop Area. The study included an analysis of the soil quality, the level of soil degradation and the development of mitigation measures to restore the agricultural capability/suitability of the site for specialty crop production (grape & tree fruits);
- ♦ Development of progressive agricultural rehabilitation plan for Vineland Quarry and Crushed Stone Limited's quarry expansion project in Vineland, Ontario. The rehabilitation plan included the restoration of a significant portion of the sites climate to a condition suitable for the production of grape and tender fruit trees;
- ♦ Prepared progressive agricultural rehabilitation plans for the expansion of the Fonthill pit located on the Fonthill Kame for TCG, Blue Circle and Lafarge. This area has special soil and microclimatic

characteristics that make it suitable for the production of specialty crops. The rehabilitation plans considered both the soils and microclimatic conditions in the design in order to restore the site following extraction to conditions suitable for the production of specialty crops;

- ◆ Soil and crop monitoring, and post construction monitoring for TransCanada Pipeline, Union Gas, and Enbridge pipeline construction projects. Projects often included the development of restoration recommendations to improve soil conditions and crop yields following post-construction monitoring; and
- ◆ Development of a progressive agricultural rehabilitation plan for Walker Brothers Quarries Ltd. quarry expansion project in Niagara Falls, Ontario. Also prepared and implemented the vegetation screening and naturalization concepts for which annual monitoring reports are prepared for review by the City of Niagara Falls and the Ministry of Natural Resources.

### **Agricultural Impact Assessment and Alternative Site Studies**

Sean specializes in agricultural impact assessment and alternative site studies for development proposed in rural areas. His experience includes over 100 agricultural impact assessments completed for settlement area expansion proposals and a wide variety of development projects including linear facilities (Class EAs), aggregate operations, and residential, commercial, recreational, industrial and institutional developments. The majority of these projects required the interpretation/assessment of agricultural land use policies, an inventory and assessment of the agricultural resources, land use, land tenure, conflict potential including the determination of minimum distance separation requirements; the identification of prime agricultural lands and areas; and a determination of the agricultural priority. Some specific examples of agricultural impact assessments completed for the aggregate industry include:

- ◆ Agricultural Impact Assessment for TCG - Fonthill Pit, Regional Municipality of Niagara (1988-89)
- ◆ Agricultural Impact Assessment of Blue Circle's Fonthill Pit, Regional Municipality of Niagara (1998-99)
- ◆ Agricultural Impact Assessment of Lafarge's Fonthill Pit, Regional Municipality of Niagara (2006 – 2013)
- ◆ Agricultural Impact Assessment of Lafarge's Oster Pit, County of Simcoe (2006 – 2015)
- ◆ Agricultural Impact Assessment for Expansion of Vineland Quarry and Crushed Stone – Town of Lincoln, Regional Municipality of Niagara (1998)
- ◆ Agricultural Impact Assessment for Walker Brothers Quarry Expansion – Niagara Falls, Regional Municipality of Niagara (1988-89)

Other examples of agricultural impact assessments and alternative site studies for other development include:

- ◆ Agricultural Impact Assessment for Schuyler Farms Limited, County of Norfolk (2015) \*
- ◆ Agricultural Impact Assessment & Comparative Analysis of Alternative Sites for Employment Land Options - Northumberland County (2015)
- ◆ Agricultural Impact Assessment and Alternative Site Assessment for North West Quadrant, Niagara Falls, Regional Municipality of Niagara (2014)\*
- ◆ Agricultural Impact Assessment for Smith Farm - Airport Employment Growth District, City of Hamilton (2014-15)
- ◆ Agricultural Alternate Site Study in Cavan-Monaghan Township for Brookfield Residential (2014)
- ◆ Agricultural Impact Assessment and Alternative Site Analysis for Angus Manor, Township of Essa, Simcoe County (2014)
- ◆ King Township Official Plan: Review and Update of Agricultural Policies, King Township (2014)
- ◆ Agricultural Impact Assessment for Vision Georgetown, Town of Halton Hills (2013-14)
- ◆ Agricultural Impact Assessment for Bolton Residential Expansion Study, Town of Caledon (2013-14)
- ◆ Agricultural Impact Assessment for Barnsdale Road Landowners Group, Nepean, City of Ottawa (2013-15)

- ◆ Agricultural Land Assessments for Richcraft Homes, Orleans and Riverside South, City of Ottawa (2012)
- ◆ Agricultural Impact Assessment for Canadian Motor Speedway racetrack in Fort Erie (2007-2015)\*
- ◆ Agricultural Impact Assessment for Walton Development - multiple sites in City of Niagara Falls (2011)
- ◆ Agricultural Impact Assessment for multiple sites in City of Ottawa for Walton Development (2011)
- ◆ Agricultural Impact Assessment of the Alloa Reservoir, Pumping Station and Feedermain, Class EA - Regional Municipality of Peel (2008)
- ◆ Agricultural Impact Assessment of the Zone 6 Reservoir and Feedermain, Class EA - Regional Municipality of Peel (2009)
- ◆ Agricultural Impact Assessment of the North Bolton Elevated Tank and Feedermain, Class EA - Regional Municipality of Peel (2009)
- ◆ Urban Boundary Expansion – Mayfield West Phase II Secondary Plan Agricultural Impact Assessment – Town of Caledon (2008)
- ◆ Urban Boundary Expansion – South Albion/Bolton Community Plan Agricultural Impact Assessment – Town of Caledon(2008)
- ◆ Urban Boundary Expansion - Agricultural Screening Study for the Township of West Lincoln’s Growth Management Study, Regional Municipality of Niagara (2007)
- ◆ Urban Boundary Expansion - Agricultural Impact Assessment and Alternate Site Study for West Kanata/Stittsville, City of Ottawa (2004, 2011)
- ◆ Urban Boundary Expansion - Agricultural Studies for Niagara Gateway Estates, Town of Grimsby, Regional Municipality of Niagara (2003)
- ◆ Urban Boundary Expansion - Agricultural Impact Assessment and Alternative Site Study for Regional Official Plan Amendment #9 Secondary Plan – City of Hamilton (2003)
- ◆ Niagara Region Mid-Term Waste Disposal Alternatives Study (2003)

### **Land Use Planning Studies**

The majority of the projects Sean has been involved requires an understanding of land use planning and policy requirements for development involving agriculture. In addition to the agricultural impact assessments listed above, other examples of the land use planning studies in which Sean has participated include:

- ◆ The Town of Lincoln Official Plan Update - Sean conducted a review of the agricultural resources, agricultural land use designations and the Town’s main agricultural sectors. The study also included a review of Provincial, Regional and Municipal agricultural policies and land severance policies; a discussion of agricultural trends and issues affecting agriculture; and the identification of constraints and opportunities for agriculture in the Town. Policy recommendations were put forward in a background report, which was then presented to committee and Town Council prior to presentation to the public.
- ◆ The Northwest Brampton Shale Resources Study – The Northwest corner of the City of Brampton is the only remaining agricultural area in the City. This area is under intense pressure for development, however, it is a prime agricultural area characterized by high capability soils and high levels of investment in agricultural infrastructure. This area is also identified containing a provincially significant shale resource. One of the study tasks required the evaluation of the agricultural resources and investments and assessment of the long term viability of this agricultural area given competing land uses. This was done by a combination of background information review of the soil resources and field surveys of land use and investment. The parcel fabric and ownership pattern was also considered in the assessment.
- ◆ Grey County Aggregate Resources Inventory Master Plan sought to identify and evaluate, protect and prescribe management policies for this provincially significant resource. As part of the process used to identify the aggregate resource areas, a number of constraints were identified that had the potential to

limit aggregate extraction. One of the potential constraints for aggregate development in the County is agriculture, one of the largest industries in the County. The study required an assessment of the County's agricultural resources and significant agricultural areas; a review the agricultural policies and the requirements of the aggregate industry when operating in agriculturally designated areas; and the preparation of generalized rehabilitation guidelines.

### **Soil Survey and Resource Evaluation**

Sean's expertise in soil science includes soil mapping techniques using Provincial and Federal soil survey methods, the assessment of CLI agricultural capability/suitability of soil and the interpretation of aerial photography for soil map production. Sean has several years of experience interpreting glacial landforms and processes; soil agricultural capability for the production of common field crops using the Canada Land Inventory system of soil classification; soil suitability for production of specialty crops using the system developed by the Ontario Ministry of Agriculture and Food; and Sean has worked with and applied the Land Suitability Rating System for Agricultural Crops developed by Agriculture and Agri-food Canada.

Sean has lead and participated in a number of large soil survey programs in Ontario, Nova Scotia and New Brunswick. Sean's experience includes:

- ◆ conducting soil surveys for paired watershed studies assessing the benefits and effectiveness of no-till cultivation compared to traditional methods in Oxford County, Ontario
- ◆ conducting soil surveys along linear facilities to determine depth of topsoil and subsoil, assess soil capability along the route and identify areas that pose limitations to construction the preparation of several soil maps, CLI maps and reports for solar farm applications to address the Ontario Power Authority's requirements for ground-mounted solar project on agricultural lands
- ◆ conducting county level soil survey reports that included the delineation, evaluation and mapping of soils series and the assessment of the soil capability for selected areas in Cumberland County, Colchester County, Hants County and Kings County, Nova Scotia
- ◆ conducting county level soil survey reports that included the delineation, evaluation and mapping of soils series and the assessment of the soil capability for selected areas in Westmoreland County, New Brunswick
- ◆ conducting over 100 soil surveys of various size and scale to assess soil capability for development proposals throughout southern and northern Ontario.

### **Research Studies**

- ◆ Project manager for a two-year study with the Agriculture Canada to develop and apply a methodology for sampling soil landscape polygons from the 1:1,000,000 scale Soil Landscapes of Canada (SLC) mapping
- ◆ Project manager for a two-year study with the Agriculture Canada to development of a methodology to sample soil organic carbon and microbial biomass in landscape

### **PUBLICATIONS**

Rees, H.W.; Duff, J.P.; Colville, S.; Soley, T. and Chow, T.L. 1995. **Soils of selected agricultural areas of Moncton Parish, Westmoreland County, New Brunswick**. New Brunswick. Soil Survey Report No. 15. CLBRR Contribution No. 95-13, Research Branch, Agriculture and Agri-Food Canada, Ottawa, Ont.

Rees, H.W.; Duff, J.P.; Soley, T.; Colville, S.; and Chow, T.L. 1996. **Soils of selected agricultural areas of Shediac and Botsford parishes, Westmoreland County, New Brunswick**. New Brunswick. Soil Survey Report No. 16. CLBRR Contribution No. 95-13, Research Branch, Agriculture and Agri-Food Canada, Ottawa, Ont. 127 pp. with maps.

**Ellise Baeza, EMAGP, EPt**

**EDUCATION**

Environmental Management and Assessment Graduate Program, Niagara College, 2013 -2014

Environmental Technician - Field and Laboratory (Co-Op), Niagara College, 2011 -2013

**PROFESSIONAL AFFILIATIONS**

Eco Canada - Environmental Professional (EPt)

**POSITIONS HELD**

2015 – Present                      Colville Consulting Inc., St. Catharines, Ontario

2014 – 2015                         Martech Group Inc., Mississauga, Ontario

**EXPERIENCE**

Ellise Baeza, Environmental and Agricultural Practitioner at Colville Consulting Inc., has over 3 years of formal educational training and experience in environmental consulting and 5 years training and experience in the agricultural consulting industry. Ellise has completed data collection, background review and reports for; Minimum Distance Separation (MDS) Requirements, Agricultural Impact Assessments, and Environmental Impact Statements in her role at Colville.

Through her education and her work experience at Colville Consulting, Ellise has gained a broad base of knowledge of agricultural and environmental planning and management. She has participated in the completion of Agricultural Impact Assessments, MDS Studies and Environmental Impact Studies. Her work at Colville includes the interpretation of regional and local land use policies, creation and interpretation of soil and land use maps, environmental protection policies, and species at risk regulations. Her field work activities have include, data collection and reporting for Land Evaluation Studies for FIT 4 Applications; active control under a supervisory role for TransCanada pipeline post-construction monitoring work in order to ensure remediation of any outstanding vegetation, subsidence and/or erosion issues. Land use surveys and evaluation of livestock operations; botanical and wildlife surveys (birds); and post-construction monitoring for wind turbines in the Wainfleet and West Lincoln.

Some Colville Consulting projects that Ellise has been involved in include:

- Halton Region Official Plan Review for Mattamy Homes - Review of Halton Region Prime Agricultural Areas and Growth Concepts for Halton Hills and Milton
- Agricultural Impact Assessment for New Tecumseth Community Builders Inc., County Of Simcoe
- Agricultural Impact Assessment for Mayfield West Phase 2 Secondary Plan Update, Town of Caledon
- Third Street Louth Municipal Class Environmental Assessment – City of St. Catharines
- Natural Heritage Summary Report for the Road and Drainage Improvements on Regional Road 81 Between Greenlane and Lincoln Avenue, Town of Lincoln
- Scoped Environmental Impact Assessment – Town of Pelham
- Post Construction Reclamation Monitoring for Eastern Mainline Parkway East and West Loops – Active Control – TransCanada, Brampton/Vaughan Ontario



- Post Construction Reclamation Monitoring for Vaughan Mainline Expansion – Active Control – TransCanada, Vaughan Ontario
- Post Construction Mortality Monitoring for Rankin Wind Project in Wainfleet and West Lincoln, Ontario
- Quarry Vegetation Screening and Naturalization annual monitoring and reporting – Walker Industries
- Agricultural Impact Assessment for in King City, Regional Municipality of York
- Agricultural Impact Assessment Ottawa - J.L. Richards & Associates Ltd.

#### **ADDITIONAL QUALIFICATIONS AND TRAINING**

- Workplace Hazardous Materials Information System (WHMIS) training – Basic Industrial
- Ground Disturbance Supervisory Training (TransCanada)
- Transportation of Dangerous Goods
- TC Energy Active Control Training
- Professional Locate Administrator Course (PLAC)
- Standard First Aid - CPR-A + AED
- Emergency First Aid - CPR-A + AED
- Valid Driver's Licence – Class G

## **Brett Espensen, B.A., EMAGP**

### **EDUCATION**

B.A. Honours, Major in Environmental Governance and Geography, University of Guelph, 2013  
Graduate Certificate, Environmental Management and Assessment, Niagara College, 2014

### **POSITIONS HELD**

May 2014 – Present                      Colville Consulting Inc., St. Catharines, Ontario.  
May – July, 2011-2013                PRT Growing Services Ltd

### **EXPERIENCE**

Brett Espensen, Environmental and Agricultural Consultant at Colville Consulting Inc., has over 5 years of formal educational training and experience in Environmental Planning. Brett has completed Minimum Distance Separation (MDS) Requirements, Alternative Site Assessments, Agricultural Impact Assessments, and Environmental Impact Statements in his role as an Agricultural Consultant at Colville.

Through his education, Brett has gained a broad base knowledge of Environmental Planning and Management, which he has taken with him to his work with Mr. Sean Colville, P. Ag., at Colville Consulting. His work at Colville includes the interpretation of regional and local land use policies, creation and interpretation of land use maps, environmental protection policies, and species at risk regulations. He has participated in the completion of Agricultural Impact Assessments, Environmental Impact Studies, and the Ministry of Natural Resources Species at Risk permitting process. Brett has also been actively involved in the supervision of interns from the Environmental Management and Assessment Graduate Program at Niagara College. He has completed work both in the field—doing land use surveys—and in the office, through the preparation of reports and mapping.

Some Colville Consulting projects that Brett has been involved in include:

- Agricultural Impact Assessment of Activa Holdings in the Kitchener area, Region of Waterloo
- Agricultural Impact Assessment for Elle B Inc. in the Laurentian Valley area, Renfrew County
- Agricultural Impact Assessment for Mayfield West Phase 2 Secondary Plan Update, Town of Caledon
- Land Evaluation Study for Golder Associates Ltd., Region of Waterloo
- Agricultural Impact Assessment for Titan Trailers Inc., Delhi, Ontario
- Minimum Distance Separation (MDS I) Report - Dundas, Ontario
- Minimum Distance Separation (MDS I) Report - Stayner, Ontario
- Supervision of post-construction reclamation crews during vegetation remediation over TransCanada pipelines in the Region of Peel
- Environmental Impact Statement for proposed fuel station, City of Hamilton
- Acoustic Monitoring for Bat roosting identification, in the Vineland area, Regional Municipality of Niagara

### **ADDITIONAL QUALIFICATIONS AND TRAINING**

- Brett has completed basic industrial Workplace Hazardous Materials Information System (WHMIS) training
- Extensively acquainted with the Occupational Health and Safety Act
- Valid Drivers Licence – Class G
- Standard First Aid Training

**Maren Nielsen, B.E.S. (Hons.), EMAGP, EPt**

432 Niagara St. Unit 2., St. Catharines, ON L2M 4W3

Office: 905-935-2161 ext. 107 | Mobile: 416-432-2043 | Email: Maren@colvilleconsultinginc.ca

**EDUCATION**

Bachelor in Environmental Studies with Honours, York University, 2016 - 2020

Environmental Management and Assessment Graduate Certificate, Niagara College, 2020 - 2021

Certificate in Sustainable Energy, York University, 2018 - 2020

**PROFESSIONAL AFFILIATIONS**

Eco Canada - Environmental Professional in Training (EPt)

**POSITIONS HELD**

2021 – Present                      Colville Consulting Inc., St. Catharines, Ontario

2018 - 2021                        The Pine Project, Toronto, Ontario

**EXPERIENCE**

Maren Nielsen, Environmental and Agricultural Consultant at Colville Consulting Inc., has over 5 years of formal educational training and experience in Environmental and Agricultural Planning. Maren has completed Agricultural Impact Assessments, Minimum Distance Separation (MDS) Requirements, Environmental Impact Studies, Natural Heritage Studies and Post Construction Monitoring in her role as a Consultant at Colville.

Through her education, Maren has gained a broad base knowledge of Environmental and Agricultural Planning and Management, which has taken her to work with Colville Consulting. Her work at Colville includes the interpretation of provincial, regional and local land use policies, creation and interpretation of land use maps, edge planning policies, regional soils mapping, and environmental protection policies. She has participated in the completion of Agricultural Impact Assessments, Minimum Distance Separation assessments, LEAR Studies, Environmental Impact Studies, and Natural Heritage Studies. Her field work activities include land use surveys, wetland and woodland boundary delineation, and post-construction avian and bat mortality monitoring for wind turbines in Chatham-Kent, Ontario.

A selection of projects Maren has been involved with at Colville Consulting Inc. include:

- Environmental Impact Studies, Niagara Region, Ontario
- Post-Construction Avian and Bat Mortality Monitoring for Pattern Energy and Samsung Renewable Energy Inc., South Kent Wind Facility, Chatham-Kent, Ontario
- Post-Construction Avian and Bat Mortality Monitoring for Grand Valley 3 Wind Project, Dufferin County, Ontario
- Agricultural Impact Assessment for private landowner, City of Vaughan
- Agricultural Characterization for Cavanagh Developments Inc., Ottawa
- Agricultural Characterization for private landowner, Township of Adjala-Tosorontio, Simcoe County
- Assessment of Agricultural-Urban Interface, Niagara-on-the-Lake, Ontario
- Agricultural Impact Assessment for Mayfield West Phase 2 Secondary Plan Update, Town of Caledon

**ADDITIONAL QUALIFICATIONS AND TRAINING**

- Standard First Aid & CPR C + AED
- Workplace Hazardous Materials Information System (WHMIS)
- Valid Driver's Licence – Ontario Class G

**APPENDIX C**  
**CLIMATE NORMALS DATA**

Climate Normals 1971-2000 Station Data

Metadata including Station Name, Province or Territory, Latitude, Longitude, Elevation, Climate ID, WMO ID, TC ID

STATION_NAME	PROVINCE_C	LATITUDE	LONGITUDE	ELEVATION	CLIMATE_ID	WMO_ID	TC_ID
*ORANGEVILLE MOE	ON	43°55'06.06	80°05'11.06	411.5 m	6155790		

\* This station meets WMO standards for temperature and precipitation.

- Legend
- A = WMO "3 and 5 rule" (i.e. no more than 3 consecutive and no more than 5 total missing for either temperature or precipitation)
  - B = At least 25 years
  - C = At least 20 years
  - D = At least 15 years

1971 to 2000 Canadian Climate Normals station data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
<b>Temperature</b>														
Daily Average (°C)		-8	-7.3	-2.3	4.9	11.8	16.5	19.1	18.3	14	7.8	1.6	-4.7	6 A
Standard Deviation		2.8	2.8	2.4	2	2.1	1.4	1.1	1.3	1.1	1.7	1.6	2.6	0.9 A
Daily Maximum (°C)		-3.9	-3	2.4	10	17.8	22.5	25	24	19.3	12.5	5.1	-1.2	10.9 A
Daily Minimum (°C)		-12.1	-11.7	-7	-0.3	5.7	10.6	13.1	12.5	8.6	2.9	-1.9	-8.1	1 A
Extreme Maximum (°C)		13	13	22.5	28.5	31.1	34	35	35.5	32.2	28.3	22.8	18	
Date (yyyy/dd)	1995/14	2000/27	1998/30	1990/28	1962/17	1994/16		Jun-88	Mar-88	Mar-73	Feb-71	Mar-61	Mar-82	
Extreme Minimum (°C)		-36	-36.5	-34.4	-20	-6.1	-2.2	0.6	-1.1	-5.6	-10.6	-18	-33	
Date (yyyy/dd)	1999/14	1979/18	Feb-62	Jul-72	Oct-62	May-64	1968/30	1965/30	1965/27	1976/27	1995/29	1980/25		
<b>Precipitation</b>														
Rainfall (mm)		24.2	20.8	42	61.7	78.9	83.9	75.3	95.6	83.7	67.8	66.6	31.2	731.5 A
Snowfall (cm)		41.1	30.1	23.8	8.3	0.4	0	0	0	0	3.2	15.2	38.1	160.2 A
Precipitation (mm)		65.2	50.9	65.8	69.9	79.3	83.9	75.3	95.6	83.7	71	81.8	69.3	891.7 A
Extreme Daily Rainfall (mm)		31.8	33	39.1	37	59.1	59.7	59.7	83.8	65	45	56.6	31.2	
Date (yyyy/dd)	1974/20	Sep-65	Jan-72	1992/16		Dec-00	1967/21	Dec-64	1968/22	Jul-96	May-95	Dec-92	Dec-72	
Extreme Daily Snowfall (cm)		25.4	27	18	20	15.5	0	0	0	0	18	16	30	
Date (yyyy/dd)	1966/22	Jul-86	1996/19	Jun-79		Dec-66	Jan-61	Jan-61	Jan-61	Jan-61	1981/22	Feb-99	Oct-92	
Extreme Daily Precipitation (mm)		35.3	38.6	41.7	37	59.1	59.7	59.7	83.8	65	45	56.6	37.3	
Date (yyyy/dd)	1974/20	1976/21	Jan-72	1992/16		Dec-00	1967/21	Dec-64	1968/22	Jul-96	May-95	Dec-92	Dec-72	
Extreme Snow Depth (cm)		37	48	60	16	0	0	0	0	0	14	23	41	
Date (yyyy/dd)	Nov-99	1993/28	1993/14	May-96		Jan-83	Jan-83	Jan-83	Jan-83	Jan-83	1997/27	Apr-99	Dec-92	
<b>Days with Maximum Temperature</b>														
<= 0 °C		23.3	19.8	11.8	1.7	0	0	0	0	0	0.14	6.4	18.6	81.8 A
> 0 °C		7.7	8.5	19.2	28.3	31	30	31	31	30	30.9	23.6	12.4	283.4 A
> 10 °C		0.1	0.21	3.6	13.7	27.7	29.8	31	31	29.1	19.7	5.8	0.82	192.5 A
> 20 °C		0	0	0.4	2	10.7	20.8	28.2	25.8	12.4	2.3	0	0	102.5 A
> 30 °C		0	0	0	0	0.07	0.83	2	1	0.21	0	0	0	4.1 A
> 35 °C		0	0	0	0	0	0	0	0.03	0	0	0	0	0.03 A
<b>Days with Minimum Temperature</b>														
> 0 °C		0.69	1.1	3.2	11.8	26	29.8	31	31	28.3	20.8	8.7	1.4	193.9 A
<= 2 °C		30.8	27.8	29.1	21.9	8.9	1.1	0	0.14	3.9	14.9	24.5	30.5	193.6 A
<= 0 °C		30.3	27.1	27.8	18.2	5	0.25	0	0	1.7	10.2	21.3	29.6	171.4 A

< -2 °C	28.3	24.9	22.5	10.8	1	0	0	0	0.28	3.9	13.3	24.6	129.5 A
< -10 °C	17.5	15.5	8.9	0.59	0	0	0	0	0	0.03	1.4	11	54.9 A
< -20 °C	4.5	4.2	1	0	0	0	0	0	0	0	0	1.1	10.8 A
< - 30 °C	0.31	0.17	0	0	0	0	0	0	0	0	0	0.03	0.51 A
Days with Rainfall													
>= 0.2 mm	3.5	3.2	6.1	10	11.8	11.6	10.3	11.6	12	12.5	10.2	4.6	107.4 A
>= 5 mm	1.7	1.6	2.7	3.8	4.9	5	4.2	5.1	4.8	4.6	4.4	2.4	45.2 A
>= 10 mm	0.8	0.7	1.7	1.9	2.8	3	2.5	3.2	2.5	2.1	2.2	1.1	24.6 A
>= 25 mm	0.17	0.03	0.21	0.3	0.53	0.47	0.73	0.9	0.67	0.27	0.33	0.19	4.8 A
Days With Snowfall													
>= 0.2 cm	12	8.8	6.5	1.9	0.13	0	0	0	0	0.93	5.3	10.9	46.6 A
>= 5 cm	2.8	2.1	1.8	0.6	0.03	0	0	0	0	0.21	1	2.9	11.4 A
>= 10 cm	1	0.57	0.53	0.3	0	0	0	0	0	0.1	0.17	0.7	3.4 A
>= 25 cm	0.03	0.03	0	0	0	0	0	0	0	0	0	0.04	0.1 A
Days with Precipitation													
>= 0.2 mm	14.7	11.3	11.8	11.5	11.9	11.6	10.3	11.6	12	13	14.6	14.8	149 A
>= 5 mm	4.6	3.5	4.6	4.5	4.9	5	4.2	5.1	4.8	4.9	5.4	5.2	56.6 A
>= 10 mm	1.9	1.3	2.3	2.2	2.8	3	2.5	3.2	2.5	2.2	2.4	1.8	28.2 A
>= 25 mm	0.2	0.13	0.21	0.3	0.57	0.47	0.73	0.9	0.67	0.28	0.33	0.26	5.1 A
Degree Days													
Above 24 °C	0	0	0	0	0.1	0.6	3	2	0.3	0	0	0	6 A
Above 18 °C	0	0	0	0.9	9.5	27.8	59.3	45.5	13.6	0.4	0	0	157.1 A
Above 15 °C	0	0	0.1	3.9	26.8	72.1	130.2	109.2	39.8	2.8	0.2	0	385.1 A
Above 10 °C	0	0	2.6	17.2	90.7	196.5	281.8	256.2	130.1	29.2	3.2	0.2	1007.6 A
Above 5 °C	0.3	0.7	12.3	60.4	212.4	343.9	436.8	410.9	268.6	106.7	22.9	2.1	1878 A
Above 0 °C	5.5	8.5	45.7	159.3	364.4	493.9	591.8	565.9	418.4	241.5	83.2	14.5	2992.6 A
Below 0 °C	252.5	218.8	116	15	0	0	0	0	0	1.1	36	156.9	796.2 A
Below 5 °C	402.4	352.2	237.5	66.2	3	0	0	0	0.3	21.2	125.7	299.5	1507.8 A
Below 10 °C	557.1	492.8	382.9	172.9	36.3	2.5	0	0.3	11.7	98.7	255.9	452.6	2463.7 A
Below 15 °C	712.1	634	535.4	309.6	127.4	28.2	3.5	8.3	71.5	227.4	402.9	607.4	3667.4 A
Below 18 °C	805.1	718.8	628.3	396.7	203.1	73.9	25.5	37.6	135.3	317.9	492.7	700.4	4535.1 A

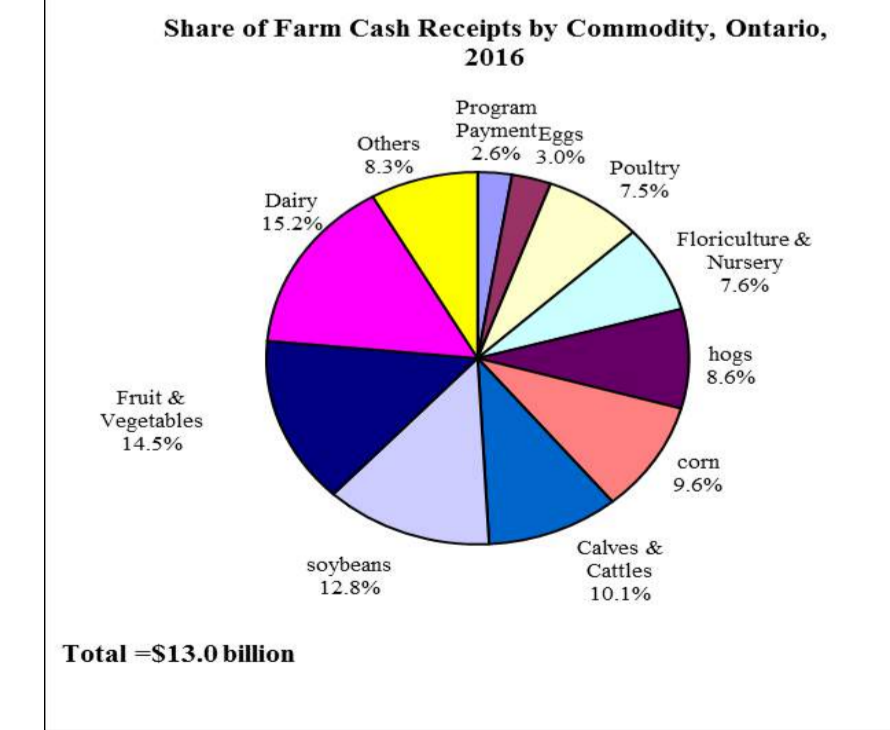
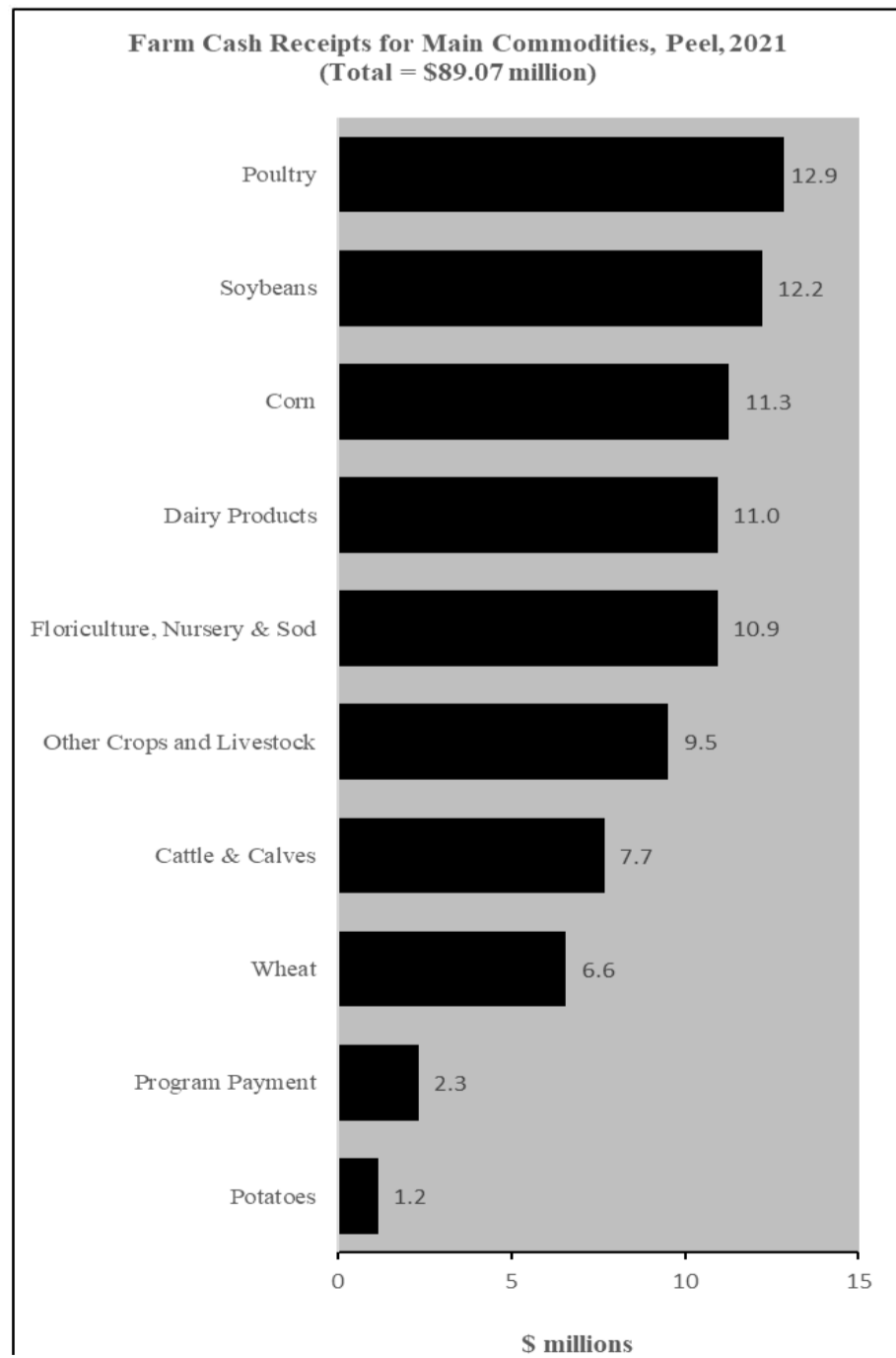
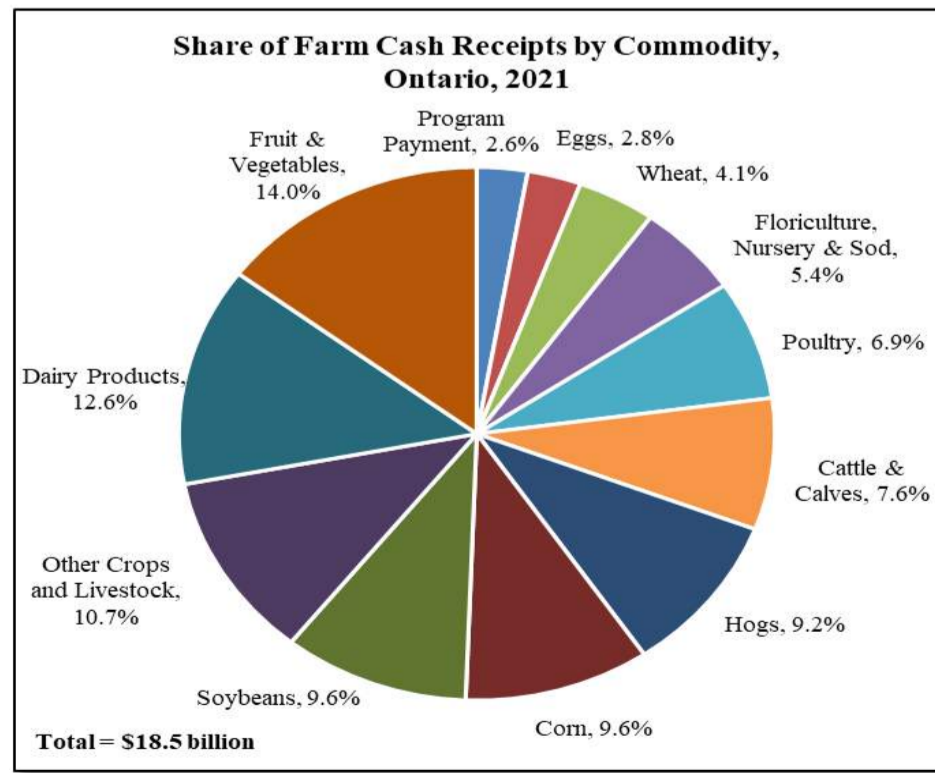
**APPENDIX D**  
**AGRICULTURAL CROP STATISTICS**



## Peel Regional Municipality at a Glance - 2021

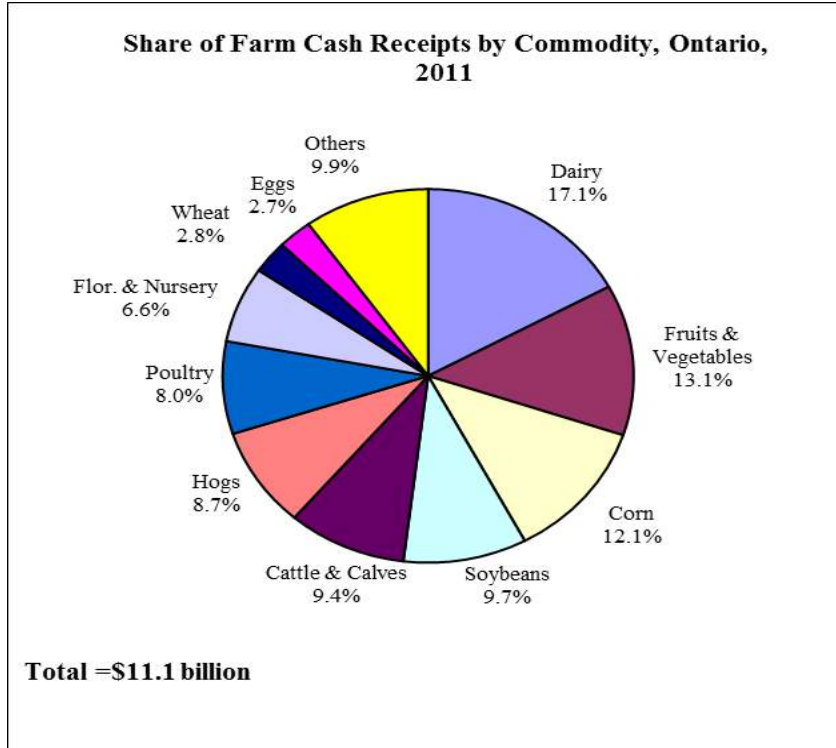
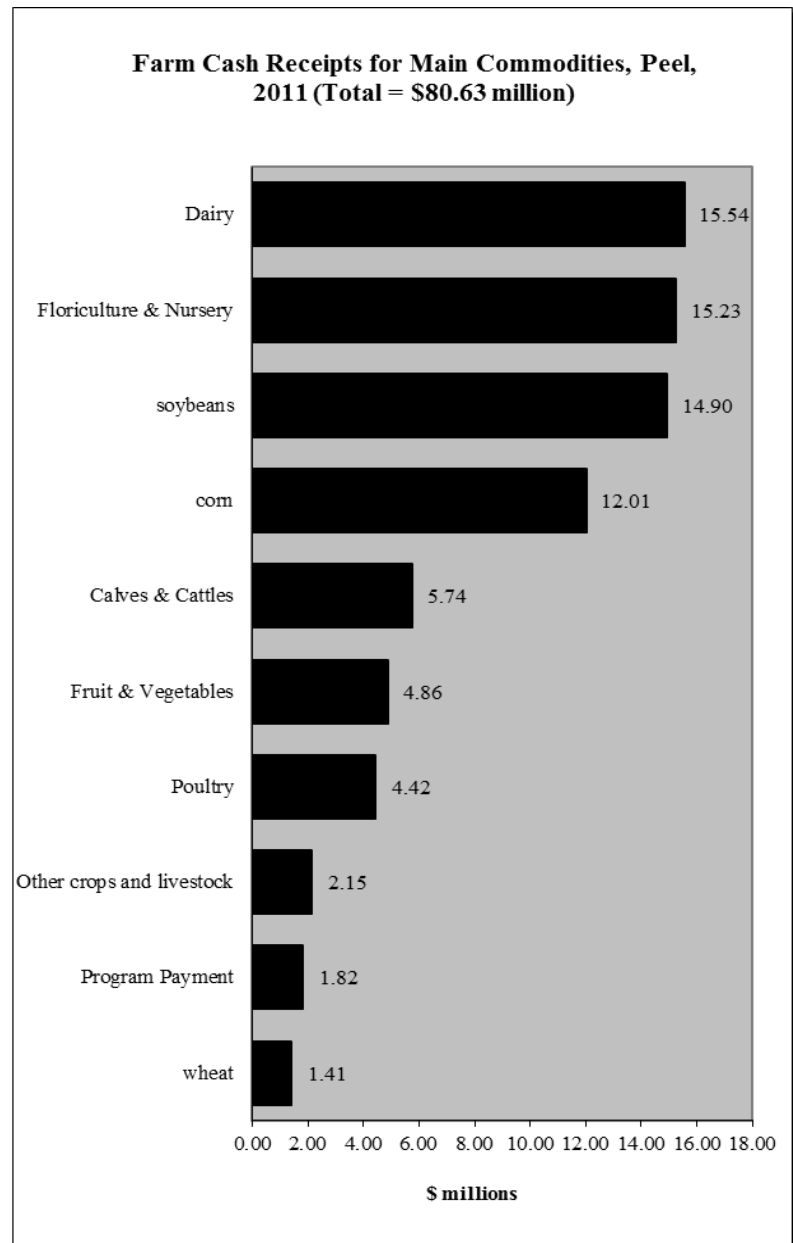
## Peel Regional Municipality at a Glance - 2016

Item	Peel	Province	Percent of province	Percent from 2016	Item	Peel	Province	Percent of province	Percent from 2016	Item	Peel	Province	Percent of province	Percent from 2011	Item	Peel	Province	Percent of province	Percent from 2011
<b>Farms, 2021 Census (number)</b>					<b>Major Field Crops, 2021 Census (acres)</b>					<b>Farms, 2016 Census (number)</b>					<b>Major Field Crops, 2016 Census (acres)</b>				
Total	377	48,346	0.78%	-7.60%	Winter wheat	10,343	1,144,406	0.90%	21.54%	Total	408	49,600	0.82%	-7.27%	Winter wheat	8,510	1,080,378	0.79%	-26.33%
Under 10 acres	52	3,217	1.62%	-1.89%	Oats for grain	344	84,320	0.41%	64.59%	Under 10 acres	53	3,051	1.74%	17.78%	Oats for grain	209	82,206	0.25%	-24.82%
10 to 69 acres	122	12,686	0.96%	-23.27%	Barley for grain	1,016	68,756	1.48%	-42.31%	10 to 69 acres	159	12,625	1.26%	-2.45%	Barley for grain	1,761	103,717	1.70%	-47.48%
70 to 129 acres	70	10,924	0.64%	0.00%	Mixed grains	453	59,961	0.76%	6.59%	70 to 129 acres	70	10,742	0.65%	-13.58%	Mixed grains	425	92,837	0.46%	-32.97%
130 to 179 acres	22	4,422	0.50%	-12.00%	Corn for grain	19,631	2,202,465	0.89%	45.98%	130 to 179 acres	25	4,592	0.54%	-3.85%	Corn for grain	13,448	2,162,004	0.62%	1.54%
180 to 239 acres	22	3,981	0.55%	4.76%	Corn for silage	1,571	289,678	0.54%	-8.50%	180 to 239 acres	21	4,282	0.49%	-12.50%	Corn for silage	1,717	295,660	0.58%	-15.75%
240 to 399 acres	18	5,396	0.33%	-5.26%	Hay	14,006	1,704,017	0.82%	8.31%	240 to 399 acres	19	6,008	0.32%	-42.42%	Hay	12,931	1,721,214	0.75%	-26.05%
400 to 559 acres	24	2,865	0.84%	4.35%	Soybeans	29,915	2,806,255	1.07%	21.65%	400 to 559 acres	23	3,093	0.74%	4.55%	Soybeans	24,592	2,783,443	0.88%	8.45%
560 to 759 acres	12	1,698	0.71%	50.00%	Potatoes	7	39,193	0.02%	-76.67%	560 to 759 acres	8	1,990	0.40%	-42.86%	Potatoes	30	34,685	0.09%	-44.44%
760 to 1,119 acres	16	1,600	1.00%	0.00%	<b>Major Fruit Crops, 2021 Census (acres)</b>					760 to 1,119 acres	16	1,593	1.00%	-23.81%	<b>Major Fruit Crops, 2016 Census (acres)</b>				
1,120 to 1,599 acres	8	720	1.11%	100.00%	Total fruit crops	284	48,661	0.58%	-29.53%	1,120 to 1,599 acres	4	801	0.50%	33.33%	Total fruit crops	403	51,192	0.79%	-6.06%
1,600 to 2,239 acres	5	451	1.11%	-44.44%	Apples	132	16,008	0.82%	7.32%	1,600 to 2,239 acres	9	457	1.97%	50.00%	Apples	123	15,893	0.77%	-58.16%
2,240 to 2,879 acres	5	173	2.89%	-	Sour Cherries	0	1,383	0.00%	-	2,240 to 2,879 acres	0	168	0.00%	-100.00%	Sour Cherries	0	2,121	0.00%	-100.00%
2,880 to 3,519 acres	0	95	0.00%	-	Peaches	0	4,608	0.00%	-	2,880 to 3,519 acres	0	88	0.00%	-	Peaches	0	5,232	0.00%	-100.00%
3,520 acres and over	1	118	0.85%	0.00%	Grapes	60	18,432	0.33%	-	3,520 acres and over	1	110	0.91%	0.00%	Grapes	x	18,718	-	-
<b>Land Use, 2021 Census (acres)</b>					<b>Major Vegetable Crops, 2021 Census (acres)</b>					<b>Land Use, 2016 Census (acres)</b>					<b>Major Vegetable Crops, 2016 Census (acres)</b>				
Land in crops	80,409	9,051,011	0.89%	19.29%	Total vegetables	519	127,893	0.41%	37.67%	Land in crops	67,408	9,021,298	0.75%	-9.15%	Total vegetables	377	135,420	0.28%	-22.11%
Summerfallow land	384	13,964	2.75%	412.00%	Sweet corn	126	20,518	0.61%	85.29%	Summerfallow land	75	15,885	0.47%	-56.90%	Sweet corn	68	22,910	0.30%	-46.46%
Tame or seeded pasture	2,722	400,480	0.68%	-11.97%	Tomatoes	32	14,614	0.22%	0.00%	Tame or seeded pasture	3,092	514,168	0.60%	-30.25%	Tomatoes	32	15,744	0.20%	-39.62%
Natural land for pasture	2,859	626,366	0.46%	-26.10%	Green peas	28	14,044	0.20%	180.00%	Natural land for pasture	3,869	783,566	0.49%	-20.75%	Green peas	10	16,268	0.06%	25.00%
Christmas trees, woodland & wetland	4,703	1,269,535	0.37%	-17.23%	Green or wax beans	18	8,709	0.21%	157.14%	Christmas trees, woodland & wetland	5,682	1,542,637	0.37%	-20.03%	Green or wax beans	7	9,732	0.07%	-22.22%
All other land	4,506	404,714	1.11%	40.24%	<b>Livestock Inventories, 2021 Census (number)</b>					All other land	3,213	470,909	0.68%	-11.19%	<b>Livestock Inventories, 2016 Census (number)</b>				
Total area of farms	95,583	11,766,071	0.81%	14.69%	Total cattle and calves	8,987	1,604,810	0.56%	-1.38%	Total area of farms	83,339	12,348,463	0.67%	-24.82%	Total cattle and calves	9,113	1,623,710	0.56%	-23.62%
<b>Greenhouse Area, 2021 Census (square feet)</b>					<b>Farm Capital Value, 2021 Census (farms reporting)</b>					<b>Greenhouse Area, 2016 Census (square feet)</b>					<b>Farm Capital Value, 2016 Census (farms reporting)</b>				
Total area in use	571,719	201,055,888	0.28%	-34.27%	Under \$200,000	11	1,212	0.91%	-54.17%	Total area in use	869,770	158,511,328	0.55%	-24.82%	Under \$200,000	24	2,142	1.12%	41.18%
<b>Farm Capital Value, 2021 Census (farms reporting)</b>					<b>Poultry Inventories, 2021 Census (number)</b>					<b>Farm Capital Value, 2016 Census (farms reporting)</b>					<b>Poultry Inventories, 2016 Census (number)</b>				
Under \$200,000	11	1,212	0.91%	-54.17%	Total hens and chickens	422,313	53,802,772	0.78%	118.96%	Under \$200,000	16	7,433	0.22%	-52.94%	Total hens and chickens	192,868	50,759,994	0.38%	-11.08%
\$200,000 to \$499,999	5	3,223	0.16%	-68.75%	Total turkeys	2,107	2,453,126	0.09%	1887.74%	\$200,000 to \$499,999	71	12,500	0.57%	-25.26%	Total turkeys	106	3,772,146	-	-
\$500,000 to \$999,999	40	8,699	0.46%	-43.66%	<b>Total Gross Farm Receipts, 2021 Census (farms reporting)</b>					\$500,000 to \$999,999	297	27,525	1.08%	1.02%	<b>Total Gross Farm Receipts, 2016 Census (farms reporting)</b>				
\$1,000,000 and over	321	35,212	0.91%	8.08%	Under \$10,000	74	7,277	1.02%	-16.85%	Under \$10,000	89	9,536	0.93%	-17.59%	Under \$10,000	89	9,536	0.93%	-17.59%
<b>Total Gross Farm Receipts, 2021 Census (farms reporting)</b>					<b>Farms by Industry Group, 2021 Census (number of farms)</b>					<b>Total Gross Farm Receipts, 2016 Census (farms reporting)</b>					<b>Farms by Industry Group, 2016 Census (number of farms)</b>				
Under \$10,000	74	7,277	1.02%	-16.85%	Beef cattle ranching and farming	53	7,986	0.66%	35.90%	Under \$10,000	77	8,376	0.92%	-14.29%	Under \$10,000	77	8,376	0.92%	-14.29%
\$10,000 to \$24,999	55	7,429	0.74%	-28.57%	Dairy cattle and milk production	13	3,188	0.41%	-31.58%	\$10,000 to \$24,999	57	6,755	0.84%	-6.56%	\$10,000 to \$24,999	57	6,755	0.84%	-6.56%
\$25,000 to \$49,999	48	6,263	0.77%	-15.79%	Hog and pig farming	3	1,189	0.25%	200.00%	\$25,000 to \$49,999	39	6,263	0.62%	11.43%	\$25,000 to \$49,999	39	6,263	0.62%	11.43%
\$50,000 to \$99,999	31	6,093	0.51%	-20.51%	Poultry and egg production	13	2,061	0.63%	44.44%	\$50,000 to \$99,999	66	7,022	0.94%	-14.29%	\$50,000 to \$99,999	66	7,022	0.94%	-14.29%
\$100,000 to \$249,999	48	6,817	0.70%	-27.27%	Sheep and goat farming	4	1,309	0.31%	-50.00%	\$100,000 to \$249,999	33	4,707	0.70%	-19.51%	\$100,000 to \$249,999	33	4,707	0.70%	-19.51%
\$250,000 to \$499,999	35	4,448	0.79%	6.06%	Other animal production	64	4,556	1.40%	-36.63%	\$250,000 to \$499,999	23	3,689	0.62%	4.55%	\$250,000 to \$499,999	23	3,689	0.62%	4.55%
\$500,000 to \$999,999	32	3,954	0.81%	39.13%	Oilseed and grain farming	112	18,194	0.62%	6.67%	\$500,000 to \$999,999	17	2,019	0.84%	30.77%	\$500,000 to \$999,999	17	2,019	0.84%	30.77%
\$1,000,000 to \$1,999,999	9	2,452	0.37%	-47.06%	Vegetable and melon farming	29	1,562	1.86%	-9.38%	\$1,000,000 to \$1,999,999	7	1,233	0.57%	-12.50%	\$1,000,000 to \$1,999,999	7	1,233	0.57%	-12.50%
\$2,000,000 and over	10	1,696	0.59%	42.86%	Fruit and tree nut farming	18	1,211	1.49%	0.00%	\$2,000,000 and over	44	7,187	0.61%	-31.25%	\$2,000,000 and over	44	7,187	0.61%	-31.25%
<b>Farms by Industry Group, 2021 Census (number of farms)</b>					<b>Total Gross Farm Receipts, 2016 Census (farms reporting)</b>					<b>Farms by Industry Group, 2016 Census (number of farms)</b>					<b>Total Gross Farm Receipts, 2016 Census (number of farms)</b>				
Beef cattle ranching and farming	53	7,986	0.66%	35.90%	Under \$10,000	89	9,536	0.93%	-17.59%	Beef cattle ranching and farming	39	6,786	0.57%	-15.22%	Under \$10,000	89	9,536	0.93%	-17.59%
Dairy cattle and milk production	13	3,188	0.41%	-31.58%	\$10,000 to \$24,999	77	8,376	0.92%	-14.29%	Dairy cattle and milk production	19	3,439	0.55%	-24.00%	\$10,000 to \$24,999	77	8,376	0.92%	-14.29%
Hog and pig farming	3	1,189	0.25%	200.00%	\$25,000 to \$49,999	57	6,755	0.84%	-6.56%	Hog and pig farming	1	1,229	0.08%	-	\$25,000 to \$49,999	57	6,755	0.84%	-6.56%
Poultry and egg production	13	2,061	0.63%	44.44%	\$50,000 to \$99,999	39	6,263	0.62%	11.43%	Poultry and egg production	9	1,816	0.50%	12.50%	\$50,000 to \$99,999	39	6,263	0.62%	11.43%
Sheep and goat farming	4	1,309	0.31%	-50.00%	\$100,000 to \$249,999	66	7,022	0.94%	-14.29%	Sheep and goat farming	8	1,097	0.73%	-11.11%	\$100,000 to \$249,999	66	7,022	0.94%	-14.29%
Other animal production	64	4,556	1.40%	-36.63%	\$250,000 to \$499,999	33	4,707	0.70%	-19.51%	Other animal production	101	5,902	1.71%	10.99%	\$250,000 to \$499,999	33	4,707	0.70%	-19.51%
Oilseed and grain farming	112	18,194	0.62%	6.67%	\$500,000 to \$999,999	32	3,954	0.81%	39.13%	Oilseed and grain farming	105	16,876	0.62%	-2.78%	\$500,000 to \$999,999	32	3,954	0.81%	39.13%
Vegetable and melon farming	29	1,562	1.86%	-9.38%	\$1,000,000 to \$1,999,999	9	2,452	0.37%	-47.06%	Vegetable and melon farming	32	1,856	1.72%	60.00%	\$1,000,000 to \$1,999,999	9	2,452	0.37%	-47.06%
Fruit and tree nut farming	18	1,211	1.49%	0.00%	\$2,000,000 and over	10	1,696	0.59%	42.86%	Fruit and tree nut farming	18	1,362	1.32%	-18.18%	\$2,000,000 and over	10	1,696	0.59%	42.86%
Greenhouse, nursery and floriculture	23	1,672	1.38%	-28.13%	<b>Farm Cash Receipts for Main Commodities, Peel, 2021 (Total = \$89.07 million)</b>					Greenhouse, nursery and floriculture	32	2,050	1.56%	-31.91%	<b>Farm Cash Receipts for Main Commodities, Peel, 2016 (Total = \$58.56 million)</b>				
Other crop farming	45	5,418	0.83%	2.27%	Poultry	12.9				Other crop farming	44	7,187	0.61%	-31.25%	Poultry	4.46			



# Peel Regional Municipality at a Glance - 2011

Item	Peel	Province	Percent of province	Item	Peel	Province	Percent of province
<b>Farms, 2011 Census (number)</b>				<b>Major Field Crops, 2011 Census (acres)</b>			
Total	440	51,950	0.85	Winter wheat	11,552	1,100,003	1.05
Under 10 acres	45	2,741	1.64	Oats for grain	278	71,040	0.39
10 to 69 acres	163	12,681	1.29	Barley for grain	3,353	126,881	2.64
70 to 129 acres	81	11,779	0.69	Mixed grains	634	106,162	0.60
130 to 179 acres	26	4,969	0.52	Corn for grain	13,244	2,032,356	0.65
180 to 239 acres	24	4,801	0.50	Corn for silage	2,038	271,701	0.75
240 to 399 acres	33	6,460	0.51	Hay	17,485	2,077,911	0.84
400 to 559 acres	22	3,359	0.65	Soybeans	22,676	2,464,870	0.92
560 to 759 acres	14	2,026	0.69	Potatoes	54	37,384	1.41
760 to 1,119 acres	21	1,587	1.32	<b>Major Fruit Crops, 2011 Census (acres)</b>			
1,120 to 1,599 acres	3	788	0.38	Total fruit crops	429	52,740	0.81
1,600 to 2,239 acres	6	436	1.38	Apples	294	15,830	1.86
2,240 to 2,879 acres	1	152	0.66	Sour Cherries	1	2,342	0.04
2,880 to 3,519 acres	0	79	0.00	Peaches	4	6,455	0.06
3,520 acres and over	1	92	1.09	Grapes	x	18,383	-
<b>Land Use, 2011 Census (acres)</b>				<b>Major Vegetable Crops, 2011 Census (acres)</b>			
Land in crops	74,193	8,929,947	0.83	Total vegetables	484	129,595	0.37
Summerfallow land	174	23,450	0.74	Sweet corn	127	25,540	0.50
Tame or seeded pasture	4,433	648,758	0.68	Tomatoes	53	16,558	0.32
Natural land for pasture	3,855	984,809	0.39	Green peas	8	15,121	0.05
Christmas trees, woodland & wetland	7,170	1,612,444	0.44	Green or wax beans	9	9,186	0.10
All other land	4,018	468,828	0.86	<b>Livestock Inventories, 2011 Census (number)</b>			
Total area of farms	93,843	12,668,236	0.74	Total cattle and calves	11,931	1,741,381	0.69
<b>Greenhouse Area, 2011 Census (square feet)</b>				<b>Poultry Inventories, 2011 Census (number)</b>			
Total area in use	1,156,880	133,520,541	0.87	Total hens and chickens	216,909	46,902,316	0.46
<b>Farm Capital Value, 2011 Census (farms reporting)</b>				<b>Total turkeys</b>			
Under \$200,000	17	2,562	0.66		x	3,483,828	-
\$200,000 to \$499,999	34	12,994	0.26	<b>Farms by Industry Group, 2016 Census (number of farms)</b>			
\$500,000 to \$999,999	95	15,276	0.62	Beef cattle ranching and farming	46	7,105	0.65
\$1,000,000 and over	294	21,118	1.39	Dairy cattle and milk production	25	4,036	0.62
<b>Total Gross Farm Receipts, 2011 Census (farms reporting)</b>				Hog and pig farming			
Under \$10,000	108	12,263	0.88		0	1,235	0.00
\$10,000 to \$24,999	75	9,098	0.82	Poultry and egg production	8	1,619	0.49
\$25,000 to \$49,999	61	6,720	0.91	Sheep and goat farming	9	1,446	0.62
\$50,000 to \$99,999	35	6,189	0.57	Other animal production	91	6,966	1.31
\$100,000 to \$249,999	77	6,985	1.10	Oilseed and grain farming	108	15,818	0.68
\$250,000 to \$499,999	41	5,086	0.81	Vegetable and melon farming	20	1,531	1.31
\$500,000 to \$999,999	22	3,248	0.68	Fruit and tree nut farming	22	1,548	1.42
\$1,000,000 to \$1,999,999	13	1,558	0.83	Greenhouse, nursery and floriculture	47	2,372	1.98
\$2,000,000 and over	8	803	1.00	Other crop farming	64	8,274	0.77



**APPENDIX E**  
**CANADA LAND INVENTORY (CLI) INFORMATION**

# Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario

## Purpose

The intention of this document is the provision of a more comprehensive classification framework for the application of CLI to mineral soils and landscapes in Ontario. The guidelines given here should be used in place of those provided in "Canada Land Inventory, Soil Capability Classification for Agriculture", (ARDA Report No. 2, 1965).

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## **Introduction**

The Canada Land Inventory for agriculture is an interpretative system for assessing the effects of climate and soil characteristics on the limitations of land for growing common field crops. Common field crops in Ontario include corn, soybeans, small grains, and perennial forages. This system does not classify land for horticultural or other specialty type crops.

The system evaluates three general qualities of mineral soils:

1. Their productivity relative to all mineral soils in Ontario and Canada.
2. Their flexibility, or the range of common field crops they are capable of producing.
3. Their management needs with respect to necessary improvements and conservation practices for field crop production.

The system classifies mineral soils into seven groups according to their potentials and limitations. The first three classes are considered capable of sustained production of cultivated field crops and are considered

prime agricultural land resources. The fourth class is marginal for cultivated field crops. The fifth is capable of hay production and permanent pasture use. The sixth is capable of sustaining unimproved pasture only, and the seventh class has no agricultural capability.

The system emphasizes the potential capability of soils. Therefore, the present land use and management of a given land area may or may not reflect its potential soil capability. For example, a forested area may rate highly under the CLI even though it has not been cleared and developed for agricultural use.

## **Assumptions**

CLI classification uses certain assumptions. These are:

1. CLI classification depends on combinations of climate and soil characteristics which affect limitations to soil use and productive capacity for common field crops. The need for land improvement by the removal of shrubs, trees, and stumps is not considered a limitation to agricultural capability unless it is considered unfeasible to remove them.
2. Contemporary best management practices for soil management and field crop production are in place.
3. The various soils within a given capability class are considered similar in degree of limitation, notwithstanding the various kinds of limitations which may be present.
4. The soil capability class represents the potential capability of land in its improved state. Land requiring improvements, such as stone removal or tile drainage, that are feasible and can be done by the individual farmer or landowner, is classified according to what its ongoing limitations would be with the needed improvements in place. It is recognized that in some local or site specific situations certain improvements may not be feasible even though such improvements are generally feasible on similar soils elsewhere.

5. The capability classification of the soils in an area may be changed when major reclamation works are installed which permanently reduce or eliminate the present limitations.
6. Distance to market, kind of roads, location, size of farms, characteristics of land-ownership and cultural patterns, and the skill or resources of individual operators are not criteria for CLI classification.
7. Capability groupings may be subject to change as new information about the behaviour and responses of soils becomes available.

## **Capability Classes and Subclasses**

In the CLI system there are seven capability classes. Soils descend in quality from Class 1, which is highest, to Class 7 soils which have no agricultural capability for the common field crops. Class 1 soils have no significant limitations. Class 2 through 7 soils have one or more significant limitations, and each of these are denoted by a capability subclass.

### **Definitions of the Capability Classes**

#### **Class 1 - Soils in this class have no significant limitations in use for crops.**

Soils in Class 1 are level to nearly level, deep, well to imperfectly drained and have good nutrient and water holding capacity. They can be managed and cropped without difficulty. Under good management they are moderately high to high in productivity for the full range of common field crops

#### **Class 2 - Soils in this class have moderate limitations that reduce the choice of crops, or require moderate conservation practices.**

These soils are deep and may not hold moisture and nutrients as well as Class 1 soils. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management they are moderately high to high in productivity for a wide range of common field crops.

**Class 3 - Soils in this class have moderately severe limitations that reduce the choice of crops or require special conservation practices.**

The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. Under good management these soils are fair to moderately high in productivity for a wide range of common field crops.

**Class 4 - Soils in this class have severe limitations that restrict the choice of crops, or require special conservation practices and very careful management, or both.**

The severe limitations seriously affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. These soils are low to medium in productivity for a narrow to wide range of common field crops, but may have higher productivity for a specially adapted crop.

**Class 5 - Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible.**

The limitations are so severe that the soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants and may be improved through the use of farm machinery. Feasible improvement practices may include clearing of bush, cultivation, seeding, fertilizing or water control.

**Class 6 - Soils in this class are unsuited for cultivation, but are capable of use for unimproved permanent pasture.**

These soils may provide some sustained grazing for farm animals, but the limitations are so severe that improvement through the use of farm machinery is impractical. The terrain may be unsuitable for the use of farm machinery, or the soils may not respond to improvement, or the grazing season may be very short.

**Class 7 - Soils in this class have no capability for arable culture or permanent pasture.**

This class includes marsh, rockland and soil on very steep slopes.



## **Definitions of the Capability Subclasses**

Capability Subclasses indicate the kinds of limitations present for agricultural use. Thirteen Subclasses were described in CLI Report No. 2. Eleven of these Subclasses have been adapted to Ontario soils.

### **Subclass Definitions:**

**Subclass C - Adverse climate:** This subclass denotes a significant adverse climate for crop production as compared to the "median" climate which is defined as one with sufficiently high growing-season temperatures to bring common field crops to maturity, and with sufficient precipitation to permit crops to be grown each year on the same land without a serious risk of partial or total crop failures. In Ontario this subclass is applied to land averaging less than 2300 Crop Heat Units.

**Subclass D - Undesirable soil structure and/or low permeability:** This subclass is used for soils which are difficult to till, or which absorb or release water very slowly, or in which the depth of rooting zone is restricted by conditions other than a high water table or consolidated bedrock. In Ontario this subclass is based on the existence of critical clay contents in the upper soil profile.

**Subclass E - Erosion:** Loss of topsoil and subsoil by erosion has reduced productivity and may in some cases cause difficulties in farming the land e.g. land with gullies.

**Subclass F - Low natural fertility:** This subclass is made up of soils having low fertility that is either correctable with careful management in the use of fertilizers and soil amendments or is difficult to correct in a feasible way. The limitation may be due to a lack of available plant nutrients, high acidity, low exchange capacity, or presence of toxic compounds.

**Subclass I - Inundation by streams or lakes:** Flooding by streams and lakes causes crop damage or restricts agricultural use.

**Subclass M – Moisture deficiency:** Soils in this subclass have lower moisture holding capacities and are more prone to droughtiness.

**Subclass P - Stoniness:** This subclass indicates soils sufficiently stony to hinder tillage, planting, and harvesting operations.

Subclass R - Consolidated bedrock: The occurrence of consolidated bedrock within 100 cm of the surface restricts rooting depth and limits moisture holding capacity. Conversely, in poorly drained soils the presence of the bedrock may, depending on depth, make artificial drainage impossible.

Subclass S - Adverse soil characteristics: This subclass denotes a combination of limitations of equal severity. In Ontario it has often been used to denote a combination of F and M when these are present with a third limitation such as T, E or P.

Subclass T - Topography: This subclass denotes limitations due to slope steepness and length. Such limitations may hinder machinery use, decrease the uniformity of crop growth and maturity, and increase water erosion potential.

Subclass W - Excess water: This subclass indicates the presence of excess soil moisture due to poor or very poor soil drainage. It is distinguished from Subclass I - water inundation which indicates risk of flooding from adjacent lakes or streams.

## **Information Requirements**

CLI classification of a soil individual requires the following data:

Soil drainage class: Seven soil drainage classes are used in Ontario and Canada. These are very rapid, rapid, well, moderately well, imperfect, poor, and very poor.

Thickness of unconsolidated soil material over bedrock: Depth to consolidated bedrock is required at sites where bedrock contact occurs at a depth of less than 1 m.

Soil Horizons: The type and thickness of significant soil horizons need to be identified. These include: Depth of topsoil (Ap or Ah horizon); diagnostic and significant B horizons, and depth to and nature of C horizons (parent material).

Texture/Particle Size Distribution: Textural class (mineral material <2mm) for each significant horizon; gravelly modifiers to the textural class are needed where gravel content exceeds 20 % by weight or 15 % by volume.

Soil Reaction: The depth at which free carbonates are detectable with 10% hydrochloric acid is needed in known alkaline soils. High acidity may be inferred in some soils if certain soil horizon characteristics are present such as evidence of podzolization. Soil pH testing, especially of parent materials, is also warranted if high acidity is suspected.

Slope: Slope class based on steepness (%) and length (m).

Surface stoniness: Percent surface coverage of stones >15 cm diameter and boulders >60 cm diameter.

Crop heat units: The average annual crop heat units for an area are determined from the general reference map for Ontario.

Location: The geographic reference point of each soil profile and soil landscape inspection; also location with respect to areas under risk of flooding by streams or lakes.

## **Determination of Subclasses and Capability Ratings**

Collection of the necessary types of data listed under "Information Requirements" and consultation of Tables 1 to 12 which follow, enable the classification of CLI for a soil individual. Classification involves two general steps.

1. Identification of all subgroup limitations present and the severity of each limitation. This involves the interpretation of the soil profile and landscape data using the guidelines provided in Tables 1 to 12.
2. Arrival at the final soil capability class on the basis of the most severe subgroup limitation (or limitations if two or more are present of equal severity).

When a soil has a single limitation, the subclass that represents that limitation is shown in the soil capability class (e.g. an excess water limitation is represented by the subclass "W"). As a general rule, only the subclass that represents the most severe limitation is shown, since it is that limitation which has determined the capability class. In cases where two limitations of equal severity exist which have therefore equally determined the capability rating, both are shown in the map symbol. When a soil has more than two limitations of equal severity,

however, all of the subclasses that apply to the soil are usually not shown in the class. These conventions are applied in order to simplify soil capability map units and their symbols.

The following list gives conventions that are used when assigning classifications and portraying them on maps.

### **Conventions in the Assignment of Subclasses and Classes**

1. The subclass or subclasses are denoted by capital letters placed after the class number. (e.g. 2P designates a Class 2 soil due to a moderate surface stoniness limitation.)
2. A subclass is used in a classification notation only when the limitation it represents has been a factor in determining the final CLI class. (E.g. a soil individual or soil landscape with both a moderate stoniness limitation (equivalent to 2P) and a moderately severe topographic limitation (equivalent to 3T) is denoted as 3T).
3. The subclass S has been used in Ontario to represent a combination of two or more subclasses, when that combination is present with a third limitation of equal severity. (E.g. 3FMT may be denoted as 3ST )
4. The climatic limitation, subclass C, is applied to soil landscapes in areas which average less than 2300 Crop Heat Units. In such areas, only soils with no other limitations have the subclass C cited in their notation (e.g. 2C, 3C). depending on the degree of Crop Heat Unit deficit below the 2300 level. Soils of the same area but with other limitations present are first downgraded in accordance with those limitations and then further downgraded according to the degree of Heat Unit deficit. However, the C subclass is not cited in their notation. For example, a pair of soil landscapes with no climatic limitation might classify as "1" and "2W". A pair of physically equivalent soil landscapes in an area of 1900 to 2300 CHU would classify as "2C" and "3W" respectively.
5. When it is necessary to indicate two capability ratings because of a complex soil landscape, the relative proportion of each should be denoted in the map symbol. E.g. 2P=3T, 2P>3T, or,

$2P^7 > 3T^3$  where the superscript deciles indicate the relative proportion.

## Subclass and Class Criteria Climate

In considering CLI classification in the context of the whole province of Ontario, climate is the single most important factor. For CLI evaluation in Ontario, climate is characterized by two basic parameters: average annual precipitation, and average annual heat energy during the growing season. Annual precipitation is considered to be non-limiting for the whole province while heat energy and growing season length become generally more limiting with latitude. Subclass C, the climatic limitation, does not generally apply in southwestern, south-central and southeastern Ontario. See Subclass C – Adverse Climate.

## Soil Texture Class Groupings

The soil texture classes have been aggregated into Soil Texture Groups (Table 1) to enable easier definition of those Subclass Guidelines in which soil texture is relevant. Each Soil Texture Group comprises a fairly exclusive range of soil texture classes, including gravelly modifiers.

Table 1. Soil Texture Groups

Group Name	Main Particle Size Characteristics	Textures Included in Group
<b>Very Gravelly</b>	Materials containing >35% gravel by volume or >50% gravel by weight	Any texture with a "very gravelly" modifier but generally associated with textures dominated by medium to coarse sands
<b>Sandy</b>	Total sand fraction > 50% and dominated by fine to coarse sands; clay content <20%.	Coarse sand, loamy coarse sand, coarse sandy loam, sand, loamy sand, sandy loam, fine sand, loamy fine sand; includes "gravelly" modifiers where applicable
<b>Loamy</b>	Materials containing <27% clay; remaining fractions dominated by high contents of very fine sand and/or silt.	Very fine sand, loamy very fine sand, very fine sandy loam, fine sandy loam, silt, silt loam, loam; includes "gravelly" modifiers if applicable
<b>Clayey</b>	Materials containing 27 to 60 % clay.	

		Sandy clay loam* , silty clay loam, clay loam, sandy clay, silty clay, clay
<b>Very Fine Clayey</b>	Materials containing > 60% clay	Heavy clay

\*Clay content of sandy clay loam can be as low as 20%.

### **Subclass D - Undesirable Structure and/or Low Permeability**

Subclass D denotes soils which are difficult to till, or which absorb or release water very slowly, or in which the depth of rooting zone is restricted by conditions other than a high water table or consolidated bedrock. In Ontario this Subclass is based on the existence of critical clay contents in the upper soil profile. These soils are generally more susceptible to compaction than are lighter textured soils. Table 2 gives the criteria for applying Subclass D.

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#### **Table 2. Determination of Subclass D (undesirable structure and/or low permeability)**

Class 2D: The top of a clayey horizon >15 cm thick occurs within 40 cm of the soil surface. Clayey materials in this case must have >35% clay content.

Class 3D: The top of a very fine clayey (clay content >60%) horizon >15 cm thick occurs within 40 cm of the soil surface.

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### **Subclass E – Erosion**

Subclass E is applied to soils which have been badly damaged by erosion. The productivity of such soils is therefore reduced. Organic matter, topsoil and subsoil losses in these soils reduce yields. In extreme situations, where erosion has caused deep gullies, farm machinery use is obstructed.

### **Subclass F - Low Natural Fertility**

Subclass F denotes soils having low fertility that is either correctable through fertility management or is difficult to correct in a feasible way. Low fertility may be due to low cation exchange capacity, low pH, presence of elements in toxic concentrations (primarily iron and aluminum), or a combination of these factors.

### Table 3. Determination of Subclass E (erosion)

Class 2E: Loss of the original plough layer, incorporation of original B horizon material into the present plough layer, and general organic matter losses have resulted in moderate losses to soil productivity.

Class 3E: Loss of original solum (A and B horizons) has resulted in a plough layer consisting mostly of Loamy or Clayey parent material. Organic matter content of the cultivated surface is less than 2%.

Class 4E: Loss of original solum (A and B horizons) has resulted in a cultivated layer consisting mainly of Sandy parent material with an organic matter content of less than 2%; shallow gullies and occasionally deep gullies which cannot be crossed by machinery may also be present.

Class 5E: The original solum (A and B horizons) has been removed exposing very gravelly material and/or frequent deep gullies are present which cannot be crossed by machinery.

Table 4. Subclass limitations for soils with low natural fertility

Class	Upper Texture Group (>40 and <100 cm from surface)	Lower Texture Group (remaining materials to 100 cm depth)	Drainage Class	Additional Soil Characteristics
<b>2F</b>	Sandy	Sandy or very gravelly	Rapid to imperfect	Neutral or alkaline parent material with a Bt horizon within 100 cm of the surface
<b>3F</b>	Sandy	Sandy or very gravelly	Any drainage class	Neutral or alkaline parent material with no Bt horizon present within 100 cm of surface
<b>3F</b>	Sandy	Loamy or Clayey	Any drainage class	Acid parent material
<b>3F</b>	Loamy or clayey	Any Texture Group		Acid parent material

			Any drainage class	
<b>4F</b>	Sandy	Sandy or very gravelly	Any drainage class	Acid parent material
<b>4F</b>	Very gravelly	Any texture	Rapid to imperfect	Neutral to alkaline parent material
<b>5F</b>	Very Gravelly	Any texture	All drainage classes	Acid parent material

### **Subclass I – Inundation by Streams or Lakes**

This subclass limitation is applicable to soils subject to periodic flooding by streams and lakes which causes crop damage or restricts agricultural use.

### **Table 5. Determination of Subclass I (inundation)**

Class 3I: Frequent inundation with some crop damage; estimated frequency of flooding is less than once every 5 years (Floodplain); includes higher floodplain-terraces on which cultivated field crops can be grown.

Class 5I: Very frequent inundation with some crop damage; estimated frequency of flooding is at least once every 5 years (Floodplain); includes active floodplain areas on which forage crops can be grown primarily for pasture.

Class 7I: Land is inundated for most of the growing season; often permanently flooded (Marsh)

### **Subclass M – Moisture Deficiency**

Subclass M denotes soils which have low moisture holding capacities and are more prone to droughtiness.

Table 6. Determination of Subclass M (moisture deficiency)

<b>Class</b>	<b>Soil Texture Groups</b>		<b>Drainage</b>	<b>Additional Soil Characteristics</b>
	<b>Upper materials<sup>1</sup></b>	<b>Lower materials<sup>2</sup></b>		
<b>2M</b>			Well	



	15 to 40 cm of loamy or finer materials	Sandy to Very Gravelly		
<b>2M</b>	40 to < 100 cm of sandy to very gravelly material.	Loamy to Very Fine Clayey	Well	
<b>2M</b>	Sandy		Rapid to well	Well developed Bt <sup>3</sup> horizon occurs within 100 cm of surface
<b>3M</b>	Sandy material to > 100cm		Rapid	Bt horizon absent within 100 cm of surface
<b>4M</b>	Very Gravelly to > 100 cm		Rapid	Bt horizon present within 100 cm of surface
<b>5M</b>	Very gravelly to > 100cm		Very rapid	Bt horizon absent within 100cm

1. Materials extending from surface to depth indicated.
2. Remaining materials within 100 cm of surface.
3. 'Bt' horizon fairly continuous with average depth at least 10 cm.

#### Subclass P - Stoniness>

The Stoniness Subclass includes soils sufficiently stony to hinder tillage, planting and harvesting of field crops.

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### **Table 7. Determination of Subclass P (surface stoniness)**

Class 2P: Surface stones cause some interference with tillage, planting and harvesting; stones are 15-60 cm in diameter, and occur in a range of 1-20 m apart, and occupy <3% of the surface area. Some stone removal is required to bring the land into production.

Class 3P: Surface stones are a serious handicap to tillage, planting, and harvesting; stones are 15-60 cm in diameter, occur 0.5-1m apart (20-75 stones/100 m<sup>2</sup>), and occupy 3-15% of the surface area. The occasional boulder >60 cm in diameter may also occur. Considerable stone removal is required to bring the land into production. Some annual removal is also required.

Class 4P: Surface stones and many boulders occupy 3-15% of the surface. Considerable stone and boulder removal is needed to bring the land into tillable production. Considerable annual removal is also required for tillage and planting to take place.

Class 5P: Surface stones 15-60 cm in diameter and/or boulders >60 cm in diameter occupy 15-50% of the surface area (>75 stones and/or boulders/100 m<sup>2</sup>).

Class 6P: Surface stones 15-60 cm in diameter and/or boulders >60 cm in diameter occupy >50% of the surface area.

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### **Subclass R - Shallowness to Consolidated Bedrock**

This subclass is applied to soils where the depth of the rooting zone is restricted by consolidated bedrock. Consolidated bedrock, if it occurs within 100 cm of the surface, reduces available water holding capacity and rooting depth. Where physical soil data were available, the water retention model of McBride and Mackintosh was used to assist in developing the subclass criteria.

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### **Table 8. Determination of Subclass R (shallowness to bedrock)**

Class 3R: Consolidated bedrock occurs at a depth of 50-100 cm from the surface causing moderately severe restriction of moisture holding capacity and/or rooting depth.

Class 4R: Consolidated bedrock occurs at a depth of 20-50 cm from the surface causing severe restriction of moisture holding capacity and/or rooting depth.

Class 5R: Consolidated bedrock occurs at a depth of 10 to 20 cm from the surface causing very severe restrictions for tillage, rooting depth and moisture holding capacity. Improvements such as tree removal, shallow tillage, and the seeding down and fertilizing of perennial forages for hay and grazing may be feasible.

Class 6R: Consolidated bedrock occurs at a depth of 10-20 cm from the surface but improvements as in 5R are unfeasible. Open meadows may support grazing.

Class 7R: Consolidated bedrock occurs at < 10cm from the surface.

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<b>Soil Textures and Depths</b>	<b>Depth to Bedrock (cm)</b>	<b>Soil Class (Drainage in place or feasible)</b>	<b>Soil Class (Drainage not feasible)</b>
<b>Very gravelly, sandy, or loamy extending &gt;40 cm from the surface, or, &lt;40 cm of any other textures overlying very gravelly, sandy or loamy textures</b>	>100	2W	4W,5W
<b>&gt;40 cm depth of clayey or very fine clayey textures, or, &lt; 40 cm of any other texture overlying clayey or very fine clayey textures</b>	>100	3W	5W
<b>&lt;40 cm of peaty material overlying any texture</b>	>100	3W	5W
<b>All textures</b>	50-100	4W	5W
<b>All textures</b>	0-50	NA	5W

### **Subclass C - Adverse Climate**

This subclass denotes significant adverse climate for crop production as compared to the "median" climate which is defined as one with sufficiently high growing-season temperatures to bring common field crops to maturity, and with sufficient precipitation to permit crops to be grown each year on the same land without a serious risk of partial or total crop failures.

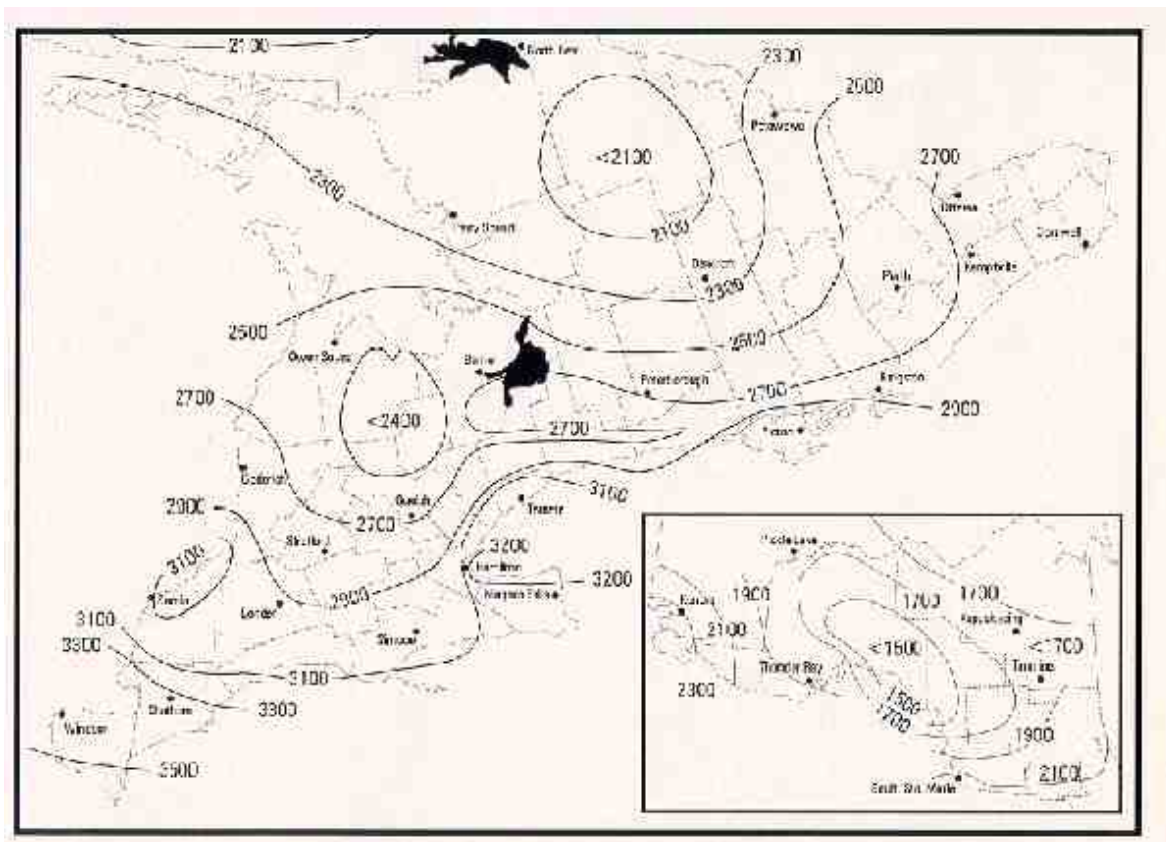
The climate subclass (Table 12) is based upon the average Crop Heat Unit (CHU) value for the area of consideration. The average CHU value is given by the CHU map in Figure 1.

If the C limitation applies in a given area, it is only cited in the classification notation of those soils present which have no other capability limitations, soils that would be class 1 if not limited by climate. Soils of the same area with other limitations are also downgraded by the same relative degree as the best soils but the C limitation is not cited in the classification notation. For example, a soil with a moderate wetness limitation (2W) is designated "3W" (but not "3CW") if it occurs in an area of 1900 to 2300 CHU.

Table 12: Determination of Subclass C (adverse climate)

Class	Crop Heat Units
1	>2300
2C	1900-2300
3C	1700-1900
4C	<1700

**Figure 1:** Average accumulated Crop Heat Units (CHU) available for warm-season crops in Ontario (Brown and Bootsma, 1993)



[Text equivalent](#)

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## **Glossary**

Ap horizon: The surface horizon of a mineral soil where organic matter has accumulated, and then been disturbed by clearing and cultivation; "plough layer".

B horizon: A weathered soil horizon of a mineral soil beneath the A horizon and which is characterized by one or more of the following:

1. Enrichment in silicate clay, iron, aluminum, or organic matter.
2. Alteration by hydrolysis, oxidation or reduction to give a change in colour, structure or both from the horizons above or below.

Bt horizon: B horizon characterized by enrichment of silicate clay as indicated by a higher clay content than the eluviated soil layer above it.



Calcareous soil: a soil containing sufficient calcium carbonate and magnesium carbonate to effervesce carbon dioxide when treated with 0.1 N hydrochloric acid.

Cation Exchange Capacity: The total amount of exchangeable cations that a soil can absorb.

Ck horizon: a C horizon comprising relatively unweathered parent material containing calcium carbonate and magnesium carbonate that is easily detectable with 0.1 N hydrochloric acid.

Coarse fragments: mineral particles which are greater than 2.0 mm in diameter. Includes fine gravel, cobbles, stones and boulders.

Crop Heat Units: values which provide an index of the average total climatic heat energy available for the growth and maturity of warm season crops.

Eolian: sediments transported and deposited by wind.

Erosion: the wearing away of the land surface by running water, wind, ice, or other geological agents, such as gravitational creep.

Field capacity: The amount of water remaining in a soil that has been saturated and then allowed to freely drain.

Floodplain: nearly level land situated on either or both sides of a channel that is subject to overflow flooding; flood prone alluvial areas adjoining inland or coastal waters; floodprone areas of islands.

Gully: a channel which has been caused by erosion due to the convergent flow of heavy water runoff and which interferes with machinery operation.

Igneous rock: rock formed by the cooling and solidification of magma. In the Canadian Shield such rock is usually high in silica, resistant to weathering and acidic.

Marsh: continuously inundated wetland areas supporting hydrophytic vegetation; can include shallow standing water (<0.5 m depth).

Metamorphic rock: rock derived from pre-existing rocks, but differing from them in physical, chemical, and mineralogical properties as a result of natural geological processes, principally heat and pressure, originating within the earth.

**Mineral soil:** a soil consisting predominantly of, and having its properties determined predominantly by mineral matter (sand, silt, clay, coarse fragments). Horizons must contain less than 30 % organic matter by dry weight, with the exception of the surface layer which may exceed 30 %, if it is less than 40 cm thick and comprised of mixed peat, or less than 60 cm thick and comprised of fibric peat.

**Organic soil:** a soil composed primarily of decomposed or partly decomposed plant and animal materials. As such it contains more than 30 % organic matter by dry weight. The total depth of the organic material must exceed 40 cm if the soil is moderately to well decomposed (mesic or humic) , or 60 cm if the material is poorly decomposed (fibric).

**Pedology:** the aspects of soil science dealing with the genesis, distribution, mapping, taxonomy and interpretation of soils.

**pH:** a measure of the acidity or hydrogen ion activity of a soil. It is used as an indicator of the acidity or alkalinity of soils. Ontario soils range from extremely acid to moderately alkaline (pH range 4.0 to 8.0).

**Porosity:** the percent volume of the total bulk soil that is not occupied by solid particles.

**Rill:** a small intermittent water course only a few centimetres wide. Rills do not interfere with tillage or other machinery.

**Sedimentary rock:** rock formed by the lithification of mechanical, chemical, or organic sediments. The principal sedimentary rocks are sandstones, shales, limestones, and conglomerates.

**Soil classification:** the systematic arrangement of soils into categories on the basis of their characteristics. Broad groupings are made on the basis of general characteristics, and subdivisions on the basis of more detailed differences in specific properties.

**Soil drainage:** as a description of the natural condition of the soil, soil drainage refers to the frequency and duration of periods during which the soil is free of saturation. In a well drained soil, excess water (gravitational water) is removed readily but not rapidly. In a poorly drained soil, the root zone is saturated for long periods unless it is artificially drained. In a very rapidly drained soil, water is removed very

rapidly in relation to supply and most crop plants suffer from lack of water.

**Soil fertility:** the status of a soil in the relation to the amount and availability to plants of elements necessary for plant growth.

**Soil horizon:** a distinct layer of soil, approximately parallel to the ground surface, within a soil profile. It differs from adjacent genetically related layers in properties such as colour, structure, texture, and consistence, and chemical, biological, and mineralogical composition. In soil surveys, the soil horizons comprising soil profiles are usually logged to depth of at least one metre. Generally, a soil horizon should more than 5 cm thick to be considered as significant to soil profile characterization.

**Soil Map Unit:** A kind of soil, or a combination of kinds of soils that can be shown as a delineation or polygon on a soil map.

**Soil morphology:** the physical constitution of a soil exhibited by the kinds, thicknesses and arrangements of the soil horizons comprising the soil profile.

**Soil organic matter:** the organic fraction of the soil which includes plant and animal residues

at various stages of decomposition. Expressed as a percentage of dry soil weight.

**Soil Pedon:** The basic soil profile sampling, description and classification unit at a representative site in a soil landscape. A soil pedon can be classified by soil series plus any applicable phases.

**Soil permeability:** the ease with which gases or liquids penetrate or pass through the soil.

**Soil profile:** a vertical section of the soil through all its horizons and extending in to the parent material.

**Soil Reaction:** The degree of acidity or alkalinity of a soil usually expressed as a pH value.

**Soil structure:** the aggregation and arrangement of primary soil particles (sand, silt, clay, organic matter) into discrete soil peds or aggregates.

**Soil texture:** the relative proportions by weight of the various particle size fractions in the mineral fraction of the soil (sand, silt, clay), as

described by the soil texture classes. The sand fraction is further subdivided into coarse sand, sand, fine sand and very fine sand, based on the proportions of various sand sizes within the sand fraction. Therefor, loamy sand textures can be more precisely described as loamy coarse sand, loamy sand, loamy fine sand and loamy very fine sand, as the case may be. Likewise, the sandy loam textures can be classified as coarse sandy loam, sandy loam, fine sandy loam, and very fine sandy loam. When the gravel percentage present is between 20 and 50 percent by weight (equates to approximately 15 to 35% gravel by volume) the texture class is 'gravelly' (e.g. gravelly sandy loam, gravelly loam). When the gravel fraction exceeds 50 % (>35% volume), a "very gravelly" descriptor is used (e.g. very gravelly sandy loam, very gravelly sand).

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**APPENDIX F**  
**SITE PHOTOGRAPHS**



Photo 1:View of signage for Site 1.



Photo 2: View of buildings associated with Site 1.



Photo 3: View of cattle at Site 5.



Photo 4: View of buildings associated with Site 5 cow/calf operation.

☉ 203°S (T) ● 17N 577293 4854336 ±10 m



Site 7

C19065

07 Oct 2021, 11:00:16

Photo 5: View of Site 7 bank barn within PSA.



☉ 265°W (T) • 17N 577417 4854222 ±7 m



Photo 6: View of Site 7 bank barn and wood shed within PSA.

☉ 120°E (T) • 17N 578925 4854619 ±10 m



Photo 7: View of Site 14 Caledon Community Recycling Centre.

☉ 139°SE (T) • 17N 579063 4854538 ±8 m



Site 15

C19065

07 Oct 2021, 12:16:01

Photo 8: View of Site 15 Lafarge property metal Quonset hut.

☉ 118°E (T) • 17N 579276 4854328 ±9 m



Site 15

C19065

07 Oct 2021, 12:29:52

Photo 9: View of Site 15 Lafarge property signage.



Photo 10: View of cattle at Site 20 within the PSA.



Photo 11: View of buildings associated with Site 20.

☉ 68°NE (T) • 17N 576616 4853091 ±3 m



Site 22

C19065

07 Oct 2021, 12:50:45

Photo 12: View of buildings associated with Site 22.

☉ 101°E (T) • 17N 574819 4854857 ±7 m



Site 29

C19065

07 Oct 2021, 13:12:19

Photo 13: Signage for Site 29 property for sale.

**APPENDIX G**  
**LAND USE NOTES**

Land Use Survey Notes – October 7, 2021 – C19065			
Weather	Temperature	Cloud Conditions	Wind
Sunny	18°	Clear	14km/h South

Site No.	Type of Use	Type of Operation	Description of Operation
1	Agricultural	Livestock Operation	Lochlea Angus Website: <a href="https://lochleaangus.ca/">https://lochleaangus.ca/</a> . From website "we are breeding the best bulls we can to the best cows we have, to improve our odds for great offspring". Approximately 30 cattle observed in pasture from roadside.
2	Non-Agriculture	Recreational	TPC Toronto at Osprey Valley Golf course. Three 18 hole courses.
3	Agricultural	Livestock Operation	Cow/calf operation. Approximately 20 cattle observed in pasture. Wood fence with electrical component in good condition. Large, old style wood barn in good condition. Implement shed on site. Manure stored on cement slab outside (observed in air photos).
4	Non-Agriculture	Recreational	Turf Care Centre. Associated with Site #4
5	Agricultural	Retired Livestock Operation	On Subject Lands. Wood shed, bank barn and small shed in fair/good condition. No sign of livestock on site. Appears suitable for housing livestock.
6	Non-Agriculture	Commercial	Gas station and restaurant
7	Agricultural	Cash Cropping	On Subject Lands. Steel sided implement shed in field. Likely used for cash crop implement storage.
8	Agricultural	Remnant	Remnant bank barn on site. Residence remains on site. Old page wire fence.
9	Non-Agriculture	Recreational	Forks of the Credit Provincial Park Parking Lot. One of several parking areas within the study area.
10	Non-Agriculture	Commercial	Caledon Community Recycling Centre
11	Non-Agriculture	Aggregates	Large buildings on site associated with aggregate operations. No

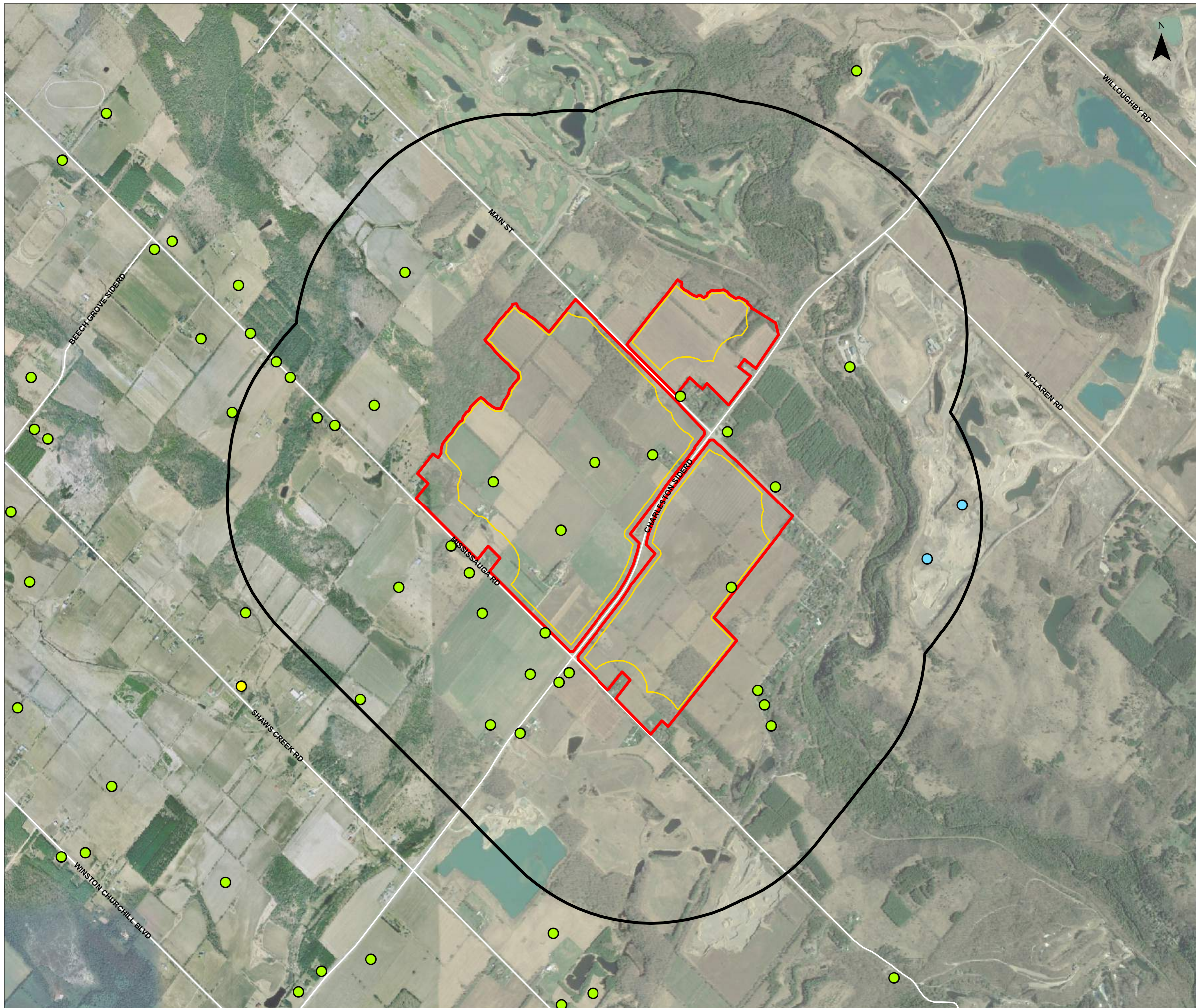
Site No.	Type of Use	Type of Operation	Description of Operation
			agricultural related activities observed.
12	Agricultural	Livestock Operation	On Subject Lands. OFA member. Cow/calf beef operation. Approximately 50 cattle observed from roadside grazing in pasture. Two capped cement silos, large wood bank barn in good condition. Steel sided grain bin(s), cash cropping implements observed on property.
13	Agricultural	Remnant Livestock Operation	On Subject Lands. Old barn foundation remains on site. Poor condition steel sided implement shed also on site.
14	Agricultural	Retired Livestock Operation	On Subject Lands. Wood sided bank barn in fair condition, missing several barn boards. Appears to be retired, but still suitable for housing livestock. Two outbuildings also on site.
15	Agricultural	Cash Cropping	Old steel sided implement shed in fair condition. Likely used for farm implements or general storage.
16	Non-Agricultural	Residential	Shed on site, non-agricultural related. Observed through aerial photography.
17	Agricultural	Retired Livestock Operation	Not visible from road. Air Photos - implement shed, steel sided grain bin and bank barn on site. No sign of livestock or manure stored on site. Still suitable for housing livestock.
18	Agricultural	Livestock Operation	Old, wood sided bank barn in fair condition. Steel grain bins, implement sheds on site. Manure piled adjacent barn. No livestock observed from roadside.
19	Agricultural	Hobby Farm	OFA member. Small hobby farm. Well maintained, small barn on site.

Site No.	Type of Use	Type of Operation	Description of Operation
20	Non-Agriculture	Aggregates	Yellow steel sided implement shed on site. Appears to be part of aggregate operation. Not agriculture related.
21	Non-Agriculture	Residential	Small building on site. Appears to be small workshop. Not suitable for housing livestock.
22	Non-Agriculture	Aggregates	Lafarge - Pinkney Aggregate weigh station
23	Agricultural	Hobby Farm	Small wooden barn on site. Fencing observed on aerial photographs. Small hobby farm
24	Agricultural	Remnant Farm	Small wooden barn on site. Fencing observed on aerial photographs. Small hobby farm.
25	Agricultural-Related Use	Brewery	Goodlot Farmstead Brewing Co. offers beer gardens adjacent to the hop yards, a patio and offers live music. The facility has trails, offers outdoor recreation and an area with sheep (seasonally). <b>Outside of SSA.</b>



<b>Table 1: Land Use Summary</b>			
	Total Number	Active	Retired or Remnant
Agricultural Use	14	Cash Crop – 2 Hobby Farm – 2 Livestock Operation – 4	Retired Operation – 3 Remnant Operation – 3
Agriculture-related Use	1	Brewery – 1	-
On-farm Diversified Use	0	-	-
	Total Number	Type	
Non-Agricultural Use	52	Aggregates – 3 Commercial – 2 Recreational – 3 Residential – approximately 44	

**APPENDIX H**  
**AGRI-FOOD NETWORK MAPPING**



**Legend**

- Primary Study Area
- Secondary Study Area
- Proposed Extraction Area

**Agricultural Systems (OMAFRA)**

- Beverage Product Manufacturing (ConnectON)
- Corn, Wheat, Soy Field (AAFC)
- Vegetable Field (AAFC)

Contains information licensed under the Open Government Licence – Ontario. Base map data from Ontario Ministry of Natural Resources, Ontario GeoHub Land Information Ontario (LIO) Warehouse Open Data Products. <https://geohub.lio.gov.on.ca/> Coordinate system : NAD 1983, UTM Zone 17T. Air photo: Google Earth 2018.

## Appendix G Agricultural Systems

### Agricultural Impact Assessment CBM Caledon Quarry

Prepared for: **CBM Aggregates**

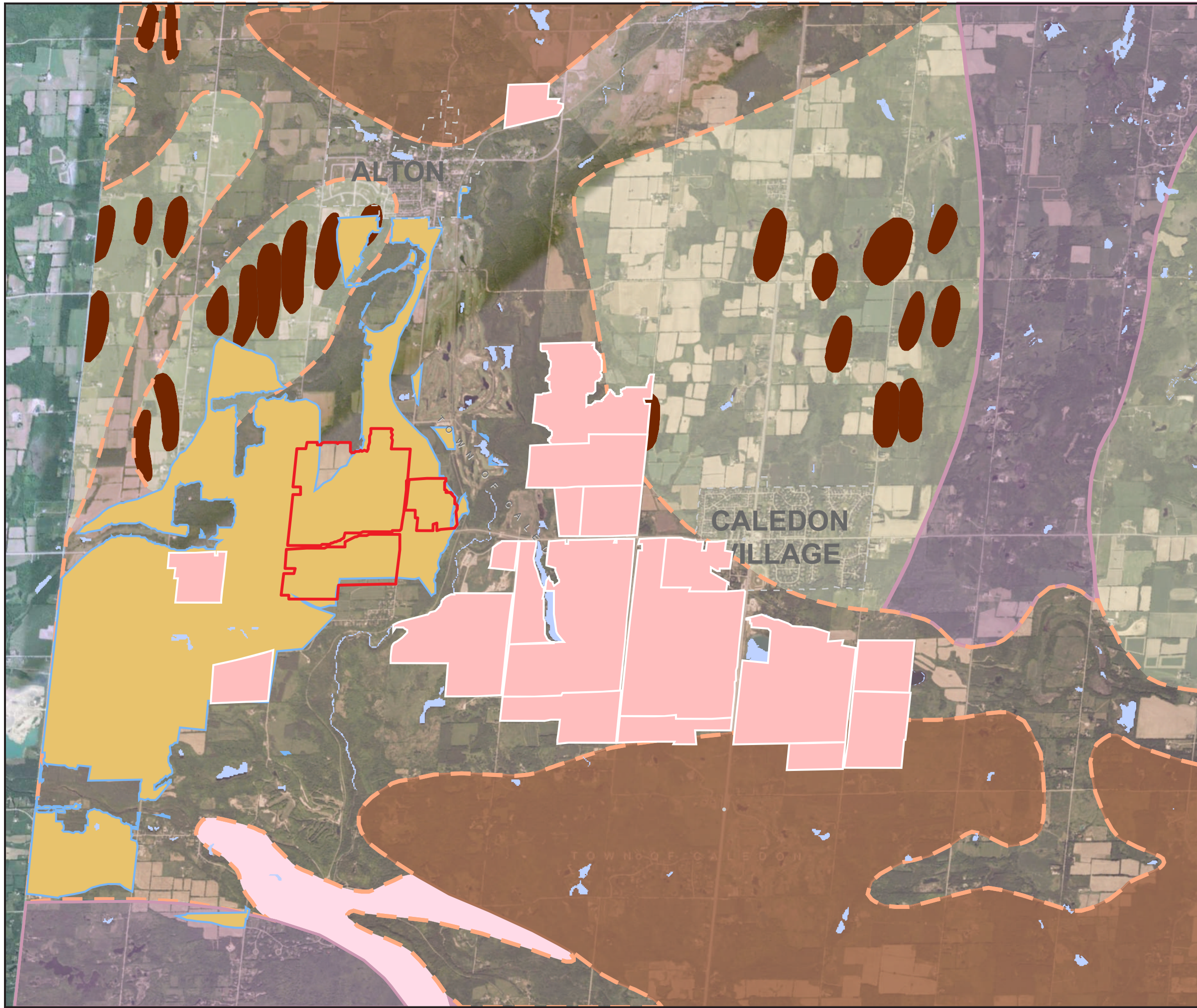
Prepared by: **COLVILLE CONSULTING INC.**

0 500 M  
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Date: September 2022  
 Rev:

FILE: C19065

**APPENDIX I**  
**ALTERNATIVE SITE ASSESSMENT**



- Legend**
- Subject Lands
  - High Potential Mineral Aggregate Resource Areas (HPMARA)
  - Within the Town of Caledon - Region of Peel Schedule C Sept 3 2021 (7979 ha)
  - Active Aggregate Site (MNRF)
- Peel Region HPMARA Sites for the Region of Peel**
- HPMARA Site
- Physiography (Ontario Ministry of Northern Development and Mines)**
- Till Moraines
  - Spillways
  - Kame Moraines
  - Till Plains (Drumlinized)
  - Drumlins

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**Appendix H  
Alternate Site Assessment**

**Agricultural Impact Assessment  
CBM Caledon Quarry**

Prepared for: **CBM Aggregates**

Prepared by: **COLVILLE CONSULTING INC.**

<p>0 <span style="margin-left: 100px;">1 KM</span></p> <p>1:45,000</p>	<p>Date: October 2022</p> <p>Rev:</p>	<p>FILE: C19065</p>
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**APPENDIX J**  
**HPI METHODOLOGY**

### Hoffman Productivity Index

The Hoffman Productivity Index (HPI) was published in ARDA Report No. 4, "The Assessment of Soil Productivity for Agriculture," and is used to relate the productivity of land to the CLI Soil Capability (Hoffman, 1971).

The Hoffman Productivity Indices, also referred to as the Soil Productivity Index, is a method used to assign a parcel of land a single value which represents the overall productivity of the parcel. This value is derived from the sum of the percentage of each CLI Soil Capability Class on the parcel multiplied by the productivity index corresponding to the Soil Capability Class.

The HPI assumes that if the same level of management is applied to areas of different CLI classes, the productivity for each CLI class will differ. Hoffman determined the average yields produced for common field crops on CLI classes 1 through 4 lands across Ontario. He determined that a CLI Class 2 soil produced yields approximately 20% less than a CLI Class 1 soil and therefore has a value of 0.80 relative to a CLI Class 1 soil. The value for a CLI Class 3 soil is 0.64 and for a CLI Class 4 soil the value is 0.49. The values for lower capability soils (i.e., CLI Classes 5, 6, & 7) can be obtained by extrapolation of these results.

An area's HPI or Soil Productivity Index is calculated as follows:

$$\text{Soil Productivity Index} = (\text{proportion of area of Class 1 soils} \times 1.0) + (\text{proportion of area of Class 2 soils} \times 0.8) + (\text{proportion of area of Class 3 soils} \times 0.64) + (\text{proportion of area of Class 4 soils} \times 0.49) + (\text{proportion of area of Class 5 soils} \times 0.33) + (\text{proportion of area of Class 6 soils} \times 0.17) + (\text{proportion of area of Class 7 soils} \times 0.02)$$

Once a Soil Productivity Index is calculated we can then relate the value back to its CLI Class equivalent. The table below illustrates the range of values which can be directly correlated to the equivalent CLI Class.

<b>Total Soil Productivity Index Rating</b>	
<b>CLI Class</b>	<b>Soil Productivity Index Range</b>
1	0.90 – 1.00
2	0.73 – 0.89
3	0.58 - 0.72
4	0.43 - 0.57
5	0.28 - 0.42
6	0.10 - 0.27
7	0.00 – 0.09