

AGRICULTURAL IMPACT ASSESSMENT FOR REDFORD PIT EXPANSION

PREPARED FOR:



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1. INTRODUCTION

1.1 Retainer

Colville Consulting Inc. was retained on February 8, 2023 by Walker Aggregates of the Grey-Bruce Region to prepare an Agricultural Impact Assessment (AIA) for a Class A pit above the water table on Part Lot 20, Concession 5, Bentinck (133832 Allan Park Road, West Grey). These lands, herein referred to as the Subject Lands, are located immediately east of Walker Aggregates (Walker) Redford Pit (ARA License No. 624883). Although the proposal can be seen as an expansion of the existing Redford Pit, a new and separate ARA license application is being submitted for the Subject Lands. The Subject Lands are designated “Agricultural” in Schedule A (Map 3) and “Aggregate Resource Area” in Schedule B (Map 3) of the Grey County Official Plan. The Agricultural land use designation is used to identify prime agricultural areas within the County of Grey.

1.2 Professional Qualifications

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 Grey County on a number of agricultural-related projects including the preparation of AIAs for proposed aggregate operations and other proposed non-agricultural uses in prime agricultural areas.

This study was led by Sean Colville, who has over 35 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 OMAFRA in the preparation of guidelines for AIAs relating to aggregate extraction and assisted in developing methodologies for progressive agricultural rehabilitation of pits and quarries in prime agricultural areas.

John Liotta was the Project Manager for this project and was responsible for completing the field investigations and the preparation of the AIA. John has over 5 years of formal education in Environmental and Agricultural Planning and has assisted in preparing a number of AIAs with Colville Consulting Inc. The CVs of Sean Colville and John Liotta can be found in Appendix A.

1.3 Purpose of Study

The Provincial Planning Statement requires the completion of an AIA for any new or expanding non-agricultural uses in prime agricultural areas. This AIA has been prepared in accordance with the Ontario Ministry of Agriculture, Food and Rural Affairs’ (OMAFRA) draft Agricultural Impact Assessment Guidance Document (2018). The purpose of the AIA is to assess and evaluate the potential impacts of the proposed expansion of the Redford Pit on the Agricultural System. In cases where impacts cannot be avoided, the AIA recommends ways to minimize and mitigate adverse impacts. In accordance with provincial policy, a rehabilitation plan will be developed as part of this study. This AIA will also determine

whether the proposed expansion of the Redford Pit will comply with the Provincial agricultural policies, as well as those of the County of Grey.

1.4 Study Area

The Study Area is located within a prime agricultural area. To be consistent with the Draft Agricultural Impact Assessment Guidance Document (2018), the Study Area includes a Primary and Secondary Study Area, referred to together as the study areas. For this AIA, the Primary Study Area encompasses the Subject Lands and is referred to as such. All lands within approximately 1000 meters (1 km) of the Subject Lands comprise the Secondary Study Area. We refer to the Secondary Study Area simply as the Study Area. Both the Primary and Secondary Study Areas are shown in Figure 1.

1.4.1 Primary Study Area

The Subject Lands are located at Part of Lot 20, Concession 5, Bentinck (133832 Allan Park Road, West Grey). They are located west of Allan Park Road, south of Concession Road 6, east of Grey Road 3, and north of Concession Road 4. These lands are primarily designated “Agricultural” in Schedule A (Map 3) of the County of Grey Official Plan, with a small portion of “Hazard Lands” located in the southeastern corner of the parcel. The Subject Lands have also been identified as being part of the “Aggregate Resource Area” in Schedule B (Map 3) of the County of Grey Official Plan.

The parcel is a rectangular shape and is approximately 20.8 ha (51.4 acres) in size. The majority of the Subject Lands are in active agricultural production of common field crops. A dwelling and small shed-like structures are located on the property, but there is no farm infrastructure present. Additionally, there are hedgerows along the western border and a small woodlot in the northern portion of the Subject Lands.

1.4.2 Secondary Study Area

The Secondary Study Area (Study Area) includes all lands within approximately 1 km (1000 m) of the Subject Lands’ boundaries. The Study Area is generally bounded to the west by Grey Road 3, to the east by Mulock Road, to the north by Concession Road 6, and to the south approximately 500 m south of Concession Road 4.

The Study Area is designated as “Agricultural”, “Rural”, and “Hazard Lands” in Schedule A (Map 3) of the County of Grey Official Plan. The Study Area has also been identified as part of the “Aggregate Resource Area” and “Mineral Resource Extraction; Licensed Pits and Quarries” in Schedule B (Map 3) of the County of Grey Official Plan.

1.5 Description of Proposed Development

Walker currently operates the Redford Pit (ARA License No. 624883), located immediately to the west of the Subject Lands. The licensed area is 40.8 ha (100.8 acres) and maximum annual tonnage for extraction of 100,000 tonnes. Walker proposes an expansion to their operation by applying for a new Category 3, Class A License (pit above the water table) on the Subject Lands. The proposed expansion seeks to license the entirety of the Subject Lands (20.8 ha) with a maximum limit of extraction of 13.8 ha (34.1 acres) and maximum annual tonnage for extraction of 300,000 tonnes.

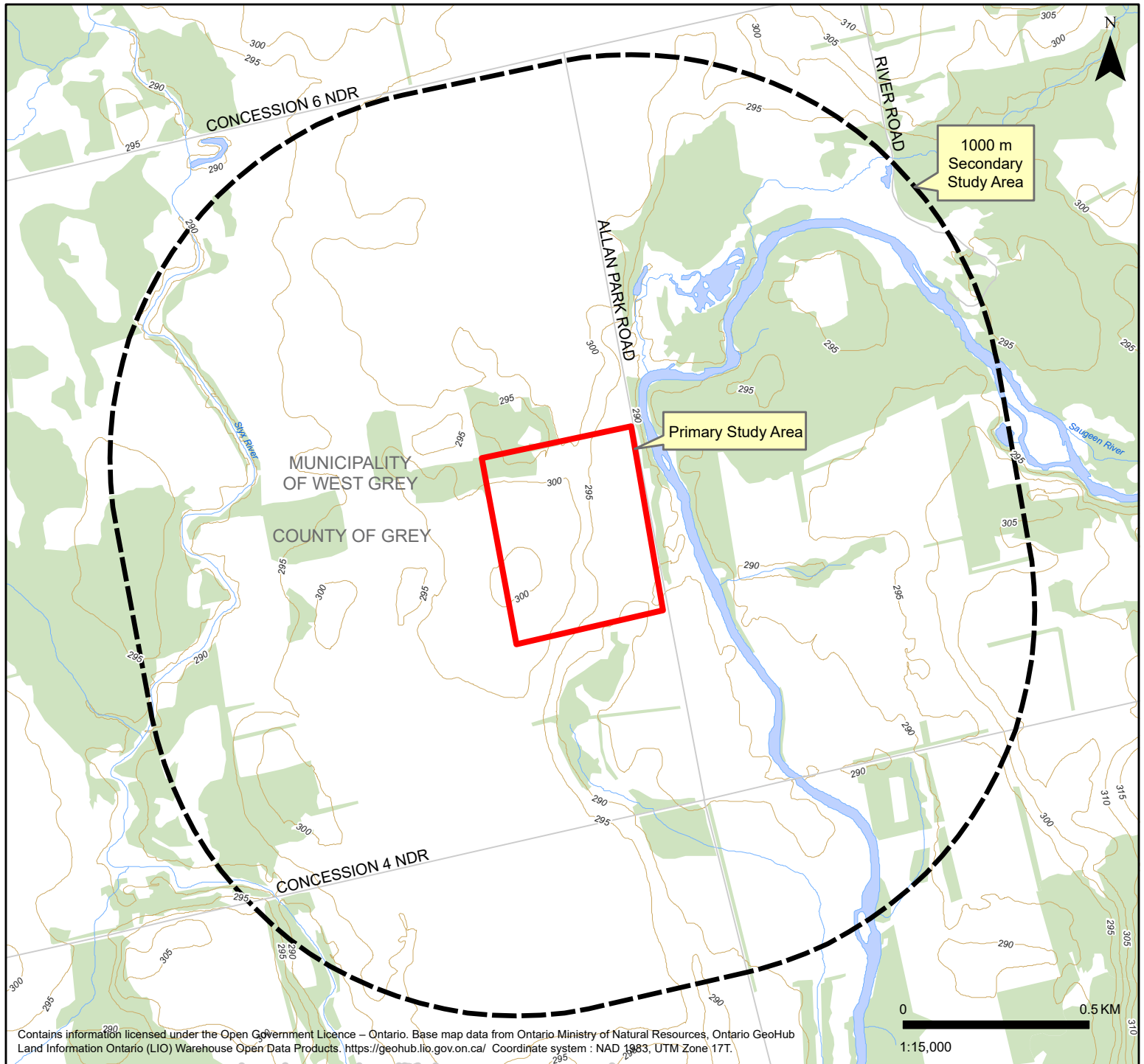


Figure 1
Location of Subject Lands

Agricultural Impact Assessment
Walkers Redford Pit Expansion
West Grey

Prepared for:



Prepared by:



DATE: June 2025

FILE: C22087

Walker is proposing a 2-phase, 1-lift extraction operation. Extraction will begin at the southwestern corner of Phase 1 and proceed northeasterly through Phase 2. Phases may overlap as one phase is prepared for extraction and the previous phase is nearing depletion and undergoing progressive rehabilitation.

The proposed expansion of the Redford Pit is for above the water table extraction. Therefore, following aggregate extraction activities, the lands will be restored to an agricultural condition similar to the existing conditions. This will be achieved through the implementation of a Rehabilitation Plan developed using the methods outlined in Appendix B: Rehabilitation Information and Resources contained within OMAFRA's Draft Agricultural Impact Assessment Guidance Document. Progressive rehabilitation shall commence as the horizontal limit of extraction and/or maximum depth of extraction are reached in any deleted, inactive part of each phase.

2. SCOPE OF STUDY

The scope of the AIA will follow the methodology recommended in the draft Agricultural Impact Assessment Guidance Document (2018). It includes:

- ♦ a review of applicable agricultural policies and other background information and land use information for lands within the surrounding area (e.g., aerial photography);
- ♦ a review of data sources such as AgMaps, the Agricultural Systems Portal, and OMAFRA's digital soil resource database (for soil and CLI information, parcel fabric and land fragmentation, artificial drainage, agri-food components, etc.);
- ♦ a land use survey of all lands within one kilometer (1.0 km) of the Subject Lands and a characterization of the area;
- ♦ a detailed soil survey and an assessment of the soil capability for common field crop production using the Canada Land Inventory (CLI) classification system;
- ♦ the collection of topsoil and subsoil samples to obtain the pre-extraction condition (baseline) within the proposed licenced area
- ♦ an assessment of the level of fragmentation of agricultural lands in the Study Area;
- ♦ an assessment of the potential impacts of the pit expansion on the agricultural system, agricultural resources, farm operations, and the broader agri-food network;
- ♦ the identification of net impacts, mitigation measures and recommendations that can be implemented to avoid or minimize potential impacts;
- ♦ the creation of a rehabilitation plan to restore the lands to an agricultural condition similar to, or better than, the pre-extraction conditions;
- ♦ a review of the site plan to ensure consistency with the rehabilitation plan;
- ♦ an assessment of the proposed pit expansion's consistency with agricultural policies of the Provincial Planning Statement (PPS), the Aggregate Resources Act, and the County of Grey Official Plan; and
- ♦ the preparation of a report summarizing our findings.

3. METHODOLOGY

The study methodology for the AIA was prepared in accordance with OMAFRA's Draft AIA Guidance Document. 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 development will be considered and recommendations to avoid and/or minimize potential impacts will be made. Given that rehabilitation of the lands is feasible due to extraction occurring above the water table, the AIA will develop a rehabilitation plan to restore the lands to agriculturally capable lands post-extraction. Appendix B of OMAFRA's Draft AIA Guidance Document outlines the appropriate steps to be considered when developing the progressive rehabilitation plan. The AIA also assesses the development's conformity with provincial, regional, and local agricultural policies.

3.1 Background Data Collection

Information sources reviewed for this study included:

- ♦ The County of Grey Official Plan and associated Land Use Schedules (2023);
- ♦ Provincial Planning Statement (2024);
- ♦ Aggregate Resources Act (R.S.O. 1990);
- ♦ Proposed Excess Soil Policy Framework (Government of Ontario, 2016);
- ♦ Soil Survey of Grey County – Report No. 17 of the Ontario Soil Survey (1981);
- ♦ OMAFRA's digital Soil Resource Database to obtain soil series and CLI agricultural capability mapping and data;
- ♦ OMAFRA's Artificial Drainage Systems mapping;
- ♦ OMAFRA's AgriSuite, AgMaps and Agri-Systems databases;
- ♦ OMAFRA's Classifying Prime and Marginal Agricultural Soils and Landscapes: Guideline for Application of the Canada Land Inventory in Ontario (2016);
- ♦ Ontario Centre for Soil Resource Evaluation's Field Manual for Describing Soils in Ontario (1993);
- ♦ Agriculture and Agri-Food Canada's Canadian System of Soil Classification (1982);
- ♦ OMAFRA's Draft Agricultural Impact Assessment (AIA) Guidance Document (2018); and
- ♦ Ortho-rectified, digital aerial photography viewed using Google Earth™.

Aerial photography covering the study areas and the parcel fabric were examined to assess the presence of non-agricultural land uses, agricultural uses, agriculture-related uses, on-farm diversified uses, and the level of fragmentation based on the lot fabric. This review will provide a general impression of agricultural activity and level of agricultural investments in the area.

The AIA also relied on information provided by Walker Aggregates, Skelton Brumwell, and other study team members.

3.2 Field Inventories

Field inventories were completed on May 17, 2023, and May 19, 2023. Field inventories included a soil survey, the collection of topsoil and subsoil samples, and a reconnaissance level land use survey. The land use survey was completed to identify agricultural operations, relative level of investment in agriculture, the cropping pattern observed, and the mix of non-farm land uses within the study areas and surrounding area.

3.2.1 Land Use Survey

The reconnaissance level land use survey was completed on May 19, 2023. The land use survey identified the number and type of agricultural operations (both active and retired), agriculture-related uses, on-farm diversified uses, the extent and type of non-agricultural land uses, and other aggregate operations in the area. Field crops observed were identified and mapped. Visual evidence of agricultural land improvements was recorded where identified.

3.2.2 Soil Survey

The soil survey was used to refine county level soils information and assess the Canada Land Inventory (CLI) capability of the soils on the Subject Lands. The method used to describe the soil profiles was consistent with the Canadian System of Soil Classification (CSSC, Agriculture and Agri-Food Canada, 1982) and the Field Manual for Describing Soils in Ontario (Ontario Centre for Soil Resource Evaluation, 1993).

The Subject Lands were traversed on foot on May 17, 2023, and the soil profile was exposed at ten locations using a hand-held Dutch auger. The physical properties of the soil, such as the mode of deposition, soil horizons and horizon depths, soil texture, drainage, and stoniness, were described and recorded on field data sheets. The slope percentage within the soil polygons was measured using a hand-held clinometer.

3.2.3 Establish Baseline Conditions

Topsoil and subsoil samples were collected on May 17, 2023, using a soil probe around each soil survey point. Soil samples were collected from at least five different locations around each soil inspection location. These five samples were then combined to create a composite sample. The well mixed composite sample was then packaged and labeled (e.g., location and soil horizon) before being sent to SGS Agriculture and Food, a provincially accredited laboratory. The physical and chemical properties were analyzed to obtain the pre-extraction soil conditions. The pre-extraction properties will be compared to samples collected annually as part of the progressive rehabilitation monitoring program to be developed for the property. It is anticipated that these efforts will provide confirmation that the lands will have been restored back to an agricultural condition similar to the pre-extraction conditions.

3.3 Evaluation of the Agricultural System

An 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. An evaluation of the Agricultural System and associated features within the study areas was completed through a reconnaissance level land use survey on May 19, 2023. Our observations were supplemented by online reviews of aerial photographic imagery and data accessible from the Agricultural Systems Portal.

The evaluation of the Agricultural System within the study areas is used to identify the features and provide insight into the significance of those features on the overall Agricultural System.

3.4 Identification of Potential Impacts and Mitigation Measures

Impacts on the Agricultural System resulting from new or expanding non-agricultural uses in prime agricultural areas should be avoided whenever possible. To be consistent with the draft AIA Guidance document, potential negative impacts of the proposed Redford Pit expansion will be assessed through the following:

- ♦ 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 the Agricultural System;
- ♦ 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 impact 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 impact 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, light, and traffic on agricultural operations and activities;
- ♦ potential compatibility concerns such as normal farm practices facing challenges with nuisance complaints, vandalism, and trespass that may occur with the proposed aggregate operation expansion; and
- ♦ the inability or challenges associated with the movement farm vehicles and equipment along roads due to increased traffic along haul routes, changes in road design, etc.

Following the identification of potential impacts, mitigation measures to avoid or minimize potential impacts were developed.

3.5 Development of Rehabilitation Plan

The development of a Rehabilitation Plan for the Redford Pit expansion is an essential component of mitigating impacts on the Agricultural System. The Rehabilitation Plan will include recommendations for

restoring a significant portion of the lands to agricultural conditions similar to the pre-extraction conditions. The Rehabilitation Plan developed for the Redford Pit expansion will follow the procedures outlined in Appendix B: Rehabilitation Information and Resources of OMAFRA's Draft Agricultural Impact Assessment Guidelines Document.

3.6 Assessment of Consistency with Agricultural Policies

All planning decisions must be consistent with the PPS and comply with applicable provincial land use plans. Municipalities also have their own agricultural policies that the proposed use must adhere to. A background review of all applicable provincial, regional, and local policies related to agriculture was undertaken. Policies applicable to the proposed pit expansion were identified and assessed for conformance as part of this AIA.

3.7 Consultations

Pre-consultation with stakeholders is an important part in the process of completing of an AIA. It is expected that through the formal planning process (rezoning and ARA Licence) that additional consultations will be undertaken. Any new information or issues that arise as a result of further consultations, which substantially affect the AIA, will be addressed in an addendum to the AIA.

4. AGRICULTURAL POLICY

4.1 Provincial Planning Statement

In 2022, the Province initiated a review on approaches for leveraging the housing supportive policies of the *Provincial Policy Statement* and A Place to Grow: Growth Plan for the Greater Golden Horseshoe (Growth Plan), removing barriers and continuing to protect the environment through a streamlined province-wide land use planning policy framework. The feedback from this review contributed to the development of the *Provincial Planning Statement*. The PPS was issued under Section 3 of the Planning Act and came into effect on October 20, 2024. The PPS replaces the policies of the Provincial Policy Statement and the Growth Plan.

4.1.1 Prime Agricultural Areas

Section 4.3 of the Provincial Planning Statement specifically deals with agricultural policy. Section 4.3.1.2 states that “As part of the agricultural land base, prime agricultural areas, including specialty crop areas, shall be designated and protected for long-term use for agriculture”. The Provincial Planning Statement 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.

4.1.2 Non-Agricultural Uses in Prime Agricultural Area

Section 4.3.5 of the PPS outlines policies for the establishment of non-agricultural uses in prime agricultural areas. Section 4.3.5.1 states:

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

- a) extraction of minerals, petroleum resources and mineral aggregate resources; 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 identified in the official plan as provided for in policy 2.1.3 for additional land 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.*

Only Policy 4.3.5.1a) applies to the proposed expansion of the Redford Pit. Policy 4.3.5.1b) does not apply and therefore an assessment of alternative locations is not required for new or expanding aggregate operations.

Section 4.3.5.2 states that “Impacts from any new or expanding non-agricultural uses on the agricultural system are to be avoided, or where avoidance is not possible, minimized and mitigated as determined through an agricultural impact assessment or equivalent analysis, based on provincial guidance.”

4.1.3 Mineral Aggregate Resources

Section 4.5 of the PPS outlines policies for mineral aggregate resources. Section 4.5.3 of the PPS outlines policies for the rehabilitation of lands where mineral aggregates are to be extracted, and states:

1. *Progressive and final rehabilitation shall be required to accommodate subsequent land uses, to promote land use compatibility, to recognize the interim nature of extraction, and to mitigate negative impacts to the extent possible. Final rehabilitation shall take surrounding land use and approved land use designations into consideration.*
2. *Comprehensive rehabilitation planning is encouraged where there is a concentration of mineral aggregate operations.*
3. *In parts of the Province not designated under the Aggregate Resources Act, rehabilitation standards that are compatible with those under the Act should be adopted for extraction operations on private lands.*

Section 4.5.4 of the PPS outlines policy for extraction of mineral aggregates in prime agricultural areas, and states:

1. *In prime agricultural areas, on prime agricultural land, extraction of mineral aggregate resources is permitted as an interim use provided that:*
 - a) *impacts to the prime agricultural areas are addressed, in accordance with policy 4.3.5.2; and*
 - b) *the site will be rehabilitated back to an agricultural condition.*
2. *Despite policy 4.5.4.1.b), complete rehabilitation to an agricultural condition is not required if:*
 - a) *the depth of planned extraction makes restoration of pre-extraction agricultural capability unfeasible; and*
 - b) *agricultural rehabilitation in remaining areas is maximized.*

The licence application being prepared will involve extraction above the water table. Therefore, rehabilitation to an agricultural condition is feasible and a rehabilitation plan will be developed to bring the Subject Lands back to an agricultural after use.

4.2 Aggregate Resources Act

The Aggregate Resources Act (ARA) issued by the Ministry of Natural Resources (MNR) provides direction for the management of aggregate resources in Ontario, regulates aggregate operations in the province, outlines requirements for the rehabilitation of extracted land, and aims to minimize adverse impacts on the environment. The ARA was most recently updated on June 1, 2021. The Act includes rules regarding issuing of licenses and permits, changes to approvals, inspections, complaint response, compliance, and rehabilitation monitoring. In considering whether a license should be issued, the Minister of Natural Resources must have regard for “any possible effects of the operation of the pit or quarry on agricultural resources”. This AIA will identify the potential impacts on agricultural operations associated with the proposed extraction operation.

4.3 County of Grey Official Plan

The Subject Lands are designated “Agricultural” within the County of Grey Official Plan (effective date June 7 2019). Section 5 of the County Official Plan contains the Agricultural and Rural Areas policies and objectives. Section 5.2 deals with Agricultural designated lands and states that “the *Agricultural land use type*, as shown on Schedule A, also contains policies for the protection of *Aggregate Resource Areas* identified on Schedule B to this Plan.”.

Section 5.2.1 outlines policy for permitted uses in the Agricultural land use type and states in part:

“Permitted uses in the Agricultural land use type include:

- h) Sand and/or gravel operations proposed within Aggregate Resource Areas on Schedule B to this Plan;
- i) Licensed aggregate operations identified as Mineral Resource Extraction on Schedule B;
- j) Wayside pits and quarries;”

The AIA will consider the potential impacts of the proposed pit expansion on the Agricultural System.

5. EVALUATION OF AGRICULTURAL RESOURCES

5.1 Physiography

The Subject Lands are located within the Horseshoe Moraines physiographic region (Chapman and Putnam, 1984) in the “toe” of the horseshoe. This area is covered by a complex of till ridges, kame moraines, outwash plains, and spillways, interspersed with more gently rolling till plains and drumlinized areas. The tills within this area are typically moderately textured (i.e., loamy) and may contain numerous stones and boulders, mainly derived from dolostone of the Amabel Formation.

The Study Area is located within the spillways of the Horseshoe moraine. Spillways, otherwise known as glacial meltwater drainage channels, are entrenched and typically occupied by streams. They are usually partially or entirely covered by gravel beds at one or more levels. Furthermore, in this area there are some large, steeply sided drumlinized landforms comprised of a bouldery till.

Styx River lies west of the Subject Lands and flows northwards to the Saugeen River, east of the Subject Lands, and its tributaries which drain to Georgian Bay.

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 Hanover station (1981-2010) were obtained from the online database (Appendix B). Environment Canada’s Hanover station provides the most up to date climate data and is approximately 11.51 km from the Subject Lands. Records show that this area receives an average of 1087.1 mm of precipitation annually: 819.7 mm of rainfall and 271.3 cm of snowfall. The daily average temperature ranges from a high of 26.1°C to a low of -11.0°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. On average, the last spring frost in the Hanover area occurs on May 24th. The first fall frost is expected on September 26th. This provides the surrounding area with a growing period of approximately 124 days, accumulating approximately 2800 crop heat units (CHU) during that period. The climate in the Hanover area provides a good overall growing period that can support a wide range of crops.

5.3 Agricultural Crop Statistics

Agricultural crop statistics are available through Statistics Canada’s Agriculture and Food Statistics Census of Agriculture and has been compiled by OMAFRA. The study areas are located within the Census Western Ontario Region, Grey County. Agricultural crop statistics for Grey County were obtained from the online database and are included in Appendix C. This data provides a general overview of agriculture and agri-food operations in the area but is unlikely to be inclusive of all operations present at the time of this report.

The County and Township Agricultural Profile for Grey includes data from the 2011, 2016 and 2021 census periods. The total number of farms in West Grey increased from 416 in 2011 to 476 in 2016, to 478 in 2021. Total cropland increased from 41,719 acres in 2011 to 51,732 acres in 2016, to 59,651 acres in 2021.

Field crops in Grey County include winter wheat, oats for grain, barley for grain, mixed grains, corn for grain, corn for silage, hay, soybeans, and potatoes. Field crop production has increased between 2011 and 2021, for winter wheat, oats for grain, corn for grain, corn for silage, hay, and soybeans, whereas barley for grain, mixed grains, and potato production decrease marginally.

Fruit crops in West Grey include apples, strawberries, and raspberries. Total fruit crop production increased from 45 acres in 2011 to 78 acres in 2016 before decreasing to 67 acres in 2021. Vegetable crops include sweet corn, tomatoes, green peas, and green or wax beans. Total vegetable crop production increased from 25 acres in 2011 to 91 acres in 2016 before decreasing to 37 acres in 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 in the Greenbelt Plan area: the Niagara Peninsula Tender Fruit and Grape Area and the Holland Marsh. The Subject Lands are not located in either of these specialty crop areas, and specialty crops are not grown in the Study Area.

5.5 Regional Soils

5.5.1 Soil Survey

The soil mapping in the *Soil Survey of Grey County* – Report No. 17 of the Ontario Soil Survey (Gillespie and Richards, 1954) includes a soil map that shows the distribution of the various soil series mapping in the County. 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 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 April 2023.

The Soil Survey of Grey 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 Subject Lands are predominantly comprised of Sargent Loam (96.68%), Gilford Loam (2.71%), and Bottom Lands (0.61%) soils. Regional scale soil mapping is shown in Figure 2.

Sargent Loam

The Sargent soil series is the well drained member of the Sargent catena. These soils have developed on well sorted gravelly materials with a shallow overburden of finer materials, resulting in rapid internal drainage. The Sargent series typically occurs on smooth, very gently sloping topography, but is occasionally found on irregular, gently sloping topography. The soil is moderately stony, with significant amounts of cobble, which require picking for cultivation. The surface horizon consists of very dark brown, loamy textures with a granular structure. The B horizons consists of yellowish-brown, loamy textures and dark brown, clay loam textures that are gravelly and have a granular structure. The C horizon is a yellowish-brown, calcareous, well sorted gravel.

These soils are droughty and have low fertility, which has a moderately severe limitation for common crop production. The Sargent Loam soils are rated as CLI Class 3FM (fertility and moisture deficiency limitations) and are mapped on approximately 96.68% of the Subject Lands.

Gilford Loam

The Gilford soil series is the poorly drained member of the Sargent catena. These soils have developed from a well sorted gravel in depressional areas which have a high water table. The surface horizon consists of black, loamy-textures with a granular structure that is highly friable. The mottled B horizon is often loamy textured and contains a mix of gravel, cobbles and stones. The calcareous parent material (C horizon) generally consists of a gleyed, calcareous, gravelly sand.

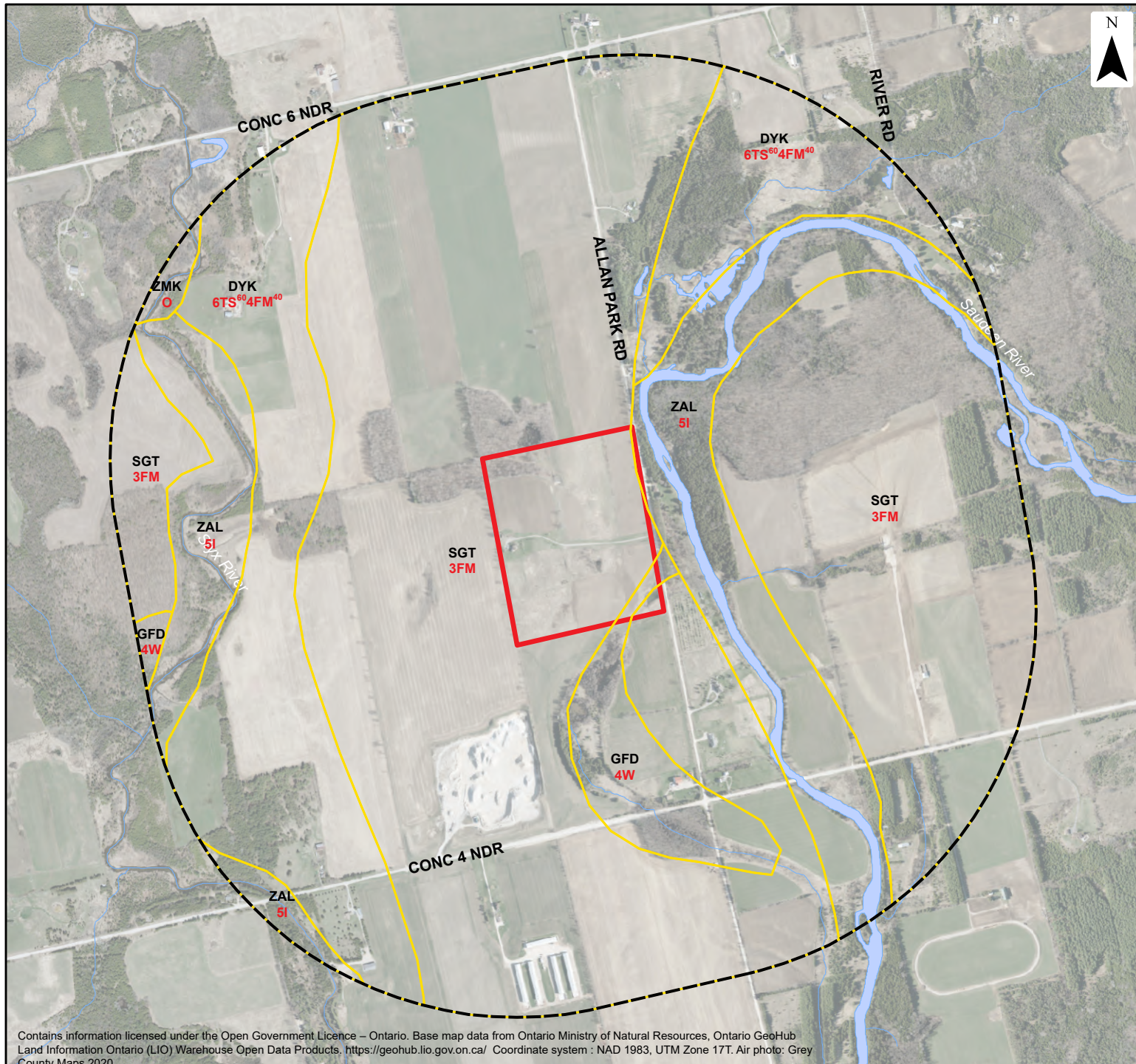
Crop production of Gilford soils is primarily limited by poor soil drainage. Where drainage is improved, some limited common field crops can be produced. However, they are still rated as CLI Class 4W (excess water limitations). These soils are only mapped on approximately 2.71% of the Subject Lands.

Bottom Land

Bottom Land soils are typically variably drained and often found along water courses and subject to periodic flooding. These soils are characterized by a dark-coloured surface and a gleyed subsoil. These soils are mapped on approximately 0.61% of the Subject Lands.

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 no major 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).



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Legend

- Primary Study Area
- Secondary Study Area
- Soil (OMAFRA)
- Investigation Point

Soil Series Name → **BGH**
 CLI Class → **4W⁵⁰** ← Percentage of Area
 CLI Subclass

Soil Series

DYK - Donnybrook Sandy Loam
GFD - Gifford Loam
SGT - Sargent Loam
ZAL - Bottom Land
ZMK - Muck

CLI AGRICULTURAL CAPABILITY CLASSES

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

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.

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

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

O - Organic Soils - The CLI Classification system cannot be used to classify areas with organic soils. Organic Soils designated by the letter "O" have no CLI rating.

CLI AGRICULTURAL CAPABILITY SUBCLASSES

F Fertility - low natural fertility
I Inundation - periodic flooding by streams and lakes
M Moisture Deficiently - low moisture holding capability
S Adverse Soil Characteristic - combination of equally severe limitations
T Topography - limited by topography
W Excess Water - presence of excess soil moisture

Figure 2 Regional Soils and CLI

Agricultural Impact Assessment
 Walkers Redford Pit Expansion
 West Grey

Prepared for:

walker
 AGGREGATES

Prepared by:

COLVILLE
 CONSULTING INC.

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Eleven of these subclasses have been adapted to Ontario soils. More information regarding the CLI Classification system is provided in Appendix D.

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 (e.g., lands designated for non-agricultural uses). Table 1 shows that Subject Lands are comprised of CLI Class 3 (96.68%), Class 4 (2.71%), and Class 5 (0.61%).

Figure 2 shows that the majority of the Subject Lands are mapped as the CLI Class 3FM Sargent Loam (96.68%), and to a lesser extent the CLI Class 4W Gilford Loam (2.71%) and the CLI Class 5I Bottom Land soils (0.61%).

Table 1. Regional Soil Series for Subject Lands			
Soil Series	CLI Class	Area (Ha)	% of Subject Lands
Sargent Loam	3FM	20.11	96.68%
Gilford Loam	4W	0.56	2.71%
Bottom Land	5I	0.13	0.61%
Totals		20.80	100.00%

CLI Class 3FM soils have moderately severe limitations for common field crop production due to low natural fertility and moisture deficiency, respectively. CLI Class 4W soils have severe limitations for common field crop production due to the presence of excess water. CLI Class 5I soils have very severe limitations for common field crop production due to inundation by streams or lakes.

5.6 Refined Soil Resources

5.6.1 Detailed Soil Survey

A field visit to the Subject Lands to complete a soil survey was made on May 17, 2023. The purpose of the soil survey is to refine the regional scale mapping as per the OMAFRA Guidelines for Detailed Soil Surveys for Agricultural Land Use Planning. Typically for site specific soil surveys, lands are mapped at a scale of 1:10,000. This equates to an inspection location density of approximately one per two hectares. With the site being just over 20 hectares in size, the soil profile was examined at ten locations within the Subject Lands.

As described in the methodologies section of this report, the Subject Lands were traversed on foot and the soil profile was exposed at ten locations using a hand-held Dutch auger. The physical properties of the soil, such as the mode of deposition, soil horizons and horizon depths, depth to bedrock, soil texture, drainage, and stoniness, were described and recorded on field data sheets. The slope percentage within the soil polygons was measured using a hand-held clinometer.

The soil survey confirmed the presence of the Sargent Loam, Gilford Loam, and Bottom Land soils. Although the clay content observed in the soils identified as Gilford Loam does not match the typical soil profile of a Gilford Loam soil, these soils were characteristic of a poorly drained soil derived from the Sargent catena. Poorly drained soils with higher clay contents are not mapped elsewhere in the

surrounding area, which aided in confirming these soils to be a Gilford Loam. Figure 3 shows the refined soil mapping for the Subject Lands.

Approximately 95.33% of the soils are mapped as Sargent Loam on complex b-Class slopes (0.5 – 2.0%), c-Class slopes (2.0 – 5.0%), e-Class slopes (9.0 – 15.0%), and f-Class slopes (15.0 – 30.0%). The Sargent soil series contains excessive amounts of coarse fragments throughout the soil profile. The coarse fragments range in size from gravels (0.2-8 cm) to cobbles (8-25 cm) and even some stones (>25 cm in diameter). The quantity of coarse fragments in the soil profile frequently restricted the depth that the auger could penetrate the soil. The soil profile, exposed to a depth of 100 cm, was only achieved on two of the ten inspection locations described due to the presence of gravel and cobbles throughout the soil profile. The photos below show the surface conditions, and the prevalence of gravel, cobble and stones associated with the Sargent soils. Additional site photos can be found in Appendix E.



Photo 1



Photo 2



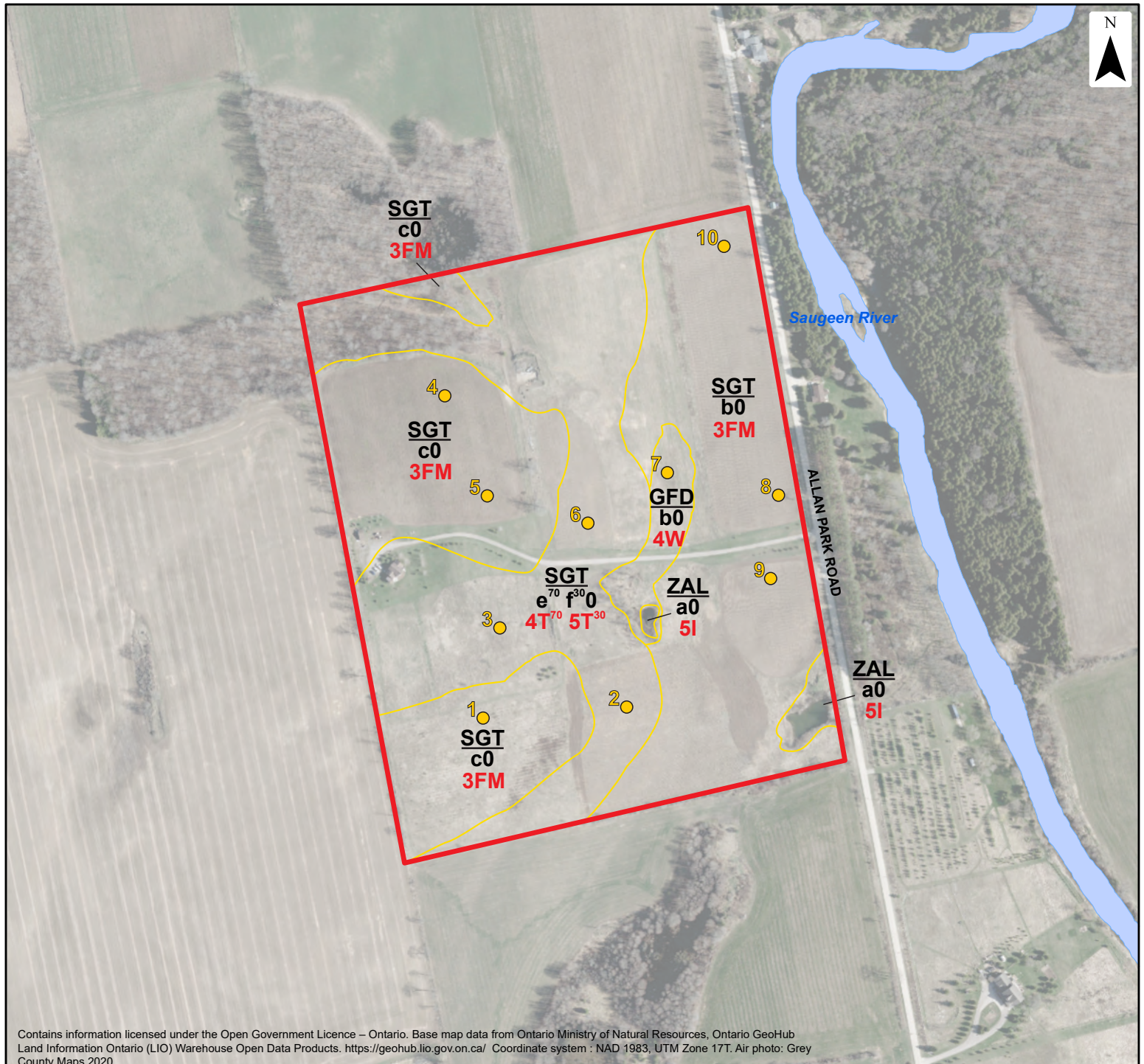
Photo 3



Photo 4

Approximately 3.20% of soils are mapped as Gilford Loam on complex b-Class slopes, and 1.47% of soils are mapped as Bottom Land on complex a-Class slopes (0.0 – 0.5%).

Table 2 shows the area and percentage of each soil series on the Subject Lands. Soil Data sheets completed during the soil survey are provided in Appendix F.



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Legend

Subject Lands

Soil

● Investigation Point

Soil Series Name → **BGH**
Slope Class → **c⁵⁰0** ← Stoniness
Percentage

Soil Series

SGT - Sargent Loam

GFD - Gilford Loam

ZAL - Bottom Land

Slope Classes (%)

a - Level slopes (0.0 - 0.5%)

b - Nearly level slopes (0.5 - 2.0%)

c - Very Gentle slopes (2.0 - 5.0%)

e - Moderate slopes (9 - 15%)

f - Strong slopes (15 - 30%)

Complex Slopes (short, irregular slopes) denoted in lower case

Stoniness/Rockiness

0 - None

CLI Class → **4W⁵⁰** ← Percentage of Area
CLI Subclass

CLI AGRICULTURAL CAPABILITY CLASSES

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

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.

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

CLI AGRICULTURAL CAPABILITY SUBCLASSES

F Fertility - low natural fertility

M Moisture Deficiently - low moisture holding capability

T Topography - limited by topography

W Excess Water - presence of excess soil moisture

Figure 3
Refined Soils and CLI

Agricultural Impact Assessment
Walkers Redford Pit Expansion
West Grey

Prepared for:

walker
AGGREGATES

Prepared by:

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Table 2. Refined Soil Series for Subject Lands

Soil Series	Area (Ha)	% of Subject Lands
Sargent Loam	19.83	95.33%
Slope Class b	6.48	31.16%
Slope Class c	5.78	27.78%
Slope Class e	5.30	25.47%
Slope Class f	2.27	10.92%
Gilford Loam	0.67	3.20%
Bottom Land	0.30	1.47%
Totals	20.80	100.00%

Photos 5 and 6 show the topography and range of slopes on the Subject Lands.



Photo 5



Photo 6

5.6.2 Agricultural Capability

The results of the detailed soil survey were used to refine the CLI capability ratings for the Subject Lands. The agricultural capability for common field crops was interpreted using OMAFRA's *Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for the Application of the Canada Land Inventory in Ontario*.

The detailed soil survey confirmed that the Subject Lands have a mix of prime and non-prime agricultural lands, with CLI capability ratings of CLI Class 3, 4, and 5. The refined CLI capability rating for the Subject Lands are shown in Figure 3 and summarized in Table 3. Approximately 12.26 ha (58.94%) of the Subject Lands are prime agricultural lands, with the remaining 8.54 ha (41.06%) of the Subject Lands being non-prime agricultural lands.

Table 3. Regional Soil Series for Subject Lands

CLI Rating	Soil Series	Area (Ha)	% of Subject Lands
CLI Class 3FM	Sargent Loam on b-Class Slope	6.48	31.16%
CLI Class 3FM	Sargent Loam on c-Class Slope	5.78	27.78%
CLI Class 4W	Gilford Loam on b-Class Slope	0.67	3.20%
CLI Class 4T	Sargent Loam on e-Class Slope	5.30	25.47%
CLI Class 5T	Sargent Loam on f-Class Slope	2.27	10.92%
CLI Class 5I	Bottom Land on a-Class Slope	0.30	1.47%
Total		20.80	100.00%

5.6.3 Evaluation of Agricultural Productivity

The Hoffman Productivity Indices (HPI) are used to relate the productivity of land to the CLI capability based on expected yields. Assuming the same level of management is applied to different CLI classes, the productivity for each class will differ. Hoffman (1971) determined the average yields produced for common field crops on CLI classes 1 through 4 lands. He determined that CLI Class 2 lands produce yields approximately 20% less than CLI Class 1 lands 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 CLI Classes 5, 6, & 7 were obtained through extrapolation. The HPI was calculated for the Subject Lands to assess the relative productivity of the land for common field crop production.

An HPI rating above 0.9 is considered to be equivalent in productivity to a CLI Class 1 soil. An HPI of between 0.73-0.89 is equivalent in productivity to a CLI Class 2 soil, an HPI in the range of 0.58-0.72 is equivalent in productivity to a CLI Class 3 soil, and so forth.

Table 4 below shows the results of the HPI calculations using the CLI classifications as determined through the refined soil survey. The HPI was calculated to be 0.56, which is equivalent in productivity to CLI Class 4 soils.

Table 4. Relative Agricultural Productivity for Subject Lands

CLI Class	Area (HA)	Percentage	Points	HPI	Total Productivity Index Range
1	0.00	0.00%	1	0.00	0.90 – 1.00
2	0.00	0.00%	0.8	0.00	0.73 – 0.89
3	12.26	58.94%	0.64	0.3772	0.58 - 0.72
4	5.97	28.67%	0.49	0.1405	0.43 - 0.57
5	2.57	12.39%	0.33	0.0409	0.28 - 0.42
6	0.00	0.00%	0.17	0.00	0.10 - 0.27
7, O, & NM	0.00	0.00%	0.02	0.00	0.00 – 0.09
	20.80	100.00%		0.5586	CLI Class 4

5.6.4 Baseline Conditions

The chemical analysis of the composite samples collected to determine the baseline conditions are summarized in Table 5. The soil data sheets in Appendix F provide the information on the soil horizon depths from which a soil budget can be developed, and the laboratory results are provided in Appendix G.

Table 5. Average Baseline Conditions

Soil Horizon	Depths (cm)	Range (cm)	Texture	pH	% SOM	P	K	Mg	CEC	K/Mg Ratio	% CaCO ₃
Ap*	21	17-26	Loam	7.5	5.1	11.6	105.3	573.5	19.5	0.2	18.1
B**	27.5	10-43	Loam	7.7	3.3	4.3	70.1	496.0	17.4	0.1	2,386
Ck			Loamy Sand	7.7		2	30	198		0.2	

*Combined A Horizons (based on 10 site locations); **Combined B Horizons (based on 7 site locations); SOM - Soil Organic Matter; P – Phosphorus; K – Potassium; Mg – Magnesium; CEC – Cation Exchange Capacity; K/Mg – Potassium/ Magnesium Ratio; CaCO₃ – %Calcium Carbonate content

Soil Textures

As shown in the table, the soil textures of the Ap and B horizons ranges from sandy loam to loam, and loam based on the average ten samples. One sample, representing a rather small depositional area within the Subject Lands, is heavier textured (silty clay loam). The surface texture of the majority of the soils on the Subject Lands consist of the very gravelly/cobbly, sandy loam to loam.

Nutrient Analysis

The pH and soil organic matter content of the Ap horizon averages 7.5 and 5.1%, respectively. Similarly for the B horizon, the pH and soil organic matter content 7.7 and 3.3%, respectively. The Ck horizon, which represents the soil's parent material and on this property also represents the aggregate resource, consists of a loamy sand.

Each of the A, B and C horizons range from gravelly to very gravelly due to the high percentages of gravel and cobbles in these soils.

The phosphorus and potassium levels in the topsoil are adequate for most field crops, and due mainly to the good soil organic content in the topsoil, the cation exchange capacity (CEC) is also satisfactory for most field crops.

The low K/Mg ratio suggests that uptake of soil nutrients is being No significant deficiencies in soil nutrients were identified.

Soil Budget

The average depth of the Ap horizon (topsoil) is approximately 21 cm based on observations at ten site locations. The Ap horizon ranges from 17 to 26 cm in depth. The average depth of the B horizon (subsoil) is 27.5 cm and the range of the thickness of the horizon is 10-43 cm). The B horizon data is based on descriptions at seven locations. The depth of the B horizon could not be determined at three locations because the high coarse fragment content in the soil prevented the penetration of the auger into this horizon. Also, the full depth of the B horizon may not have been recorded due to the high coarse fragment content.

It is understood that the proposed licenced area will be 13.8 ha in size. Therefore, approximately 28,980 m³ of topsoil and 37,950 m³ of subsoil are available for rehabilitation purposes.

5.7 Land Use

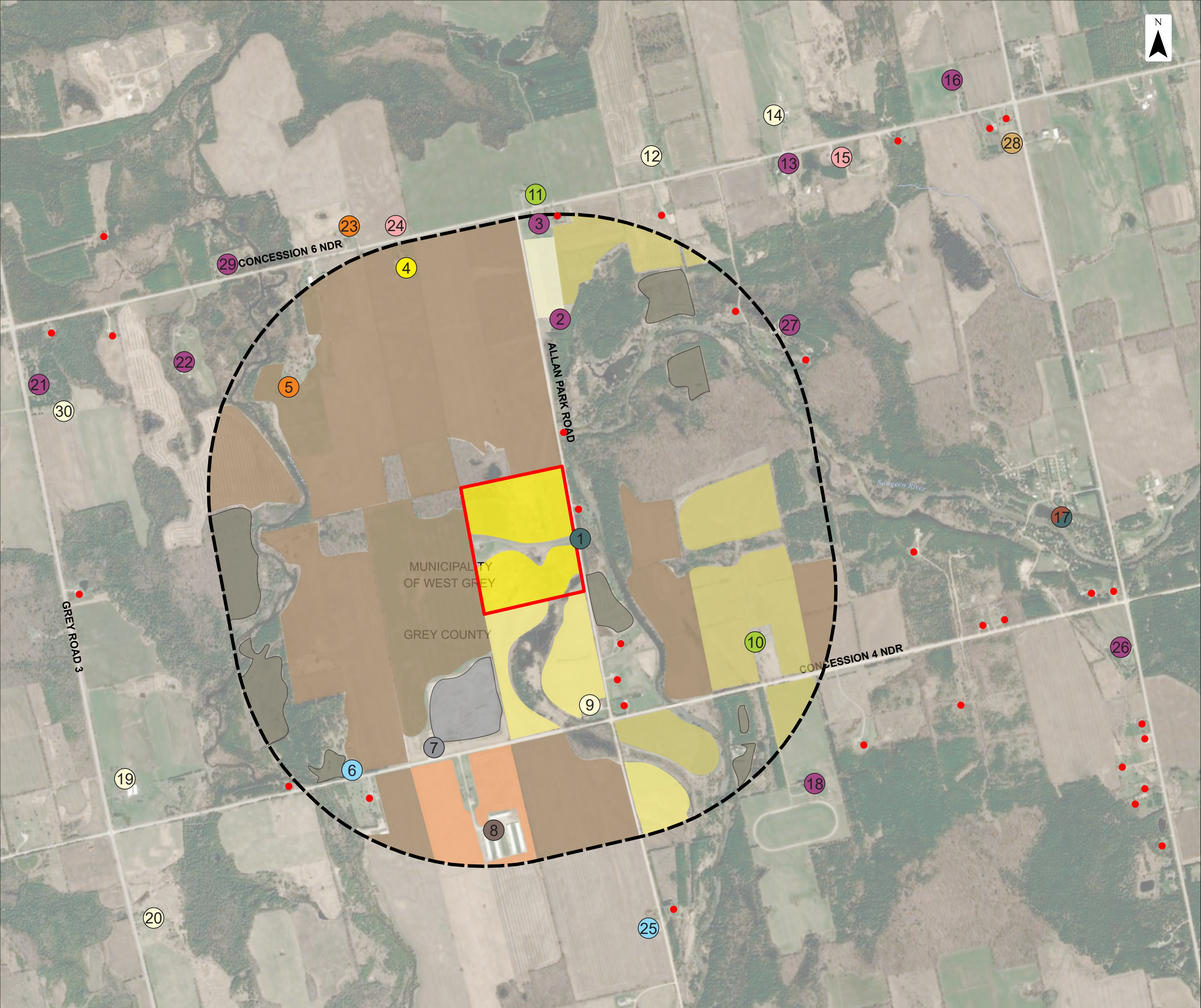
A reconnaissance level land use survey was completed on May 19, 2023. The land use survey identified the number and type of agricultural operations (both active and retired), agriculture-related uses, on-farm diversified uses, and the type and extent of non-agricultural uses within the study areas. Crop types observed during the land use survey were recorded and mapped.

The purpose of the land use survey is to document the mix of agricultural and non-agricultural uses in the Study Area; identify agricultural operations that may be sensitive to the introduction of new land uses; and describe features of the local agri-food network. Figure 4 shows the land uses and crop types observed within the study areas. Photographs taken during the land use survey are provided in Appendix E. All observed land uses are numbered, and short descriptions of these land operations are included in the land use survey notes found in Appendix H.

Eight agricultural uses were identified within the study areas during the land use survey. These include one poultry operation, one beef operation, one equestrian operation, two hobby farms, one cash crop operation, one empty livestock operation, and one remnant farm.

No on-farm diversified uses or agriculture-related uses were identified within the study areas during the land use survey or throughout the desktop review.

In addition to the approximately eight non-farm residences observed, two non-agricultural uses were identified within the study areas during the land use survey. The non-agricultural uses identified include one aggregate operation (Redford Pit) and one recreational use.



- Legend**
- Primary Study Area
 - Secondary Study Area
 - Agricultural Uses**
 - Equestrian Operation
 - Beef Operation
 - Poultry Operation
 - Hobby Farm
 - Cash Crop Operation
 - Empty Livestock Operation
 - Remnant Farm
 - On-Farm Diversified Uses**
 - Agri-Tourism
 - Non-Agricultural Uses**
 - Commercial
 - Recreational
 - Aggregate
 - Institutional
 - Non-Farm Residence
 - Cropping Pattern**
 - Hay
 - Canola
 - Spring Wheat
 - Pasture/Forage
 - Cover Crop
 - Cultivated
 - Idle
 - Disturbed

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Figure 4
Land Use Mapping

Agricultural Impact Assessment
Walkers Redford Pit Expansion, West Grey

Prepared for:



Prepared by:



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5.7.1 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 (e.g, empty livestock operations), livestock operations, cash crop operations, or hobby farms. Livestock operations include dairy, beef, cow-calf, swine, poultry, and equestrian operations. Retired livestock operations were evaluated to determine whether they should be considered 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 operation is still in a condition that could permit the keeping of livestock with minimal investment.

Primary Study Area

Except for the cultivation of the lands for crop production, no other agricultural uses were identified on the Subject Lands. At the time of the site visit, canola was being grown on the property. There is a residential dwelling on the property but there are no agricultural structures or any other agricultural-related infrastructure present.

Study Area

Within the Study Area, eight agricultural uses were identified. They include one poultry operation (#8), one beef operation (#4), one equestrian operation (#5), two hobby farms (#2 and #3), one cash crop operation (#10), one empty livestock operation (#9), and one remnant farm (#6). As noted above, empty livestock operations appear to have infrastructure that is capable of housing livestock with minimal investment, whereas remnant farms have no infrastructure that is capable of housing livestock.

5.7.2 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

No agriculture-related uses were identified within the study areas throughout the desktop review or the land use survey.

5.7.3 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 uses were identified within the study areas throughout the desktop review or the land use survey.

5.7.4 Non-Agricultural Uses

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

Approximately eight non-farm residences within the study areas were observed through the land use survey. Excluding non-farm residences, two non-agricultural uses were observed throughout the study areas. The non-agricultural uses identified include one recreational use (#1) and one aggregate operation (#7).

5.7.5 Land Use Summary

Table 6 below summarizes the types of land uses observed within the study areas.

Table 6. Land Use Summary			
	Total Number	Active	Retired or Remnant
Agricultural Use	8	1 – Poultry Operation 1 – Beef Operation 2 – Hobby Farm 1 – Equestrian Operation 1 – Cash Crop	1 – Empty Livestock Operation 1 – Remnant Farm
Agriculture-related Use	0	0	0
On-farm Diversified Use	0	0	0
	Total Number	Type	
Non-Agricultural Use	10	1 – Recreational 1 – Aggregate 8 – Non-Farm Residential	

5.7.6 Cropping Pattern

The land use survey completed on May 19, 2023, identified crops based on observations of crop stubble and other identifying features. As shown in Figure 4, the crops grown within the study areas are predominantly a mix of hay, canola, spring wheat, pasture/forage crops, and cover crops or cultivated lands

where land is being used for agricultural crops, but specific crops being grown were not observed. There are also areas of idle lands, woodlands, and disturbed land from the Redford Pit.

5.8 Land Improvements

OMAFRA's Agricultural Information Atlas (AgMaps) provides artificial drainage mapping for the province. This online tool was accessed to obtain drainage mapping for the study areas. Land improvements often include investments 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 areas and areas with nearly level topography.

The soils within the Subject Lands and in the surrounding area are predominantly well to rapidly 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. A review of OMAFRA's AgMaps Portal shows that there are no investments in tile drainage or municipal drains within the Subject Lands nor the Study Area.

The remains of a sprinkler irrigation system were observed on the Subject Lands, which now appear to be in poor condition and not suitable for use without substantial repair. Replacement of many of the components will be required. The image below shows some of the components of the sprinkler irrigation system observed on the Subject Lands. The presence of an irrigation system suggests that the soils are susceptible to drought conditions which is not surprising given the coarse texture and low moisture holding capacity of these soils.



Photo 7 – Old irrigation components

5.9 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 farmlands can diminish the economic viability of the agricultural area by reducing farming efficiency and increasing operating costs for farmers who must manage multiple small, separated parcels. Larger farm parcels can accommodate a wider range of agricultural activities and ensure long term viability of the property. In contrast, smaller farm parcels cannot offer the same flexibility and may not be viable as standalone parcels. Generally, smaller farm parcels cannot sustain a family farm without a secondary source of income (off farm) to maintain the agricultural operation.

Additionally, agricultural areas which have been fragmented often have a higher occurrence of non-agricultural land uses, which in turn can result in more frequent occurrences of conflict arising between agricultural and non-agricultural land uses. Agricultural areas with lower levels of fragmentation are considered to be more viable economically for agricultural uses and generally have fewer sources of non-agricultural land use conflicts. In most cases, these areas have a higher priority for protection. High levels of fragmentation in an agricultural area lower the areas agricultural priority.

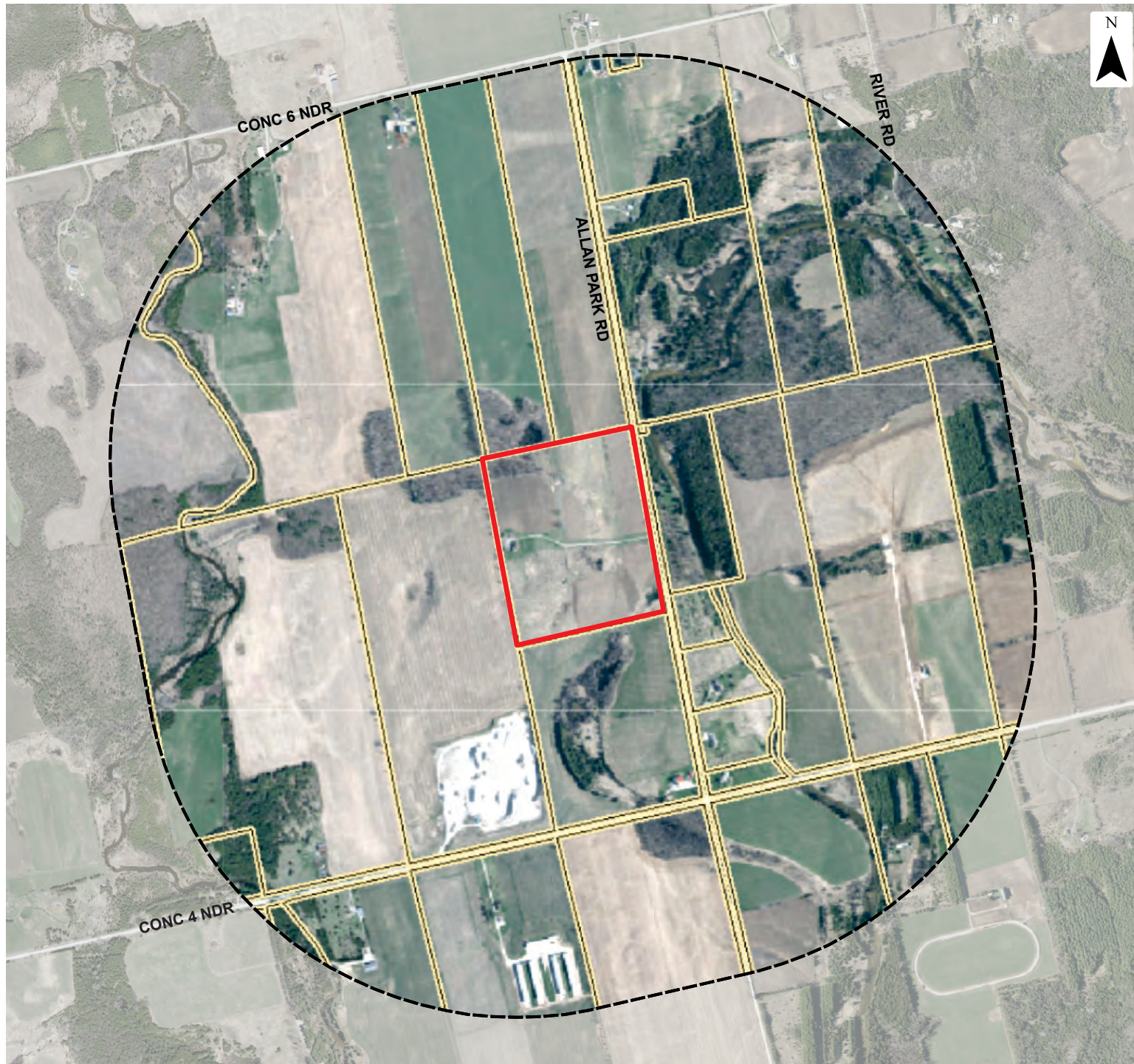
The PPS planning policies recognize the impact of fragmentation on agricultural lands and try to minimize the fragmentation of agricultural lands for non-agricultural uses. For example, the PPS policies do not permit lot creation in prime agricultural areas for residential purposes. New permitted development in prime agricultural areas should avoid further fragmentation of the agricultural land base whenever possible.

The lot fabric in this area is shown in Figure 5. The majority of the parcels in this area are relatively large and are generally well suited for agricultural uses. Fragmentation of the lands within the Study Area is related mainly to natural features such as the Saugeen River and woodlands. The proposed pit expansion will be progressively rehabilitated which will minimize the level of fragmentation resulting from aggregate extraction.

5.10 Economic and Community Benefits of Agriculture

Understanding the economic and community benefits associated with agriculture in the study areas are important in assessing the impacts associated with the proposed Redford Pit expansion. The agriculture and agri-food sector is one of the largest primary goods producing sectors and plays a key role in the Grey County and the West Grey economies. The area also employs local residents and actively contributes to the agri-food network.

According to the 2021 Census of Agriculture data, the agriculture, forestry, fishing and hunting industry employs approximately 2,405 individuals within Grey County, of which 330 individuals were employed within West Grey. Agri-food employment in the crop and animal production category employs roughly 2,330 individuals within Grey County, of which 325 individuals are employed within West Grey.



Legend

- Primary Study Area
- Secondary Study Area (1000m)
- Lot Fabric (AgMaps, OMAFRA)

Figure 5 Fragmentation

Agricultural Impact Assessment
Walkers Redford Pit Expansion
West Grey

Prepared for:



Prepared by:



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In 2021, there were a total of 478 farms in West Grey. Of the 478 farms, 8 farms are worth under \$200,000, 21 farms are valued between \$200,000 and \$400,000, 101 farms are worth between \$500,000 and \$999,999, and 348 farms are worth over \$1,000,000.

It is unlikely that the Subject Lands contributes significantly to the regional agricultural economy. This is in part due to the agricultural capability of the soil on the Subject Lands and its limitations associated with growing field crops; the absence of agricultural infrastructure and land improvements; and the absence of livestock. With the implementation of mitigation measures to minimize indirect impacts on surrounding farm operations, it is expected that the proposed Redford Pit expansion will have minimal negative impacts on farm operations and other components of the agri-food network in the Study Area. Additionally, impacts will be short-term, as the Subject Lands will be rehabilitated to an agricultural after use.

6. ASSESSMENT OF IMPACTS ON AGRICULTURE

The PPS requires that impacts on surrounding agricultural operations from any new or expanding non-agricultural uses in prime agricultural areas be mitigated to the extent feasible. Farm operations can be adversely impacted by new non-farm development on adjacent lands. Non-agricultural development adjacent to agricultural lands can cause disruptions to existing farm practices as a result of construction activity, an increase in non-farm traffic, incidence of trespass and vandalism, noise, dust, and lighting. Farmers may also experience an increase in nuisance complaints that are often related to issues such as odour, light, dust, and noise generated through normal farm practices.

The Subject Lands are located within a prime agricultural area designated by the County of Grey. The proposed Class A pit above the water table will have both direct and indirect impacts. However, through the implementation of the following mitigation measures, potential impacts will be minimized to the extent feasible.

6.1 Direct Impacts

6.1.1 Prime Agricultural Land

The Subject Lands are comprised of prime agricultural lands (58.95%) and non-prime agricultural lands (41.05%). The proposed extraction will be phased, limiting the amount of lands impacted by removal of prime agricultural lands at any given time. The loss of prime agricultural lands will primarily be an interim loss, as the Subject Lands will be progressively rehabilitated for an agricultural after use. The side slopes of the pit, which will account for approximately 1.35 ha of the Subject Lands following rehabilitation, will create topographic limitations which reduce the agricultural capability of these lands. Of the 1.35 ha of side slopes, approximately 0.72 ha are prime agricultural lands. Ultimately, the proposed extraction will result in a minimal loss of approximately 0.72 ha of prime agricultural lands. The temporary loss of prime agricultural lands (12.26 ha) and the permanent loss of approximately 0.72 ha of prime agricultural lands are expected to have a negligible impact on the Agricultural System in the area.

6.1.2 Loss of Crop Land

The majority of the Subject Lands (approximately 15.10 ha) are currently cultivated with cover crops. As noted above, extraction on the Subject Lands will be phased and the lands will be progressively rehabilitated for an agricultural after use. During extraction activities, the Subject Lands will be unavailable for crop production. However, rehabilitated lands will be planted with a cover crop during the soil conditioning phase to increase organic matter within the soil. Upon completion of extraction activities each year, the lands will be returned to an agricultural after use and the majority of lands will be available for crop production following final rehabilitation. The side slopes of the proposed extraction operation will have a slope of 3:1 (33.33%), which will create topographical limitation for the production of common field crops. Following rehabilitation, the side slopes will be CLI Class 6T lands and will only be suitable for permanent pasture (rough grazing). Therefore, there will be a loss of approximately 1.35 ha of cultivatable lands of which only 0.72 ha consist of prime agricultural land. The interim loss of crop land and the permanent loss of approximately 1.35 ha of crop land will have a negligible impact on the Agricultural System in the area.

6.1.3 Agricultural Infrastructure

There are no investments in agricultural infrastructure within the Subject Lands. The agricultural infrastructure associated with the farm operations in the Study Area will not be directly impacted by the proposed pit expansion. Therefore, no agricultural infrastructure will be lost due to the proposed pit expansion.

6.1.4 Land Improvements

According to OMAFRA's Artificial Drainage Systems mapping there is no tile drainage within the Subject Lands. The irrigation system has already been retired. No other agricultural land improvements were observed on site. Therefore, no agricultural land improvements will be lost as a result of the proposed pit expansion.

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 two small ponds located within the Subject Lands. Tatham Engineering's Combined Level 1 and Level 2 Hydrogeological Assessment for the Redford Pit Expansion states that "With respect to potential impacts to water quality in the surface water features, as per the site plans, where necessary a low earth berm will be installed to prevent siltation of the adjacent lands including a low earth berm at the southeast corner of the site." No livestock operations appear to use the ponds located within the Subject Lands as a source of drinking water for livestock. Therefore, no direct impacts to surficial drainage features are anticipated as a result of the proposed extraction operation.

Groundwater

Farm operations often rely on well water as a source of drinking water for the farmstead (for both human and animal consumption). Water is also needed as part of the day-to-day operation of the farm for a variety of uses. Tatham Engineering's Combined Level 1 and Level 2 Hydrogeological Assessment for the Redford Pit Expansion states that the "proposed pit is an above-water pit and it is anticipated no groundwater interference will occur." However, a comprehensive complaints response program has been established for the site for the purpose of responding to water well interference complaints for water well users in the vicinity of the proposed pit for due diligence purposes.

Impacts to groundwater levels are not anticipated and therefore we do not expect any negative impacts on agricultural uses. .

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 pit expansion 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 pit. It is unlikely that there will be any disruption to farm operations in the Study Area.

Access to the aggregate extraction area is restricted and it is expected to be highly monitored. The boundaries of the licenced area will be fenced and access to the Subject Lands will be strictly controlled by the operators. Opportunities for trespass and vandalism as a result of the originating from the proposed expansion of the Redford Pit aggregate extraction operation.

6.2.2 Changes to Drainage Features & Groundwater

Surficial Drainage Features

As stated above, surface water features in the Study Area may be used as a source of drinking water for livestock or sources of irrigation water, which may be impacted as a result of the proposed expansion. The majority of the Subject Lands drain eastward to the Saugeen River as sheet flow. Tatham Engineering's Combined Level 1 and Level 2 Hydrogeological Assessment for the Redford Pit Expansion states that "The overall reduction in drainage area to the Saugeen River as a result of the proposed expansion is 0.02% and is expected to have negligible impacts to the watercourse." The proposed Redford Pit expansion should implement the recommendations provided in the Hydrogeological Assessment to ensure there is no contamination to the watercourse. No indirect impacts to surficial drainage features are anticipated.

Groundwater

Farm operations relying on well water in the Study Area may be impacted if there is a drawdown of the water table. Tatham Engineering's Hydrogeological Assessment concludes that there are no impacts to groundwater anticipated from the proposed Redford Pit expansion, as extraction will occur above the water table.

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 from extraction, will not result in significant impacts on cold sensitive crops due to any changes that might occur to the microclimatic conditions.

6.2.4 Transportation Impacts

A Traffic Impact Study has been prepared by Skelton, Brumwell & Associates Inc., which states that the maximum licensed tonnage for the proposed expansion "could generate an average of 125 trips per day from May to November. It is estimated that this volume could result in a peak hour volume of up to 12 trips per hour (6 in / 6 out)." Trucks from the proposed expansion will use Concession Road 4 to access Grey Road 3, with most trucks expected to head south to Grey Road 4. The Traffic Impact Study states that there "are no recommendations within this Traffic Impact Study that impact the ARA Site Plan."

Agricultural operations are likely to have already modified their operations to account for non-farm traffic associated with the Redford Pit and other aggregate operations. It is expected that the proposed expansion will have a negligible impact on the moving of farm equipment in the Study Area.

6.2.5 Noise, Vibration, Dust, and Light

The proposed pit expansion has the potential to increase the level of noise, vibration, dust, and light within the Subject Lands and, to a lesser extent, the Study Area. These potential impacts have been addressed in detail in separate reports which will be included as part of this application.

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

Sudden noise associated with aggregate operations has the potential to startle or upset domestic livestock. The closest livestock operation is approximately 550 metres from the proposed licenced area. However, livestock often become acclimatized to the noise, and it is unlikely that noise associated with the Redford Pit expansion will adversely impact livestock. While no impacts from noise, vibration, dust, and light are anticipated, it is recommended that these elements be controlled and in compliance with Ministry of Environment, Conservation and Parks (MECP) guidelines.

6.3 Economic and Community Impacts

6.3.1 Loss of Available Farmland

The proposed pit expansion will result in the temporary loss of cultivatable land. During extraction activities, the lands will be unavailable for the production of crops. However, the Subject Lands will be progressively rehabilitated and returned to a similar agricultural condition, subsequent to extraction activities. The loss of available farmland will be short-term and there will be no long-term impacts following rehabilitation of the Subject Lands.

Adjacent agricultural lands will not be directly impacted by the proposed pit expansion. The proposed expansion will have a negligible effect on the larger farming community in area.

6.3.2 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.

No agricultural-related infrastructure is present within the Subject Lands. The Subject Lands were being cultivated at the time of the site visit and will be available for agricultural production following final rehabilitation. No agri-food related businesses or infrastructure were identified within the Subject Lands, nor within the Study Area. The proposed pit expansion is unlikely to have any impact on agri-food services that provide community benefits.

6.4 Summary of Impacts & Mitigation

6.4.1 Impacts and Mitigation Measures

Mitigation measures recommended to avoid, reduce, or eliminate the impacts identified in the preceding sections are summarized in Table 7 below.

Table 7. Summary of Impacts			
Potential Impact	Potential Degree of Impact	Recommended Mitigation Measure	Anticipated Net Impact
Direct Impacts			
Loss of prime agricultural land	Low	Progressive rehabilitation will return the Subject Lands to a similar agricultural condition	Temporary loss of 12.26 ha of CLI Class 3 lands, permanent loss of 0.72 ha of CLI Class 3 lands (PAL).
Loss of agricultural infrastructure	None	None required	No impact
Loss of agricultural land improvements	None	None required	No impact
Loss of cropland	Low	- Use cover crops during progressive rehabilitation to increase organic matter content of soils - Progressive rehabilitation will return the Subject Lands to an agricultural after use	Temporary loss of approximately 15.10 ha of crop land.
Loss of Surface Waters as Source of Drinking Water	Low	Implement recommendations contained in the hydrogeological report	No impact
Indirect Impacts			
Non-farm traffic	Low	No impacts anticipated. No mitigation required	No significant impact anticipated

Table 7. Summary of Impacts

Potential Impact	Potential Degree of Impact	Recommended Mitigation Measure	Anticipated Net Impact
Fragmentation	Low	• No impacts anticipated. No mitigation required	No impact
Changes to Microclimatic Conditions	Low	• No impacts anticipated. No mitigation required	No impact
Economic	Low	• Use progressive rehabilitation to return lands to an agricultural after use	No impact
Disruption to Farm Operations	Low	• No impacts anticipated. No mitigation required	No impact
Wells, Irrigation, water bodies	Low	• Implement recommendations made within hydrogeological report	No impact anticipated
Noise, Vibration, Dust, and Light	Low	• Adhere to Ministry of Environment, Conservation and Parks (MECP) guidelines.	No significant impact

6.4.2 Monitoring

The physical and chemical properties of the pre-extraction soil conditions will be compared to samples collected annually as part of the progressive rehabilitation monitoring program for the proposed Redford Pit expansion. The purpose of the annual monitoring program is to ensure that the progressive and final rehabilitation of the site to an agricultural after-use is successful and consistent with the Provincial Planning Statement, which requires that mineral aggregate operations within *prime agricultural areas* be rehabilitated back to an agricultural condition.

The monitoring program is intended to assess the effectiveness of soil replacement, compaction mitigation, drainage restoration, and other site-specific measures aimed at supporting the return of agricultural productivity that is equal to or greater than the pre-extraction condition, as determined through baseline conditions identified through the topsoil and subsoil samples collected during the site visit.

Annual monitoring will commence during the initial phase of progressive rehabilitation and will continue on a yearly basis until such time as the site demonstrates sustained agricultural productivity comparable to pre-extraction conditions.

If monitoring identifies issues such as soil degradation, poor crop performance, erosion, or drainage problems, site-specific mitigation measures will be proposed and implemented. These may include soil amendments, tilling to alleviate compaction, reseeding, or the installation of artificial drainage. Follow-up monitoring will assess the effectiveness of these interventions.

The monitoring program will remain in place until post-rehabilitation agricultural productivity is demonstrated to meet or exceed pre-extraction benchmarks for a minimum of three consecutive years.

6.4.3 Net Impacts

The agricultural lands impacted by the proposed Redford Pit expansion will be rehabilitated back to an agricultural after use. Substantially the same area and same average soil capability for agriculture will be restored through progressive rehabilitation of the lands.

Impacts associated with the proposed pit expansion will primarily be limited to the temporary loss of prime agricultural lands and cultivatable lands and the permanent loss of 0.72 ha of prime agricultural lands (CLI Class 3) and 1.35 ha of cultivatable lands. The proposed expansion will have a negligible impact on the agricultural system.

7. REHABILITATION PLAN

A rehabilitation plan was prepared for the existing licenced Redford Pit. The plan requires it to be rehabilitated back to an agricultural condition. The proposed expansion will also be rehabilitated back to an agricultural condition in accordance with Appendix B: Rehabilitation Information and Resources of OMAFRA's draft Agricultural Impact Assessment (AIA) Guidance Document. Although the proposal can be seen as an expansion to the existing Redford Pit, Walker Aggregates is submitting a new and separate ARA license application for the Subject Lands. It is understood that an amendment to the existing Redford Pit rehabilitation plan will likely be required in the future to coordinate rehabilitation along the shared boundary of the two licensed areas if extraction is permitted to continue to the western boundary of the Subject Lands.

7.1 Pre-Planning

Careful planning is required to ensure that the lands are successfully rehabilitated to an agricultural condition. This involves the planning and consideration of extraction activities on the Subject Lands and an understanding of the extraction activities and rehabilitation plans for the adjacent property (i.e., the existing licenced area). The primary objective in the pre-planning stage is to ensure that planned extraction and rehabilitation develop a comprehensive plan prior to initiation of extraction and one that will be compatible with the adjacent extraction and rehabilitation procedures. In addition, a good plan will assist the operator plan for the most efficient use of machinery and labour to economically maximize resource extraction and progressively return the site to an agricultural condition.

Pre-planning includes a review of the site plans developed for the proposed pit expansion and adjacent lands, and the consideration of the soil and land use data collected for the AIA.

7.2 Initiation

The first phase of an operational sequence involves the determination of the initial extraction area and processing areas with associated perimeter berming requirements and soil storage areas. The direction and sequence of extraction should strive to reach limits of extraction in order to reach the point where rehabilitated side slopes can be established and opportunities for progressive rehabilitation are created. The proposed extraction operation will be a 2-phase, 1-lift operation, with the first phase beginning at the southwestern extent of the property, moving in a northeasterly direction. The area covered by the first and second phases are approximately even.

Soil and overburden will be stripped and stored separately in berms that have been designed to provide acoustic and visual screening. Soils will be stored in berms until there are sufficient depleted areas ready for rehabilitation. Stripping of soils and overburden will be limited to what is required for a season of operations, minimizing the disturbed area at any given time, and reducing the duration of land being out of agricultural production. This practice will also reduce double handling of soil.

To prevent adverse impacts on soil structure caused by compaction, soils should be handled under dry (unsaturated) conditions. Stripping activities during frozen soil conditions are generally not recommended due to the increased risk of topsoil and subsoil mixing.

7.3 Progressive Rehabilitation

Once there are depleted areas of the operation that are no longer required for extraction or associated uses, progressive rehabilitation can begin whereby soils from areas being prepared for extraction can be moved directly into areas that are ready for rehabilitation. In some cases, sites may need subsequent stages of berm construction. During this stage of rehabilitation, the area being stripped or added to the disturbed areas should be approximately offset by equivalent areas being rehabilitated so that the total disturbed area remains fairly constant as regular progressive rehabilitation continues.

7.3.1 Post Extraction Grading and Landform

Slope contours on the pit floor will be as uniform as possible and grading should ensure there are no irregular undulations or depression areas on the rehabilitated pit floor. Slopes to be created will be in the range of 2% to 5% to provide for adequate surface drainage toward an outlet or infiltration area with coarse materials that will allow for rapid infiltration.

Perimeter slopes will be rehabilitated as the limits of extraction are reached. Side slopes will be established by backfilling with soil and then grading prior to the placement of topsoil. The maximum permitted side slopes in accordance with Appendix B is 3:1 (33%), which has significant topographic limitations for agriculture. Grass/legume cover should be established on the side slopes to stabilize the slopes and reduce erosion. The recommended side slope depth of topsoil ranges from 10 cm to 15 cm and must have a minimum depth of 5 cm in locations where topsoil quantities are scarce.

7.3.2 Soil Handling

When replacing and managing topsoil, subsoil, or overburden, it is crucial to handle these materials separately and under unsaturated conditions. To the extent possible, minimizing travel over soils and rehabilitated areas is recommended. After each layer of topsoil/subsoil is spread, compaction should be mitigated through soil ripping or tilling. During this process, care should be taken to avoid mixing different soil materials or layers.

7.3.4 Soil Conditioning

The replaced soil must be free from stones, debris, and any harmful substances. To determine the appropriate amount and type of soil amendments and/or fertilizer needed, laboratory soil testing should be done to verify soil fertility and nutrient content, ensuring levels are similar to pre-extraction soil laboratory results.

7.3.5 Crop Recommendations

To maximize rehabilitated areas, it is recommended to initially establish a grass-legume cover crop. Annually, the crops should be plowed under to enhance and increase organic matter in the soil.

7.3.6 Monitoring and Management

It is important to monitor crops at least twice during the growing season to ensure the success of cover crops and effective weed control. Over seeding and reseeding may be necessary to manage weed growth and ensure the successful establishment of the crops.

To determine the appropriate amount and type of soil amendments and/or fertilizer needed, laboratory soil testing should be done to verify soil fertility and nutrient content, ensuring levels are similar to pre-extraction soil laboratory results. Soils should be ripped or tilled and stones should be removed.

7.4 Final Rehabilitation

As the aggregate resources become depleted and extraction rates decline, the areas required for extraction and production generally decline and the rate of rehabilitation can usually be accelerated. In this stage, pit infrastructure and product inventory will be removed. Soils that were stored in interim berms are made available to complete rehabilitation. During this stage, there is no, or minimal, new extraction areas being disturbed and rehabilitated areas exceed new disturbances so that the total disturbed area declines and eventually reaches zero.

Once the Subject Lands have been rehabilitated, the lands will be available for the production of a variety of agricultural crops. The Final Rehabilitation Plan developed by Skelton Brumwell indicates that all equipment, buildings, and stockpiles will be removed from the site; roads may be maintained to access the property; drainage will be contained within the rehabilitated pit and will infiltrate into the pit floor; and the final rehabilitated state of the site will be agricultural.

8. CONSISTENCY WITH AGRICULTURAL POLICY

8.1 Provincial Planning Statement

Section 4.3.5 of the Provincial Planning Statement states in part that:

1. “Planning authorities may only permit non-agricultural uses in prime agricultural areas for:
 - a. Extraction of minerals, petroleum resources and mineral aggregate resources; or
2. Impacts from any new or expanding non-agricultural uses on the agricultural system are to be avoided, or where avoidance is not possible, minimized and mitigated as determined through an agricultural impact assessment or equivalent analysis, based on provincial guidance.”

Policy 4.3.5.1 confirms that extraction of mineral aggregate resources is a permitted use in prime agricultural areas. An AIA has been prepared for the proposed extraction of mineral aggregate resources in accordance with provincial guidance documents completed. Impacts have been assessed and avoided where possible. Where it is not possible to avoid impacts, the AIA has provided mitigation measures to minimize the impacts. The proposed application for extraction of mineral aggregate resources is consistent with Policy 4.3.5.2.

Section 4.5.4 addresses aggregate extraction in prime agricultural areas and states in part that:

1. “In prime agricultural areas, on prime agricultural land, extraction of mineral aggregate resources is permitted as an interim use provided that:
 - a. impacts to the prime agricultural areas are addressed, in accordance with policy 4.3.5.2; and
 - b. the site will be rehabilitated back to an agricultural condition.

The proposed Redford Pit expansion will be rehabilitated back to an agricultural condition and impacts have been addressed in accordance with policy 4.3.5.2. Therefore, the proposed aggregate operation is consistent with the Provincial Planning Statement.

8.2 Aggregate Resources Act

The Aggregate Resources Act (ARA) issued by the Ministry of Natural Resources (MNR) provides direction for the management of aggregate resources in Ontario, regulates aggregate operations in the province, outlines requirements for the rehabilitation of extracted land, and aims to minimize adverse impacts on the environment. The ARA was most recently updated on June 1, 2021. The Act includes rules regarding issuing of licenses and permits, changes to approvals, inspections, complaint response, compliance, and rehabilitation monitoring. In considering whether a license should be issued, the Minister of Natural Resources must have regard for “any possible effects of the operation of the pit or quarry on agricultural resources”.

The AIA has assessed potential direct and indirect impacts of the proposed mineral aggregate resources extraction on the agricultural land base which is part of a prime agricultural area. The AIA has determined

that negative impacts can be avoided. Where it is not possible to avoid impacts, mitigation have been developed to minimize the impacts. The assessment of impacts and development of measures that mitigate potential impacts is consistent with the policies of the Aggregate Resources Act.

8.3 County of Grey Official Plan

Section 5.2.1 of the County of Grey Official Plan outlines policy for permitted uses in the Agricultural land use type and states in part that:

“Permitted uses in the Agricultural land use type include:

- h) Sand and/or gravel operations proposed within Aggregate Resource Areas on Schedule B to this Plan;
- i) Licensed aggregate operations identified as Mineral Resource Extraction on Schedule B;
- j) Wayside pits and quarries;”

The proposed Redford Pit expansion is a permitted use in the County of Grey Official Plan and is consistent with the agricultural policies of the Plan.

9. STUDY RECOMMENDATIONS AND CONCLUSIONS

9.1 Study Recommendations

With the implementation of the recommended mitigation measures discussed in Table 7, the potential direct impacts can be minimized and the indirect impacts can be avoided or minimized to the extent feasible. The anticipated impacts include the temporary loss of 12.26 ha of prime agricultural land and 15.10 ha of cultivatable lands within the Subject Lands, and the permanent loss of 0.72 ha of prime agricultural lands (CLI Class 3) and 1.35 ha of cultivatable lands within the Subject Lands. However, the majority of this area will eventually be returned to the agricultural land base as rehabilitation progresses over the lifespan of the operation.

Should any complaints from surrounding neighbours and businesses arise, we recommend that a note be added to the site plans under AIA recommendations that stipulates: "The Licensee shall document any complaints involving the local agricultural community and annually, confirm with the Ministry of Natural Resources how they were resolved".

9.2 Conclusions

The purpose of the AIA is to characterize the agricultural land base and agricultural operations within the Subject Lands and surrounding Study Area. The AIA identified potential impacts of the proposed Redford Pit expansion and, where possible, provided mitigation measures to avoid or minimize potential impacts to the extent feasible. Direct impacts to the Subject Lands will be temporary and indirect impacts on the Study Area are expected to be minimal and can be mitigated.

With the implementation of the recommended mitigation measures, the proposed Redford Pit expansion operation will have minimal effect on the surrounding land uses. The proposed pit expansion will utilize existing haul routes minimizing the potential traffic related impacts. It is expected that noise, vibration, dust, and light will be kept at provincial standards.

Licensing of the proposed Redford Pit expansion will be consistent with the agricultural policies of the Provincial Planning Statement and the County of Grey Official Plan regarding mineral extraction in prime agricultural areas.

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10. GLOSSARY OF TERMS

Agricultural uses:* - 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 housing for farm workers, when the size and nature of the operation requires additional employment.

Agriculture-related uses:* - those farm-related commercial and farm-related industrial 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.

Agricultural system: - means a system comprised of a group of inter-connected elements that collectively create a viable, thriving agri-food sector. It has two components:

- An agricultural land base comprised of *prime agricultural areas*, including *specialty crop* areas. It may also include *rural lands* that help to create a continuous productive land base for agriculture.
- An *agri-food network* which includes agricultural operations, *infrastructure*, services, and assets important to the viability of the agri-food sector.

Agri-food network:* - a network within the *agricultural system* that includes elements important to the viability of the agri-food sector such as regional *infrastructure* and transportation networks; agricultural operations including on-farm buildings and primary processing; infrastructure; agricultural services, farm markets, and distributors; and vibrant, agriculture-supportive communities.

Agri-tourism uses:* - means those farm-related tourism uses, including limited accommodation such as a bed and breakfast, that promote the enjoyment, education or activities related to the farm operation.

Altered livestock facility:* - Any building activity occurring on, or in, an *existing livestock facility* that requires a building permit issued under the *Building Code Act, 1992*, and results in a change in *design capacity*. This also includes the alteration of earthen *manure storages*.

Anaerobic digester:* - A permanent structure designed for the decomposition of organic matter by bacteria in an oxygen-limiting environment.

Anaerobic digester materials:* - Solid or liquid organic input materials that are intended for treatment in an *anaerobic digester*, whether the materials are generated at the agricultural operation or received at the agricultural operation from an outside source.

Anaerobic digester output (digestate):* - Any solid or liquid materials that result from the treatment of *anaerobic digestion* materials in an *anaerobic digester*.

Beef farm: a farm operation whose predominant livestock is beef cattle, including cow-calf operations.

Brownfield sites:* - means undeveloped or previously-developed properties that may be contaminated. They are usually, but not exclusively, former industrial or commercial properties that may be underutilized, derelict, or vacant.

Cash crop: - means a crop being produced for income purposes and not to supplement a livestock operation by contributing to feed requirements.

Catena: - the group of soils that have developed on the same parent material but as a result of being located on a different position in the landform the group differs by drainage class (i.e., well drained, imperfectly drained, and poorly drained).

Cultivated: - means lands that have recently been under active agricultural production, however, depending on the season or growth stage of the crop during the land use survey or through aerial photographic interpretation the crop type could not be determined.

Dairy farm: - a farm whose primary livestock is dairy cattle, including dairy heifers.

Development: - means the creation of a new lot, a change in land use, or the construction of buildings and structures, requiring approval under the Planning Act; but does not include activities that create or maintain infrastructure authorized under an environmental assessment process; or works subject to the Drainage Act.

Dwelling:* - Any permanent building that is used, or intended to be used, continuously or seasonally, as a domicile by one or more persons and usually containing cooking, eating, living, sleeping, and sanitary facilities.

Forage/Pasture: - means a crop that consists of either pastureland, including rough grazing, or hay crops including silage and haylage.

Former livestock facility:* - means an empty livestock facility that no longer contains manure or livestock. The buildings are generally in fair to good condition and the potential for housing livestock in the building remains. The MDS formula is applied to these facilities.

Glaciolacustrine deposit: - soil derived from material deposited in a glacial lake environment.

Gleyed: – means soils that are poorly drained and exhibit greyish colours in the profile indicating that they have developed in a reduced environment (i.e., oxygen depleted) due to high water tables throughout the year.

Gleyed horizon: – greyish colours and prominent mottles in the soil horizon profile which indicate that soils are poorly drained and have developed in a reduced environment (i.e., oxygen depleted) due to high water tables throughout the year.

Hobby farm: - A residential dwelling, with or without accessory buildings, which may include some crop production for personal consumption or limited sale; and/or small numbers of livestock raised for personal consumption, pleasure, or limited sale. A hobby farm normally will generate little or no income and as such may not have a Farm Business Registration Number.

Idle agricultural lands: - means lands that have not been used for agricultural production for at least five years (estimated).

Inclusion: - a small soil polygon that occurs within a larger soil polygon and which is comprised of a different soil type or is located on a different slope class, however it is too small to map as a single unit given the scale of map.

Livestock:* - includes dairy, beef, swine, poultry, horses, goats, sheep, ratites, fur-bearing animals, deer & elk, game animals, birds, and other animals.

Livestock facility:* - means one or more barns or permanent structures with livestock-occupied portions, intended for keeping or housing livestock. A livestock facility also includes all manure or material storages and anaerobic digesters.

Mineral aggregate resources:* - means gravel, sand, clay, earth, shale, limestone, dolostone, sandstone, marble, granite, rock, or other material prescribed under the *Aggregate Resources Act, 1990*, suitable for construction, industrial, manufacturing and maintenance purposes but does not include metallic ores, asbestos, graphite, kyanite, mica, nepheline syenite, salt, talc, wollastonite, mine tailings or other material prescribed under *The Mining Act, 1990*.

Minerals:* - means metallic *minerals* and non-metallic *minerals* as herein defined but does not include *mineral aggregate resources* or *petroleum resources*.

Minimum Distance Separation (MDS) formulae: - formulae and guidelines developed by the province, as amended from time to time, to separate uses so as to reduce incompatibility concerns about odour from livestock facilities.

Minimum Distance Separation (MDS) I formulae: - used to determine the minimum distance separation for new development from any existing and some former livestock facilities.

Minimum Distance Separation (MDS) II formulae: - used to determine the minimum distance separation for new or expanding livestock facilities from existing non-farm land uses.

Morainal till: - generally a compact, poorly sorted, and poorly stratified material deposited by glacial action.

Mottles: - are spots of colour in soil horizons, caused by impeded drainage. The mottle colours are recorded as faint, distinct or prominent depending on the contrast between the mottle colour and the basic horizon colour.

Non-agricultural uses:* - Buildings designed or intended for a purpose other than an *agricultural use*; as well as land, vacant or otherwise not yet fully developed, which is zoned or designated such that the principal or long-term use is not intended to be an *agricultural use*, including, but not limited to: commercial, future urban development, industrial, institutional, *open space uses*, *recreational uses*, *settlement area*, *urban reserve*, etc.

Non-farm residential (NFR): - means residential buildings and lots not associated with a farm operation such as farm retirement lots/severances and/or other residences in the Agricultural and Rural Area. Second farm residences for farm help would be considered a farm residence if it is on an existing farm operation.

Normal farm practices:* - means a practice, as defined in the *Farming and Food Production Protection Act, 1998*, that is conducted in a manner consistent with proper and acceptable customs and standards as

established and followed by similar agricultural operations under similar circumstances; or makes use of innovative technology in a manner consistent with proper advanced farm management practices. *Normal farm practices* shall be consistent with the *Nutrient Management Act, 2002* and regulations made under that Act.

Prime agricultural area:* - means an area where *prime agricultural land* predominates. Prime agricultural areas may also be identified through an alternative agricultural land evaluation system approved by the Province.

Prime agricultural land:* - means land that includes *specialty crop lands* and/or Canada Land Inventory Class 1, 2 and 3 soils, in this order of priority for protection.

Provincial Planning Statement, 2024: - the Provincial Planning Statement (PPS), 2024 is a streamlined province-wide land use planning policy framework that replaces both the *Provincial Policy Statement, 2020* and *A Place to Grow: Growth Plan for the Greater Golden Horseshoe, 2019* while building upon housing-supportive policies from both documents. The PPS 2024 provides municipalities with the tools and flexibility they need to build more homes. It enables municipalities to:

- plan for support development, and increase the housing supply across the province;
- align development with infrastructure to build a strong and competitive economy that is investment-ready;
- foster the long-term viability of rural areas; and
- protect agricultural lands, the environment, public health and safety.

Redevelopment:* - means the creation of new units, uses or lots on previously developed land in existing communities, including *brownfield sites*.

Remnant: - means a location where one or more farm buildings once stood. All or some of the buildings have fallen, are severely structurally unsound and/or been removed. No MDS would be applied to a remnant farm operation.

Retired farm operation: - means a former farm operation whose buildings or farm related structures remain; however, it has either been converted to a non-agricultural use; would require significant upgrades and investment to modernize; or it is in poor condition and not suitable for agricultural uses. The MDS may still apply if it is a former livestock facility.

Rural areas:* - means a system of lands within municipalities that may include *rural settlement areas, rural lands, prime agricultural areas*, natural heritage features and areas, and resource areas.

Rural lands:* - means lands which are located outside *settlement areas* and which are outside *prime agricultural areas*.

Rural residential cluster:* - means four or more, adjacent rural lots, generally one hectare or less in size, sharing a common contiguous boundary. Lots located directly across a road from one another shall be considered as having a common boundary.

Scrub land: - means lands that are no longer farmed and woody species (young trees and shrubs) have begun regenerating and/or sparsely treed areas.

Secondary uses:* - means uses secondary to the principal use of the property, including home occupations, home industries, and uses that produce value-added agricultural products from the farm operation on the property.

Settlement areas:* - means urban areas and rural settlement areas within municipalities (such as cities, towns, villages, and hamlets). Ontario's *settlement areas* vary significantly in terms of size, density, population, economic activity, diversity and intensity of land uses, service levels, and types of infrastructure available. Settlement areas are:

- a) built up areas where development is concentrated and which have a mix of land uses; and
- b) lands which have been designated in an official plan for development over the long term.

Soil horizon: - a layer of soil, approximately parallel to the land surface, that differs from adjacent layers in properties such as texture, colour, structure, etc. As an example, the surface horizon of a mineral soil is recorded as the "A" horizon. If the surface is ploughed then the suffix p is used (i.e., Ap) if the surface has not been ploughed, as in a forest soil, a humic layer generally develops and an eluviated light coloured soil horizon often forms immediately below. These horizons are identified with the suffix h is used (i.e., Ah) and e (i.e., Ae), respectively. The weathered portion of the profile below the A horizons is identified as the "B" horizon and the unweathered, parent material is the "C" horizon.

Soil profile: - a vertical section of the soil through all its horizons and extending into the soil parent material.

Soil texture: - the relative portion of particle sizes in soil (i.e., sand, silt, and clay) that are used to describe the soil textural class (e.g., clay, sandy clay loam, sandy loam, loam, clay loam, sand, loamy sand, etc.).

Specialty crop area:* - means areas within the agricultural land base designated based on provincial guidance. 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.

Tender fruit: - a term applied to tree fruits such as peaches, apricots, and nectarines which are particularly sensitive to low winter and/or spring temperatures.

Unoccupied livestock barn: - A livestock barn that does not currently house any livestock, but that housed livestock in the past and continues to be structurally sound and reasonably capable of housing livestock.

Wooded: - Forested areas of various age composition and size.

** Indicates that the definition is essentially derived from OMAFRA publications.*

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- Ontario Ministry of Municipal Affairs. Provincial Planning Statement. 2024, King's Printer for Ontario.

APPENDIX A

Curriculum Vitae



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

432 Niagara St., Unit 2, St. Catharines, ON L2M 4W3
Tel: (905) 935-2161 | Email: 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	President - Colville Consulting Inc., St. Catharines, Ontario
2001 – 2003	Senior Project Manager - ESG International Inc., St. Catharines, Ontario
1998 – 2001	Senior Project Manager - ESG International Inc., Guelph, Ontario
1988 – 1998	Project Manager - ESG International Inc., Guelph, Ontario
1984 – 1988	Soil Scientist – MacLaren Plansearch Ltd., Halifax, Nova Scotia
1982 – 1983	Assistant Soil Scientist – Nova Scotia Department of Agriculture and Marketing

EXPERIENCE

Colville Consulting Inc. (CCI) was established in June of 2003 by Sean Colville. CCI offers agricultural and environmental consulting services to clients across Ontario, catering to both public and private sectors. Sean has over 35 years of agricultural consulting experience, which includes agricultural resource evaluation studies, soil surveys, interpretations of agricultural capability, agricultural impact assessments, alternative site assessments, and soil and microclimatic rehabilitation/restoration projects. Sean has extensive experience interpreting agricultural land use policies for a wide variety of development applications.

Sean is a Professional Agrologist (P.Ag.), and a member of both the Ontario Institute of Agrology and the Agricultural Institute of Canada. Sean has been recognized by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) as an expert in the identification of Prime Agricultural Areas and in the interpretation of the Minimum Distance Separation requirements for livestock operations.

Sean has presented expert testimony before the Ontario Land Tribunal (formerly OMB, LPAT), Consolidated Joint Board, Assessment Review Board, Ontario Superior Court, and the Normal Farm Practices Protection Board. Sean's testimonies have involved land use planning matters as they relate to agriculture, impact assessments, resource evaluations, soil science, and normal farm practices.

Agricultural Impact Assessments and Alternative Site Studies

Colville Consulting Inc. specializes in agricultural impact assessment and alternative site studies for development applications in Prime Agricultural Areas. Sean has prepared over 200 agricultural impact assessments for a wide variety of development projects, including settlement area boundary expansions, linear facilities (Class EAs), new and expanding aggregate operations, and residential, commercial, recreational, industrial, and institutional developments. The majority of these projects required the interpretation of agricultural land use policies, an inventory and assessment of the agricultural resources,

land use, land tenure, an assessment of conflict potential including determination of minimum distance separation requirements, interpretation of the agricultural priority, and development of mitigation measures to avoid or minimize potential impacts. Justification of the location for development proposals in agricultural areas is required by the Provincial Policy Statement and can often be addressed by an alternative site study.

Recent examples of Sean Colville's agricultural work include:

- Agricultural Impact Assessment for Stubbes New Durham Precast Plant (2021)
- Agricultural Impact Assessment for New Tecumseth Community Builders Inc., County of Simcoe (2021)
- Agricultural Impact Assessment for Caledon Costco (2021)
- Agricultural Impact Assessment for Walker Industries' Redford Pit Expansion, West Grey (2022)
- Agricultural Impact Assessment for Milton Business Park (2022)
- Minimum Distance Separation for Mono Hills Corporation (2022)
- Land Evaluation and Area Review for Norfolk County (2022)

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, Ontario

Rees, H.W.; Duff, J.P.; Colville, S.; Soley, T 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, Ontario. 127 pp. with maps.



JOHN LIOTTA, B.Sc. (Env.), EMA, P.Ag.

432 Niagara St., Unit 2, St. Catharines, ON L2M 4W3
Tel: (905) 935-2161 | Email: john@colvilleconsultinginc.ca

EDUCATION

Bachelor of Science in Environmental Sciences, University of Guelph, 2018
Environmental Management and Assessment Graduate Certificate, Niagara College, 2022

PROFESSIONAL AFFILIATIONS

Eco Canada – Environmental Professional in Training
Ontario Institute of Agrologists – Professional Agrologist

POSITIONS HELD

2022 – Present – Colville Consulting Inc., St. Catharines, Agrologist/Ecologist

EXPERIENCE

John Liotta, Agrologist and Ecologist at Colville Consulting Inc., has over 5 years of formal educational training and experience in Environmental and Agricultural Planning. John has completed Agricultural Impact Assessments, Minimum Distance Separation (MDS) Requirements, and Agricultural Characterization Reports in his role as at Colville Consulting Inc.

Through his education at the University of Guelph and Niagara College, John has gained a broad base knowledge of Environmental and Agricultural Planning and Management, which he has applied in his current role at Colville Consulting Inc. His work at Colville Consulting Inc. includes the interpretation of provincial, regional, and local land use policies, creation and interpretation of land use maps, regional soils mapping, and agricultural protection policies. He has participated in the completion of Agricultural Impact Assessments, Minimum Distance Separation Assessments, and Agricultural Characterization Reports. His field work activities include land use surveys and post-construction avian and bat mortality monitoring for wind turbines in the County of Haldimand, Ontario.

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

- ♦ Post-Construction Avian and Bat Mortality Monitoring for Pattern Energy, Korea Electric Power Corporation, and Samsung Renewable Energy Inc., Grand Renewable Energy Park, County of Haldimand, Ontario
- ♦ Agricultural Impact Assessment for landowner group, City of Pickering
- ♦ Agricultural Impact Assessment for landowner, Township of North Dumfries, Ontario
- ♦ Agricultural Characterization Report for landowner, Township of Beckwith, Ontario
- ♦ Agricultural Characterization Report for landowner, Town of Carleton Place, Ontario
- ♦ Minimum Distance Separation Report for landowner, Town of Caledon, Ontario
- ♦ Agricultural and Rural Lands Discussion Paper for municipality, Town of Blue Mountain, Ontario
- ♦ Agricultural Impact Assessment for Wildfield Village, Town of Caledon
- ♦ Agricultural Impact Assessment for Redford Pit Expansion, West Grey

ADDITIONAL TRAINING AND WORKSHOPS

Standard First Aid, CPR C, AED – St. John's Ambulance (2023)
Workplace Hazardous Materials Information System
Natural Gas Pipeline Safety Training – TC Energy (2022)
Excavation Safety Training – TC Energy (2022)
Supervisor (Level 2) Ground Disturbance Training (2022)

APPENDIX B

Climate Normals Data

Degree Days													
Above 24 °C	0	0	0	0	0.1	1.7	4.1	2.3	0.2	0	0	0	8.3 C
Above 18 °C	0	0	0	1.6	9.3	38.9	68.4	50.2	16.5	1	0	0	185.9 C
Above 15 °C	0	0	0.4	5.2	26.8	88.1	142.2	116.7	47.9	5.6	0	0	433 C
Above 10 °C	0	0	3.5	22.8	94.8	216.1	294.3	265.2	147.6	36.7	3.6	0.5	1084.9 C
Above 5 °C	0.7	1.1	14.3	73.3	217	364.2	449.3	420	288.1	120.5	28.4	4.1	1980.9 C
Above 0 °C	9.4	11.9	52.7	181.6	369.5	514.2	604.3	575	437.8	260.7	101	23.4	3141.4 C
Below 0 °C	220.8	179.1	106.6	8.5	0	0	0	0	0	0.2	24	129.4	668.5 C
Below 5 °C	367.1	309.4	223.2	50.3	2.5	0	0	0	0.2	15	101.4	265.2	1334.2 C
Below 10 °C	521.4	449.5	367.3	149.8	35.2	1.9	0	0.1	9.8	86.2	226.6	416.5	2264.3 C
Below 15 °C	676.4	590.7	519.3	282.2	122.3	24	3	6.6	60.1	210.1	373	571	3438.6 C
Below 18 °C	769.4	675.4	611.9	368.6	197.7	64.8	22.2	33.2	118.6	298.6	463	664	4287.3 C

1981 to 2010 Canadian Climate Normals station data (Frost-Free)		
	Frost-Free:	Code
Average Date of Last Spring Frost	24-May	C
Average Date of First Fall Frost	26-Sep	C
Average Length of Frost-Free Period	124 Days	C

Probability of last temperature in spring <= 0°C, on or after indicated date (10%)	05-Jun
Probability of last temperature in spring <= 0°C, on or after indicated date (25%)	31-May
Probability of last temperature in spring <= 0°C, on or after indicated date (33%)	27-May
Probability of last temperature in spring <= 0°C, on or after indicated date (50%)	22-May
Probability of last temperature in spring <= 0°C, on or after indicated date (66%)	19-May
Probability of last temperature in spring <= 0°C, on or after indicated date (75%)	17-May
Probability of last temperature in spring <= 0°C, on or after indicated date (90%)	10-May
Probability of first temperature in fall <= 0°C, on or before indicated date (10%)	12-Sep
Probability of first temperature in fall <= 0°C, on or before indicated date (25%)	16-Sep
Probability of first temperature in fall <= 0°C, on or before indicated date (33%)	22-Sep
Probability of first temperature in fall <= 0°C, on or before indicated date (50%)	25-Sep
Probability of first temperature in fall <= 0°C, on or before indicated date (66%)	29-Sep
Probability of first temperature in fall <= 0°C, on or before indicated date (75%)	02-Oct
Probability of first temperature in fall <= 0°C, on or before indicated date (90%)	12-Oct
Probability of frost-free period equal to or less than indicated period (Days) (10%)	94
Probability of frost-free period equal to or less than indicated period (Days) (25%)	112
Probability of frost-free period equal to or less than indicated period (Days) (33%)	119
Probability of frost-free period equal to or less than indicated period (Days) (50%)	125
Probability of frost-free period equal to or less than indicated period (Days) (66%)	130

Probability of frost-free period equal to or less than indicated period (Days) (75%)	135
Probability of frost-free period equal to or less than indicated period (Days) (90%)	150

APPENDIX C

Agricultural Crop Statistics

Grey County at a Glance - 2021

Item	Grey	Province	Percent of province	Percent from 2016
Farms, 2021 Census (number)				
Total	2,178	48,346	4.51%	-5.47%
Under 10 acres	102	3,217	3.17%	22.89%
10 to 69 acres	559	12,686	4.41%	5.87%
70 to 129 acres	584	10,924	5.35%	0.17%
130 to 179 acres	247	4,422	5.59%	-5.36%
180 to 239 acres	202	3,981	5.07%	-19.84%
240 to 399 acres	240	5,396	4.45%	-18.92%
400 to 559 acres	111	2,865	3.87%	-20.14%
560 to 759 acres	54	1,698	3.18%	-35.71%
760 to 1,119 acres	38	1,600	2.38%	-7.32%
1,120 to 1,599 acres	22	720	3.06%	0.00%
1,600 to 2,239 acres	10	451	2.22%	66.67%
2,240 to 2,879 acres	2	173	1.16%	-33.33%
2,880 to 3,519 acres	3	95	3.16%	0.00%
3,520 acres and over	4	118	3.39%	33.33%

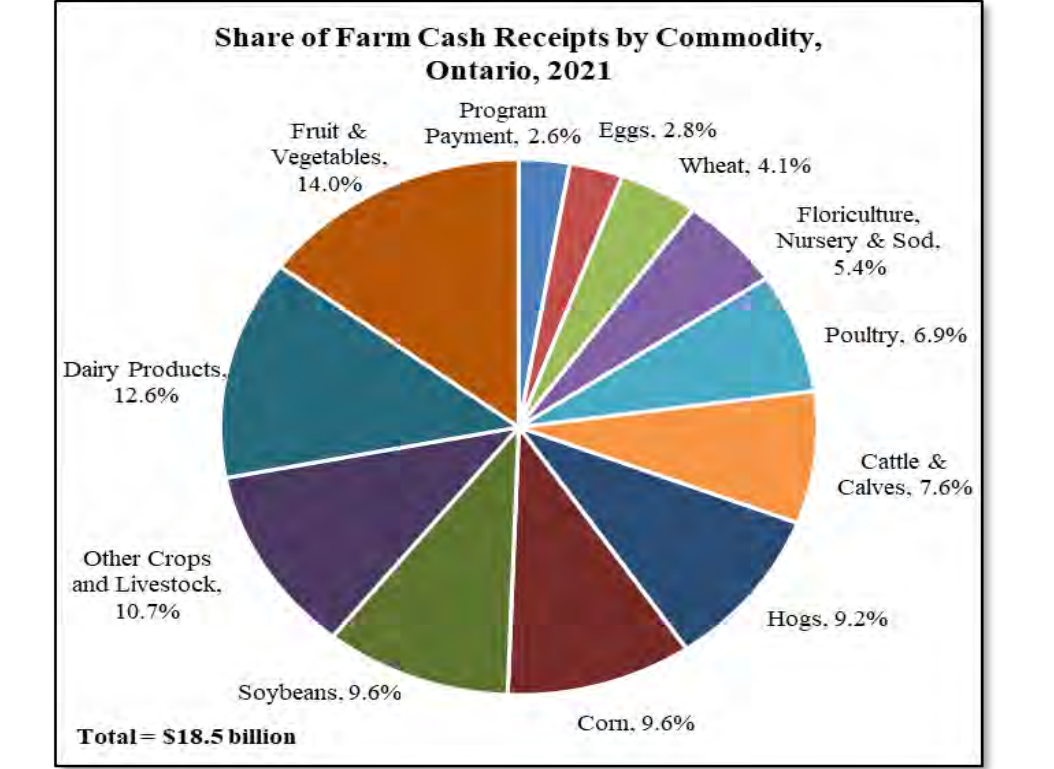
Land Use, 2021 Census (acres)				
Land in crops	295,038	9,051,011	3.26%	-1.64%
Summerfallow land	555	13,964	3.97%	-44.89%
Tame or seeded pasture	34,234	400,480	8.55%	-30.56%
Natural land for pasture	30,512	626,366	4.87%	-3.46%
Christmas trees, woodland & wetland	69,122	1,269,535	5.44%	-21.84%
All other land	18,736	404,714	4.63%	-25.61%
Total area of farms	448,197	11,766,071	3.81%	-9.54%

Greenhouse Area, 2021 Census (square feet)				
Total area in use	200,244	201,055,888	0.10%	17.68%

Farm Capital Value, 2021 Census (farms reporting)				
Under \$200,000	63	1,212	5.20%	-8.70%
\$200,000 to \$499,999	119	3,223	3.69%	-69.57%
\$500,000 to \$999,999	439	8,699	5.05%	-38.17%
\$1,000,000 and over	1,557	35,212	4.42%	37.30%

Total Gross Farm Receipts, 2021 Census (farms reporting)				
Under \$10,000	424	7,277	5.83%	-21.19%
\$10,000 to \$24,999	429	7,429	5.77%	-12.09%
\$25,000 to \$49,999	316	6,263	5.05%	-6.78%
\$50,000 to \$99,999	252	6,093	4.14%	-5.97%
\$100,000 to \$249,999	286	6,817	4.20%	-3.05%
\$250,000 to \$499,999	176	4,448	3.96%	-6.38%
\$500,000 to \$999,999	139	3,954	3.52%	11.20%
\$1,000,000 to \$1,999,999	50	2,452	2.04%	19.05%
\$2,000,000 and over	24	1,696	1.42%	14.29%

Farms by Industry Group, 2021 Census (number of farms)				
Beef cattle ranching and farming	717	7,986	8.98%	3.46%
Dairy cattle and milk production	113	3,188	3.54%	-13.08%
Hog and pig farming	45	1,189	3.78%	32.35%
Poultry and egg production	50	2,061	2.43%	31.58%
Sheep and goat farming	123	1,309	9.40%	28.13%
Other animal production	286	4,556	6.29%	-20.99%
Oilseed and grain farming	376	18,194	2.07%	14.63%
Vegetable and melon farming	36	1,562	2.30%	-28.00%
Fruit and tree nut farming	53	1,211	4.38%	-11.67%
Greenhouse, nursery and floriculture	36	1,672	2.15%	-34.55%
Other crop farming	343	5,418	6.33%	-25.11%



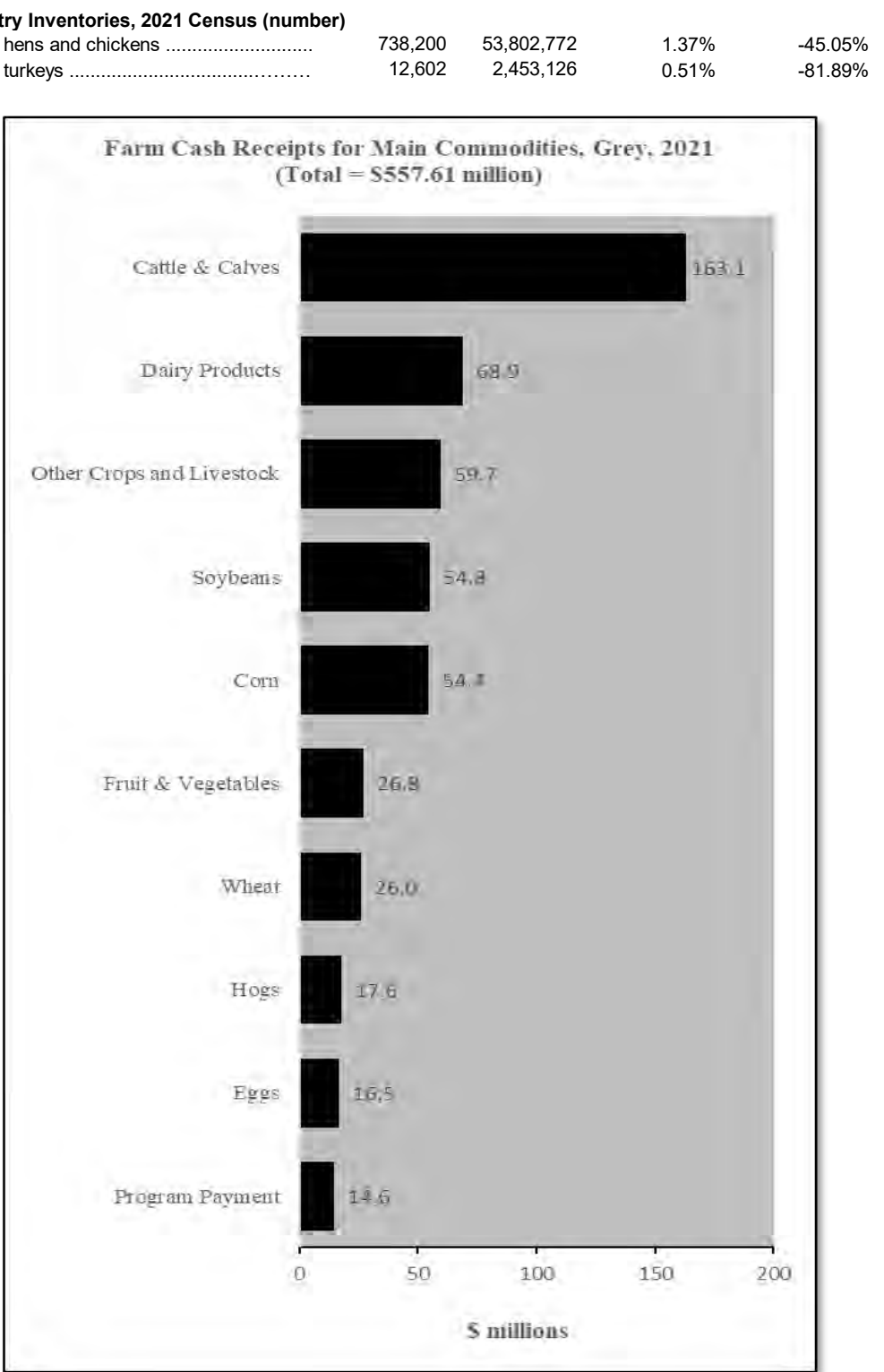
F - too unreliable to be published
Sources: 2021 & 2016 Census of Agriculture, OMAFRA
2022-06-21

Grey County at a Glance - 2016

Item	Grey	Province	Percent of province	Percent from 2016
Major Field Crops, 2021 Census (acres)				
Winter wheat	36,945	1,144,406	3.23%	39.81%
Oats for grain	4,897	84,320	5.81%	20.29%
Barley for grain	8,231	68,756	11.97%	-47.44%
Mixed grains	7,674	59,961	12.80%	-47.80%
Corn for grain	40,757	2,202,465	1.85%	22.08%
Corn for silage	14,288	289,678	4.93%	-0.72%
Hay	108,892	1,704,017	6.39%	-9.69%
Soybeans	55,120	2,806,255	1.96%	15.82%
Potatoes	604	39,193	1.54%	529.17%
Major Fruit Crops, 2021 Census (acres)				
Total fruit crops	3,908	48,661	8.03%	11.88%
Apples	3,769	16,008	23.54%	12.44%
Sour Cherries	0	1,383	0.00%	-100.00%
Peaches	0	4,608	0.00%	-
Grapes	65	18,432	0.35%	140.74%
Strawberries	5	2,633	0.19%	-84.38%
Raspberries	9	438	2.05%	-55.00%
Major Vegetable Crops, 2021 Census (acres)				
Total vegetables	246	127,893	0.19%	-25.00%
Sweet corn	95	20,518	0.46%	93.88%
Tomatoes	9	14,614	0.06%	-43.75%
Green peas	5	14,044	0.05%	-
Green or wax beans	4	8,709	0.05%	-

Livestock Inventories, 2021 Census (number)				
Total cattle and calves	107,167	1,604,810	6.68%	-14.90%
Steers	32,599	299,540	10.88%	-22.82%
Beef cows	18,465	224,194	8.24%	-9.98%
Dairy cows	8,704	327,272	2.66%	-6.23%
Total pigs	74,730	4,071,902	1.84%	93.84%
Total sheep and lambs	28,502	322,508	8.84%	-7.35%

Poultry Inventories, 2021 Census (number)				
Total hens and chickens	738,200	53,802,772	1.37%	-45.05%
Total turkeys	12,602	2,453,126	0.51%	-81.89%



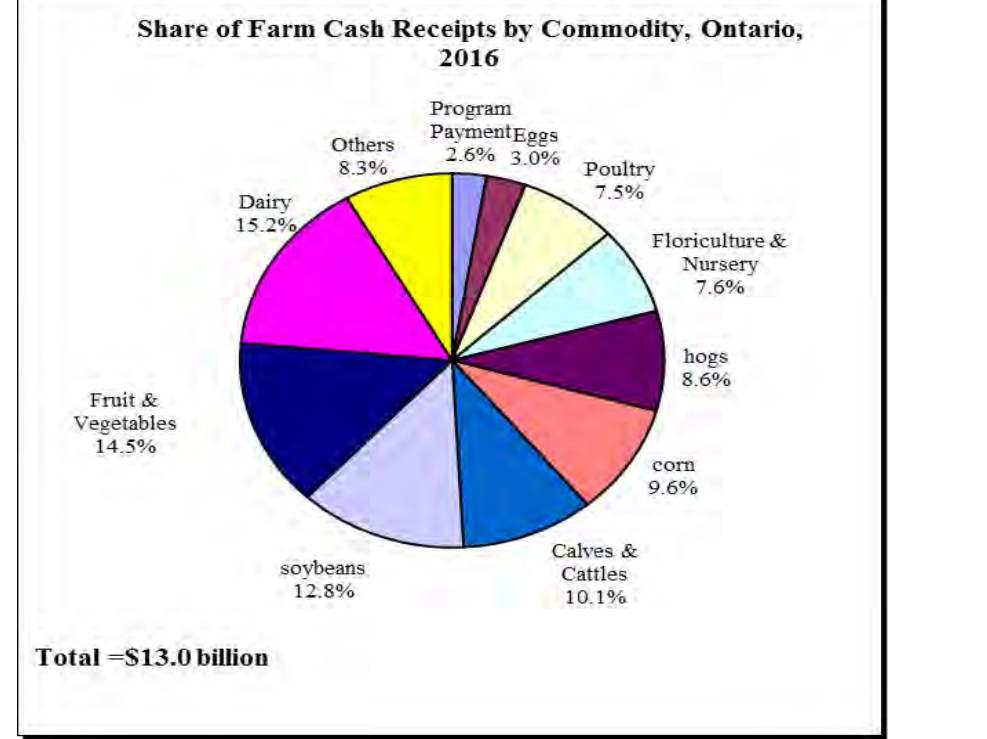
Land Use, 2016 Census (acres)				
Land in crops	299,952	9,021,298	3.32	6.94
Summerfallow land	1,007	15,885	6.34	-13.64
Tame or seeded pasture	49,298	514,168	9.59	-23.15
Natural land for pasture	31,604	783,566	4.03	-18.53
Christmas trees, woodland & wetland	88,435	1,542,637	5.73	5.66
All other land	25,187	470,909	5.35	12.39
Total area of farms	495,483	12,348,463	4.01	0.97

Greenhouse Area, 2016 Census (square feet)				
Total area in use	170,164	158,511,328	0.11	-22.31

Farm Capital Value, 2016 Census (farms reporting)				
Under \$200,000	69	2,142	3.22	0.00
\$200,000 to \$499,999	391	7,433	5.26	-50.51
\$500,000 to \$999,999	710	12,500	5.68	-7.67
\$1,000,000 and over	1,134	27,525	4.12	82.90

Total Gross Farm Receipts, 2016 Census (farms reporting)				
Under \$10,000	538	9,536	5.64	-22.59
\$10,000 to \$24,999	488	8,376	5.83	-5.06
\$25,000 to \$49,999	339	6,755	5.02	7.28
\$50,000 to \$99,999	268	6,263	4.28	17.03
\$100,000 to \$249,999	295	7,022	4.20	22.92
\$250,000 to \$499,999	188	4,707	3.99	22.08
\$500,000 to \$999,999	125	3,689	3.39	92.31
\$1,000,000 to \$1,999,999	42	2,019	2.08	100.00
\$2,000,000 and over	21	1,233	1.70	50.00

Farms by Industry Group, 2016 Census (number of farms)				
Beef cattle ranching and farming	693	6,786	10.21	10.00
Dairy cattle and milk production	130	3,439	3.78	4.84
Hog and pig farming	34	1,229	2.77	54.55
Poultry and egg production	38	1,816	2.09	-2.56
Sheep and goat farming	96	1,097	8.75	-24.41
Other animal production	362	5,902	6.13	-7.18
Oilseed and grain farming	328	16,876	1.94	44.49
Vegetable and melon farming	50	1,856	2.69	92.31
Fruit and tree nut farming	60	1,362	4.41	-10.45
Greenhouse, nursery and floriculture	55	2,050	2.68	-3.51
Other crop farming	458	7,187	6.37	-15.03



x - Suppressed data
Sources: 2016 & 2011 Census of Agriculture and Strategic Policy Branch, OMAFRA
2017-06-02

Grey County at a Glance - 2011

Item	Grey	Province	Percent of province	Percent from 2011
Farms, 2016 Census (number)				
Total	2,304	49,600	4.65	2.49
Under 10 acres	83	3,051	2.72	53.70
10 to 69 acres	528	12,625	4.18	15.79
70 to 129 acres	583	10,742	5.43	-7.46
Mixed grains	261	4,592	5.43	3.98
Corn for grain	252	4,282	5.89	5.00
Corn for silage	296	6,008	4.93	-8.64
Hay	139	3,093	4.49	6.11
Soybeans	84	1,990	4.22	1.20
Potatoes	41	1,593	2.57	-2.38
760 to 1,119 acres	22	801	2.75	-4.35
1,120 to 1,599 acres	6	457	1.31	-33.33
1,600 to 2,239 acres	3	168	1.79	200.00
2,240 to 2,879 acres	3	88	3.41	200.00
2,880 to 3,519 acres	3	110	2.73	0.00
3,520 acres and over				

Major Field Crops, 2016 Census (acres)				
Winter wheat	26,425	1,080,378	2.45	40.75
Oats for grain	4,071	82,206	4.95	28.14
Barley for grain	15,660	103,717	15.10	-0.58
Mixed grains	14,700	92,837	15.83	-5.31
Corn for grain	33,395	2,162,004	1.54	50.78
Corn for silage	14,392	295,660	4.87	22.99
Hay	120,581	1,721,214	7.01	-12.23
Soybeans	47,590	2,783,443	1.71	51.96
Potatoes	96	34,685	0.28	146.15
760 to 1,119 acres	42	1,587	2.65	
1,120 to 1,599 acres	23	769	2.92	
1,600 to 2,239 acres	9	436	2.06	
2,240 to 2,879 acres	1	152	0.66	
2,880 to 3,519 acres	1	79	1.27	
3,520 acres and over	3	92	3.26	

Major Fruit Crops, 2016 Census (acres)				
Total fruit crops	3,493	51,192	6.82	-6.25
Apples	3,352	15,893	21.09	-5.95
Sour Cherries	4	2,121	0.19	100.00
Peaches	x	5,232	-	-
Grapes	27	18,718	0.14	-18.18
Strawberries	32	2,915	1.10	-8.57
Raspberries	20	680	2.94	-4.76

Major Vegetable Crops, 2016 Census (acres)				
Total vegetables	328	135,420	0.24	1.55
Sweet corn	49	22,910	0.21	-51.96
Tomatoes	16	15,744	0.10	-44.83
Green peas	x	16,268	-	-
Green or wax beans	x	9,732	-	-

Livestock Inventories, 2016 Census (number)				
Total cattle and calves	125,633	1,623,710	7.76	13.24
Steers	42,236	305,514	13.82	50.86
Beef cows	20,512	236,253	8.68	-13.50
Dairy cows	9,282	311,960	2.98	29.28
Total pigs	38,553	3,534,104	1.09	13.68
Total sheep and lambs	30,763	321,495	9.57	22.17

Poultry Inventories, 2016 Census (number)				
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West Grey Township at a Glance - 2021

Item	West Grey	Province	Percent of province	Percent from 2016
Farms, 2021 Census (number)				
Total	478	48,346	0.99%	0.42%
Under 10 acres	19	3,217	0.59%	-13.64%
10 to 69 acres	121	12,686	0.95%	3.42%
70 to 129 acres	137	10,924	1.25%	0.00%
130 to 179 acres	47	4,422	1.08%	0.00%
180 to 239 acres	47	3,981	1.18%	9.30%
240 to 399 acres	51	5,396	0.95%	-19.05%
400 to 559 acres	30	2,865	1.05%	7.14%
560 to 759 acres	16	1,698	0.94%	23.08%
760 to 1,119 acres	5	1,600	0.31%	150.00%
1,120 to 1,599 acres	3	720	0.42%	0.00%
1,600 to 2,239 acres	1	451	0.22%	0.00%
2,240 to 2,879 acres	0	173	0.00%	-
2,880 to 3,519 acres	1	95	1.05%	-
3,520 acres and over	0	118	0.00%	-
Land Use, 2021 Census (acres)				
Land in crops	59,651	9,051,011	0.66%	15.31%
Summerfallow land	98	13,964	0.70%	-11.71%
Tame or seeded pasture	5,663	400,480	1.41%	-17.00%
Natural land for pasture	4,041	626,366	0.65%	-3.97%
Christmas trees, woodland & wetland	15,183	1,269,535	1.20%	-4.82%
All other land	3,703	404,714	0.91%	-12.27%
Total area of farms	88,339	11,766,071	0.75%	6.37%
Greenhouse Area, 2021 Census (square feet)				
Total area in use	52,408	201,055,888	0.03%	151.77%
Farm Capital Value, 2021 Census (farms reporting)				
Under \$200,000	8	1,212	0.66%	-55.56%
\$200,000 to \$499,999	21	3,223	0.65%	-73.75%
\$500,000 to \$999,999	101	8,699	1.16%	-35.67%
\$1,000,000 and over	348	35,212	0.99%	57.47%
Total Gross Farm Receipts, 2021 Census (farms reporting)				
Under \$10,000	72	7,277	0.99%	-29.41%
\$10,000 to \$24,999	92	7,429	1.24%	-14.02%
\$25,000 to \$49,999	71	6,263	1.13%	-21.11%
\$50,000 to \$99,999	66	6,093	1.08%	3.13%
\$100,000 to \$249,999	84	6,817	1.23%	44.89%
\$250,000 to \$499,999	36	4,448	0.81%	20.00%
\$500,000 to \$999,999	28	3,954	0.71%	86.67%
\$1,000,000 to \$1,999,999	4	2,452	0.16%	33.33%
\$2,000,000 and over	7	1,696	0.41%	0.00%
Farms by Industry Group, 2021 Census (number of farms)				
Beef cattle ranching and farming	138	7,986	1.73%	13.11%
Dairy cattle and milk production	33	3,188	1.04%	22.22%
Hog and pig farming	10	1,189	0.84%	150.00%
Poultry and egg production	6	2,061	0.29%	-40.00%
Sheep and goat farming	23	1,309	1.76%	-14.81%
Other animal production	51	4,556	1.12%	-38.55%
Oilseed and grain farming	130	18,194	0.71%	52.94%
Vegetable and melon farming	3	1,562	0.19%	-70.00%
Fruit and tree nut farming	1	1,211	0.08%	-50.00%
Greenhouse, nursery and floriculture	12	1,672	0.72%	0.00%
Other crop farming	71	5,418	1.31%	-24.47%
Major Field Crops, 2021 Census (acres)				
Winter wheat	8,257	1,144,406	0.72%	59.56%
Oats for grain	1,247	84,320	1.48%	77.89%
Barley for grain	1,325	68,756	1.93%	-37.05%
Mixed grains	1,706	59,961	2.85%	-35.23%
Corn for grain	8,767	2,202,465	0.40%	38.27%
Corn for silage	2,515	289,678	0.87%	28.78%
Hay	20,257	1,704,017	1.19%	-2.30%
Soybeans	13,104	2,806,255	0.47%	30.79%
Potatoes	1	39,193	0.00%	-85.71%
Major Fruit Crops, 2021 Census (acres)				
Total fruit crops	67	48,661	0.14%	-14.10%
- Apples	63	16,008	0.39%	-
- Sour Cherries	0	1,383	0.00%	-
- Peaches	0	4,608	0.00%	-
- Grapes	0	18,432	0.00%	-
- Strawberries	2	2,633	0.08%	-
- Raspberries	1	438	0.23%	-
Major Vegetable Crops, 2021 Census (acres)				
Total vegetables	37	127,893	0.03%	-59.34%
- Sweet corn	3	20,518	0.01%	-
- Tomatoes	0	14,814	0.00%	-100.00%
- Green peas	1	14,044	0.01%	0.00%
- Green or wax beans	1	8,709	0.01%	0.00%
Livestock Inventories, 2021 Census (number)				
Total cattle and calves	21,065	1,604,810	1.31%	3.97%
- Steers	7,556	299,540	2.52%	23.28%
- Beef cows	3,553	224,194	1.58%	-4.64%
- Dairy cows	2,180	327,272	0.67%	14.14%
- Total pigs	22,103	4,071,902	0.54%	178.76%
- Total sheep and lambs	6,195	322,508	1.92%	4.22%
Poultry Inventories, 2021 Census (number)				
Total hens and chickens	292,327	53,802,772	0.54%	-67.41%
- Total turkeys	108	2,453,126	0.00%	-

West Grey Township at a Glance - 2016

Item	West Grey	Province	Percent of province	Percent from 2011
Farms, 2016 Census (number)				
Total	476	49,600	0.96	14.42
Under 10 acres	22	3,051	0.72	37.50
10 to 69 acres	117	12,625	0.93	48.10
70 to 129 acres	137	10,742	1.28	10.48
130 to 179 acres	47	4,592	1.02	-11.32
180 to 239 acres	43	4,282	1.00	-21.82
240 to 399 acres	63	6,008	1.05	8.62
400 to 559 acres	28	3,093	0.91	86.67
560 to 759 acres	13	1,990	0.65	85.71
760 to 1,119 acres	2	1,593	0.13	-50.00
1,120 to 1,599 acres	3	801	0.37	-40.00
1,600 to 2,239 acres	1	457	0.22	-
2,240 to 2,879 acres	0	168	0.00	-
2,880 to 3,519 acres	0	88	0.00	-
3,520 acres and over	0	110	0.00	-
Land Use, 2016 Census (acres)				
Land in crops	51,732	9,021,298	0.57	24.00
Summerfallow land	111	15,885	0.70	-53.56
Tame or seeded pasture	6,823	514,168	1.33	-16.06
Natural land for pasture	4,208	783,566	0.54	-0.28
Christmas trees, woodland & wetland	15,952	1,542,637	1.03	-1.03
All other land	4,221	470,909	0.90	10.96
Total area of farms	83,047	12,348,463	0.67	11.88
Greenhouse Area, 2016 Census (square feet)				
Total area in use	20,816	158,511,328	0.01	-6.91
Farm Capital Value, 2016 Census (farms reporting)				
Under \$200,000	18	2,142	0.84	12.50
\$200,000 to \$499,999	80	7,433	1.08	-52.10
\$500,000 to \$999,999	157	12,500	1.26	7.53
\$1,000,000 and over	221	27,525	0.80	154.02
Total Gross Farm Receipts, 2016 Census (farms reporting)				
Under \$10,000	102	9,536	1.07	-20.93
\$10,000 to \$24,999	107	8,376	1.28	22.99
\$25,000 to \$49,999	90	6,755	1.33	20.00
\$50,000 to \$99,999	64	6,263	1.02	16.36
\$100,000 to \$249,999	58	7,022	0.83	75.76
\$250,000 to \$499,999	30	4,707	0.64	57.89
\$500,000 to \$999,999	15	3,689	0.41	87.50
\$1,000,000 to \$1,999,999	3	2,019	0.15	0.00
\$2,000,000 and over	7	1,233	0.57	0.00
Farms by Industry Group, 2016 Census (number of farms)				
Beef cattle ranching and farming	122	6,786	1.80	14.02
Dairy cattle and milk production	27	3,439	0.79	3.85
Hog and pig farming	4	1,229	0.33	0.00
Poultry and egg production	10	1,816	0.55	-9.09
Sheep and goat farming	27	1,097	2.46	-10.00
Other animal production	83	5,902	1.41	9.21
Oilseed and grain farming	85	16,876	0.50	46.55
Vegetable and melon farming	10	1,856	0.54	233.33
Fruit and tree nut farming	2	1,362	0.15	-33.33
Greenhouse, nursery and floriculture	12	2,050	0.59	-7.69
Other crop farming	94	7,187	1.31	10.59
Major Field Crops, 2016 Census (acres)				
Winter wheat	5,175	1,080,378	0.48	86.42
Oats for grain	701	82,206	0.85	63.02
Barley for grain	2,105	103,717	2.03	15.72
Mixed grains	2,634	92,837	2.84	-7.77
Corn for grain	6,355	2,162,004	0.29	45.29
Corn for silage	1,953	295,660	0.66	4.16
Hay	20,734	1,721,214	1.20	2.87
Soybeans	10,019	2,783,443	0.36	66.21
Potatoes	7	34,685	0.02	75.00
Major Fruit Crops, 2016 Census (acres)				
Total fruit crops	78	51,192	0.15	73.33
- Apples	x	15,893	-	-
- Sour Cherries	x	2,121	-	-
- Peaches	0	5,232	0.00	-
- Grapes	0	18,718	0.00	-
- Strawberries	x	2,915	-	-
- Raspberries	x	680	-	-
Major Vegetable Crops, 2016 Census (acres)				
Total vegetables	91	135,420	0.07	264.00
- Sweet corn	x	22,910	-	-
- Tomatoes	3	15,744	0.02	200.00
- Green peas	1	16,268	0.01	0.00
- Green or wax beans	1	9,732	0.01	0.00
Livestock Inventories, 2016 Census (number)				
Total cattle and calves	20,269	1,623,710	1.25	31.20
- Steers	6,129	305,514	2.01	124.34
- Beef cows	3,726	236,253	1.58	8.35
- Dairy cows	1,910	311,960	0.61	31.27
- Total pigs	7,929	3,534,104	0.22	-14.05
- Total sheep and lambs	5,944	321,495	1.85	7.64
Poultry Inventories, 2016 Census (number)				
Total hens and chickens	896,885	50,759,994	1.77	20.21
- Total turkeys	x	3,772,146	-	-

West Grey Township at a Glance - 2011

Item	West Grey	Province	Percent of province	Item	West Grey	Province	Percent of province
Farms, 2011 Census (number)				Major Field Crops, 2011 Census (acres)			
.....	416	51,950	0.80	Winter wheat	2,776	1,100,003	0.25
Under 10 acres	16	2,741	0.58	Oats for grain	430	71,040	0.61
10 to 69 acres	79	12,681	0.62	Barley for grain	1,819	126,881	1.43
70 to 129 acres	124	11,779	1.05	Mixed grains	2,856	106,162	2.69
130 to 179 acres	53	4,969	1.07	Corn for grain	4,374	2,032,356	0.22
180 to 239 acres	55	4,801	1.15	Corn for silage	1,875	271,701	0.69
240 to 399 acres	58	6,460	0.90	Hay	20,155	2,077,911	0.97
400 to 559 acres	15	3,359	0.45	Soybeans	6,028	2,464,870	0.24
560 to 759 acres	7	2,026	0.35	Potatoes	4	37,384	0.01
760 to 1,119 acres	4	1,587	0.25	Major Fruit Crops, 2011 Census (acres)			
1,120 to 1,599 acres	5	788	0.63	Total fruit crops	45	52,740	0.09
1,600 to 2,239 acres	0	436	0.00	Apples	x	15,830	-
2,240 to 2,879 acres	0	152	0.00	Sour Cherries	0	2,342	0.00
2,880 to 3,519 acres	0	79	0.00	Peaches	0	6,455	0.00
3,520 acres and over	0	92	0.00	Grapes	0	18,383	0.00
Land Use, 2011 Census (acres)				Strawberries	8	3,283	0.24
Land in crops	41,719	8,929,947	0.47	Raspberries	4	902	0.44
Summerfallow land	239	23,450	1.02	Major Vegetable Crops, 2011 Census (acres)			
Tame or seeded pasture	8,128	648,758	1.25	Total vegetables	25	129,595	0.02
Natural land for pasture	4,220	984,809	0.43	Sweet corn	x	25,540	-
Christmas trees, woodland & wetland	16,118	1,612,444	1.00	Tomatoes	1	16,558	0.01
All other land	3,804	468,828	0.81	Green peas	1	15,121	0.01
Total area of farms	74,228	12,668,236	0.59	Green or wax beans	1	9,186	0.01
Greenhouse Area, 2011 Census (square feet)				Livestock Inventories, 2011 Census (number)			
Total area in use	22,360	133,520,541	0.02	Total cattle and calves	15,442	1,741,381	0.89
Farm Capital Value, 2011 Census (farms reporting)				Steers	2,732	291,263	0.94
Under \$200,000	16	2,562	0.62	Beef cows	3,439	282,062	1.22
\$200,000 to \$499,999	167	12,994	1.29	Dairy cows	1,455	318,158	0.46
\$500,000 to \$999,999	146	15,276	0.96	Total pigs	9,225	3,088,646	0.30
\$1,000,000 and over	87	21,118	0.41	Total sheep and lambs	5,522	352,807	1.57
Total Gross Farm Receipts, 2011 Census (farms reporting)				Poultry Inventories, 2011 Census (number)			
Under \$10,000	129	12,263	1.05	Total hens and chickens	746,084	46,902,316	1.59
\$10,000 to \$24,999	87	9,098	0.96	Total turkeys	x	3,483,828	-
\$25,000 to \$49,999	75	6,720	1.12				
\$50,000 to \$99,999	55	6,189	0.89				
\$100,000 to \$249,999	33	6,985	0.47				
\$250,000 to \$499,999	19	5,086	0.37				
\$500,000 to \$999,999	8	3,248	0.25				
\$1,000,000 to \$1,999,999	3	1,558	0.19				
\$2,000,000 and over	7	803	0.87				
Farms by Industry Group, 2011 Census (number of farms)							
Beef cattle ranching and farming	107	7,105	1.51				
Dairy cattle and milk production	26	4,036	0.64				
Hog and pig farming	4	1,235	0.32				
Poultry and egg production	11	1,619	0.68				
Sheep and goat farming	30	1,446	2.07				
Other animal production	76	6,966	1.09				
Dilled and grain farming	58	15,618	0.37				
Vegetable and melon farming	9	1,531	0.20				
Fruit and tree nut farming	3	1,548	0.19				
Greenhouse, nursery and floriculture	13	2,372	0.55				
Other crop farming	85	8,274	1.03				

APPENDIX D

Canada Land Inventory Information

Canada Land Inventory Soil Capability Classification for Agriculture

The Canada Land Inventory (CLI) classification system was developed to classifying soil capability for agricultural use for use across Canada. CLI is an interpretative system which assesses the effects of climate and soil characteristics on the limitations of land for growing common field crops. It classifies soils into one of seven capability classes based on the severity of their inherent limitations to field crop production. 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.

In Ontario the document, "Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario" (OMAFRA, 2008) provides a Provincial interpretation of the CLI classification system. These guidelines are based on the "Canada Land Inventory, Soil Capability Classification for Agriculture" (ARDA Report No. 2, 1965) and have been modified for use in Ontario. In Ontario, CLI Classes 1 to 4 lands are generally considered to be arable lands and Classes 1 to 3 soils and specialty crop lands are considered to be prime agricultural lands.

The following definitions were taken from Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario (2008).

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 Prime and Non-prime Agricultural Lands

In Ontario, CLI Classes 1, 2 and 3 and specialty crop lands are considered prime agricultural lands. Non-prime agricultural lands are comprised of CLI Class 4-7 lands.

Organic soils (Muck) are not classified under the CLI system but are mapped and identified as O in the provincial mapping.

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.

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

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.

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

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.

Class	Soil Characteristics
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.
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%.
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.
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.

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.

Class	Upper Texture Group (>40 and <100 cm from surface)	Lower Texture Group (remaining materials to 100 cm depth)	Drainage Class	Additional Soil Characteristics ¹
2F	Sandy	Sandy or very gravelly	Rapid to imperfect	Neutral or alkaline parent material with a Bt horizon within 100 cm of the surface
3F	Sandy	Sandy or very gravelly	Any drainage class	Neutral or alkaline parent material with no Bt horizon present within 100 cm of surface
3F	Sandy	Loamy or Clayey	Any drainage class	Acid parent material
3F	Loamy or clayey	Any Texture Group	Any drainage class	Acid parent material
4F	Sandy	Sandy or very gravelly	Any drainage class	Acid parent material
4F	Very gravelly	Any texture	Rapid to imperfect	Neutral to alkaline parent material
5F	Very Gravelly	Any texture	All drainage classes	Acid parent material

¹ "Acid" means pH<5.5; "Neutral" pH 5.5 to 7.4; "Alkaline" pH>7.4 as measured in 0.01 M CaCl₂ (CSCC, 1998). PH 's measured in distilled water tend to be slightly higher (up to 0.5 units).

Bt horizon should be fairly continuous and average more than 10cm thickness

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

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

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

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Class	Soil Texture Groups		Drainage	Additional Soil Characteristics
	Upper materials1	Lower materials2		
2M	15 to 40 cm of loamy or finer materials	Sandy to Very Gravelly	Well	
2M	40 to < 100 cm of sandy to very gravelly material.	Loamy to Very Fine Clayey	Well	
2M	Sandy		Rapid to well	Well developed Bt3 horizon occurs within 100 cm of surface
3M	Sandy material to > 100cm		Rapid	Bt horizon absent within 100 cm of surface
4M	Very Gravelly to > 100 cm		Rapid	Bt horizon present within 100 cm of surface
5M	Very gravelly to > 100cm		Very rapid	Bt horizon absent within 100cm

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

Class	Soil Characteristics
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.
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 ²), 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.
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.
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 ²).
6P	Surface stones 15-60 cm in diameter and/or boulders >60 cm in diameter occupy >50% of the surface area.

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.

Class	Soil Characteristics
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.
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.
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.

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

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

The steepness of the surface slope and the pattern or frequency of slopes in different directions are considered topographic limitations if they: 1) increase the cost of farming the land over that of level or less sloping land; 2) decrease the uniformity of growth and maturity of crops; and 3) increase the potential of water and tillage erosion.

Determination of Subclass T for Very Gravelly and Sandy Soils

Slope %	<2		2-5		5-9		9-15		15-30		30-60		>60	
Slope type	S	C	S	C	S	C	S	C	S	C	S	C	S	C
Class				2T	2T	3T	3T	4T	5T	5T	6T	6T	7T	7T

Slope %	<2		2-5		5-9		9-15		15-30		30-60		>60	
Slope type	S	C	S	C	S	C	S	C	S	C	S	C	S	C
Class				2T	3T	3T	4T	4T	5T	5T	6T	6T	7T	7T

S = Simple Slopes >50 m in length

C =Complex Slopes <50 m in length

Subclass W - Excess water:

The presence of excess soil moisture, other than that brought about by inundation, is a limitation to field crop agriculture. Excess water may result from inadequate soil drainage, a high water table, seepage or runoff from surrounding areas.

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

APPENDIX E

Site Photographs



Photo 1: Operation #3 – Hobby farm showing sheep, barn, and outdoor manure storage



Photo 2: Operation #9 – Empty Livestock Operation showing barn in good condition, small shed, and farm implements



Photo 3: Operation #7 – Existing Walkers Redford Pit



Photo 4: Operation #8 – Poultry Operation showing multiple two-storey barns and grain bins



Photo 5: Operation #5 – Equestrian operation showing bank barn and implement shed



Photo 6: Operation #4 – Beef Operation showing bank barn and implement shed



Photo 7: Subject Lands showing stones at surface



Photo 8: Subject Lands showing stone pile



Photo 9: Soil profile at Site #3 of detailed soil survey



Photo 10: Soil profile at Site #5 of detailed soil survey



Photo 11: Soil profile at Site #6 of detailed soil survey

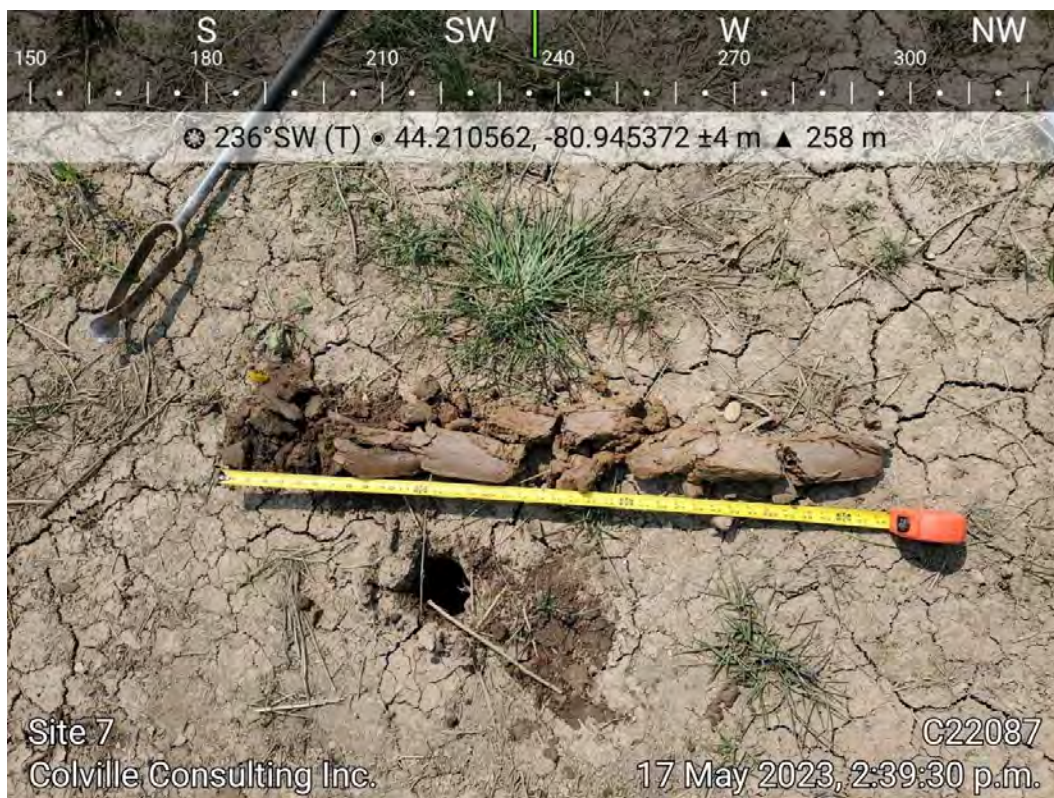


Photo 12: Soil profile at Site #7 of detailed soil survey

APPENDIX F

Soil Data Sheets

SOIL DATA SHEET

Site No. 1	Date (DD/MM/YY) 17 05 23	GPS Coordinates 44°12'30"N 80°56'49"W	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GF	SLOPE CLASS C	SLOPE POSITION L	SLOPE % 3	LENGTH
	NO.2 	DRAINAGE CLASS W	STONINESS X	ROCKINESS X	
	NO.3 				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		00	20			>15	gL	
	B	tj		20	40			>35	vg L-CL	
	R									

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainal Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock				
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: R = Stopped by gravel

Spill

Very mild reaction in Btj

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common: 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No. 2	Date (DD/MM/YY) 17 05 23	GPS Coordinates 44°12'30"N 80°56'45"W	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GF	SLOPE CLASS e	SLOPE POSITION M	SLOPE % 14	LENGTH
	NO.2 	DRAINAGE CLASS R	STONINESS X	ROCKINESS X	
	NO.3 				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		0	20				SL-vg CL	
	B	m		20	30				SL-vg CL	
	R			30						

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainal Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock				
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Surface erosion evident

Lots of cobble stones at surface

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, line, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No. 3	Date (DD/MM/YY) 17 05 23	GPS Coordinates 44°12'33"N 80°56'50"W	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GF	SLOPE CLASS e	SLOPE POSITION L	SLOPE % 14	LENGTH
	NO.2 	DRAINAGE CLASS W	STONINESS 	ROCKINESS 	
	NO.3 				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		0	26				L	
	B	h		26	41				SL	
	BC			41	50				co SL	
	R			50						

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainal Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock				
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

NOTES: **Stopped by gravel**
Dark B horizon recorded as Bh

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, line, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No. 4	Date (DD/MM/YY) 17 05 23	GPS Coordinates 44°12'40"N 80°56'51"W	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GF	SLOPE CLASS C	SLOPE POSITION L	SLOPE % 3	LENGTH
	NO.2 	DRAINAGE CLASS W	STONINESS X	ROCKINESS X	
	NO.3 				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		0	25				L	
	B	t		25	46				L	
	B	m		46	58				LS	
	C	k		58	64				vg-co LS	
	R			64						

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainial Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock	Horizon	Abun.	Size	Contrast
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Stopped by gravel

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, line, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No. 5	Date (DD/MM/YY) 17 05 23	GPS Coordinates 	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GF	SLOPE CLASS 	SLOPE POSITION 	SLOPE % 	LENGTH
	NO.2 	DRAINAGE CLASS 	STONINESS 	ROCKINESS 	
	NO.3 				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		0	25				L	
	B	m		25	40				L	
	B	t		40	58				L	
	BC			58	73				FSL	
	C	k		73	100				g co-LS	

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainial Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock				
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

NOTES: _____

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, line, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No. 6	Date (DD/MM/YY) 17 05 23	GPS Coordinates 44°12'36"N 80°56'45"W	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GF	SLOPE CLASS F	SLOPE POSITION M	SLOPE % 22	LENGTH
	NO.2 	DRAINAGE CLASS W	STONINESS X	ROCKINESS X	
	NO.3 				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		0	17				L	
	B	m		17	28				L	
	B	tj		28	56				gL	
	R			56						

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainial Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock				
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

NOTES:

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, line, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No. 7	Date (DD/MM/YY) 17 05 23	GPS Coordinates 44°12'38"N 80°56'43"W	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GL	SLOPE CLASS B	SLOPE POSITION D	SLOPE % 2	LENGTH
	NO.2 	DRAINAGE CLASS PO	STONINESS X	ROCKINESS X	
	NO.3 				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		0	18				L	
	B	t		18	41				C	
	B	mgj		41	61				SCL	
	C	kg		61	100				SCL	

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainial Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock				
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES:

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, line, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No. 8	Date (DD/MM/YY) 17 05 23	GPS Coordinates 44°12'37"N 80°56'38"W	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GF	SLOPE CLASS C	SLOPE POSITION M	SLOPE % 2	LENGTH
	NO.2 	DRAINAGE CLASS W	STONINESS X	ROCKINESS X	
	NO.3 				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		0	20				L	
	R			20						

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainal Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock				
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

NOTES: Cobbles and gravel at surface

Lots of gravel

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, line, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No. 9	Date (DD/MM/YY) 17 05 23	GPS Coordinates 44°12'35"N 80°56'38"W	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GF	SLOPE CLASS C	SLOPE POSITION M	SLOPE % 2	LENGTH
	NO.2 	DRAINAGE CLASS W	STONINESS X	ROCKINESS X	
	NO.3 				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		0	20				L	
	R			20						

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainal Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock				
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Very gravelly and cobbly
Stopped by gravel at 20cm

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, line, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No. 10	Date (DD/MM/YY) 17 05 23	GPS Coordinates	Project Number: C22087
Surveyor SMC	Observation Type A	Project Name Redford Pit	

MODE OF DEPOSITION	NO. 1 GF	SLOPE CLASS C	SLOPE POSITION B	SLOPE % 2	LENGTH
	NO.2	DRAINAGE CLASS W	STONINESS X	ROCKINESS X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		% C.F.	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours			
	A	p		0	20				L	
	R			20						

Mode of Deposition	Slope Class	Drainage Class	Stoniness/Rockiness	Consistency
MT Morainial Till	Aa 0-0.5%	RA Rapidly	X Non	L- Loose
LA Lacustrine	Bb 0.5-2.0%	WE Well	1 Slightly	FR - Friable
GF Glacial Fluvial	Cc 2-5%	MW Mod. Well	2 Moderately	F - Firm
GL Glacio Lacustrine	Dd 5-9%	IM Imperfectly	3 Very	VF - Very Firm
AL Aluvial	Ee 9-15%	PO Poorly	4 Excessively	
	Ff 15-30%	VP Very Poorly	5 Exceedingly	
	Gg 30-45%			

Depth to (cm):	Mottles	Abundance	Size	Contrast
Bedrock				
Constricting Layer				
Carbonates				
Gley Colours				
Water Table				

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Stopped by gravel at 20cm

Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, line, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%

Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

APPENDIX G

Soil Laboratory Results



Analysis Report

GS23-01496

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received: 19-May-2023

Completed: 24-May-2023

Description: Sean - Redford Pit Baseline -Ellise

Report File Reference Number: 0000266993

Page 1 of 2

Sample ID	Laboratory ID	pH	BpH	Total Salts (mmhos/cm)	Organic Matter (%)	Nitrogen NO3-N (ppm)	Phosphorus - P (ppm) Sodium Bicarb. Bray Phosph.	Potassium K (ppm)	Magnesium Mg (ppm)	Calcium Ca (ppm)
AP #1 Topsoil	GS23-01496.001	7.4	-	-	5.4	-	13 -	98	608	3120
AP# 2	GS23-01496.002	7.7	-	-	5.1	-	5 -	103	555	2620
AP# 3	GS23-01496.003	7.6	-	-	5.7	-	18 -	122	477	2230
AP# 4	GS23-01496.004	7.5	-	-	4.4	-	20 -	92	479	2420
AP# 5	GS23-01496.005	7.6	-	-	4.0	-	21 -	82	429	2410
AP# 6	GS23-01496.006	7.5	-	-	5.3	-	7 -	118	545	2400
AP# 7	GS23-01496.007	7.0	-	-	4.9	-	5 -	138	640	2580
AP# 8	GS23-01496.008	7.4	-	-	5.6	-	7 -	107	684	2800

Sample ID	Zinc Zn (ppm)	Zn Index	Manganese Mn (ppm)	Mn Index	Copper Cu (ppm)	Iron Fe (ppm)	Boron B (ppm)	Texture	Cation Exchange MEQ/100g	K%	Base Saturation Mg%	Ca%
AP #1	2.2	20.1	19.9	17.1	0.8	31.2	0.59	M	22.1	1.1	22.9	70.5
AP# 2	2.0	18.9	15.7	18.2	0.3	26.4	0.62	M	19.2	1.4	24.1	68.3
AP# 3	2.8	22.4	19.2	18.0	1.5	24.6	0.56	M	16.6	1.9	23.9	67.0
AP# 4	2.2	19.9	22.7	18.6	1.4	24.7	0.67	M	17.5	1.4	22.8	69.0
AP# 5	1.9	18.4	20.8	18.8	1.2	22.8	0.60	M	17.0	1.2	21.0	70.7
AP# 6	1.7	17.8	17.3	16.7	0.4	22.1	0.83	M	18.0	1.7	25.2	66.5
AP# 7	1.0	15.7	18.7	15.9	1.0	42.3	0.89	M	19.8	1.8	27.0	65.2
AP# 8	1.6	17.3	20.4	17.3	0.4	30.1	0.93	M	21.2	1.3	26.9	66.1

Sample ID	Sodium Na (ppm)	Sulphate Sulphur SO4-S (ppm)	Chloride Cl (ppm)	Aluminum Al (ppm)	K/Mg Ratio	Exchangeable Acidity	Ammonium (ppm)
AP #1	-	-	-	-	0.2	-	-
AP# 2	-	-	-	-	0.2	-	-
AP# 3	-	-	-	-	0.3	-	-
AP# 4	-	-	-	-	0.2	-	-
AP# 5	-	-	-	-	0.2	-	-
AP# 6	-	-	-	-	0.2	-	-
AP# 7	-	-	-	-	0.2	-	-
AP# 8	-	-	-	-	0.2	-	-

NOTE:

The analysis report above refers to the time and place of testing, and strictly to the supplied sample(s) only, without reference to any other matter. This report does not evidence or refer to any consignment or shipment or/and SGS sampling and inspection.

For and on behalf of SGS Canada Inc., Agriculture and Food

Jack Legg, CCA-ON, 4R NMS
Branch Manager, Agronomist

Signed and dated in Guelph, ON
On 24-May-2023

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Analysis Report

GS23-01496

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received: 19-May-2023

Completed: 24-May-2023

Description: Sean - Redford Pit Baseline -Ellise

Report File Reference Number: 0000266993

Page 2 of 2

Sample ID	Laboratory ID		pH	BpH	Total Salts (mmhos/cm)	Organic Matter (%)	Nitrogen NO3-N (ppm)	Phosphorus - P (ppm)		Potassium K (ppm)	Magnesium Mg (ppm)	Calcium Ca (ppm)
AP# 9	GS23-01496.009		7.7	-	-	5.1	-	6	-	84	632	3120
AP #10	GS23-01496.010		7.7	-	-	5.3	-	14	-	109	686	2790
Sample ID	Zinc Zn (ppm)	Zn Index	Manganese Mn (ppm)	Mn Index	Copper Cu (ppm)	Iron Fe (ppm)	Boron B (ppm)	Texture	Cation Exchange MEQ/100g	K%	Base Saturation Mg%	Ca%
AP# 9	1.3	15.8	14.5	18.3	0.3	27.8	0.82	M	22.3	1.0	23.6	70.0
AP #10	1.7	17.6	20.9	19.6	0.6	29.8	0.91	M	21.1	1.3	27.0	66.0
Sample ID	Sodium Na (ppm)	Sulpahte Sulphur SO4-S (ppm)	Chloride Cl (ppm)	Aluminum Al (ppm)	K/Mg Ratio	Exchangeable Acidity	Ammonium (ppm)					
AP# 9	-	-	-	-	0.1	-	-					
AP #10	-	-	-	-	0.2	-	-					

NOTE:

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Signed and dated in Guelph, ON
On 24-May-2023

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For and on behalf of SGS Canada Inc., Agriculture and Food

Jack Legg, CCA-ON, 4R NMS
Branch Manager, Agronomist



Analysis Report

GS23-01497

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 19-May-2023
Completed : 26-May-2023
Order Reference : Sean/Ellise - Redford Pit Baseline

Laboratory ID: Client Sample #: Description:	GS23-01497.001 AP# 1 Topsoil	GS23-01497.002 AP# 2	GS23-01497.003 AP# 3	GS23-01497.004 AP# 4
Texture	Loam	Sandy Loam	Sandy Loam	Loam
Sand (%)	41	52	54	41
Silt (%)	43	37	33	42
Clay (%)	16	11	13	17

NOTE:

The analysis report above refers to the time and place of testing, and strictly to the supplied sample(s) only, without reference to any other matter. This report does not evidence or refer to any consignment or shipment or/and SGS sampling and inspection.

Report File Reference Number: 0000267263

Page 1 of 3

Signed and dated in Guelph, ON
On 26-May-2023

For and on behalf of SGS Canada Inc., Agriculture and Food

Jack Legg, CCA-ON, 4R NMS
Branch Manager, Agronomist

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Analysis Report

GS23-01497

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 19-May-2023
Completed : 26-May-2023
Order Reference : Sean/Ellise - Redford Pit Baseline

Laboratory ID: Client Sample #: Description:	GS23-01497.005 AP# 5	GS23-01497.006 AP# 6	GS23-01497.007 AP# 7	GS23-01497.008 AP# 8
Texture	Loam	Sandy Loam	Silty Clay Loam	Silt Loam
Sand (%)	50	57	8	28
Silt (%)	34	33	61	54
Clay (%)	16	10	31	18

NOTE:

The analysis report above refers to the time and place of testing, and strictly to the supplied sample(s) only, without reference to any other matter. This report does not evidence or refer to any consignment or shipment or/and SGS sampling and inspection.

Report File Reference Number: 0000267263

Page 2 of 3

Signed and dated in Guelph, ON
On 26-May-2023

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Analysis Report

GS23-01497

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 19-May-2023
Completed : 26-May-2023
Order Reference : Sean/Ellise - Redford Pit Baseline

Laboratory ID:	GS23-01497.009	GS23-01497.010
Client Sample #:	AP# 9	AP# 10
Description:		
Texture	Loam	Silt Loam
Sand (%)	38	29
Silt (%)	44	51
Clay (%)	18	20

NOTE:

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Report File Reference Number: 0000267263

Page 3 of 3

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Jack Legg, CCA-ON, 4R NMS
Branch Manager, Agronomist

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Analysis Report

GS23-01511

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 19-May-2023
Completed : 31-May-2023
Order Reference : Sean/Ellise - Redford Pit Baseline

Laboratory ID: Client Sample #: Description:	GS23-01511.001 AP#1 Topsoil	GS23-01511.002 AP#2	GS23-01511.003 AP#3	GS23-01511.004 AP#4
Calcium Carbonate (%)	8.85	41.52	26.63	16.59

NOTE:

The analysis report above refers to the time and place of testing, and strictly to the supplied sample(s) only, without reference to any other matter. This report does not evidence or refer to any consignment or shipment or/and SGS sampling and inspection.

Report File Reference Number: 0000267645

Page 1 of 3

Signed and dated in Guelph, ON
On 31-May-2023

For and on behalf of SGS Canada Inc., Agriculture and Food

Jack Legg, CCA-ON, 4R NMS
Branch Manager, Agronomist

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Analysis Report

GS23-01511

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 19-May-2023
Completed : 31-May-2023
Order Reference : Sean/Ellise - Redford Pit Baseline

Laboratory ID: Client Sample #: Description:	GS23-01511.005 AP#5	GS23-01511.006 AP#6	GS23-01511.007 AP#7	GS23-01511.008 AP#8
Calcium Carbonate (%)	16.86	32.27	0.45	10.75

NOTE:

The analysis report above refers to the time and place of testing, and strictly to the supplied sample(s) only, without reference to any other matter. This report does not evidence or refer to any consignment or shipment or/and SGS sampling and inspection.

Report File Reference Number: 0000267645

Page 2 of 3

Signed and dated in Guelph, ON
On 31-May-2023

For and on behalf of SGS Canada Inc., Agriculture and Food

Jack Legg, CCA-ON, 4R NMS
Branch Manager, Agronomist

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Analysis Report

GS23-01511

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 19-May-2023
Completed : 31-May-2023
Order Reference : Sean/Ellise - Redford Pit Baseline

Laboratory ID:
Client Sample #:
Description:

GS23-01511.009
AP#9

GS23-01511.010
AP#10

Calcium Carbonate (%)

21.29

6.51

NOTE:

The analysis report above refers to the time and place of testing, and strictly to the supplied sample(s) only, without reference to any other matter. This report does not evidence or refer to any consignment or shipment or/and SGS sampling and inspection.

Report File Reference Number: 0000267645

Page 3 of 3

Signed and dated in Guelph, ON
On 31-May-2023

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Jack Legg, CCA-ON, 4R NMS
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Analysis Report

GS23-01537

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received: 24-May-2023

Completed: 26-May-2023

Description: Sean - Redford Pit Baseline - Ellise

Report File Reference Number: 0000267328

Page 1 of 1

Sample ID	Laboratory ID	pH	BpH	Total Salts (mmhos/cm)	Organic Matter (%)	Nitrogen NO3-N (ppm)	Phosphorus - P (ppm) Sodium Bicarb. Bray Phosph.	Potassium K (ppm)	Magnesium Mg (ppm)	Calcium Ca (ppm)
B#1 Subsoil	GS23-01537.001	7.5	-	-	4.4	-	5 -	69	579	2110
B#2 Subsoil	GS23-01537.002	7.7	-	-	3.5	-	4 -	81	545	2280
B#3 Subsoil	GS23-01537.003	7.8	-	-	2.9	-	2 -	49	379	1930
B#4 Subsoil	GS23-01537.004	7.8	-	-	3.5	-	7 -	63	471	2400
B#5 Subsoil	GS23-01537.005	7.8	-	-	2.2	-	6 -	52	369	2600
B#6 Subsoil	GS23-01537.006	7.7	-	-	4.3	-	4 -	88	488	2900
B#7 Subsoil	GS23-01537.007	7.5	-	-	2.6	-	2 -	89	641	2480
C#5 Parent Material	GS23-01537.008	7.7	-	-	0.6	-	2 -	30	198	2900

Sample ID	Zinc Zn (ppm)	Zn Index	Manganese Mn (ppm)	Mn Index	Copper Cu (ppm)	Iron Fe (ppm)	Boron B (ppm)	Texture	Cation Exchange MEQ/100g	K%	Base Saturation Mg%	Ca%
B#1	1.3	15.8	14.5	16.6	0.6	18.1	0.52	M	16.8	1.1	28.8	63.0
B#2	1.4	16.3	10.7	16.9	0.2	17.2	0.56	M	17.3	1.2	26.2	65.7
B#3	0.6	12.9	15.1	20.1	0.4	12.7	0.40	M	14.1	0.9	22.3	68.3
B#4	0.9	14.0	15.1	19.2	0.5	15.5	0.49	M	17.3	0.9	22.7	69.4
B#5	0.7	13.1	13.0	19.4	0.4	15.8	0.39	M	17.4	0.8	17.7	74.7
B#6	1.3	15.8	11.4	17.3	0.3	17.1	0.59	M	20.0	1.1	20.3	72.5
B#7	0.4	11.8	8.6	15.0	0.7	24.7	0.38	M	19.2	1.2	27.9	64.7
C#5	0.3	11.5	11.2	17.8	0.3	13.6	0.17	M	17.4	0.4	9.5	83.2

Sample ID	Sodium Na (ppm)	Sulphate Sulphur SO4-S (ppm)	Chloride Cl (ppm)	Aluminum Al (ppm)	K/Mg Ratio	Exchangeable Acidity	Ammonium (ppm)
B#1	-	-	-	-	0.1	-	-
B#2	-	-	-	-	0.1	-	-
B#3	-	-	-	-	0.1	-	-
B#4	-	-	-	-	0.1	-	-
B#5	-	-	-	-	0.1	-	-
B#6	-	-	-	-	0.2	-	-
B#7	-	-	-	-	0.1	-	-
C#5	-	-	-	-	0.2	-	-

NOTE:

The analysis report above refers to the time and place of testing, and strictly to the supplied sample(s) only, without reference to any other matter. This report does not evidence or refer to any consignment or shipment or/and SGS sampling and inspection.

For and on behalf of SGS Canada Inc., Agriculture and Food

Jack Legg, CCA-ON, 4R NMS
Branch Manager, Agronomist

Signed and dated in Guelph, ON
On 26-May-2023

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Analysis Report

GS23-01538

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 24-May-2023
Completed : 30-May-2023
Order Reference : Sean -Redford Pit Baseline -SSC

Laboratory ID: Client Sample #: Description:	GS23-01538.001 B#1 Sub soil	GS23-01538.002 B#2 Sub soil	GS23-01538.003 B#3 Sub soil	GS23-01538.004 B#4 Sub soil
Texture	Loam	Sandy Loam	Sandy Loam	Loam
Sand (%)	38	57	57	45
Silt (%)	45	33	30	40
Clay (%)	17	10	13	15

NOTE:

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Report File Reference Number: 0000267475

Page 1 of 2

Signed and dated in Guelph, ON
On 30-May-2023

For and on behalf of SGS Canada Inc., Agriculture and Food

Jack Legg, CCA-ON, 4R NMS
Branch Manager, Agronomist

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Analysis Report

GS23-01538

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 24-May-2023
Completed : 30-May-2023
Order Reference : Sean -Redford Pit Baseline -SSC

Laboratory ID: Client Sample #: Description:	GS23-01538.005 B#5 Sub soil	GS23-01538.006 B#6 Sub soil	GS23-01538.007 B#7 Sub soil	GS23-01538.008 C#5 Parent Material
Texture	Sandy Loam	Sandy Loam	Silty Clay Loam	Loamy Sand
Sand (%)	58	57	19	78
Silt (%)	28	33	43	17
Clay (%)	14	10	38	5

NOTE:

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Report File Reference Number: 0000267475

Page 2 of 2

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Analysis Report

GS23-01539

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 24-May-2023
Completed : 30-May-2023
Order Reference : Sean - RedFord Pit Baseline - CACO3

Laboratory ID: Client Sample #: Description:	GS23-01539.001 B#1 Sub soil	GS23-01539.002 B#2 Sub soil	GS23-01539.003 B#3 Sub soil	GS23-01539.004 B#4 Sub soil
Calcium Carbonate (%)	15.71	39.01	17.38	13.22

NOTE:

The analysis report above refers to the time and place of testing, and strictly to the supplied sample(s) only, without reference to any other matter. This report does not evidence or refer to any consignment or shipment or/and SGS sampling and inspection.

Report File Reference Number: 0000267519

Page 1 of 2

Signed and dated in Guelph, ON
On 30-May-2023

For and on behalf of SGS Canada Inc., Agriculture and Food

Jack Legg, CCA-ON, 4R NMS
Branch Manager, Agronomist

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Analysis Report

GS23-01539

COLVILLE CONSULTING
404 QUEENSTON STREET
ST. CATHERINES ON L2P 2Y2
CANADA

Received : 24-May-2023
Completed : 30-May-2023
Order Reference : Sean - RedFord Pit Baseline - CACO3

Laboratory ID: Client Sample #: Description:	GS23-01539.005 B#5 Sub soil	GS23-01539.006 B#6 Sub soil	GS23-01539.007 B#7 Sub soil	GS23-01539.008 C#5 Parent Material
Calcium Carbonate (%)	20.60	33.41	2.54	36.64

NOTE:

The analysis report above refers to the time and place of testing, and strictly to the supplied sample(s) only, without reference to any other matter. This report does not evidence or refer to any consignment or shipment or/and SGS sampling and inspection.

Report File Reference Number: 0000267519

Page 2 of 2

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Appendix H

Land Use Notes

Land Use Survey Notes –May 19 th , 2023 – C22087 - Brett Espensen			
Weather	Temperature	Cloud Conditions	Wind
Clear	17°	Mostly Cloudy	14km/h S

Site No.	Type of Use	Type of Operation	Description of Operation
1	Non-Agricultural	Recreational	"Camp McGovern" https://campmcgovern.com/ Overnight summer camp on the Saugeen River
2	Agricultural	Hobby Farm	1 barn 7 pastures No livestock observed but appears to be active
3	Agricultural	Hobby Farm	1 barn in fair/good condition. 3 pastures Manure stored behind bank barn, V3. Approximately 20 sheep observed outside in pasture.
4	Agricultural	Beef Operation	"The Heipels" 1 barn 2 implement sheds 1 grain bin 1 cattle yard Beef Operation.
5	Agricultural	Equestrian Operation	1 bank barn, currently having roof and side walls repaired. 1 pasture Evidence of livestock. Five cows and five horses observed in pasture.
6	Agricultural	Remnant Farm	Barn on site removed. Remnant livestock operation.
7	Non- Agricultural	Aggregate	Walker Redford Pit
8	Agricultural	Poultry Operation	5 large two-storey barns Associated solid manure uncovered storage per barn. 8 steel feed grain bins 2 implement sheds Poultry operation.
9	Agricultural	Empty Livestock Operation	1 bank barn in good condition and 1 small shed. Farm implements on site. No evidence of livestock. No livestock observed.
10	Agricultural	Cash Crop	1 small barn There is a barn foundation west of the existing barn that is currently used for storage. Location of future Tremble Pit.

Site No.	Type of Use	Type of Operation	Description of Operation
11	Agricultural	Cash Crop	1 implement shed 1 large metal grain bin No evidence of livestock Farm implements on site
12	Agricultural	Empty Livestock Operation	1 barn 1 capped cement silo 1 paddock Appears to be retired livestock operation, no sign of livestock or manure storage.
13	Agricultural	Hobby Farm	1 barn structure in fair condition. 1 pasture No livestock observed but pasture appears to be in use. Significant amount of old machinery and material stored on site.
14	Agricultural	Empty Livestock Operation	1 bank barn 2 implement sheds 2 capped cement silos Wrapped haylage on site. No manure or livestock observed from road.
15	Non-Agricultural	Commercial	Country Lake Hairstyling sign out front of residence.
16	Agricultural	Hobby Farm	1 bank barn in fair condition 8 horses observed in paddock. Two field shelters in paddock. Fencing is in good condition.
17	On-Farm Diversified Use/ Non-Agricultural	Recreational/Agri-tourism	"Saugeen Springs RV Park" https://www.saugeenspringspark.com/petting-zoo/ Bank barn and field shelters on site. Petting zoo as part of RV park, includes sheep, goats, horses, and ponies.
18	Agricultural	Hobby Farm	1 large bank barn in good condition. 1 riding track behind barn. No sign of livestock from road.
19	Agricultural	Empty Livestock Operation	OFA Member. For sale/ sold sign out front. 1 bank barn 1 feed silo 1 hoop structure 2 paddocks 2 pastures 2 implement sheds Evidence of livestock but no livestock observed on site.

Site No.	Type of Use	Type of Operation	Description of Operation
20	Agricultural	Empty Livestock Operation	1 barn in good condition 1 uncapped cement silo 1 capped cement silo 3 grain bins. Farm implements on site. No evidence of livestock. No livestock observed.
21	Agricultural	Hobby Farm	1 small barn in good condition, small well maintained pasture. Sheep observed from roadside
22	Agricultural	Hobby Farm	1 barn 2 paddocks 2 pastures Evidence of livestock in aerial photos. Can't see from road.
23	Agricultural	Empty Livestock Operation	1 barn 4 pastures 3 implement sheds Evidence of livestock. Additional buildings on back of property viewed through aerial photography, not visible from road.
24	Agricultural	Commercial	Small office building. No signage out front. Likely part of small commercial business.
25	Agricultural	Remnant Farm	1 residence Barn foundation present, historical photos show barn present in 2019.
26	Agricultural	Hobby Farm	1 barn in good condition 2 paddocks 2 pastures No horses observed but operation appears active.
27	Agricultural	Hobby Farm	Small hobby farm observed from the road. Small (<10m ²) enclosure and fenced in area. Possibly sheep or chickens.
28	Non- Agricultural	Institutional	"Mulock Christian Fellowship" http://www.mulock.org
29	Agricultural	Hobby Farm	Old sign out front at roadway "Lone Ridge Quarter Horses" No sign of livestock observed from roadway. Small paddock and barn visible in air photos.
30	Agricultural	Empty Livestock Operation	"Tall Oaks" Farm sign out front or residence. Retired bank barn on west side part of property along Grey Road 3. Appears to still be capable for housing livestock. No manure or livestock observed.

Land Use Summary			
	Total Number	Active	Retired or Remnant
Agricultural Use	24	1 – Equestrian Operation 1 – Poultry Operation 1 – Beef Operation 10 – Hobby Farm 2 – Cash Crop	7 – Empty Livestock Operation 2 – Remnant Farm
Agriculture-related Use	0	0	0
On-farm Diversified Use	1	1 – Agri-tourism	0
	Total Number	Type	
Non-Agricultural Use	6	2 – Recreational 2 – Commercial 1 – Aggregate 1 – Institutional	

*Operations were identified within the Primary and Secondary Study Area, as well as in the surrounding area. Operations #1 through #10 are located within the Primary and Secondary Study Areas, whereas Operations #11 through #30 are located in the area outside of the Secondary Study Area.

**Operation #17 is associated with two separate uses on the same parcel. These uses have been denoted with the same operation number but have been counted separately in the land use summary (e.g., there are 30 operation numbers and 31 land total uses within the summary table).