AGRICULTURAL IMPACT ASSESSMENT REPORT
FOR THE PROPOSED ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC) LOCATED IN THE TOWNSHIP OF SPRINGWATER, COUNTY OF SIMCOE

Prepared for:
GHD
on behalf of Simcoe County
By:
AgPlan Limited
November 16, 2016

About This Report

This report has been prepared by Michael K. Hoffman, a Professional Agrologist working in agriculture since 1971. The report was written because of requests from 2 sources. Staff of the Ministry of Municipal Affairs, Ministry of Housing requested an Agricultural Impact Assessment of the proposed Simcoe Environmental Resource Recovery Centre (ERRC). The Township of Springwater requested information as follows:

- Agricultural Potential Assessment
  a) OMAFRA Report identifying Agricultural Potential
  b) Report by Qualified Professional in Agriculture
  c) Crop Records
  d) Minimum Distance Separation Formula
- Soil Quality Test

Soil potential has been interpreted to mean an umbrella term that includes soil capability for common field crops and soil potential for fruits and vegetables. Both soil capability and soil potential are addressed within the report.

No OMAFRA report identifying agricultural potential is included in this AIA. However, soil survey and Canada Land Inventory Soil Capability for Agriculture information has been used as provided by Land Information Ontario (LIO). LIO information was originally prepared by OMAFRA.

Crop records have not been included within this AIA because the proposed ERRC site and property is forested and relatively current crop records are not available for the property. Crop yield information is available for some common field crops as well as some fruit and vegetable crops at a Regional/County scale. However, these yields are not representative of the yields which could be obtained on soil capability class 4 through 7 which are found on the ERRC site.

Minimum Distance Separation calculations were not completed because the site is exempt and this is described within this AIA.

Soil quality tests were not completed for the site because soil quality tests are normally used to make farm management decisions (see Winder et al., 2003 as well as Evanylo and McGuinn, 2009). Additionally, soil capability and soil potential are indicative of soil quality.

Executive Summary

AgPlan Limited was retained by GHD on behalf of the Simcoe County in August 2016 to undertake an Agricultural Impact Assessment (AIA) of the proposed Environmental Resource Recovery Centre (ERRC) which is located west of Highway 400 and north of Hidden Valley Road in the Township of Springwater in the County of Simcoe, Province of Ontario. The agricultural work has been completed to determine whether evidence exists to support amendments to Simcoe County's Official Plan (Ontario Municipal Board approved, 2016) and to the Township of Springwater's Official Plan (Office Consolidation to 2016) and Zoning Bylaw (mapping and text changes to 2014).

AgPlan Limited reviewed existing published information including planning documents, previous site evaluations completed by GHD, Canada Land Inventory soil capability mapping, soil mapping, agricultural land use from Agriculture and Agri-Food Canada and data from Statistics Canada and the Ontario Ministry of Agriculture, Food and Rural Affairs. In addition, fieldwork and aerial photo interpretation was completed on the proposed Environmental Resource Recovery Centre (ERRC) property, site and surrounding area.

The general findings of the report are summarized in the following:

- Specialty Crop Area

  There are no specialty crops grown on the proposed Simcoe ERRC site or property. The Simcoe ERRC Property, site and the surrounding area are not a *specialty crop area* as defined in *the PPS* (2014).
- Specialty Crop Capability/Suitability/Potential

  The Simcoe ERRC property has very limited soil potential for a restricted range of specialty crop (fruit and vegetable) production. The crops that could be grown on the site and property could be grown on similar sandy soils (where those similar sandy soils have lower slope gradients than those slopes present on the site) throughout Simcoe County.
- Common Field Crop Capability

  The Simcoe ERRC property has an agricultural capability for common field crops ranging from classes 1 - 7. The average productivity index for the Simcoe ERRC property has a value that lies between the productivity index for soil capability class 3 and soil capability class 4. The site has an average productivity index of 0.24 equivalent to soil capability class 6.
- Agricultural Land Uses

  None of the proposed Simcoe ERRC property and site is currently used for common field crop agricultural use. Good agricultural land in active agricultural production is only present adjacent to the west side outside of the ERRC property and site.
- Non-Agricultural Land Uses

  The proposed Simcoe ERRC property and site are in an extensive forested/woodlot area.
- Climate

  The Simcoe ERRC property has no special climate that would allow for the production of tender fruit crops.

- Minimum Distance Separation (MDS)

  MDS measurements are not required because the proposed Simcoe ERRC is infrastructure which is exempt from MDS.
- Infrastructure

  Agricultural infrastructure and improvement on the Simcoe ERRC property is not present.
- Economics

  The proposed ERRC property and site is in public ownership and, as a result, no owned and actively used agricultural land was purchased. The ERRC lands are forested and are not available as leased land for agricultural purposes. Therefore, the availability of leased agricultural land and agricultural land for purchase will not be affected by the proposed ERRC use.

The PPS (2014) has a requirement in section 2.3.6.2 for the mitigation of impacts of non-agricultural uses on agricultural operations and lands. However, this requirement is part of section 2.3.6 related to "Non-Agricultural Uses in Prime Agricultural Areas" and the proposed ERRC site is not located in a prime agricultural area. Thus, it can reasonably be interpreted that mitigation to the extent feasible is not required. Regardless, impacts to agriculture have been minimized by:

- choosing a site that is not designated for agriculture,
- choosing a site that has poor soil quality as characterized by soil capability and soil potential,
- placing the site away from the boundary of the ERRC property thereby providing vegetative screening and distance between the proposed use and the agricultural uses outside of the ERRC property located to the west.

Therefore, impacts to agriculture have been *mitigated to the extent feasible*.

In summary, given the agricultural characteristics of the Simcoe ERRC property as well as the agricultural characteristics of the adjacent lands and surrounding area, the proposed Simcoe ERRC is a reasonable location for non-agricultural development. The development can be accomplished in a way that the intent and purpose of the agricultural sections within the *Provincial Policy Statement,* the *Growth Plan*, the *County of Simcoe Official Plan,* the *Springwater Official Plan,* and *The Corporation of the Township of Springwater Comprehensive Zoning Bylaw 5000* will be maintained.

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1.0 STUDY OBJECTIVES

AgPlan Limited was retained by GHD on behalf of the Simcoe County in August 2016 to undertake an Agricultural Impact Assessment (AIA) of the proposed Environmental Resource Recovery Centre (ERRC) which is located west of Highway 400 in the Township of Springwater in the County of Simcoe, Province of Ontario (Maps 1, 2, 3 and 4). The agricultural work has been completed to determine whether evidence exists to support amendments to Simcoe County's Official Plan (Ontario Municipal Board approved, 2016) and to the Township of Springwater's Official Plan (Office Consolidation to 2016) and Zoning Bylaw (mapping and text changes to 2014).

The general objective of the study was to assess:

- the agricultural characteristics of the lands proposed to be used for the Simcoe ERRC and whether the proposed use has an agricultural impact based on the wording of policy.

In reaching this objective the following work was completed:

- An assessment of the soils which relate to the planned use of the lands generally and which provide context to soils on the Simcoe ERRC;
- An analysis of the soil capability for common field crops as well as the soil potential of lands for specialty crops within the Simcoe ERRC;
- An analysis of the agricultural land use within and around the Simcoe ERRC;
- Analyses to put the agricultural characteristics of Simcoe County and Springwater Township in context.

1.1 Description of the Proposed Simcoe ERRC Use

The proposed Simcoe Environmental Resource Recovery Centre (ERRC) will house:

1. *Materials Management Facility (MMF) – a location for consolidation and transfer of waste (garbage, blue box recycling, and organics) from multiple collection vehicles for more economical shipment to other disposal or processing locations.*
2. *Organics Processing Facility (OPF) – a location where green bin material (kitchen waste, soiled paper products, etc.) and potentially materials such as leaf and yard waste, pet waste, diapers, and sanitary products are processed under controlled conditions and converted into other valuable products, such as compost or fertilizer.*
3. *Other – additional developments include a Solid Waste Management truck servicing area, a public education area, and the potential for future expansion to a recycling sorting facility.*

Specific information concerning the planning amendments proposed for the Simcoe ERRC are described more fully in reports by qualified professional planner.

1.2 Report Format

This report reviews existing published and unpublished information as well as presents the findings associated with photo interpretation and fieldwork. The review and data gathering was subsequently used to produce agricultural indicators/metrics for evaluating the County of Simcoe and the Simcoe ERRC site (with specific reference to

soil capability for common field crops, soil potential for specialty crops and other agricultural characteristics relative to policy and legislation). Methods are described generally as part of the text. However, in some instances, more specific information is outlined in the Appendices. Discussion includes references to literature prepared by various authors and are listed in the References Section (Section 6.0) of this report.

This agricultural assessment is only part of the information prepared for the proposed Simcoe ERRC. Therefore, this report should be read in conjunction with other reports – such as those reports related to planning, environment and heritage. Contextual agricultural information has been evaluated and presented at different scales throughout this report. Some general descriptive information has been presented at the Provincial level and this is followed by a discussion of agriculture at the regional, township, property and site levels. More information, including the results of fieldwork, is described for the Simcoe ERRC in Section 4.0.

Wherever possible, conclusions reached in this AIA report are based on data analyses. The data was used in the form presented and was readily available from published sources (with emphasis on statistical information compiled by Statistics Canada (StatsCan) and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

The report uses three phrases extensively which are defined as follows:

- **Soil Capability Class** - This term is the one most often used in rating agricultural soils and is defined as part of the *Canada Land Inventory Soil Capability Classification for Agriculture* - Soil Capability for Common Field Crops. It is an interpretive classification of the soils maps produced within Canada where soils are identified by texture, drainage class, layers (diagnostic horizons) etc. following the Canadian System of Soil Classification (1978, third edition 1989 http://sis.agr.gc.ca/cansis/references/1998sc_a.html). The soil capability rating is a seven-class system consisting of a class number (1 (best) – 7 (poorest)) and a subclass limitation such as stoniness, slope, or erosion (represented by an alphabetic code P, T, E, etc.). The best soils with no limitations for production of common field crops are ranked as class I and soils unsuitable for agriculture are rated as class 7. This information concerning capability classes and subclass limitations is provided as part of the relational database included with the soil mapping digitized by OMAFRA and provided by LIO/MNR (Land Information Ontario/Ministry of Natural Resources).
- **Soil Productivity Index** - The original soil capability classification classes one through seven have been converted from an ordinal to a ratio scale on the basis of crop yields. For common field crops, such as grain corn, oats and barley, a relationship was measured to demonstrate that if class I land was assigned the soil productivity index value 1.00, then class 2 would be 0.80 and class 3 would be 0.64 etc. The use of the ratio scale allows for a mathematically acceptable measurement of mean value. Therefore, a given study area can have a single average value of a soil productivity index. When comparing different site alternatives, the use of the soil productivity index allows comparison of the alternatives using a single value. The use of the soil productivity index also provides a way to deal with soil complexes - where a soil complex is represented

by a single polygon (in the past this was called a map unit) where there are two or more soil series/types present and mapped and where there is some likelihood to be a combination of soil capability classes such as 60% class I and 40% class 2T, for example.

- **Agricultural Performance** - Agricultural performance is a single relative comparative measure that combines many agricultural characteristics of a given area in comparison to another given area (for example, one Region or County relative to another Region or County). The scoring, ranking or relative difference is quantitative. Agricultural performance includes economic, socio-cultural and physical variables and is described in more detail in Appendix 5.

The acronym "ERRC" has been used synonymously within the report with the word "site". Use of the word "property" refers to the land enclosed by property boundaries upon which the site is located.

2.0 POLICY BACKGROUND

2.1 Policy

This agricultural analysis was prepared as supporting information for review by municipal and provincial government representatives as part of a broader study that related to approval requirements under the following statute:

- *The Planning Act.*

In addressing approval requirements for this statute, the following additional documents, as well as those listed in Section 6.0 References, were consulted:

- *Provincial Policy Statement* (PPS, 2014);
- *The Growth Plan for the Greater Golden Horseshoe* (Office Consolidation, 2013);
- *Official Plan of The County of Simcoe (2013; OMB approved, 2016);*
- *Springwater Official Plan (1998; Office Consolidation, 2016);* and,
- *The Corporation of the Township of Springwater Comprehensive Zoning Bylaw 5000 (2004; mapping and text changes, 2014).*

For the purpose of the provision of general background information in this section of the report, the agricultural issue has been stated as:

> Is the proposed use of lands appropriate for the proposed Simcoe ERRC given the lands' agricultural characteristics such as soil capability, soil potential, climate and current use?

The wording of the question is a function of the interpretation of the agricultural policies in the PPS (2014). Discussions of policy and legislation found within this report are not intended to be comprehensive. Additional discussion on policy and legislation can be found in the planning reports for the ERRC. Generally, the PPS provides direction to municipalities to distinguish between the better agricultural lands as compared to the poorer agricultural lands and to protect *prime agricultural areas* for agriculture (sections 2.3.1 and 2.3.2. The PPS (2014) agricultural policy in section 2.3.6.1 does permit limited non-residential uses in prime agricultural areas. Section 2.3.6.2 does specify that

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

Nothing in the Growth Plan for the Greater Gold Horseshoe, in the County of Simcoe or the Township of Springwater Official Plans contradicts the wording within PPS (2014) or the requirements related to agriculture set out in sections 2.3.1, 2.3.2, 2.3.6.1 and 2.3.6.2.

The PPS (2014) does not refer to economics related to agriculture specifically but does use the word economic (the word itself or as part of another word such as "uneconomic") approximately 38 times. Therefore, this AIA includes information related to agricultural economics.

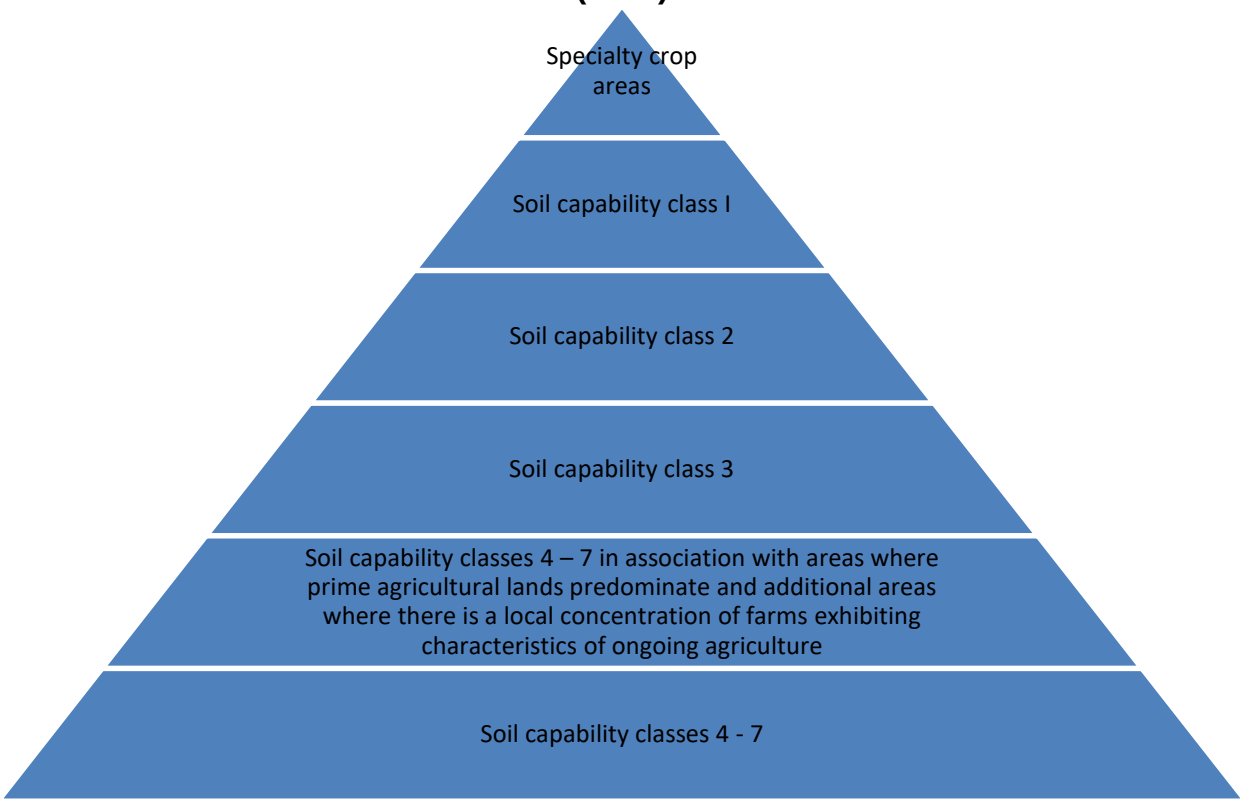
2.2 Policy Interpretation

The wording in the *PPS (2014) related to prime agricultural lands and prime agricultural areas* has been interpreted as the hierarchy presented in Figure 1. Therefore, the following sections within this report provide information which places the Simcoe ERRC site and property within the agricultural hierarchy described within the PPS (2014). The soil capability within the hierarchy provides a measure of "soil quality" as requested by the Township of Springwater.

Agricultural policy only prohibits the use of *specialty crop areas* for non-agricultural uses but does not prohibit the use of soil capability classes 1 through 3 provided there is a need for the use and that an alternatives analysis, as outlined in the PPS (2014), has been completed. Studies of need, as well as an alternatives analysis, have already been completed (GHD, 2015). The multi-attribute alternatives analysis included a criterion of *prime agricultural land* as described in reports by GHD (2015). The Ministry of Municipal Affairs, Ministry of Housing in a letter dated August 26, 2016 states that *Ministry staff are satisfied that the tests of 2.3.6.1 b) in the Provincial Policy Statement 2014, as it relates to the site selection process, have been met to allow this proposed non-agricultural (limited non-residential) use in a prime agricultural area*. This letter is included within this report in Appendix 2.

The proposed site, located within a larger property (which is part of Simcoe County Forest lands), has been plotted on Schedules (maps) from the County of Simcoe Official Plan and the Springwater Official Plan. Map 1 (Schedule 5.1 in the OP) shows that the site and property are located within the Greenlands designation in Simcoe County. Map 2, copied from the Springwater Township Official Plan has the site within the Rural Designation and the ERRC property as having only a small portion of land designated for agriculture. However, Map 3 from the Springwater OP has the ERRC property with the northwest corner as part of Natural Heritage System (which correlates partially with the Greenlands designation in Simcoe County). The Rural Designation and Natural Heritage System mapping has been interpreted to mean that the Natural Heritage System is an overlay on top of the Rural Designation on the ERRC property and other areas within Springwater.

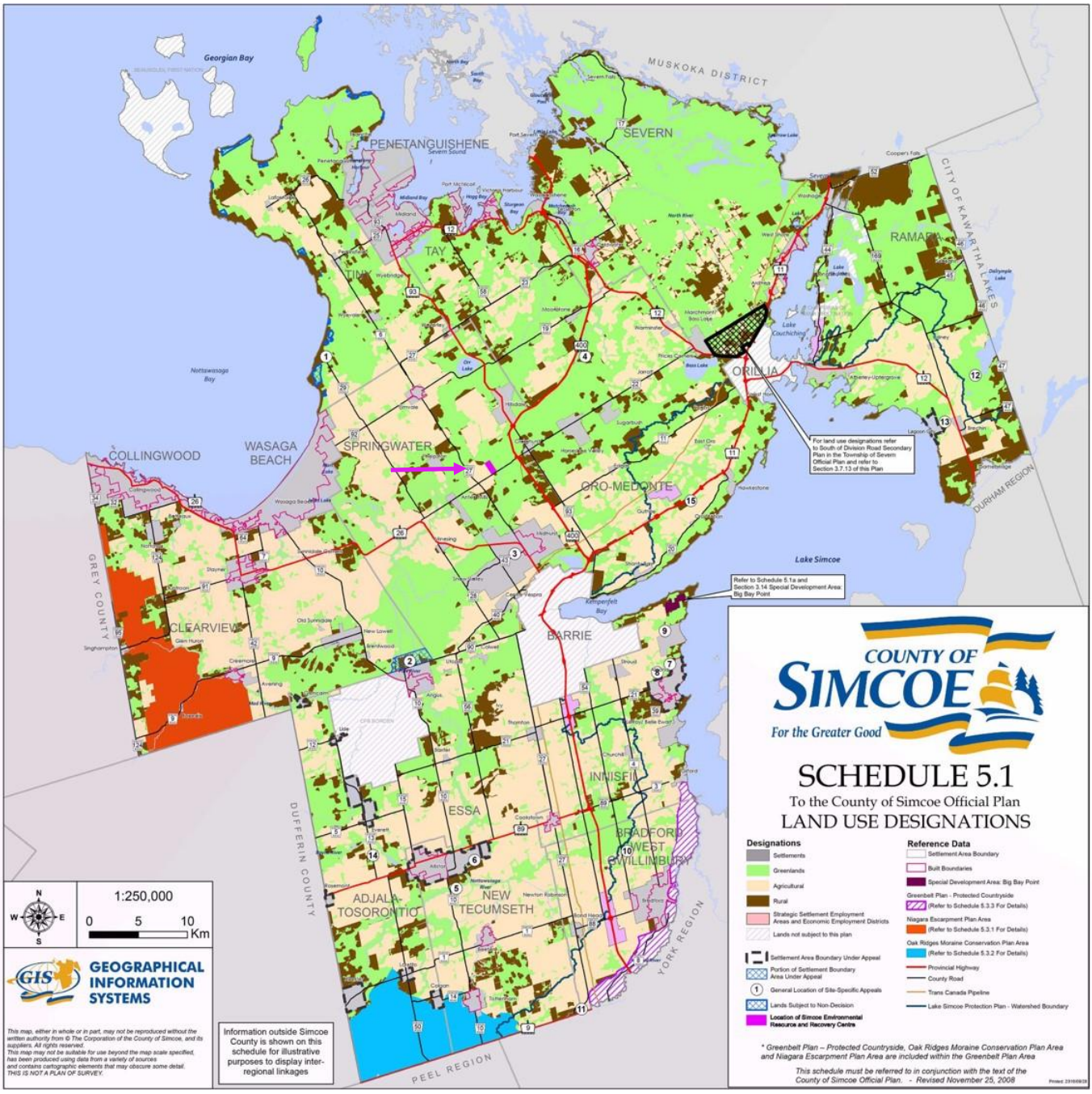
FIGURE 1 AGRICULTURAL LAND HIERARCHY RELATED TO THE PPS (2014)



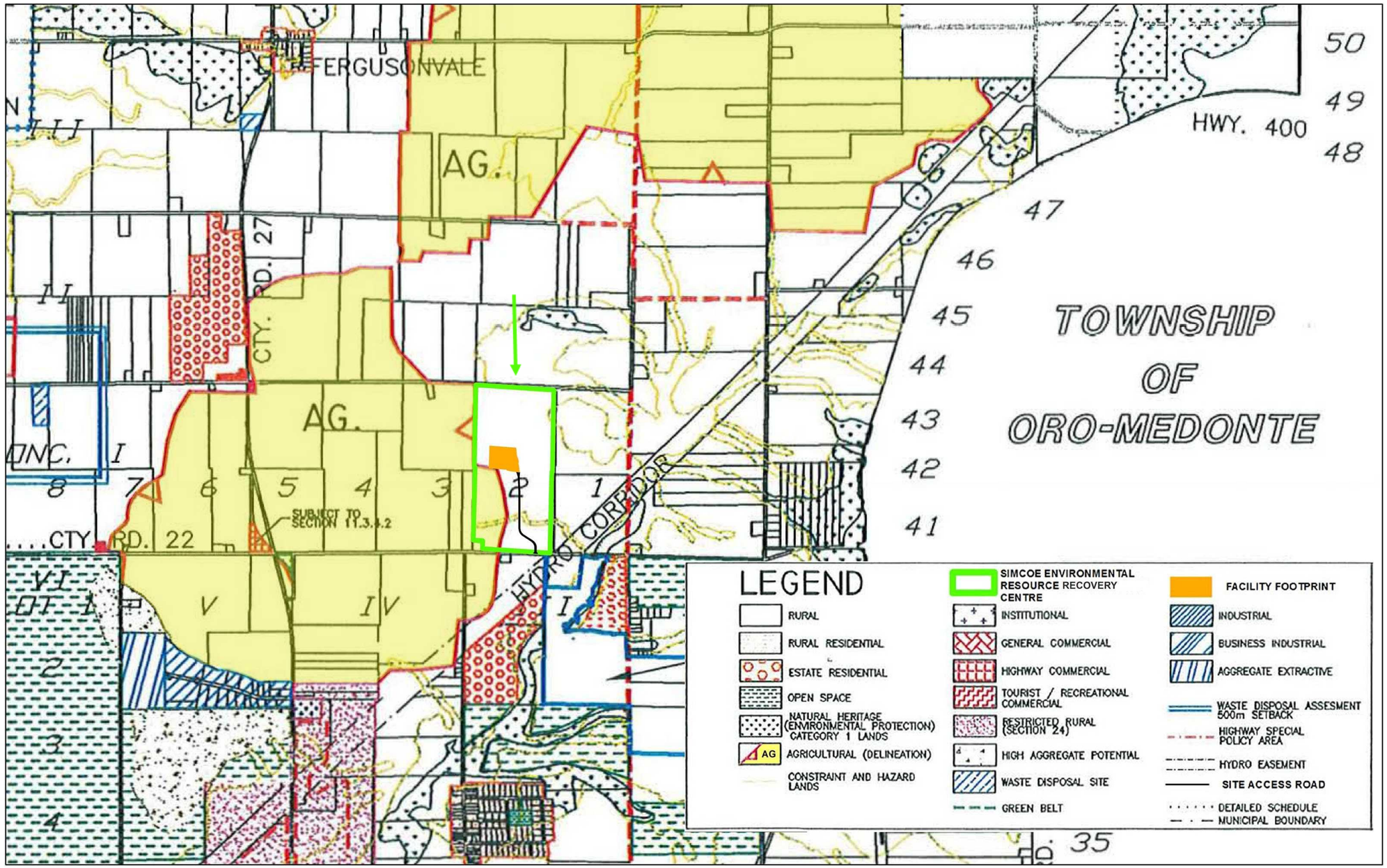
The Springwater Zoning By-law has the ERRC property and site located in the agricultural zone (Map 4). The agricultural zone permits residential uses and non-residential uses. The permitted non-residential uses are listed as:

a) agricultural use in accordance with the General Provisions Section.
b) hobby kennel in accordance with subsection 3.6(c) of the Kennel (K) Zone.
c) conservation and wildlife sanctuary, including a forestry use.
d) veterinary clinic.
e) equestrian facility.
f) market garden or farm produce sales outlet.
g) home occupation in accordance with General Provisions Section.
h) home industry in accordance with General Provisions Section and 33.3.13.
i) bed & breakfast establishment.
j) radio, television, telephone or other communications tower or transmission facility.
k) passive outdoor recreation use.
l) public use in accordance with the General Provisions Section.

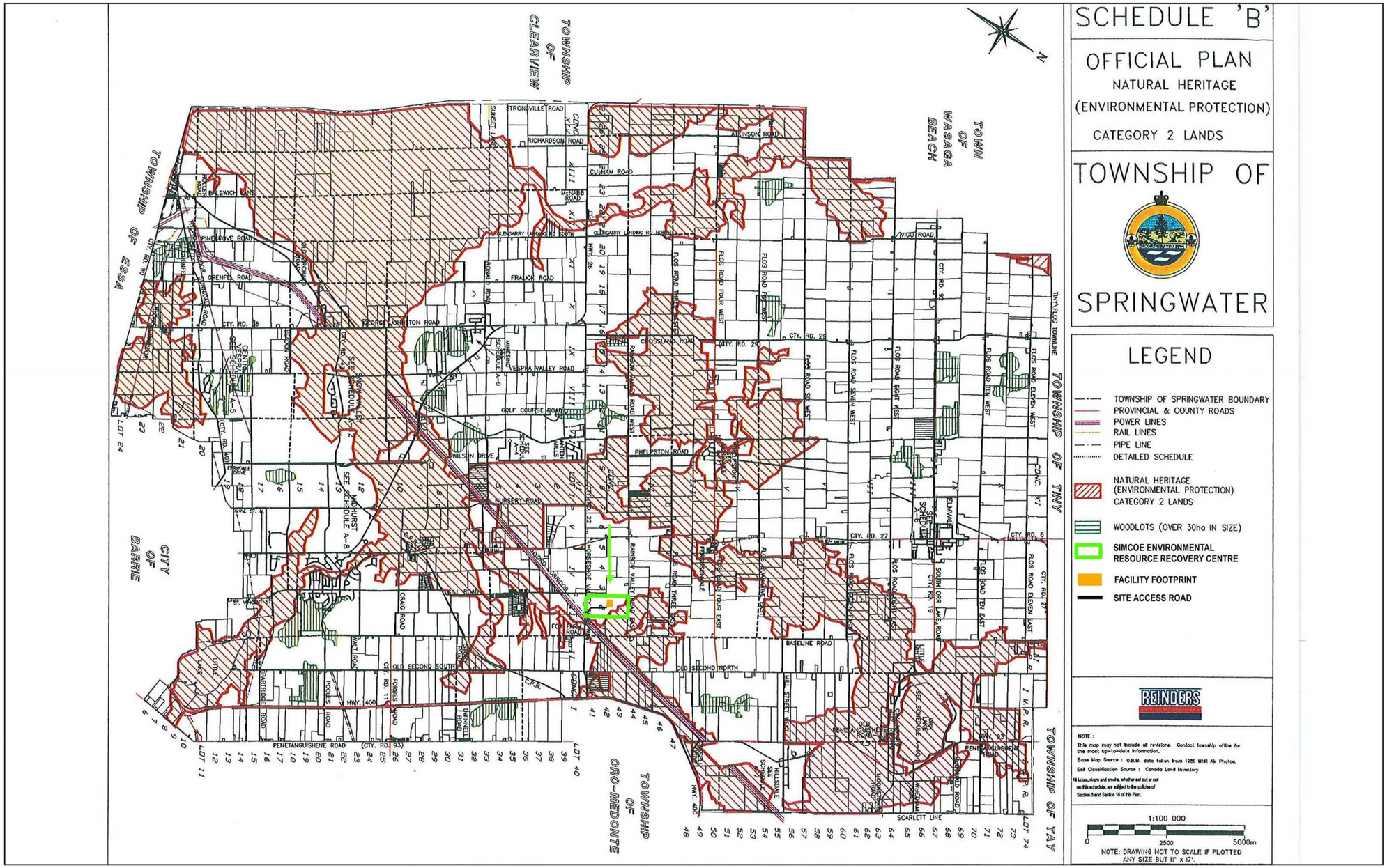
MAP 1


Georgian Bay
MUSKOKA DISTRICT
PENETANGUISHENE
SEVERN
TAY
TINY
RAMARA
ORILLIA
Lake Couchiching
Nottawasaga Bay
COLLINGWOOD
WASAGA BEACH
SPRINGWATER
ORO-MEDONTE
CITY OF KAWARTHA LAKES
DURHAM REGION
Lake Simcoe
GREY COUNTY
CLEARVIEW
BARRIE
INNISFIL
ESSA
BRADFORD WEST GWILLIMBURY
ADJALA-TOSORONTIO
NEW TECUMSETH
DUFFERIN COUNTY
YORK REGION
PEEL REGION
For land use designations refer to South of Division Road Secondary Plan in the Township of Severn Official Plan and refer to Section 3.7.13 of this Plan
Refer to Schedule 5.1a and Section 3.14 Special Development Area: Big Bay Point
1:250,000
0 5 10 Km
GEOGRAPHICAL INFORMATION SYSTEMS
Information outside Simcoe County is shown on this schedule for illustrative purposes to display inter-regional linkages
COUNTY OF SIMCOE
For the Greater Good
SCHEDULE 5.1
To the County of Simcoe Official Plan
LAND USE DESIGNATIONS
Designations
Settlements
Greenlands
Agricultural
Rural
Strategic Settlement Employment Areas and Economic Employment Districts
Lands not subject to this plan
Settlement Area Boundary Under Appeal
Portion of Settlement Boundary Area Under Appeal
General Location of Site-Specific Appeals
Lands Subject to Non-Decision
Location of Simcoe Environmental Resource and Recovery Centre
Reference Data
Settlement Area Boundary
Built Boundaries
Special Development Area: Big Bay Point
Greenbelt Plan - Protected Countryside
(Refer to Schedule 5.3.3 For Details)
Niagara Escarpment Plan Area
(Refer to Schedule 5.3.1 For Details)
Oak Ridges Moraine Conservation Plan Area
(Refer to Schedule 5.3.2 For Details)
Provincial Highway
County Road
Trans Canada Pipeline
Lake Simcoe Protection Plan - Watershed Boundary
* Greenbelt Plan – Protected Countryside, Oak Ridges Moraine Conservation Plan Area and Niagara Escarpment Plan Area are included within the Greenbelt Plan Area
This schedule must be referred to in conjunction with the text of the County of Simcoe Official Plan. - Revised November 25, 2008

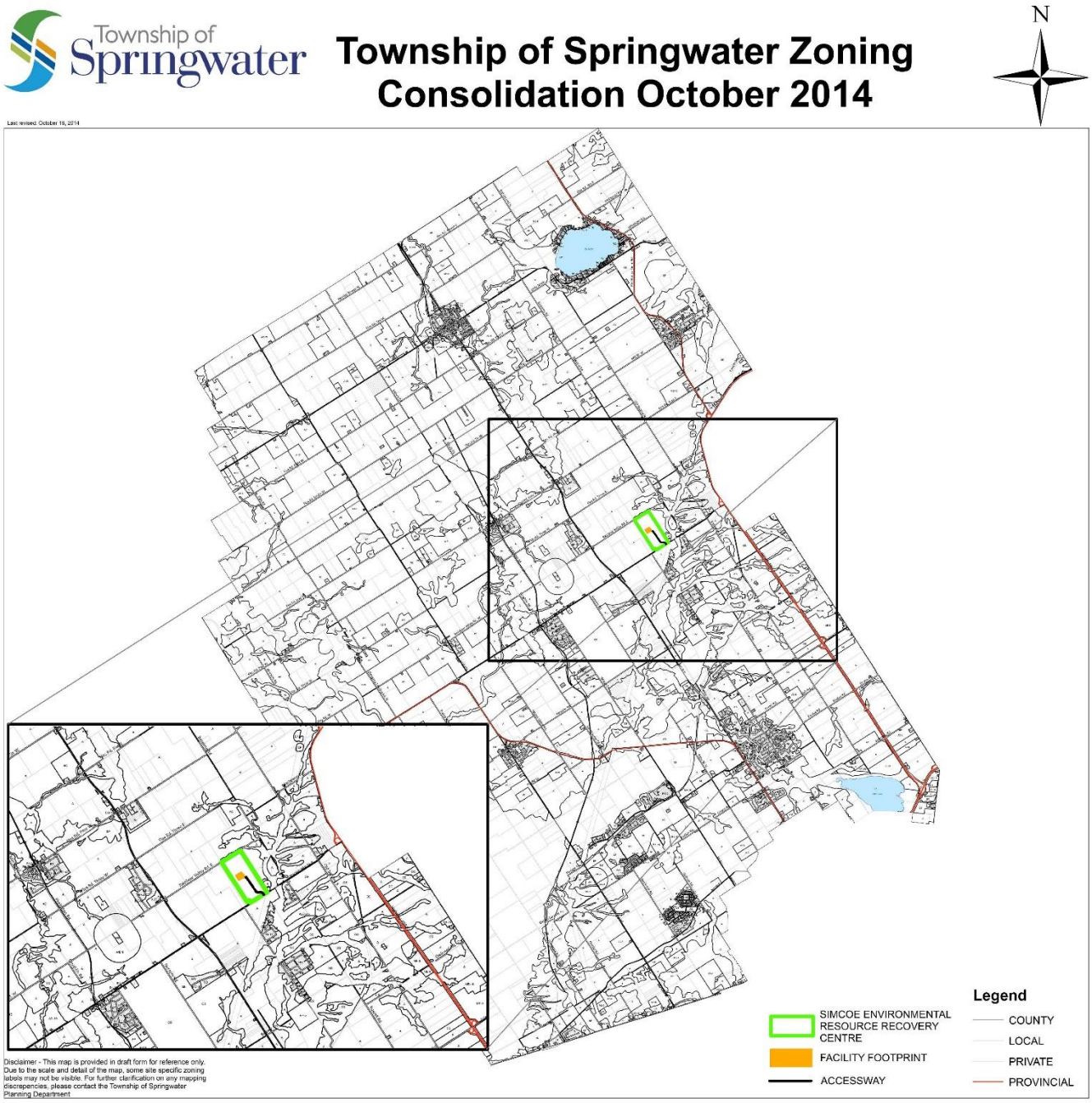
MAP 2


FERGUSONVALE
AG.
CTY. RD. 27
AG.
ONC. I
8 7 6 5 4 3 2 1
SUBJECT TO SECTION 11.3.4.2
CTY. RD. 22
HYDRO CORRIDOR
VI
OT 1
2
3
4
V
IV
I
HWY. 400
50
49
48
47
46
45
44
43
42
41
35
TOWNSHIP OF ORO-MEDONTE
LEGEND
RURAL
RURAL RESIDENTIAL
ESTATE RESIDENTIAL
OPEN SPACE
NATURAL HERITAGE (ENVIRONMENTAL PROTECTION) CATEGORY 1 LANDS
AG AGRICULTURAL (DELINEATION)
CONSTRAINT AND HAZARD LANDS
SIMCOE ENVIRONMENTAL RESOURCE RECOVERY CENTRE
INSTITUTIONAL
GENERAL COMMERCIAL
HIGHWAY COMMERCIAL
TOURIST / RECREATIONAL COMMERCIAL
RESTRICTED RURAL (SECTION 24)
HIGH AGGREGATE POTENTIAL
WASTE DISPOSAL SITE
GREEN BELT
FACILITY FOOTPRINT
INDUSTRIAL
BUSINESS INDUSTRIAL
AGGREGATE EXTRACTIVE
WASTE DISPOSAL ASSESMENT 500m SETBACK
HIGHWAY SPECIAL POLICY AREA
HYDRO EASEMENT
SITE ACCESS ROAD
DETAILED SCHEDULE
MUNICIPAL BOUNDARY

MAP 3


SCHEDULE 'B'
OFFICIAL PLAN
NATURAL HERITAGE
(ENVIRONMENTAL PROTECTION)
CATEGORY 2 LANDS
TOWNSHIP OF
SPRINGWATER
LEGEND
TOWNSHIP OF SPRINGWATER BOUNDARY
PROVINCIAL & COUNTY ROADS
POWER LINES
RAIL LINES
PIPE LINE
DETAILED SCHEDULE
NATURAL HERITAGE (ENVIRONMENTAL PROTECTION) CATEGORY 2 LANDS
WOODLOTS (OVER 30ha IN SIZE)
SIMCOE ENVIRONMENTAL RESOURCE RECOVERY CENTRE
FACILITY FOOTPRINT
SITE ACCESS ROAD
REINDERS
NOTE :
This map may not include all revisions. Contact township office for the most up-to-date information.
Base Map Source : O.B.M. data taken from 1986 MNR Air Photos.
Soil Classification Source : Canada Land Inventory
All lakes, rivers and creeks, whether set out or not on this schedule, are subject to the policies of Section 5 and Section 16 of this Plan.
1:100 000
0 2500 5000m
NOTE: DRAWING NOT TO SCALE IF PLOTTED ANY SIZE BUT 11" x 17".
TOWNSHIP OF CLEARVIEW
TOWN OF WASAGA BEACH
TOWNSHIP OF ESSA
CITY OF BARRIE
TOWNSHIP OF ORO-MEDONTE
TOWNSHIP OF TAY
TINY/FLOS TOWNLINE
STRONSVILLE ROAD
RICHARDSON ROAD
ATKINSON ROAD
CULHAM ROAD
DENAB ROAD
OLD BARRIE ROAD
OLD INNISFIL ROAD
GRENFELL ROAD
FRALICK ROAD
GEORGE JOHNSTON ROAD
CROSSLAND ROAD
VESPRA VALLEY ROAD
GOLF COURSE ROAD
WILSON DRIVE
PHELPSTON ROAD
NURSERY ROAD
MIDHURST SCHEDULE A-8
HIGHWAY 26
FLOS ROAD THREE WEST
FLOS ROAD FOUR WEST
FLOS ROAD SEVEN WEST
FLOS ROAD EIGHT WEST
FLOS ROAD TEN WEST
FLOS ROAD ELEVEN WEST
FLOS ROAD THREE EAST
FLOS ROAD FOUR EAST
FLOS ROAD SEVEN EAST
FLOS ROAD EIGHT EAST
FLOS ROAD TEN EAST
FLOS ROAD ELEVEN EAST
CTY. RD. 27
CTY. RD. 6
CTY. RD. 23
CTY. RD. 19
SOUTH ORR LAKE ROAD
BASELINE ROAD
OLD SECOND SOUTH
OLD SECOND NORTH
MAIN STREET WEST
HIGHWAY 400
C.P.R.
SCARLETT LINE
PENETANGUISHENE ROAD (CTY. RD. 93)
LITTLE LAKE
BARTRIDGE ROAD
POOLES ROAD
FORBES ROAD
CRAIG ROAD
WALT ROAD
FORT PENETANG ROAD
MUSKOKA ROAD
RAINBOW VALLEY ROAD SOUTH
RAINBOW VALLEY ROAD NORTH
LOT 24
LOT 11
LOT 40
LOT 74

MAP 4


Township of Springwater
Township of Springwater Zoning
Consolidation October 2014
N
Last revised: October 16, 2014
Legend
SIMCOE ENVIRONMENTAL RESOURCE RECOVERY CENTRE
FACILITY FOOTPRINT
ACCESSWAY
COUNTY
LOCAL
PRIVATE
PROVINCIAL
Disclaimer - This map is provided in draft form for reference only. Due to the scale and detail of the map, some site specific zoning labels may not be visible. For further clarification on any mapping discrepancies, please contact the Township of Springwater Planning Department

3.0 AGRICULTURAL CONTEXT - METHODS AND REGIONAL ANALYSIS

3.1 Introduction

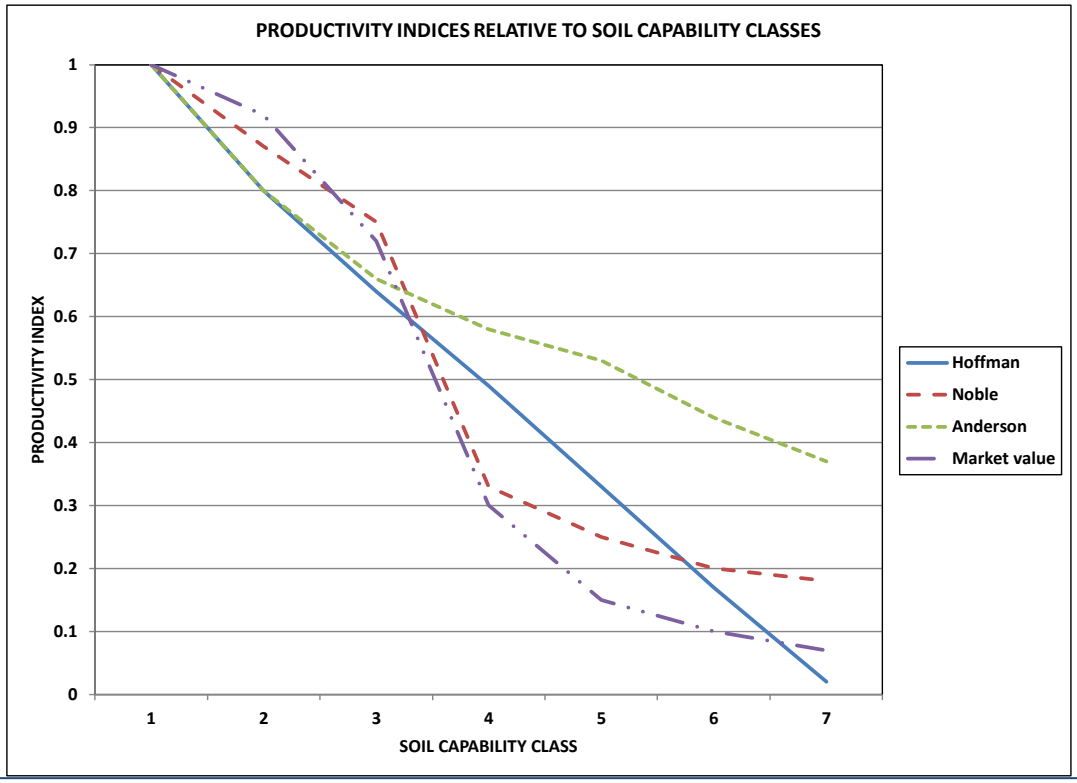
The following subsections provide context for agriculture at the Regional/County scale (within Simcoe as well as within central and southwestern Ontario). The data presented is based on published literature with emphasis on the Agricultural Census. When multi-attribute measurement of agricultural performance has been completed, a weighted additive method (a Land Evaluation and Area Review, LEAR, is a weighted additive method approved by OMAFRA for evaluating *prime agricultural areas*) was used.

3.2 Soil Capability, Soil Potential and Climate

Soils

The soil capability classification is described more fully in Appendix 3. It is a system for rating soils based on their continuing limitations for common field crop production where common field crops include, for example, corn, wheat, oats, barley etc. Soil capability classes have been linked to various productivity indices for common field crops, forage crops, farm assessment and economics. The Hoffman indices for field crops and the Anderson indices for forage crops provide an indication of yield variation with soil capability class. Noble's work relates economics of farming in Eastern Ontario to soil capability class and the Committee on Farm Assessment links soil capability class to assessed value. These 4 different indices are summarized by Hoffman (1973) and reproduced here as Figure 2. An average productivity index value has been calculated for various scales from the regional to the site specific using Hoffman's indices as outlined in Appendix 4.

FIGURE 2



Simcoe County has relatively lower average soil capability/soil productivity index for common field crops with an average soil productivity index of 0.55 which is equivalent to soil capability class 4 based on data summarized by Hoffman and Noble (1975). There are several County/Regions with a higher average soil productivity index as summarized for central and southwestern Ontario in Figure 3.

Springwater has an average productivity index of 0.63 which is equivalent to soil capability class 3 (based on Land Information Ontario (LIO) data). However, both Springwater and Simcoe have average productivity indices which are less than the value 0.64 assigned by Hoffman's research to soil capability class 3 as summarized in Figure 4. The more recent LIO data results in an average soil productivity index of 0.57 for Simcoe County.

FIGURE 3

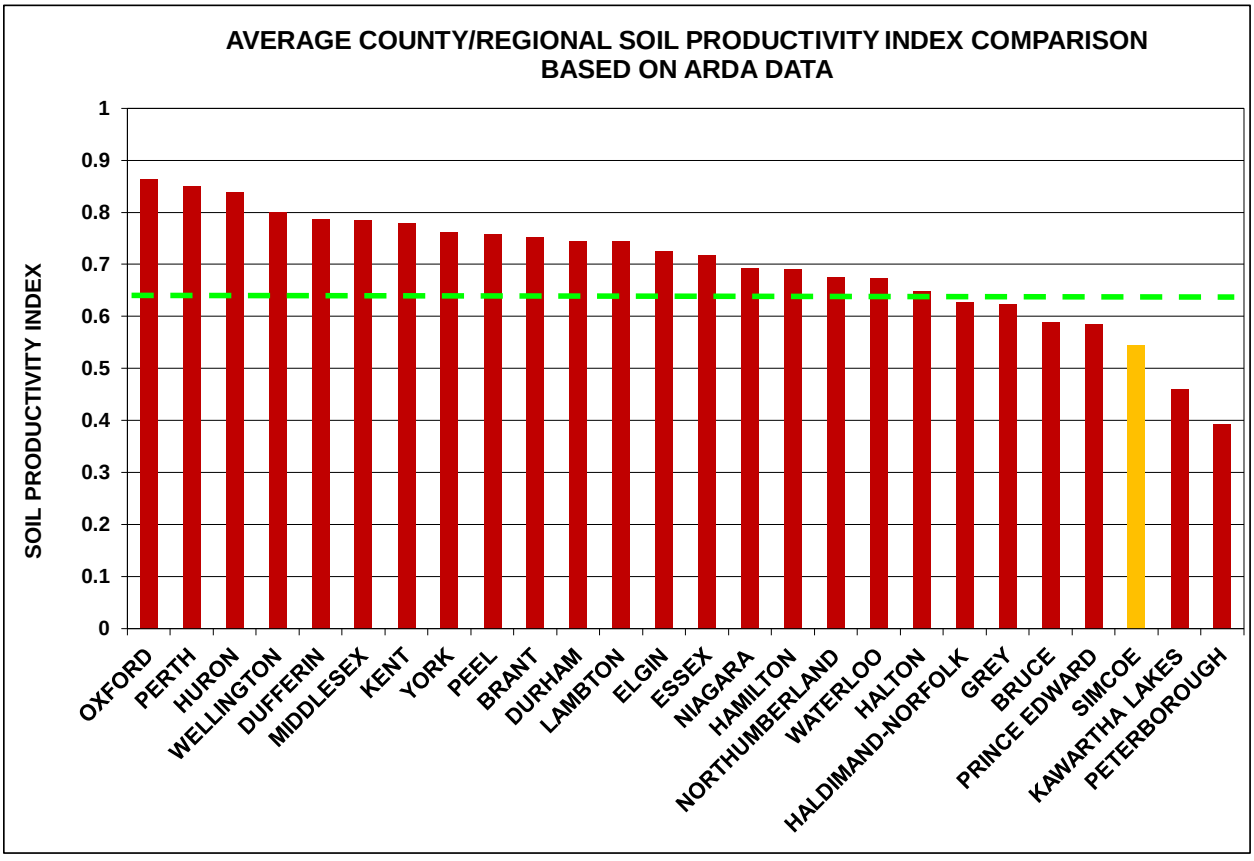
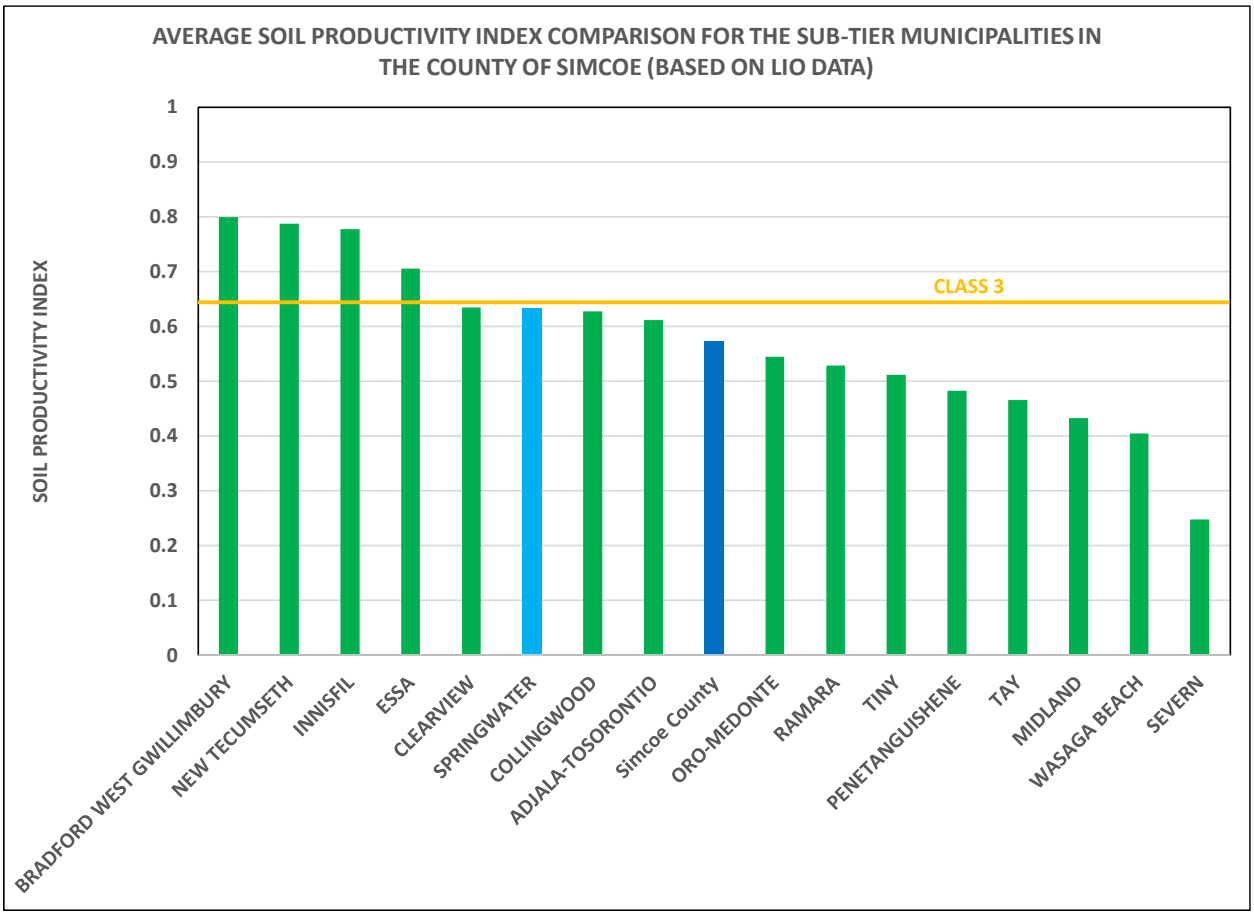


FIGURE 4



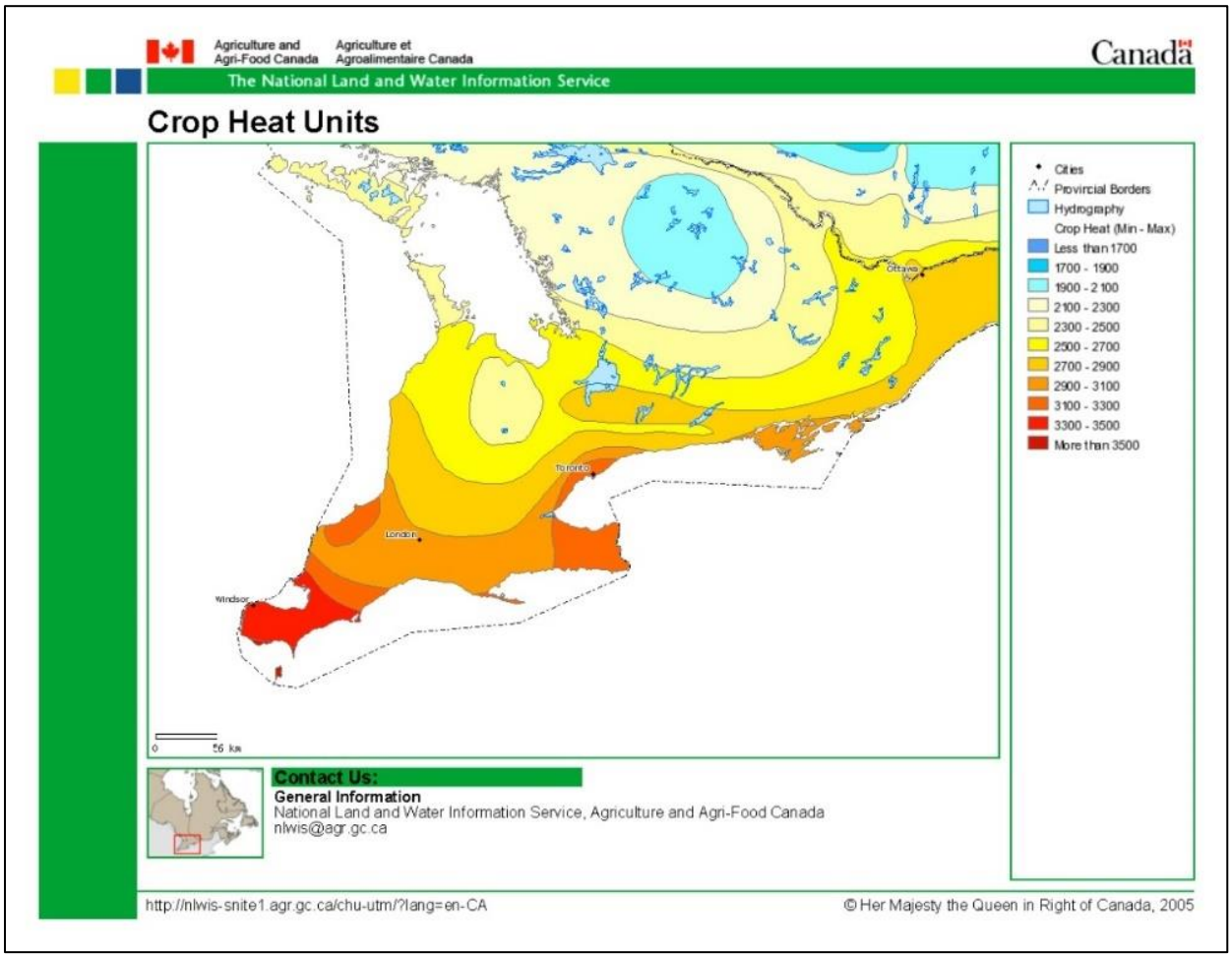
Climate

The climate of Simcoe County is relatively cool in the context of Ontario (but is not as cool as the Dundalk Plateau) as can be seen on Map 5. Crop heat units very between 2300 and 2900 in the agricultural areas of Simcoe. The crop heat unit information has not been supplemented by additional climate mapping as it has been in Niagara and Essex County.

Fruits and vegetables benefit from good cold air drainage. No mapping is available in Simcoe showing areas of better versus poorer cold air drainage.

The broad-based climate information supports the view that Simcoe does not have unique climate characteristics relative to other areas in southern Ontario.

MAP 5



3.3 Agricultural Production and Relative Performance

Common field crops are the predominant plant production in Simcoe County as well as Springwater Township. The predominant crop in both Simcoe and Springwater is soybeans. Simcoe produces alfalfa and alfalfa mixtures as the 2nd most predominant crop followed by wheat and corn as summarized for the census year 2011 in Figure 5. The 2nd and 3rd most predominant crops are corn and wheat in Springwater as shown in Figure 6.

The following paragraphs examine fruit and vegetable production given their importance in defining *specialty crop areas* in the PPS (2014). Vegetable production is greater than fruit production in both Simcoe and Springwater which is not surprising given the vegetable production that occurs on organic soils in the south part of Simcoe. Vegetable production is less important in Springwater than in Simcoe based on the area (relative rank) data presented in Figures 5 and 6.

The importance of Simcoe's vegetable production varies with context. As a proportion of total census farm area Simcoe rates 10th in southern Ontario (Figure 7). However,

Simcoe's vegetable production as a proportion of total vegetable production in Ontario, ranks as 4th (Figure 8).

FIGURE 5

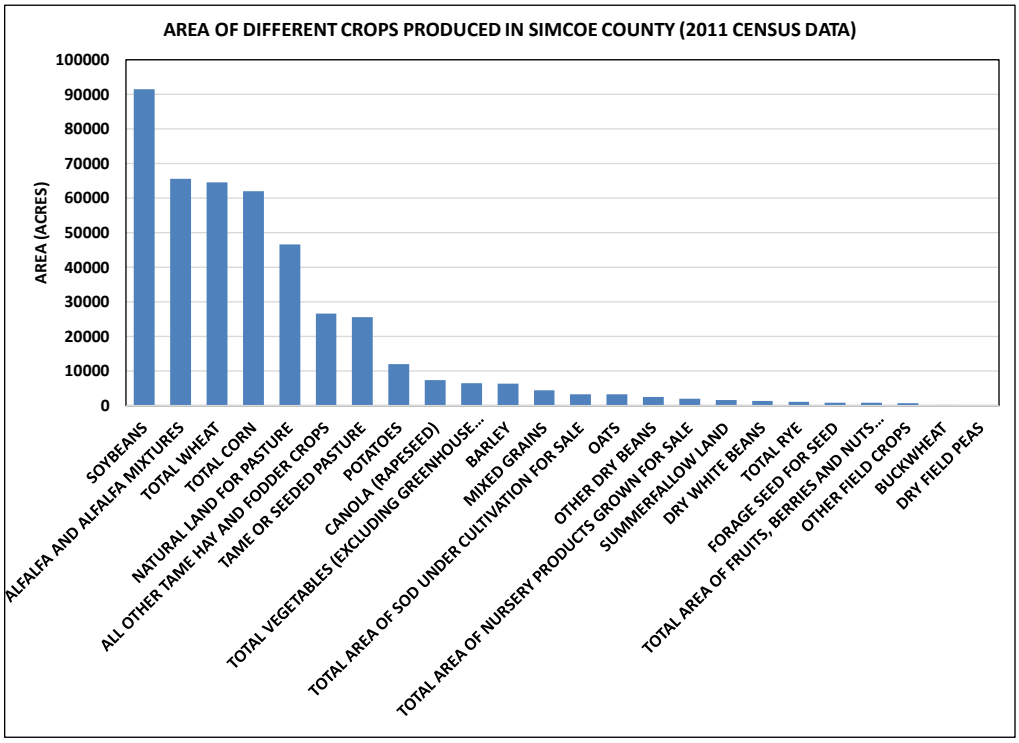


FIGURE 6

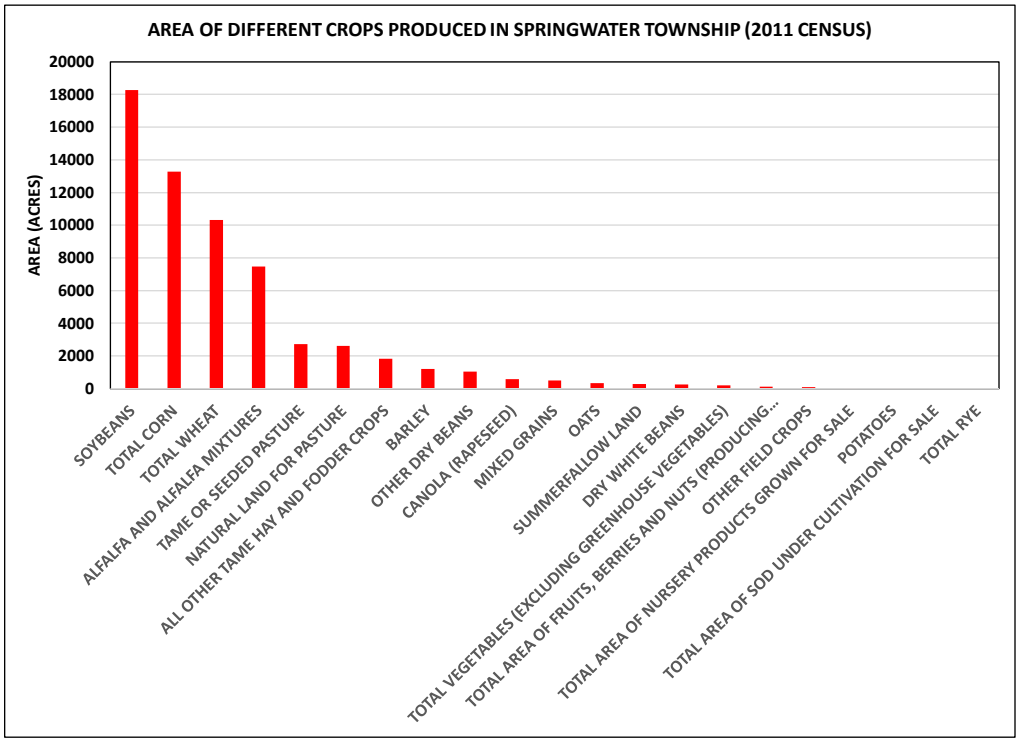


FIGURE 7

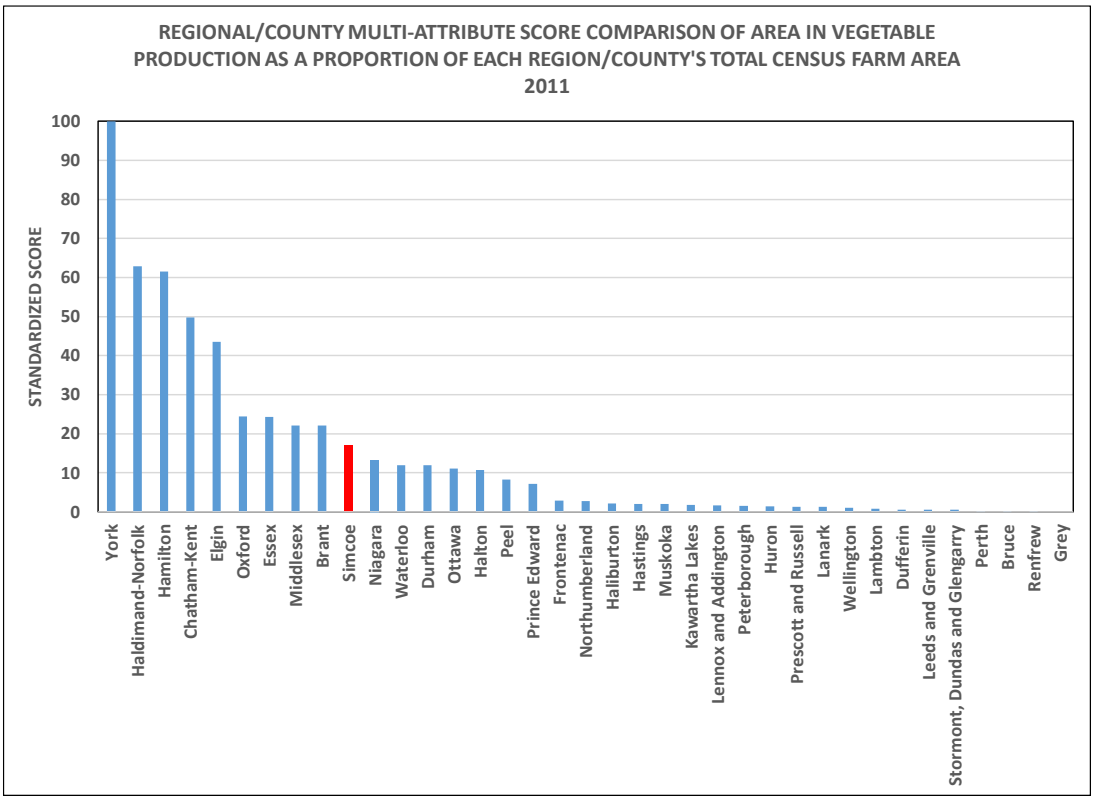
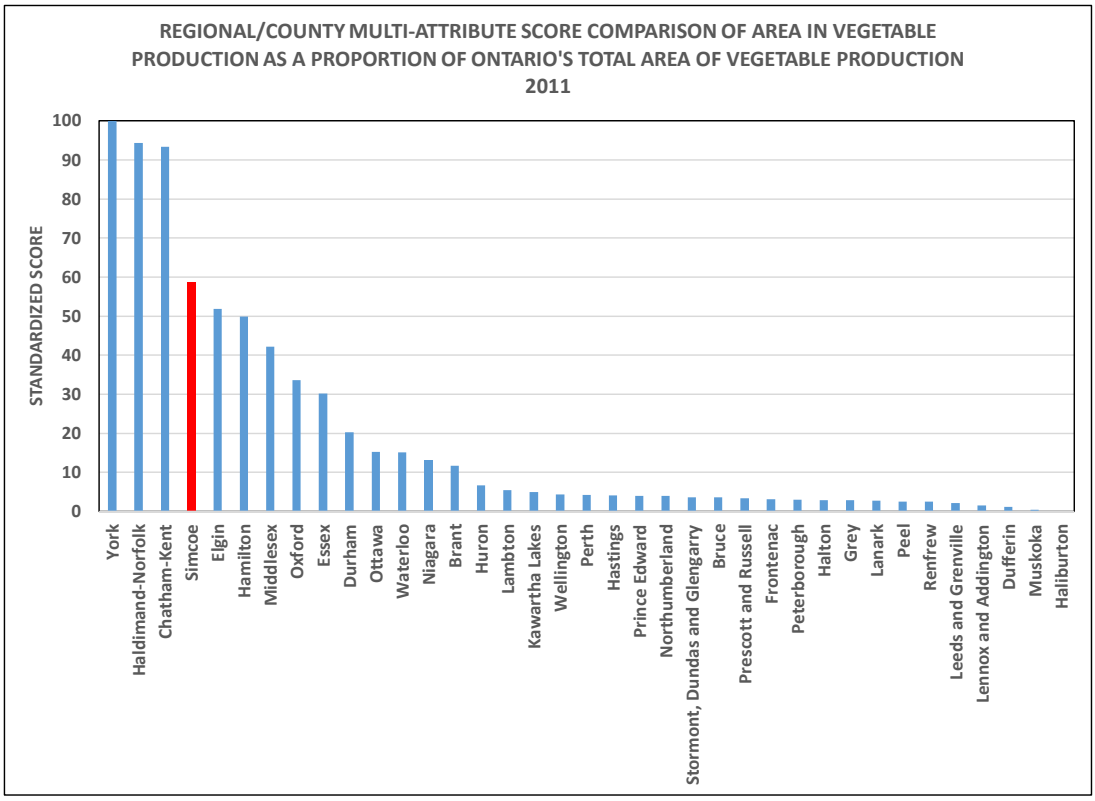
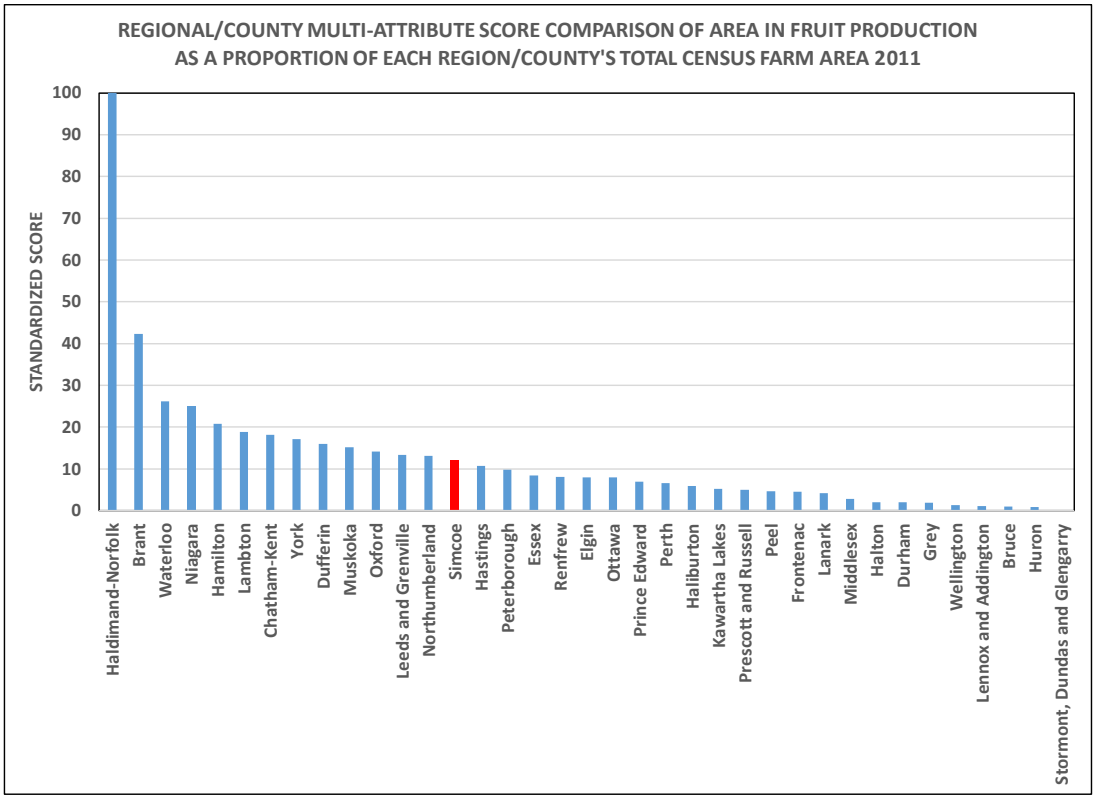


FIGURE 8



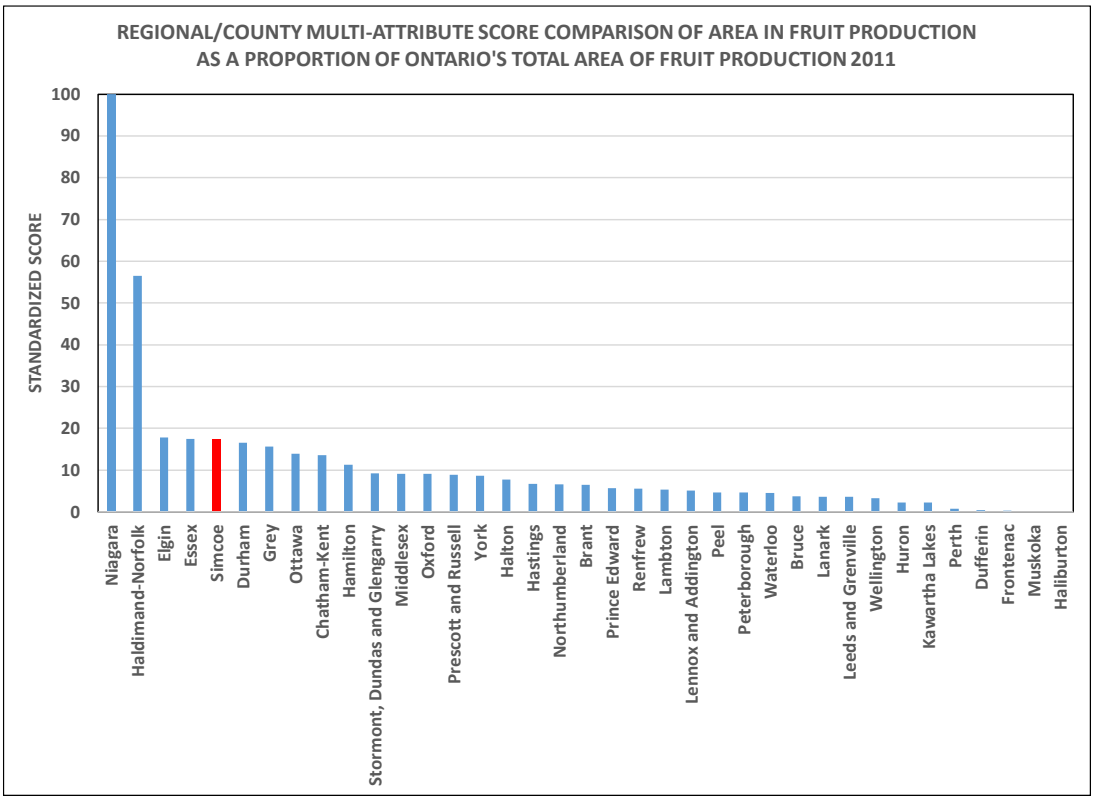
The importance of fruit production in Simcoe also varies with context. Simcoe's fruit area production as a proportion of its total census farm area results in a rank of 14th in southern Ontario (Figure 9). Like vegetable production, Simcoe's fruit production area as a proportion of the total production area in Ontario is greater having a rank of 5th in southern Ontario (Figure 10).

FIGURE 9

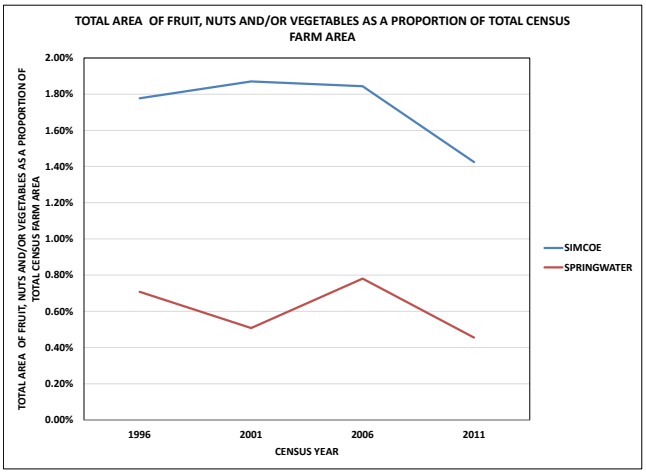


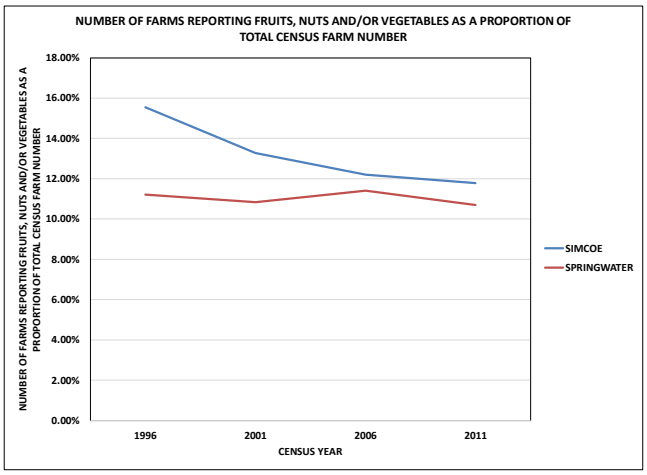
In Simcoe County, the area of specialty crop reported (fruits and vegetables) relative to total census farm area has been decreasing from 1996 to 2011 in both Simcoe County and Springwater Township (Figure 11). The number of farms reporting fruit and/or vegetable production has been decreasing in Simcoe but has been reasonably constant within Springwater Township (Figure 12).

FIGURE 10



FIGURES 11 AND 12





3.5 Economics

In general, it is difficult to make sufficient income from farming alone. In Ontario, 80% or greater of farms have greater off-farm income than net on farm operating income as summarized in Figure 13. The proportion of net on-farm income relative to off-farm income tends to be less as summarized in Figure 14.

FIGURE 13

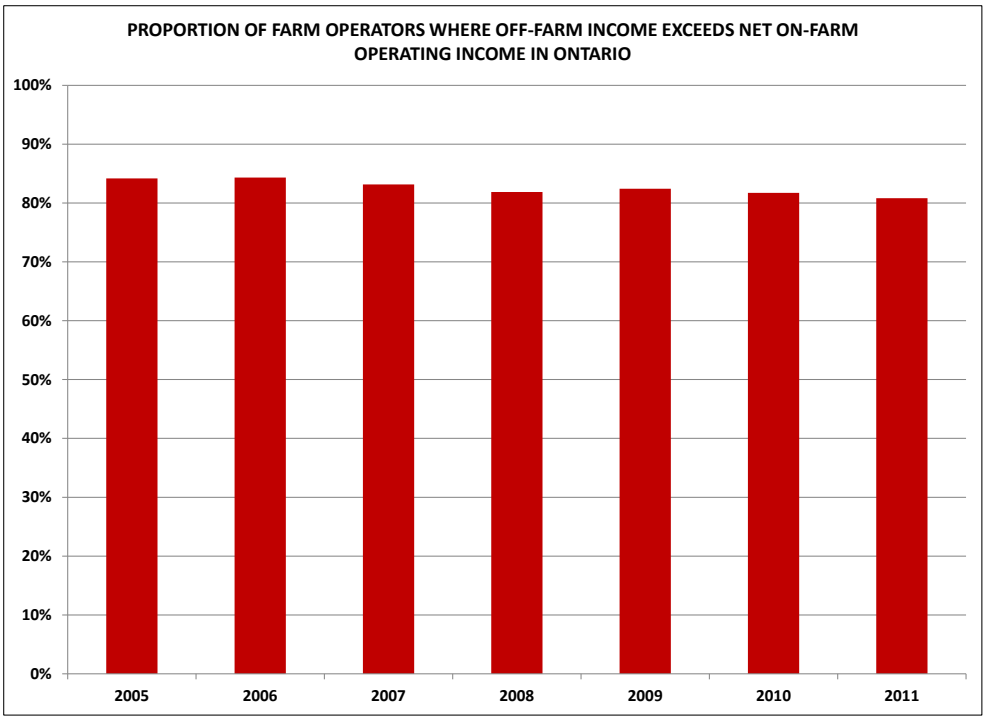
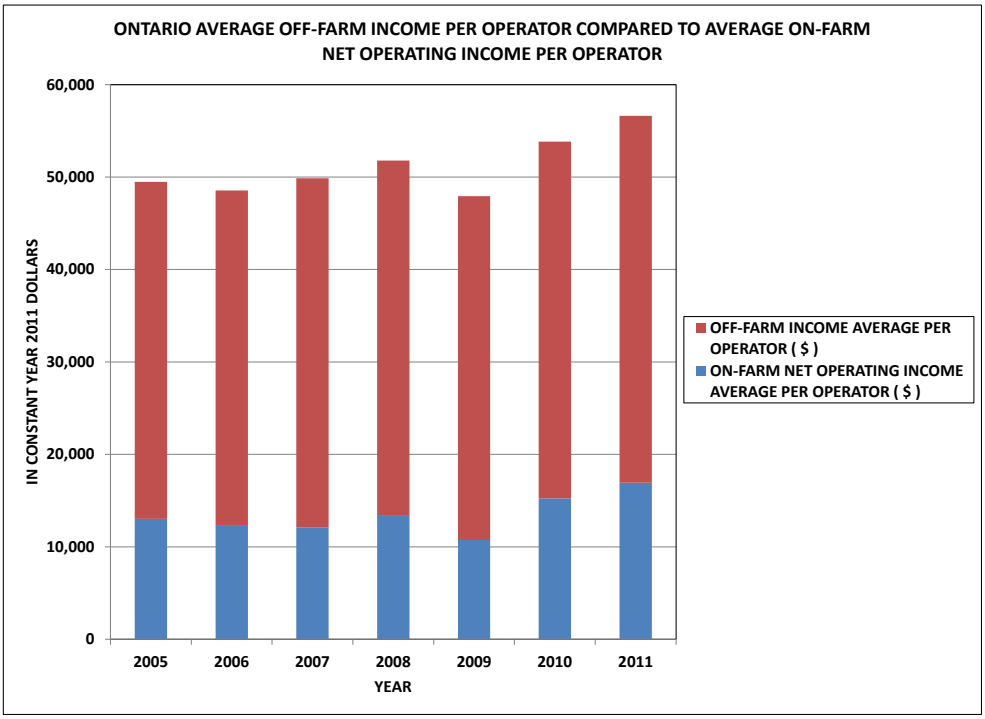


FIGURE 14



Products for direct human consumption (fruit and vegetables) have higher gross income per unit area as summarized in Figure 15. Marginal returns and net income associated with fruits and vegetables vary with the fruit and/or vegetable produced but also tend to be higher per unit area than what would be received for small grains. Prices received for various agricultural products can be presented differently from that shown in Figure 15. Average gross income and net income, based on data from 1981 to 2014, are

summarized in Figure 16. In this graph, the average value over more than 30 years is plotted and the changes in that monetary value are represented by the standard deviation in price received (where standard deviation is the square root of variance). More specifically, there are variations in gross dollars from year to year for apples and grapes as noted by the standard deviation "whiskers" in Figure 19. Alternatively, soybeans and wheat have relatively low variations from year to year as shown by relatively low levels in standard deviation in price as shown by relatively short "whiskers" in Figure 15. The gross income per acre values shown in Figures 15 and 16 are Province wide.

FIGURE 15

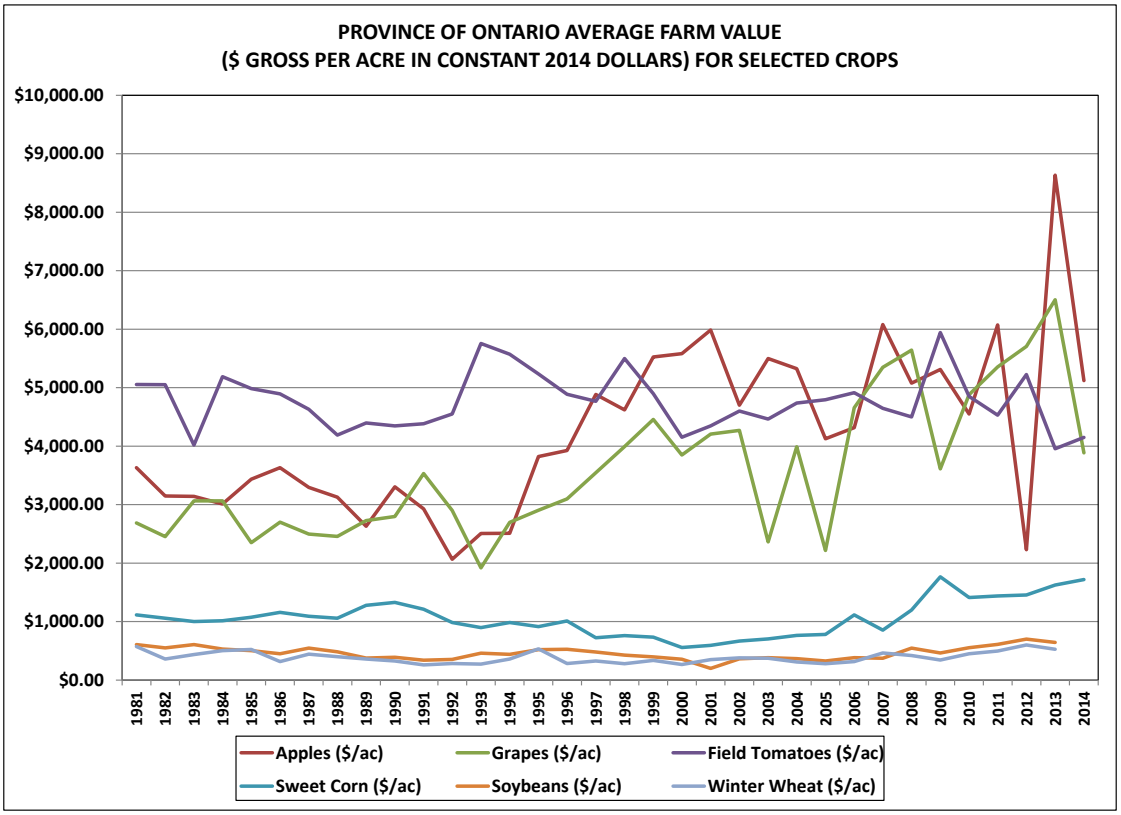
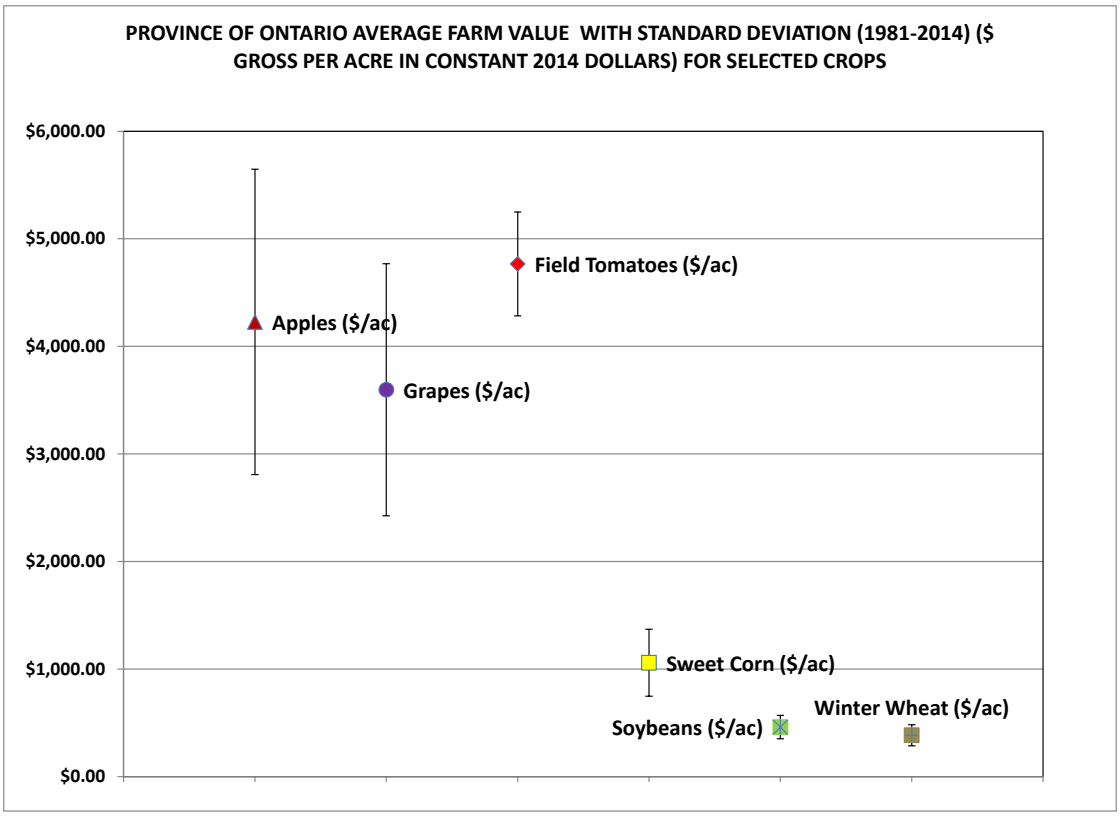
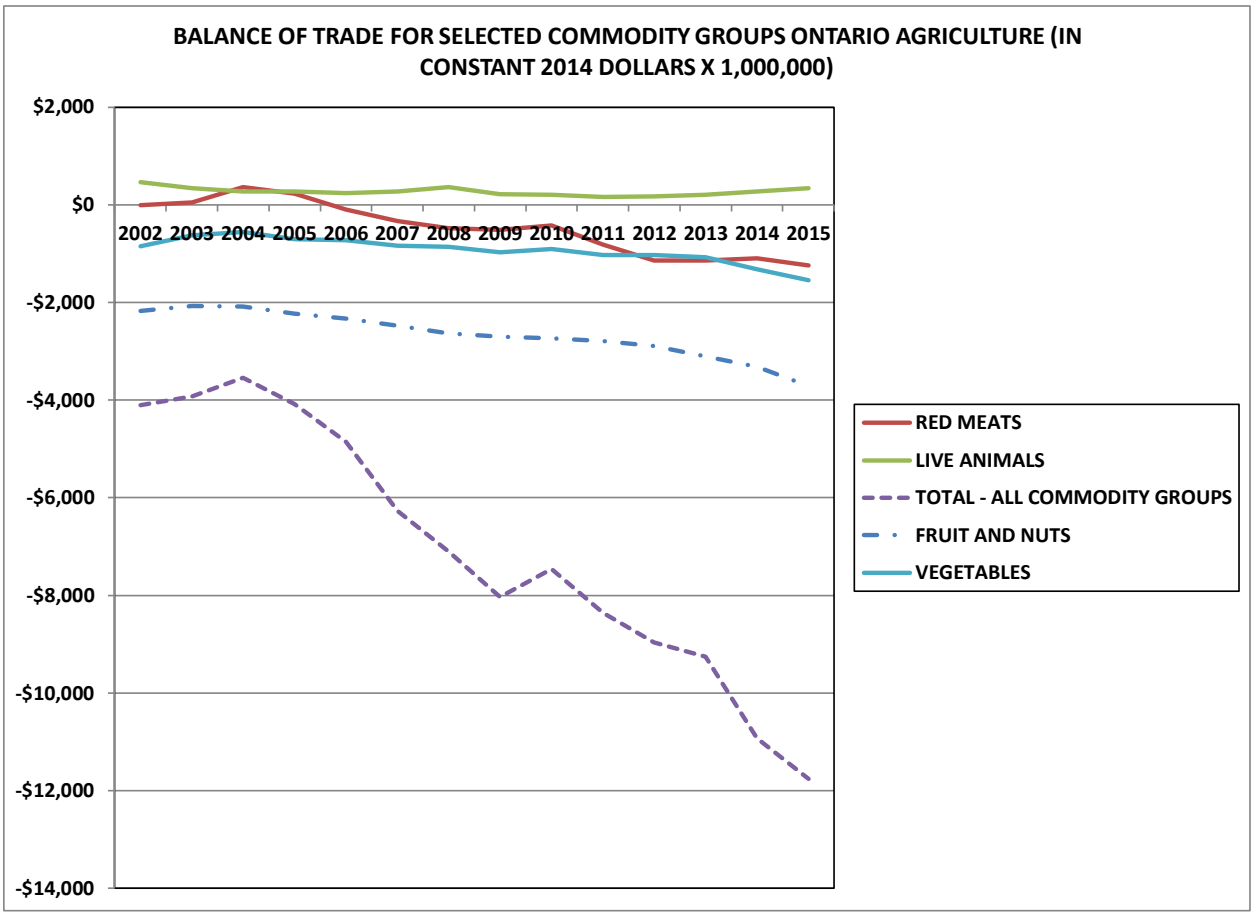


FIGURE 16



Given the relatively higher net income associated with fruit and vegetable production, one might hypothesize that more farmers would be producing specialty crops. However, as discussed previously, the area of fruit and vegetable production relative to total census farm area in Springwater and Simcoe is diminishing. Balance of trade data (Figure 17) provide some insight into why this reduction might be occurring. Over time, more money is being spent on fruit, nuts and vegetable imports than is received from exporting those same commodity groups. Several factors, including regulation, farm labour availability and cost, as well as consumer purchasing decisions have influenced whether fruits and vegetables are being produced and purchased within Ontario.

FIGURE 17



An analysis of economic data specific to Springwater and Simcoe County is presented in the following paragraphs to ascertain whether it is likely that Springwater and/or Simcoe are special cases that tend not to follow the provincial data presented previously in Figures 13 to 17. Statistics Canada data for total/gross farm receipts, net income (defined as gross farm receipts minus farm business operating expenses), and total farm capital were evaluated on a “per unit area” as well as “per farm basis” at the regional scale for southern Ontario, Simcoe County and for the Townships within Simcoe as summarized in Figures 18 through 21.

Simcoe has relatively lower farm net incomes and gross farm receipts on a per unit area basis as well as on a per farm basis when compared to other Regions/Counties in southern Ontario as summarized in Figures 18 and 19. However, the relatively large differences amongst Regions/Counties is in gross farm receipts rather than the more important (from a farm business perspective) net income values.

The relative net income per farm for Simcoe farmers is relatively good in the context of southern Ontario. However, the net income values for Simcoe support the view that Simcoe farmers need to supplement their on-farm income with income from non-farm sources.

FIGURE 18

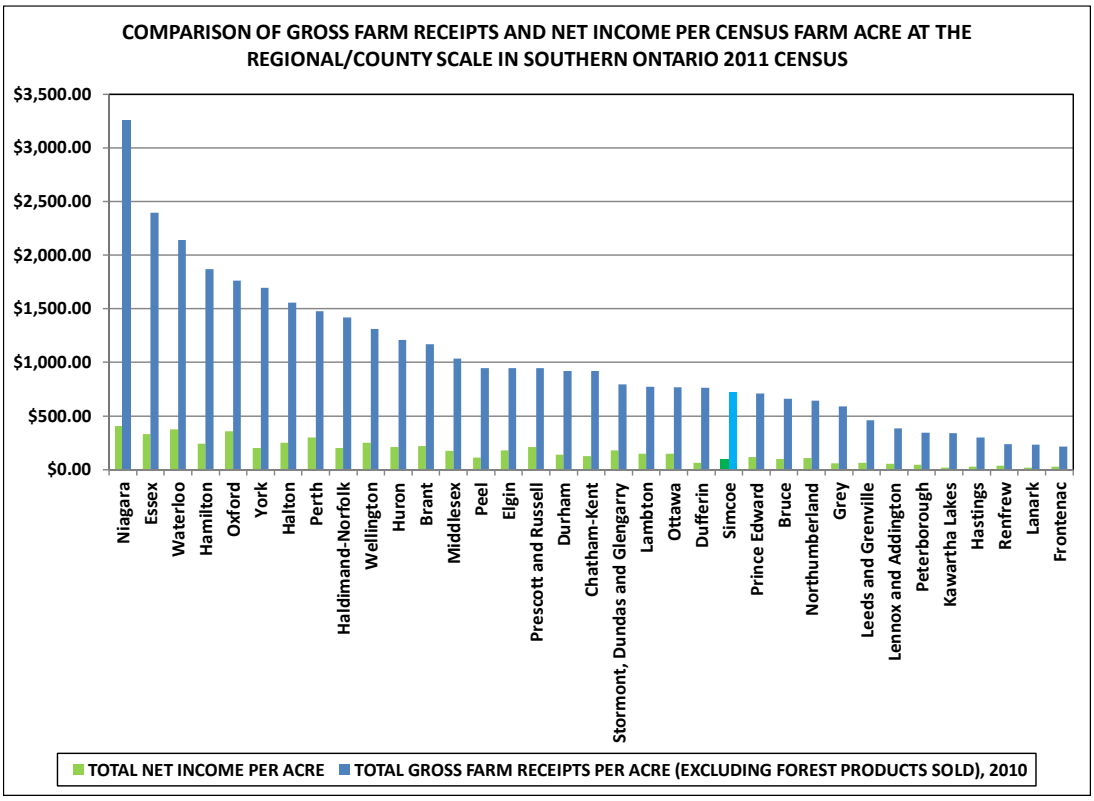
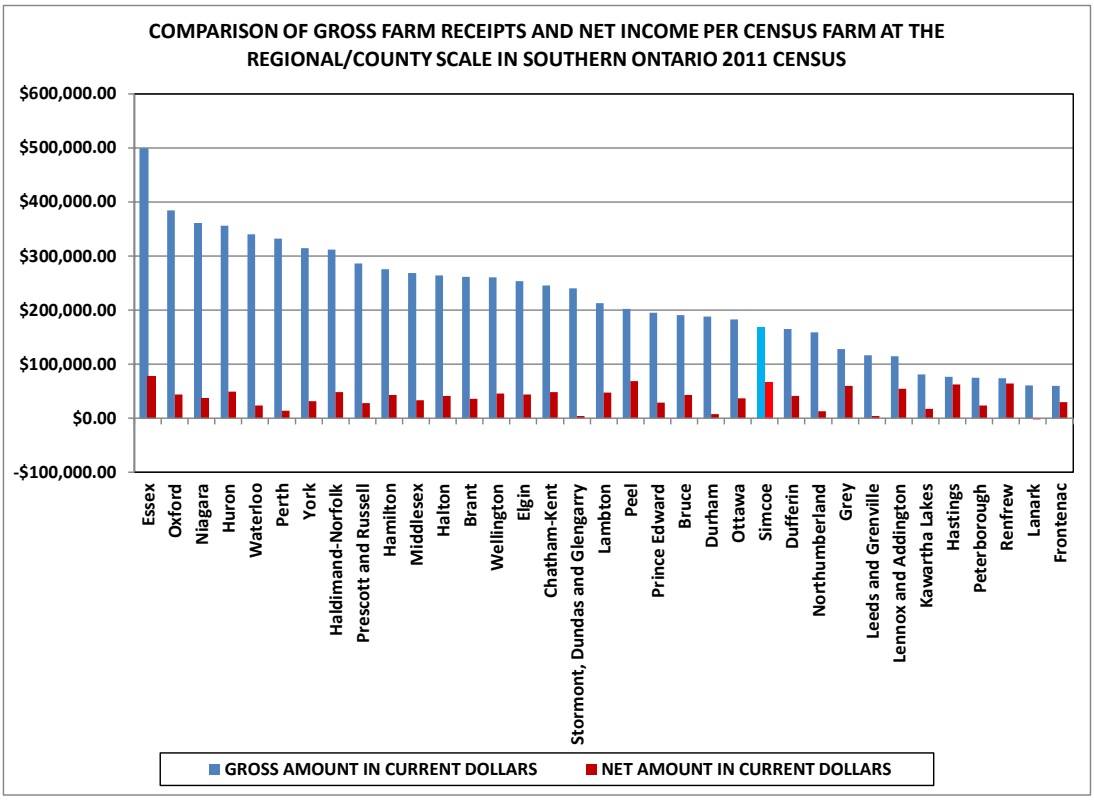


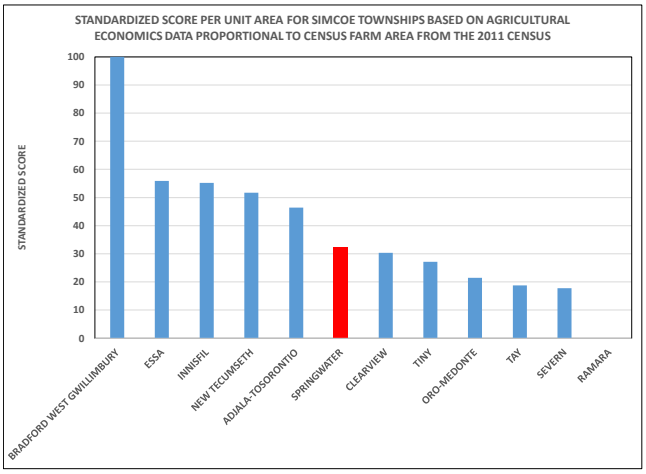
FIGURE 19

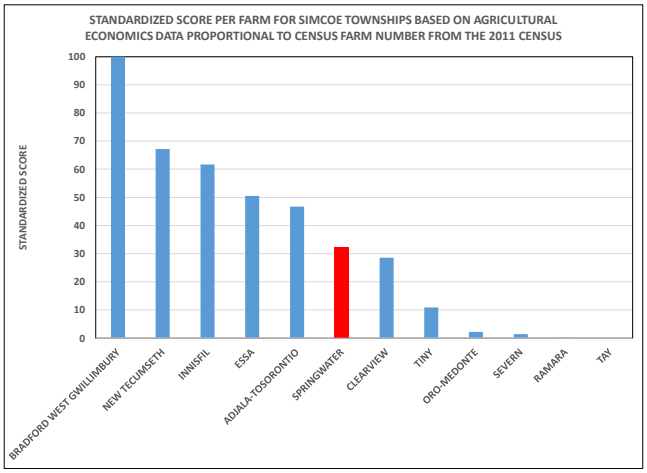


When a number of economic characteristics including gross income, operating expenses and capital value are compared, the Township of Springwater is midrange relative to the other Towns and Townships in Simcoe County, when the comparison is made proportional to census farm area or to census farm number (Figures 20 and 21).

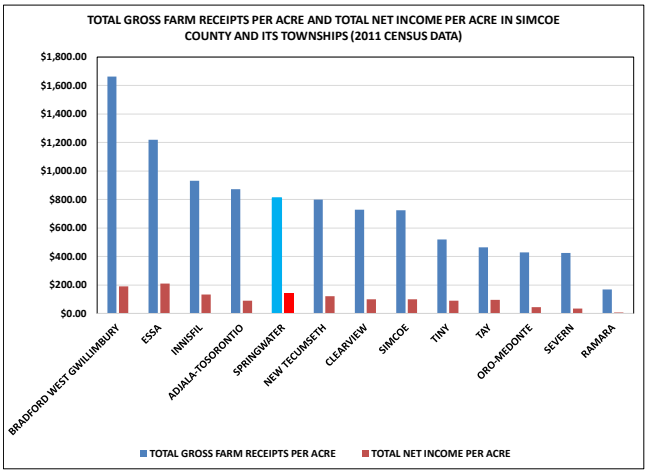
Springwater's net farm income is above the average for Simcoe County on a per unit area basis (Figure 22) and is above the average for Simcoe on a per farm basis (Figure 23). Gross farm receipts follow the same trend where they are slightly above the average for Simcoe County on a per unit area basis (Figure 22) but is much lower than the average for Simcoe on a per farm basis (Figure 23). However, Springwater's gross farm receipts and total net income are midrange with respect to the values found for the Towns and Townships within Simcoe County.

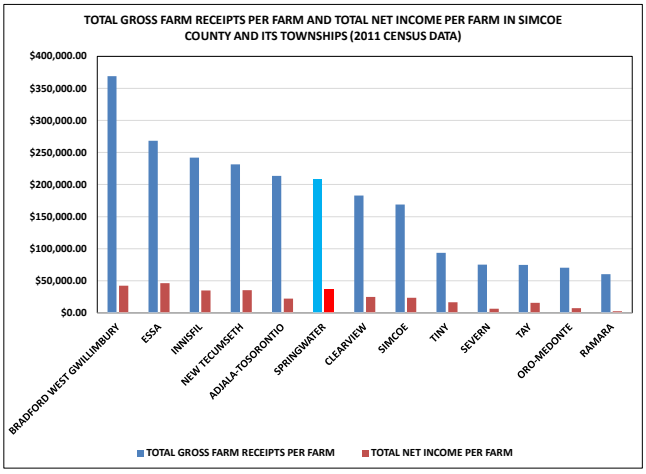
FIGURES 20 and 21





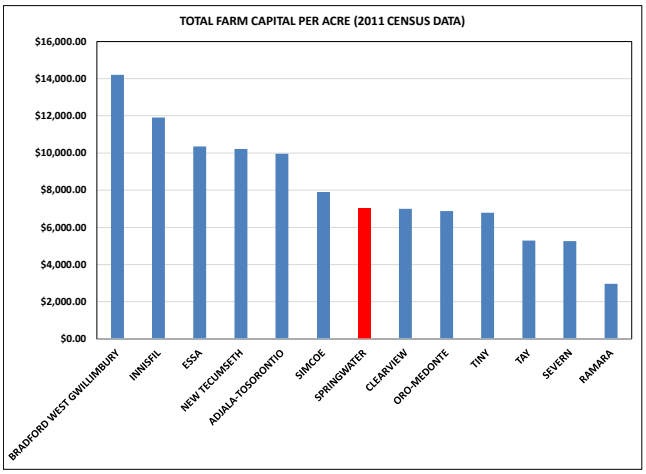
FIGURES 22 and 23

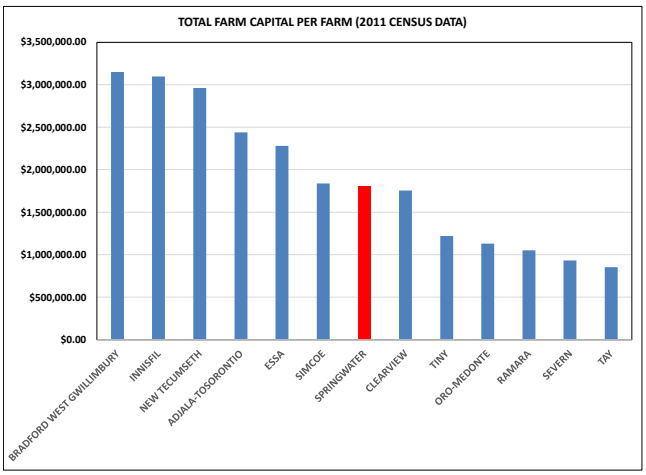




Springwater's total farm capital is relatively lower than that for Simcoe County both on a per unit area basis (Figure 24) and on a per farm basis (Figure 25).

FIGURES 24 and 25





The total farm receipts, total farm capital, total farm business expenses, and net farm income data for the Township of Springwater are not unusual and are reasonable in the context of southern Ontario and Simcoe County.

4.0 ADDITIONAL PROPERTY AND SITE SPECIFIC AGRICULTURAL STUDIES

4.1 Introduction

The number and kind of metrics used to characterize agriculture tends to vary with agricultural study scale and study author. Regardless, the PPS (2014) sets a minimum standard of factors or metrics that must be used to describe and evaluate agriculture. The following paragraphs summarize findings with respect to soil capability for common field crops, soil potential for specialty crops, climate, agricultural land use and Minimum Distance Separation. When possible, data summaries are presented graphically within the text.

4.2 Common Field Crops – Soil Capability

4.2.1 Introduction and Methods

Soil capability information is an interpretive classification of existing soil survey maps and is based on the published literature. The relative amounts of different soil capability classes for a given area, from the regional to the site-specific scale, varies from one published source to another. Within this report, soils and/or soil capability have been or will be compared using fieldwork and photo interpretation in addition to published sources.

The data set supplied by Land Information Ontario (LIO) is information originally supplied by OMAFRA. The data set was checked, for purposes of this report, for inconsistencies using a unique soil symbol list which was based on soil map symbol, stoniness class, slope class, capability class, surface texture etc. The capability class information was converted to a soil productivity index following methods described in Appendix 3.

4.2.2 Findings

Soils mapped by Hoffman (1962) at a scale of 1:63,360 on the site, property and in the surrounding area are shown on Map 6 and are summarized in Table 1. The soil symbols used in the 1962 soil survey map do not match those from the Land Information Ontario (LIO) database. The soil symbols shown in Table 1 are from LIO. Those soils potentially affected by the ERRC footprint and/or access road are identified in bold font in Table 1.

Table 1 Soil Series Summary Description

Soil Series Name	Soil Symbol	Surface Texture	Parent Materials	Drainage Class	Slope Class
Alliston	**ALT**	**Sandy loam**	**Grey calcareous outwash sand**	**Imperfect**	**C**
Dundonald	**DUL**	**Sandy loam**	**Outwash sand underlain by grey calcareous loam or sandy loam at depths of 3 feet or less**	**Well**	**D**
Granby	GNY	Sandy loam	Grey calcareous outwash sand	4	B
Smithfield	SMF	Clay loam	Calcareous, lacustrine, varved silt loam and clay	Imperfect	C
Schomberg	SMG	Silty clay loam	Calcareous, lacustrine, varved silt loam and clay	Well	C or D
Tioga	**TIG**	**Sandy loam**	**Grey calcareous outwash sand**	**Well**	**D or G**
Vasey	**VSY**	**Sandy loam**	**Light grey, calcareous and non-calcareous, sandy loam till**	**Well**	**D or E**
Wyevale	WVL	Gravelly sandy loam	Gray, non-calcareous gravel outwash	Well	D
Muck	ZMK	Organic	Organic	Very poor	B

Based on the published soil map, the ERRC site is predominantly located in a soil polygon (map unit) having to soils called Tioga and Vasey. Both soils have sandy loam surface textures and are underlain by sand and sandy loam till respectively. The east portion of the site as the soil series called Dundonald with sandy loam surface textures underlain by sand or sandy loam.

The soil series have been placed in soil capability classes and the original decisions related to soils and subclass limitations were made in the 1960s in information summarized by Hoffman (1964). This data forms the base for the soil capability information mapped by LIO. The soil capability of the site, property and surrounding

area is summarized in Map 7. Based on the published information, most the site is in a soil polygon consisting of capability classes 7 (60%) and 4 (40%) as shown on Map 7.

Fieldwork was completed to verify the presence of the soils on the site. Tioga series and a soil phase, Tioga series eroded, was identified on the site using methods outlined in Appendix 3. The eroded phase was not mapped in the published information and the soil profile in this phase has no horizonal differentiation (no "A" or "B" horizons were discernible; therefore, the soil can be classified as a Regosol). The Regosol is found in the area where dunes are present on the site.

The soils on the site were interpreted for soil capability based on their characteristics (principally texture, organic matter content, slope) as shown on Map 8. The original published information by Hoffman (1962) rated Tioga series as capability class 4 where they were present with up to 6% slope. The remaining part of the site is downgraded further on the basis of slope and those slopes are outlined on Map 9. Slope alone, that is, without any other limitations such as droughtiness and fertility, results in relatively low soil capability on the site based on the information provided by OMAFRA (2004b) for placing soils in various soil capability classes (subclass T related to topography, Table 2).

Table 2. Determination of Soil Capability Subclass T for Very Gravelly and Sandy Soils

Slope %	<2		2-5		5-9		9-15		15-30		30-60		>60	
Slope Class	B	b	C	c	D	d	E	e	F	f	G	g	H	h
Slope type	S	C	S	C	S	C	S	C	S	C	S	C	S	C
Capability Class				2T	2T	3T	3T	4T	5T	5T	6T	6T	7T	7T

The ERRC site has soil capability classes 4, 5 and 7 with the proportion of lands that are in soil capability class 7 being relatively high. Therefore, the average productivity index for the site is 0.24, equivalent to a site average soil capability class 6.

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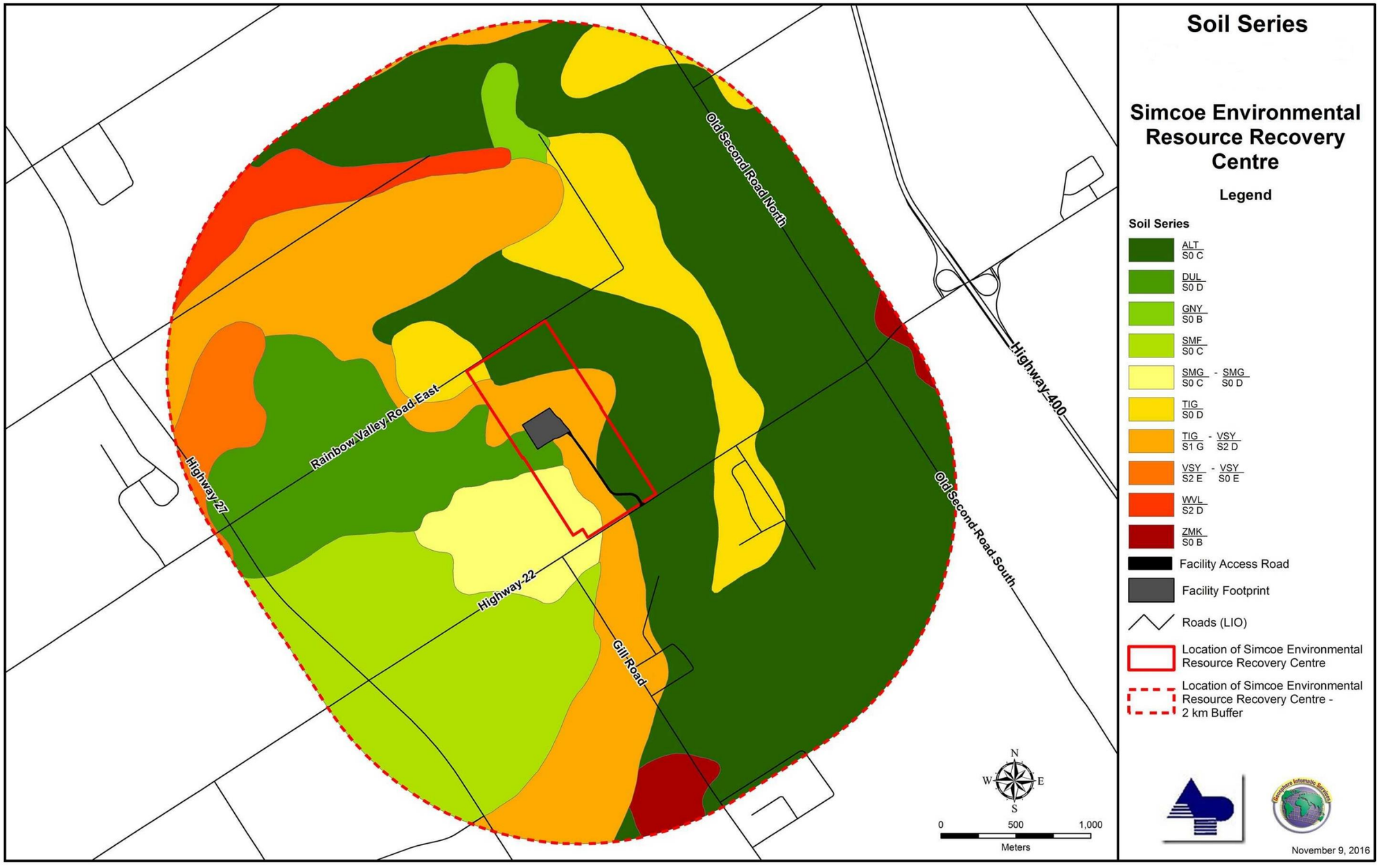
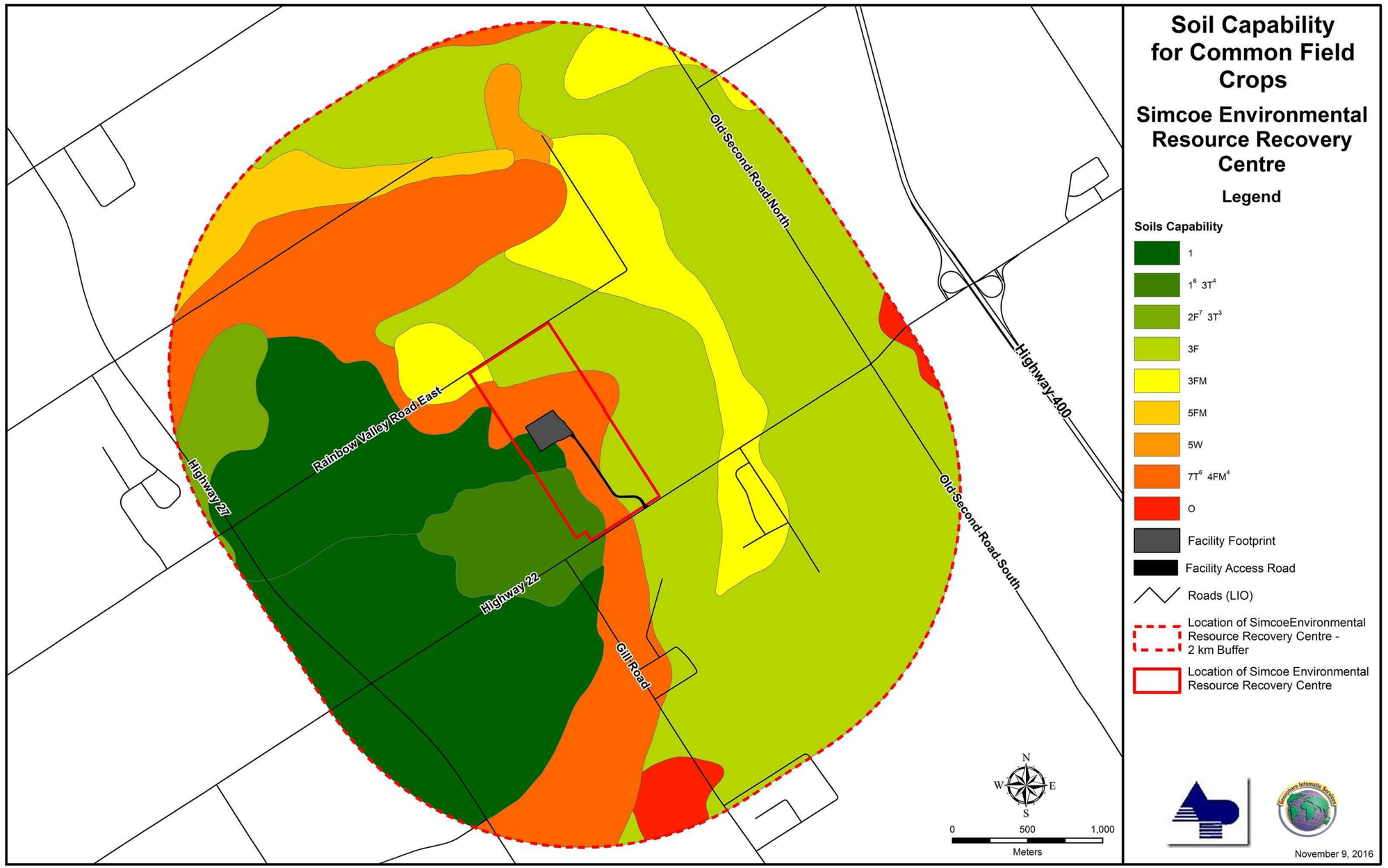
MAP 6



MAP 7


Old Second Road North
Highway 400
Rainbow Valley Road East
Highway 27
Highway 22
Gill Road
Old Second Road South
N
W
E
S
0
500
1,000
Meters
Soil Capability for Common Field Crops
Simcoe Environmental Resource Recovery Centre
Legend
Soils Capability
1
1^6 3T^4
2F^7 3T^3
3F
3FM
5FM
5W
7T^6 4FM^4
O
Facility Footprint
Facility Access Road
Roads (LIO)
Location of SimcoeEnvironmental Resource Recovery Centre - 2 km Buffer
Location of Simcoe Environmental Resource Recovery Centre
November 9, 2016

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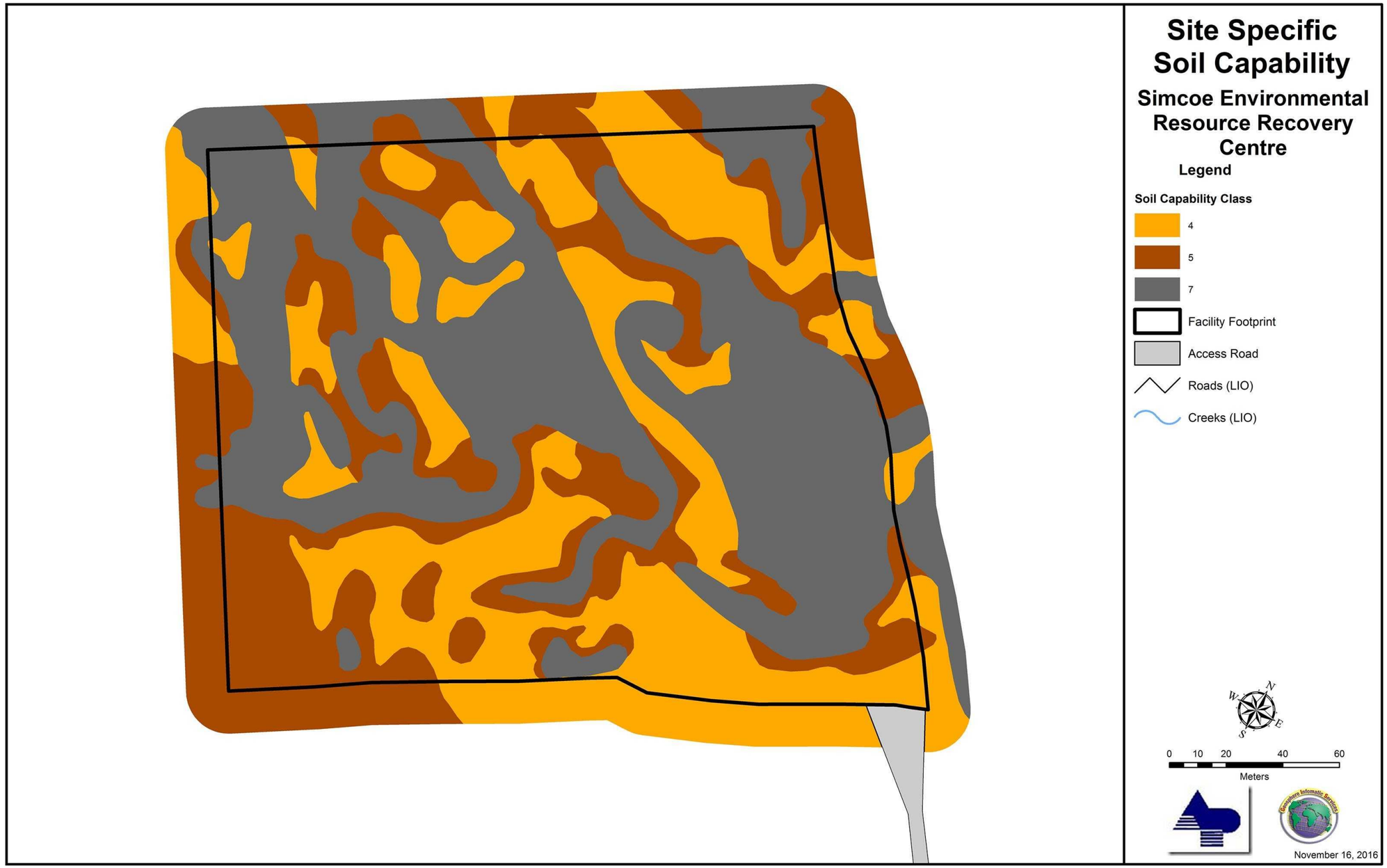
MAP 8



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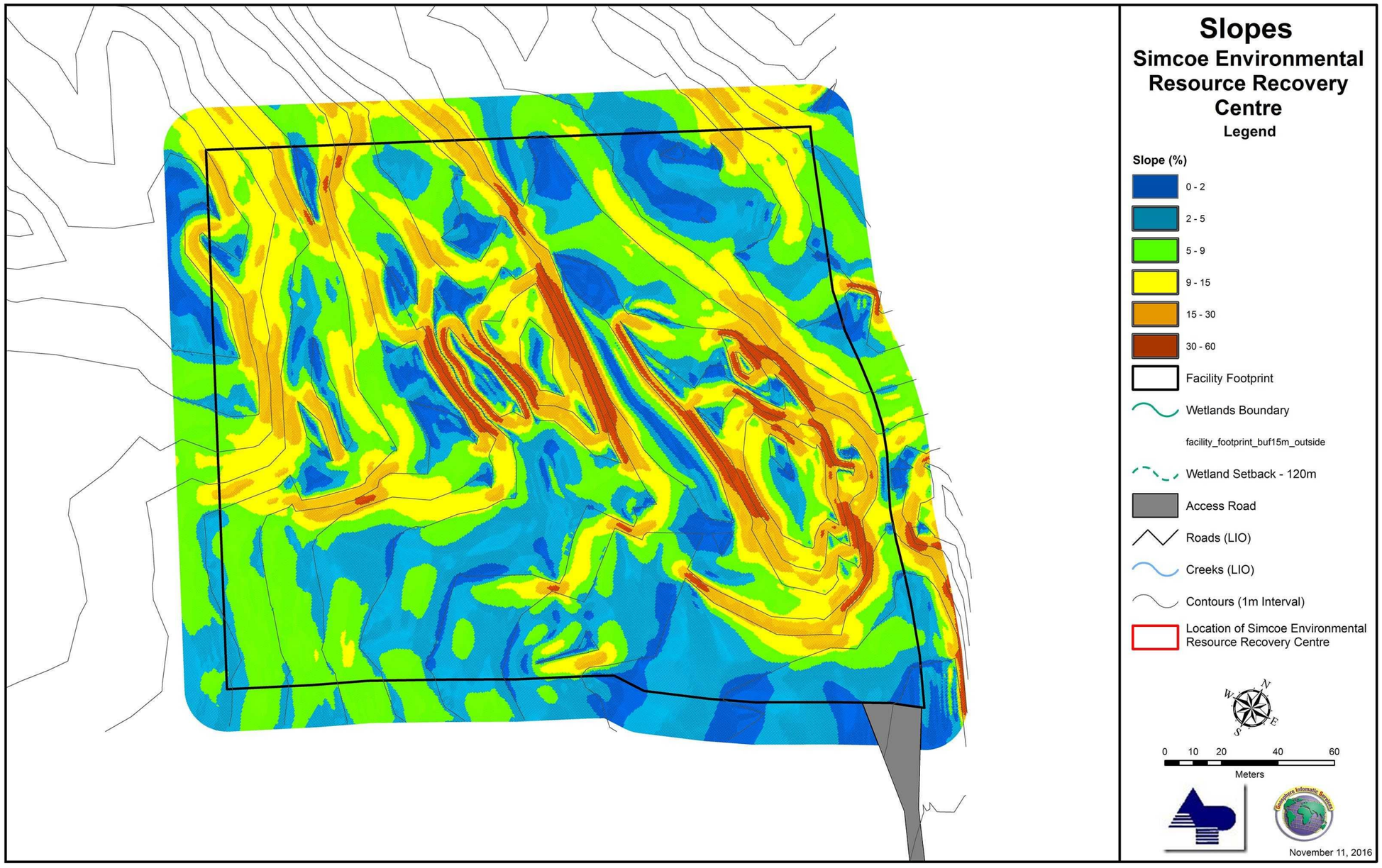
MAP 9



4.3 Specialty Crops - Soil Potential and Climate

4.3.1 Introduction and Methods

The PPS (2014) specifies several characteristics as part of a *specialty crop area.* These characteristics include good/appropriate soils and climate, existing fruit and vegetable production, infrastructure related to that production as well as farmers skilled in specialty crop production. Normally, farmers with special skills and specialty crop infrastructure are found concomitantly with specialty crop production. As a result, observations on the presence or absence of specialty crops is a reasonable 1st step in identifying whether a particular area can be classified as a *specialty crop area*. These observations are summarized later in this report as Section 4.4 (land use). This section will concentrate on the potential of soils within the boundaries of the Simcoe ERRC Property to support specialty crop production.

Statistics available through OMAFRA and Statistics Canada have already been analyzed to assist in putting Simcoe County and the Simcoe ERRC property in context. The published map, fieldwork and statistical agricultural analyses, completed as part of this section on specialty crops, are viewed as a reasonable way of distinguishing between the better and the poorer lands for specialty crops.

As described more fully in Appendix 4, there is no single Canada-wide or province-wide measure of the potential of soils to produce fruit and vegetable crops as there is for soil capability for common field crops. However, the most comprehensive soil potential rating for fruits and vegetables, which is called “soil suitability” within the Niagara Region soil survey is available. This rating is specific to Niagara Region. To obtain a better understanding of soil potential in the context of southern Ontario, the soil potential ratings for Niagara Region were applied to the Simcoe ERRC property. The assumptions associated with the soil potential ratings are also described in Appendix 4.

4.3.3 Findings

Lands within the ERRC Property are not suitable for tender fruit production. The Niagara *tender fruit and grape lands,* for example, have crop heat units of approximately 3100 – 3300 whereas lands within Simcoe ERRC Property have crop heat units in the range of 2500 - 2700 (using Map 2). The lack of tender fruit crop production reduces the average soil potential rating for fruits and vegetables throughout Simcoe County.

Interpretation and application of the seven ranks specialty crop soil potential system demonstrates that average soil potential for specialty crops within the ERRC Property is relatively low due primarily to limitations of fertility, slope and drouthiness. Similar to soil capability for common field crops, soil potential for fruit and vegetables is limited significantly due to slope gradient.

4.4 Land Use

4.4.1 Introduction and Methods

Agricultural land use within the study area was ascertained based on colour aerial photo interpretation, roadside reconnaissance and site observations in support of the land use map prepared by Agriculture and Agri-Food Canada (Map 10). Observations were

made to ascertain if and where specialty crops are present within and around the Simcoe ERRC Property. Field observations around the Property are limited by lines of sight and this limitation resulted in the need for aerial photo interpretation.

4.4.2 Findings

Lands in use for commercial fruit and vegetable production are not present within the Simcoe ERRC Property. Neither are there specialty crops being grown around the Property. The lack of specialty crop production on the site and surrounding areas indicates that the Simcoe ERRC Property is not part of a *specialty crop area* as defined within the PPS (2014).

The site is currently non-agricultural forest land and is part of an extensive forested area. Lands to the west of the property are used for common field crop production.

The Simcoe ERRC Property does not contain farm infrastructure such as farm buildings or tile drainage. The farm infrastructure, much of it large and of good quality, is located to the west of the site. The site is separated from this good farmland by woodland.

4.5 Minimum Distance Separation (MDS)

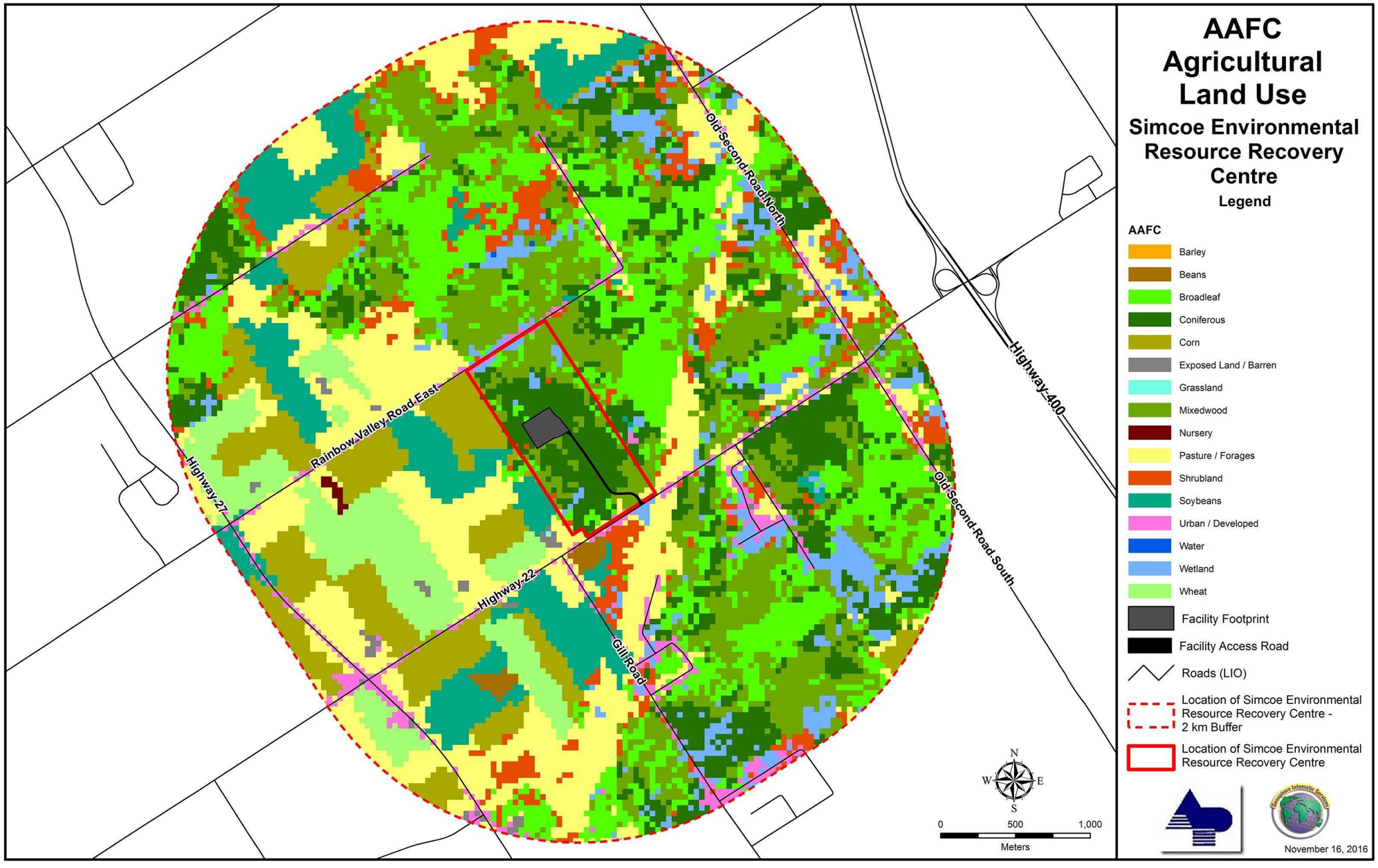
4.5.1 Introduction and Methods

There is a requirement to separate non-agricultural uses from the manure odours produced as part of livestock operations. Agricultural policy and MDS Guidelines have an objective related to the minimization of land-use conflict related to livestock manure odours. The Province of Ontario has produced 4 different documents since the 1970s which provide a systematic way of measuring a separation distance between livestock barns and/or manure storage areas and non-agricultural uses. MDS Guidelines from 2006 as well as the current 2016 document (software made available November, 2016) were considered in this AIA.

4.5.2 Findings

A review of MDS Guidelines published in 2006 can be reasonably interpreted to mean that infrastructure is exempt from MDS. The exemption has been made quite specific in the 2016 *Implementation Guidelines* (John Turvey, OMAFRA, 2016). The status of the proposed ERRC as exempt from MDS has been confirmed as outlined in communication copied in Appendix 1 (Jocelyn Beatty, OMAFRA, 2016).

MAP 10


Old Second Road North
Highway 400
Rainbow Valley Road East
Highway 27
Highway 22
Gill Road
Old Second Road South
N
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E
S
0
500
1,000
Meters
AAFC Agricultural Land Use
Simcoe Environmental Resource Recovery Centre
Legend
AAFC
Barley
Beans
Broadleaf
Coniferous
Corn
Exposed Land / Barren
Grassland
Mixedwood
Nursery
Pasture / Forages
Shrubland
Soybeans
Urban / Developed
Water
Wetland
Wheat
Facility Footprint
Facility Access Road
Roads (LIO)
Location of Simcoe Environmental Resource Recovery Centre - 2 km Buffer
Location of Simcoe Environmental Resource Recovery Centre
November 16, 2016

5.0 SUMMARY AND CONCLUSIONS

The general findings of the report are summarized in the following:

- Specialty Crop Area
  There are no specialty crops grown on the proposed Simcoe ERRC site or property. The Simcoe ERRC Property, site and the surrounding area are not a *specialty crop area* as defined in *the PPS* (2014).
- Specialty Crop Capability/Suitability/Potential
  The Simcoe ERRC property has very limited soil potential for a restricted range of specialty crop (fruit and vegetable) production. The crops that could be grown on the site and property could be grown on similar sandy soils (where those similar sandy soils have lower slope gradients than those slopes present on the site) throughout Simcoe County.
- Common Field Crop Capability
  The Simcoe ERRC property has an agricultural capability for common field crops ranging from classes 1 - 7. The average productivity index for the Simcoe ERRC property has a value that lies between the productivity index for soil capability class 3 and soil capability class 4. The site has an average productivity index of 0.24 equivalent to soil capability class 6.
- Agricultural Land Uses
  None of the proposed Simcoe ERRC property and site is currently used for common field crop agricultural use. Good agricultural land in active agricultural production is only present adjacent to the west side outside of the ERRC property and site.
- Non-Agricultural Land Uses
  The proposed Simcoe ERRC property and site are in an extensive forested/woodlot area.
- Climate
  The Simcoe ERRC property has no special climate that would allow for the production of tender fruit crops.
- Minimum Distance Separation (MDS)
  MDS measurements are not required because the proposed Simcoe ERRC is infrastructure which is exempt from MDS.
- Infrastructure
  Agricultural infrastructure and improvement on the Simcoe ERRC property is not present.
- Economics
  The proposed ERRC property and site is in public ownership and, as a result, no owned and actively used agricultural land was purchased. The ERRC lands are forested and are not available as leased land for agricultural purposes. Therefore, the availability of leased agricultural land and agricultural land for purchase will not be affected by the proposed ERRC use.

The PPS (2014) has a requirement in section 2.3.6.2 for the mitigation of impacts of non-agricultural uses on agricultural operations and lands. However, this requirement is part of section 2.3.6 related to “Non-Agricultural Uses in Prime Agricultural Areas” and

the proposed ERRC site is not located in a prime agricultural area. Thus, it can reasonably be interpreted that mitigation to the extent feasible is not required. Regardless, impacts to agriculture have been minimized by:

- choosing a site that is not designated for agriculture,
- choosing a site that has poor soil quality as characterized by soil capability and soil potential,
- placing the site away from the boundary of the ERRC property thereby providing vegetative screening and distance between the proposed use and the agricultural uses outside of the ERRC property located to the west.

Therefore, impacts to agriculture have been *mitigated to the extent feasible*.

In summary, given the agricultural characteristics of the Simcoe ERRC property as well as the agricultural characteristics of the adjacent lands and surrounding area, the proposed Simcoe ERRC is a reasonable location for non-agricultural development. The development can be accomplished in a way that the intent and purpose of the agricultural sections within the *Provincial Policy Statement,* the *Growth Plan*, the *County of Simcoe Official Plan,* the *Springwater Official Plan,* and *The Corporation of the Township of Springwater Comprehensive Zoning Bylaw 5000* will be maintained.

AgPlan Limited

Michael K. Hoffman
Agricultural Analyst

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APPENDIX 1

LITERATURE SUMMARY RELATED TO AN AIA

A review of an agricultural impact assessment (AIA) could reasonably be structured if that agricultural assessment needed to be consistent with provincial standards and guidelines for such work. Unfortunately, there are no standards or guidelines related to Agricultural Impact Assessment produced by the Province of Ontario. In addition, the Province does not have documentation to provide assistance with respect to the phrase "in accordance with evaluation procedures established by the Province, as amended from time to time" outlined within the Provincial Policy Statement (1997, 2005). The Province has not presented a literature review describing the spectrum of different evaluation methods available nor has it objectively evaluated various land evaluation methods. Additionally, current discussions with the Ontario Ministry of Agriculture Food and Rural Affairs (Turvey, 2016), indicate that the Province of Ontario has no documents which outline possible and/or probable impacts to agriculture associated with development. However, OMAFRA will be preparing a document on Agricultural Impact Assessments. As well, the *Proposed Growth Plan for the Greater Golden Horseshoe, 2016* does contain a definition of Agricultural Impact Assessment as follows:

> *Agricultural Impact Assessment*
> *A study that evaluates the potential impacts of non-agricultural development on agricultural operations and the agricultural system and recommends ways to avoid or, if avoidance is not possible, minimize and mitigate adverse impacts.*
>
> *Agricultural System*
> *A group of inter-connected elements that collectively create a viable, thriving agricultural sector. It has two components:*
> *1. An agricultural land base comprised of prime agricultural areas, including specialty crop areas and rural lands that together create a continuous productive land base for agriculture;*
> *2. An agricultural support network which includes infrastructure, services and agri-food assets important to the viability of the sector.*
>
> *Agricultural Support Network*
> *A network that is part of the agricultural system and includes elements important to the viability of the agri-food sector such as: regional agricultural infrastructure and transportation networks, on-farm buildings and infrastructure, agricultural services, farm markets, distributors and first-level processing, and vibrant, agriculture-supportive communities.*

Other sources of literature in addition to Ontario planning policy have been used to provide a framework related to the review of the agricultural assessment report. Two documents, both with the title *Agricultural Impact Assessment Guidelines*, have been produced by the Region of Halton (1985, 2013) and the Town of Caledon (draft, 2003). The Guidelines describe the process to be followed within the Region and the Town when evaluating a development, redesignation and/or zoning proposal with the potential to affect agriculture. The AIA Guidelines contain a list of information requirements (which have been interpreted and summarized in Matrix 2). For Halton Region, the AIA

Guidelines are a reflection of the Food Land Guidelines (1976) and subsequently the Provincial Policy Statement (2005) and for the Town of Caledon the Provincial Policy Statement (1997). Some of the wording in the matrix has been reinterpreted to reflect a change based on the wording of current (2014) policy.

MATRIX 1

Principal information requirements	Subcomponent information
Development proposal description	Site plan, location plan, description
Site physical resource inventory	Soils and soil capability including inherent limitations to the capability classification
Site land use	Past and present agricultural production, the non-agricultural uses on site, land parcel(s) shape and size, land tenure, operation and farm operator characteristics, farm capital investment
Off-site land-use	Adjacent land uses (type and intensity), existing constraints imposed by external uses including Minimum Distance Separation (MDS), land parcel sizes, ownership/tenancy, off-site soil capability, off-site designations/zoning
Economic viability	Viability of the lands themselves, viability when in combination with a larger farm operation, flexibility for different kinds of farm use
Impacts on agriculture	Direct loss of agricultural land, affects the surrounding lands including the general area in which the site is located
Mitigation measures	Methods of impact mitigation on-site and off-site
Conclusions	Summary and recommendations, compliance with MDS and policy
Background information	Literature cited, data sources, personal communications, methodologies, Curriculum Vitae of team member(s)

There are several similarities between the two documents including a description of the proposed new use, information requirements, mitigation, and conclusions.

APPENDIX 2

CORRESPONDENCE

Ministry of Municipal Affairs / **Ministère des Affaires municipales**

Ministry of Housing / **Ministère du Logement**

Municipal Services Office
Central Ontario
777 Bay Street, 13th Floor
Toronto ON M5G 2E5
Phone: 416 585-6226
Facsimile: 416 585-6882
Toll-Free: 1 800 668-0230

Bureau des services aux municipalités
du Centre de l'Ontario
777, rue Bay, 13e étage
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Sans frais : 1 800-668-0230

August 26, 2016

By Email Only

Nathan Westendorp, MCIP RPP
Manager of Development
Planning, Development & Tourism Department
County of Simcoe
1110 Highway 26
Midhurst ON L0L 1X0

Dear Mr. Westendorp,

Re: GHD Limited memo regarding County of Simcoe's proposed Organics Processing/Materials Management Facility in Township of Springwater
MMA File No. 43-OP-169096

Thank you for forwarding GHD Limited's July 28, 2016 memorandum, prepared for the Ministry of Municipal Affairs' (Ministry) review as to how the overall site selection process for the County of Simcoe's (County) proposed Organics Processing Facility and Material Management Facility was undertaken. These proposed facilities are intended to improve the County's ability to manage its long-term solid waste needs as identified in the County's 2010 Solid Waste Management Strategy. It is our understanding that GHD Limited was retained by the County to assist in the site selection process for this infrastructure.

This memorandum, in addition to other studies prepared to date, aims to support the County's future planning applications for the co-location of these facilities by demonstrating consistency with provincial land use policies – in particular the Provincial Policy Statement 2014 policies with respect to the long-term protection of prime agricultural areas.

Upon reviewing the memorandum's summary of the site selection process, Ministry staff are satisfied that the process was comprehensive and attempted to avoid prime agricultural areas and the conceptual layout proposes to locate the facility outside any prime agricultural lands on the selected site. Further, Ministry staff are satisfied that the tests of 2.3.6.1 b) in the Provincial Policy Statement

2014, as it relates to the site-selection process, have been met to allow this proposed non-agricultural (limited non-residential) use in a prime agricultural area.

In order to ensure the non-agricultural use has no impacts on this site and surrounding agricultural operations and lands, we request that a detailed Agricultural Impact Assessment be undertaken.

The Ministry looks forward to undertaking a provincial One Window review of any related application to amend the County Official Plan along with supporting documentation, including a detailed Agricultural Impact Assessment, prior to the County scheduling a public meeting and County Council's consideration of adoption.

We hope these comments are of assistance. Should you wish to discuss this matter further, do not hesitate to contact me at 416-585-6154 or at aldo.ingraldi@ontario.ca.

Yours truly,

Aldo Ingraldi, MCIP, RPP
Senior Planner, Community Planning and Development (East)
Municipal Services Office – Central Ontario

c. Arthur Churchyard, OMAFRA
David Parks, County of Simcoe
Blair Shoniker, GHD Limited

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Ontario

POLICY DIVISION
FOOD SAFETY & ENVIRONMENT POLICY BRANCH
ENVIRONMENTAL & LAND USE POLICY UNIT

October 7th, 2016

Re: County of Simcoe Organics Processing Facility

To whom it may concern,

This letter has been provided by staff at OMAFRA confirming that the achievement of MDS setbacks are not required for the proposed Organics Processing Facility in the County of Simcoe. MDS calculations are used to determine appropriate setbacks between new, existing, or expanding developments and livestock facilities and, as such, do not apply in this project.

Kind regards,

Jocelyn Beatty
Rural Planner

APPENDIX 3

SOIL CLASSIFICATION DESCRIPTION AND LIMITATIONS

SOIL CLASSIFICATION AND SOIL SURVEY

Ontario's published soil surveys follow a hierarchical system of soil classification to represent a three-dimensional area called a pedon (see http://www.pedosphere.ca/resources/CSSC3rd/chapter02.cfm). This three-dimensional area is intended to be represented as a two-dimensional map polygon usually shown as the soil series on soil maps in Ontario. Soil characteristics such as texture and particle size are a part of a continuum and the soil map also must present a landscape continuum as part of a discrete map polygon. In short, soils are represented as discrete units on a map even though the soils themselves are not discrete. As a result, there can be and there have been different ways of representing changes in soils that have been mapped within Ontario and within parts of the rest of the world. Not surprisingly, the opportunity to represent soils in different ways has resulted in significant changes in the approach to mapping soils over the time within which soil surveys have been published in Ontario. The older soil surveys tend to lump large areas into soil map polygons, whereas newer soil surveys have smaller more detailed polygons. Newer soil surveys also tend to have complexes (which are soil map polygons containing 2 or more soil series and/or two a more soil capability classes and subclass limitations). Examples of more recent soil surveys include Simcoe, Haldimand-Norfolk, Simcoe, Kent, Middlesex, Ottawa urban fringe, Ottawa-Carlton and the soils component within the report titled *State of the Resources for the Duffin-Rouge Agricultural Preserve*. A review of older as well as newer Ontario soil reports indicates the following:

- soil series with the same name may not have the same characteristics between Counties and/or Regions,
- some soil series identified in detailed field studies are not always represented in the County/Regional published soil survey within which the detailed work is being completed; and,
- not all the soil capabilities assigned to a particular soil series are consistent from one soil report to another soil report.

The significance of the difference between old mapping styles and newer ones can be illustrated by using an old soil report and comparing the old soil map to a newer map. Both maps were produced by government staff. Within Durham Region as well as a part of Peel Region an area identified as an Agricultural Preserve was remapped (Schut *et al*) at a scale of 1:20,000 in 1994 relative to two maps produced in 1956 (Olding et al.) and 1955 (Hoffman and Richards) both at a scale of 1: 63,360. A review of these older and newer maps shows that:

- there are differences in the number and size of soil polygons and the differences in the soil polygons represent differences in soil series and soil phases, and
- soil capability values assigned to each of the soil polygons are different from older map to newer map.

When the soil capability information is calculated as a productivity index, the old map assigned a productivity index of 0.91 (equivalent to capability class 1 soils) to that part of the Agricultural Preserve located within Durham Region whereas the new map has a productivity index of 0.66 that is relatively equivalent to capability class 3 (0.64). This information demonstrates that the soil productivity within the Preserve is significantly

lower than the original mapping by Olding *et al.* (1956) would indicate. Given that some of the soils mapped in the Preserve by Schut et al. (1994, OMAF) require tile drainage, this tile drainage would need to be in place in order to reach the average productivity index value of 0.66.

RATING FOR COMMON FIELD CROPS

The original soil capability classification is part of the Canada Land Inventory (CLI) and used an ordinal scale having the numbers 1 through 7. (A discussion of the definition of different scales is available in many mathematics texts. Siegel (1956) outlines a good summary matrix of the definitions for different scales that can be related to statistical tests). Alternatively, Velleman and Wilkinson (1993) describe mathematical scales as part of a continuum and argue that the use of specific statistical tests for specific scales is inappropriate. Irrespective of scale, the CLI capability interpretation was derived on the basis of "*research data, recorded observations, and experience*" and was not intended for use as an indicator of the "*most profitable use of land*".

The class, the broadest category in the capability classification, is a grouping of subclasses that have the same relative degree of limitation or hazard. The limitation or hazard becomes progressively greater from class 1 to class 7. The class indicates the general suitability of the soils for agricultural use.

Class 1 - Soils in this class have no significant limitations in use for crops.
Class 2 - Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices.
Class 3 - Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices or both.
Class 4 - Soils in this class have severe limitations that restrict the range of crops or require special conservation practices or both.
Class 5 - Soils in this class have very severe limitations that restrict their capability of producing perennial forage crops, and improvement practices are feasible.
Class 6 - Soils in this class are capable only of producing perennial forage crops and improvement practices are not feasible.
Class 7 - Soils in this class have no capability for arable agriculture or permanent pasture.

Subsequently, research by Hoffman (1973) indicated that soil capability class was an indicator of common field crop yields and productivity (yield) indices could be derived on the basis of those yields. The indices, described more specifically in Appendix 1, are used as an "average" for three crops: oats, barley, and corn.

The soil capability class ordinal scale could then be converted into an interval scale using Hoffman's (1973) data. The data used to create the interval scale are based on older soil surveys and the soil capability class summaries associated with the older surveys are summarized by Hoffman and Noble (1975). New surveys have been completed for Regions such as Middlesex, Elgin and Simcoe. In these new surveys, as

a result of work by McBride (1983), the soil capability classes for some soils have been changed to a lower class, particularly for soils with a high clay content. While McBride's work has been related to average yield data, on a County or Regional basis, no site-specific yield data has been used to confirm that the newer changes to soil capability class is supported by specific yields as was completed in Hoffman's (1973) research. Therefore, the capability classes used in the newer soil surveys, such as the one for Simcoe, might better be described as being part of an ordinal scale.

Regardless of the difference of opinion concerning arithmetic scale, yield data, and productivity indices, both data sources and methods have been investigated as part of the work described in the following paragraphs.
The original soil capability rating report (Environment Canada, 1972) has a number of assumptions which have been applied to the interpretation of soil Map 2 (Appendix 4). Two of these assumptions (Environment Canada, 1972) are germane to a discussion on the capability of the subject lands and are as follows:

- *Good soil management practices that are feasible and practical under a largely mechanized system of agriculture are assumed.*
- *Soils considered feasible for improvement by draining, by irrigating, by removing stones, by altering soil structure, or by protecting from overflow, are classified according to their continuing limitations or hazards in use after the improvements have been made. The term "feasible" implies that it is within present day economic possibility for the farmer to make such improvements and it does not require a major reclamation project to do so. Where such major projects have been installed, the soils are grouped according to the soil and climatic limitations that continue to exist. A general guide as to what is considered a major reclamation project is that such projects require co-operative action among farmers or between farmers and governments. (Minor dams, small dykes, or field conservation measures are not included).*

Soil capability mapping used in this study has been based on the original soil map which is now available in digital format from the Ontario Ministry of Agriculture, Food and rural affairs (OMAFRA). The 1:50,000 scale blueprint soil capability maps available from OMAFRA were not used directly because these maps were originally prepared without edit (and therefore may be inaccurate) to be generalised for soil capability maps produced at the scale of 1: 250,000 by the Federal Government.

As discussed previously, the Canada Land Inventory (CLI) originally assumed that soil management that could be applied by a farmer would occur. Therefore, improvements such as irrigation and adequate drainage (both surface and subsurface) were already assumed to be applied in the rating of soils into capability classes in this study. have soils that would produce higher yields when soil improvements are completed. As well, more recent soil surveys have included capability ratings for soils in an unimproved state.

Tile Drainage

As noted previously, soil capability and therefore productivity makes assumptions about tile drainage (that is, that tile drainage is applied where it is needed and that capability class ratings reflect the fact that the drainage is already assumed to be in place). There are some differences of opinion about which soil drainage classes would benefit from tile drainage. However, it is likely that imperfectly and poorly drained soils would show improved yields when tiles had been installed. There is no doubt that poorly drained soils have better yields when tile drained. As well, it is likely that the imperfectly drained soils would benefit from tile drainage. Unfortunately, the newer soil surveys do not indicate how soil capability class levels would change if imperfectly drained soils are not tiled.

Some information is available to assist in estimating how productivity is diminished in areas requiring tile drainage. For example, yield data collected over 20 years and that were summarized and evaluated by Irwin (1999) indicate that, as a result of tile drainage, average yields have improved within a range where the least improvement was a 10 percent increase for coloured beans in contrast to a high increase of 38 percent for wheat. The summary by Irwin (1999) did not differentiate by soil series, soil drainage class, or by location in the Province. Based on a general interpretation of the data from Irwin (1999), it can be estimated that imperfectly drained soils in an undrained state could be poorer by a single capability class. However, the installation of tile drainage on the imperfectly drained soils is less likely than installation on poorly and very poorly drained soils.

Capability and Economics

Regardless of issues related to accuracy and precision due to mapping scale and assuming that tile drainage is in place, there is some evidence that lands with the average productivity of class 2 or lower cannot likely be used economically for the production of common field crops. The economic limitations associated with field crop production have been outlined previously in a document produced by the Centre for Resources Development (CRD, University of Guelph, 1972).

> *With the 20 percent decrease in productivity between class 1 and 2 land there is some doubt whether farmers can use class 2 to produce the common field crops and still realize a profit. There is little doubt at all that class 4 land cannot be the basis for profitable agriculture when only common field crops are grown. A 50 percent difference between production on class 1 soils and that on class 4 is too great to warrant using class 4 soils for most cultivated crops.*

SOIL PRODUCTIVITY INDEX CALCULATION

Soil Productivity Index

The soil productivity index is an arithmetic mean that expresses the relative occurrence of soil capability classes 1 to 7 on selected properties or within specified boundaries. The index is based on soil productivity ratings (Hoffman, 1973). Areas with the highest soil capability index will have mainly class 1 land. Areas with a low index will consist of

lower soil capabilities. The productivity index method has been used because it provides a single number derived from a listing, by proportion, of the soil capability classes 1 through 7 which allows for direct comparison among different areas or sites. Impacts on soil capability will generally be greatest on an area with a high soil capability index; that is, impacts will be highest when good (higher capability land) is lost to development.

Method

Soil Productivity Index = *(proportion of area of class 1 soils x 1.0) + (proportion of area of class 2 soils x 0.8) + (proportion of area of class 3 soils x 0.64) + (proportion of area of class 4 soils x 0.49) + (proportion of area of class 5 soils x 0.33) + (proportion of area of class 6 soils x 0.17) + (proportion of area of class 7 soils x 0.02)*

The area of each soil map unit was measured and areas of similar soil capability were summed for CLI classes 1 to 7 lands. The area was calculated for each CLI class and subsequently multiplied by a productivity index corresponding to each soil class. The productivity index is specific to each capability class. The proportion of each area occupied by each soil capability class was multiplied by the corresponding soil productivity value (following Hoffman, 1973) and products were subsequently summed to obtain a soil productivity index for lands affected by or potentially affected by development.

SITE-SPECIFIC SOIL SURVEY

A reconnaissance survey of field crops and general land use was completed by travelling roads around the Simcoe ERRC property. As well, field work was completed on-site for agricultural soils. Soils observations were made using an Oakfield manually operated soil probe, shovel and/or a Dutch auger. Soil profiles were compared to existing soil maps and series names. The methods used in the soil survey are outlined in this appendix.

Each of the soil characteristics observed in the field (excluding slope) were noted for three diagnostic horizons called the A (surface), B (subsurface subsoil, a zone of change or accumulation) and C (subsurface parent materials). Soils were classified into series names such as Vasey based on criteria outlined in previous soil reports (Hoffman et al., 1962) following the Canadian System of Soil Classification.

Soil series were subsequently interpreted for agricultural capability for common field crops into one of seven classes, where class 1 has no limitations for agriculture and class 7 is unsuitable for agriculture. Descriptions for the different classes are summarized in this Appendix. Guidelines outlined for the Canada Land Inventory (Environment Canada, 1972; Hoffman, unpublished, 1964) as well as published soil surveys (Kingston and Presant, 1989) were used to place soils in capability classes.

Soil observations made in the field follow standard practice and were completed as needed to allow for soil capability classification as outlined in the following.

- All depth measurements are recorded in centimetres
- Slope classes follow a convention.

Slope Classes

Simple	Complex	Range (%)
A	a	0.0 - 0.5
B	b	0.5 - 2.0
C	c	2.0 - 5.0
D	d	5.0 - 10.0
E	e	10.0 - 15.0
F	f	15.0 - 30.0
G	g	30.0 - 60.0
H	h	60.0 +

- Textural characteristics are described using short forms which are:

cs	=	coarse sand
ms	=	medium sand
s	=	sand
ls	=	loamy sand
fsl	=	fine sandy loam
vfsl	=	very fine sandy loam
sl	=	sandy loam
fs	=	fine sand
vfs	=	very fine sand
sil	=	silt loam
si	=	silt
sic	=	silty clay
sicl	=	silty clay loam
cl	=	clay loam
c	=	clay
g	=	gravel
gl	=	gravelly loam
gsl	=	gravelly sandy loam

SOIL CHARACTERISTICS AND OBSERVATION METHODS

Characteristic	Method
Texture -	Using hand methods outlined by Ontario Institute of Pedology (1992) into textural classes and using particle size classes outlined in C.S.S.C. (1978).
Stoniness -	For surface stones into classes following Ontario Institute of Pedology (1992) and C.S.S.C. (1978).
Slope -	In % by use of clinometer and Abney level. Subsequently into classes identified by an alphabetic code following C.S.S.C. (1978).
Colour -	Recorded for soil matrix and mottles on hue, value and chroma following Munsell Soil Colour Charts (no date).
Horizons -	Presence of different horizons following C.S.S.C. (1978).
Depth -	In centimetres for mottles, horizons, stones.

Carbonates - Depth to free carbonates observed by fizzing after application of dilute hydrochloric acid.

APPENDIX 4

SOIL POTENTIAL AND SOIL POTENTIAL INDEX

Soil potential ratings for fruits and vegetables have data limitations associated with soil rating systems and climate as described in the following paragraphs. All the databases evaluated have limitations associated with scale, data availability or alternatively, data suppression. For example, a soil rating system for specialty crops was developed by Hoffman and Cressman in 1984 for Ontario Hydro (Ecologistics and Smith, Hoffman, 1984). This is a three-class system – good, fair or poor which uses crop groupings but has not been applied on a broad scale to the Province. The Ontario Institute of Pedology and subsequently the Ontario Center for Soil Resource Evaluation has compiled specialty crop capability systems for some areas within Ontario. However, the Province has not a single specialty crop soil potential rating for all of Ontario. Given this lack of comprehensive soil potential information for specialty crops, it is not possible to reasonably differentiate which soils are most unique for specialty crop production within the Province.

However, some soil potential ratings for fruit and vegetables have been produced for Haldimand-Norfolk, Niagara, Elgin, Middlesex and Brant. Unfortunately, the fruit and vegetable crop groupings used in different soil surveys are dissimilar in number as well as in the kinds of fruits or vegetables included in each group. For example, Niagara has 20 crop groupings (9 for fruits and 11 for vegetables) whereas Haldimand-Norfolk has 15 groups that do not always separate fruit and vegetables into separate categories. More details about the soil potential ratings for specialty crops are outlined in a summary in the table following in this Appendix. In addition, both five as well as seven class soil potential rating systems have been used in published soil survey reports in Ontario.

As a second example of information limitations, climate data is limited due to scale and a lack of integration. Several single factor maps produced on a broad scale are available for crop heat units, plant hardiness zones, temperature minima and maxima as well as precipitation. More specific maps such as the map for *Site Selection for Grapes in the Niagara Peninsula* (Fisher and Slingerland, 2002) are not available for the province of Ontario. Additionally, specific studies on irrigation such as that done for Niagara Region (Stantec, 2007) are not available for southern Ontario.

ONTARIO SPECIALTY CROP SOIL CLASSIFICATIONS SUMMARY

Crop Grouping Description 1	Niagara Crop Grouping	Crop Grouping Description 2	Haldimand-Norfolk Crop Grouping	Crop Grouping Description 3	Middlesex and Elgin Crop Grouping	Crop Grouping Description 4	Brant Crop Grouping
	Seven Class System		Seven Class System		Five Class System		Seven Class System
Tree Fruits, Grapes and Small Fruits:	**Tree Fruits, Grapes and Small Fruits:**	**Tree Fruits, Grapes and Small Fruits:**	**Tree Fruits, Grapes and Small Fruits:**	**Tree Fruits, Grapes and Small Fruits:**	**Tree Fruits, Grapes and Small Fruits:**	**Tree Fruits, Grapes and Small Fruits:**	**Tree Fruits, Grapes and Small Fruits:**
Peaches, Apricots, Nectarines	A	Apricots, Sour Cherries, Sweet Cherries, Peaches	D1				

Crop Grouping Description 1	Niagara Crop Grouping	Crop Grouping Description 2	Haldimand-Norfolk Crop Grouping	Crop Grouping Description 3	Middlesex and Elgin Crop Grouping	Crop Grouping Description 4	Brant Crop Grouping
Sweet Cherries	B						
Sour Cherries	C						
Labrusca Grapes	D	Hybrid and Vinifera Grapes, Labrusca Grapes	D3				
Vinifera Grapes	E						
Apples	F	Apples	D4	Apples	2	Apples	D1
Pears, Plums	G	Pears, Plums	D2	Pears, Plums	3		
Strawberries, Raspberries	H	Peppers, Raspberries, Rhubarb, Strawberries	B3	Raspberries, Strawberries	1	Strawberries	B3
Currants, Gooseberries	I						
				Rutabagas	3		
		Peanuts	A2	Peanuts	2		
				Heart Nuts, Filbert Nuts	3		
				Walnuts	2		
Vegetable Crops:	**Vegetable Crops:**	**Vegetable Crops:**	**Vegetable Crops:**	**Vegetable Crops:**	**Vegetable Crops:**	**Vegetable Crops:**	**Vegetable Crops:**
Crop Grouping Description 1	Niagara Crop Grouping	Crop Grouping Description 2	Haldimand-Norfolk Crop Grouping	Crop Grouping Description 3	Middlesex and Elgin Crop Grouping	Crop Grouping Description 4	Brant Crop Grouping
Broccoli, Brussels Sprouts, Cauliflower	J	Cabbage, Cauliflower, Canola, Sweet Corn, Tomatoes, Turnips	C3	Brussels Sprouts, Cauliflower, Cabbage	8	Cabbage, Cauliflower	C2
Bulb Onions, Garlic	K	Onions, Beets, Carrots	B1				
Green (Bunching) Onions	L						
Eggplant, Peppers	M	Peppers, Raspberries, Rhubarb, Strawberries	B3	Peppers	6	Peppers	B2
Cucumbers	N			Cucumbers	4		
Muskmelon	O	Ginseng, Muskmelon, Watermelon	B2			Ginseng	B1
Potatoes	P	Potatoes	A3	Irish Potatoes	3	Potatoes	A1
Tomatoes	Q					Tomatoes	C2
Sweet Corn	R			Sweet corn	7	Sweet Corn	C2
Celery, Lettuce	S	Cucumber, Lettuce, Radish	C4				
Pumpkins, Squash	T	Green Beans, Peas, Pumpkins, Squash	C2				
		Asparagus	A1	Asparagus	1		
		Fava Beans, Soybeans, White Beans	C1	Soybeans	4	Beans	C1
				Sweet Potatoes	2		
				White beans	5		

SOIL POTENTIAL RATING FOR FRUITS AND VEGETABLES

Soil potential ratings are based on crop groupings and classes described for Brant County by Acton (1989) and for Niagara Region by Kingston and Presant (1989). Crop suitability class descriptors in the original Kingston and Presant's report have been placed in an ordinal scale for soil potential as outlined in the following:

- Good (G) – 1
- Fair to Good (F-G) – 2
- Fair (F) – 3
- Poor to Fair (P-F) – 4
- Poor (P) – 5
- Very Poor (VP) – 6
- Unsuitable (U) - 7

A matrix is created having rows which are the different soils found within a given area in the columns are for the crop groupings. The highest or best rating is class 1 and those soils that are unsuitable rated lowest as class 7. Climate has been assumed to limit the production of peaches, nectarines, apricots, cherries and vinifera grapes within some Counties/Regions and the soil potential rating has been modified to class 7 (unsuitable) based on that climate limitation. An average specialty crop soil potential rating was calculated by adding the classes for the separate crops or crop groupings and dividing it by the total number of those crop groups (8 crop groupings following Acton and 20 crop groupings following Kingston and Presant).

The application of this average soil potential rating is limited to comparisons at a provincial and regional/county scale at its broadest extent but depending on variations in climate may only be suitable as a relative rating at the municipal or township level.
It should also be noted that the soil potential rating is an average and that there may be individual crops that will grow very well on a particular soil. In other words, a soil with an average specialty crop potential class 4 rating may actually contain one or two crop groupings with soil potential ratings at a higher level - that is, soil potential subclass 2, for example.

Soil Potential Index

The average soil potential index is an arithmetic mean that expresses the relative occurrence of soil potential ratings 1 to 7 on selected properties or within specified boundaries. Areas with the highest soil potential index will have mainly rating 1 land. Areas with a low index will consist of lower soil potential (5-7) for specialty crops. The potential index method has been used because it provides a single number derived from a listing, by proportion, of the soil potential ratings 1 through 7 in a given area which allows for direct comparison among different areas or sites.

Method

Soil Potential Index = *(proportion of area of rating 1 soils x 1) + (proportion of area of rating 2 soils x 2) + (proportion of area of rating 3 soils x 3) + (proportion of area of rating 4 soils x 4) + (proportion of area of reading 5 soils x 5) + (proportion of area of rating 6 soils x 6) + (proportion of area of class 7 soils x 7)*

The area of each soil map unit was measured using GIS and areas of similar soil potential were summed for potential ratings 1 to 7 lands. The soil productivity index and the soil potential index both tend to correlate with soil capability class.

APPENDIX 5

MULTI-ATTRIBUTE ANALYSES

The following paragraphs briefly describe the methods used to evaluate agricultural performance within different Regions or Counties in central to southwestern Ontario. Most of the variables used in the analyses are outlined in the Agricultural Census for Ontario. Additional variables for soil productivity and crop yields are available through OMAF(RA) for the years used in the analyses. The early census years had relatively few variables (in the order of 30) while later census years used many variables (in the range of hundreds). Some environmental variables used in the later analyses first appeared in 1996.

The study design started with a given maximum database available for southwestern Ontario. This maximum was modified in three ways as follows:

- Number and type of variables included;
- Year/time of data collection; and
- Variable type; that is, single component variable versus multiple component variable. The multiple component variable was derived by a calculation to produce a single number combining two or more other variables or time periods.

There is the potential for an infinite number of ways to modify the data using the three ways described. Therefore, individual databases were designed to include some relatively different measures of agricultural performance/achievement. For example, environmental, economic, and production viewpoints were separated for some databases. In other instances, a modified characterization within a single category such as production was completed. For example, production was characterized as using total production values (volumetric or gravimetric) for some data sets and as production per unit area (yield) in other data sets. Multiple characterisations were used to represent different perspectives as well as different values associated with the agricultural indicators/metrics. Therefore, for example, total production values were included because they give a relative indication of a County's contribution to the total food production that occurred within a given year within southern to central Ontario. However, this production indicator tends to be correlated with the area of the County. Therefore, yield data was included and/or emphasized to minimize any effect associated with a County's size on that County's achievement rating. As well, each of the data sets was modified using different weighting schemes to represent disparate views about which indicators are better predictors of agricultural performance.

Different variables were grouped into databases to emphasize different parts of each year's agricultural indicators. In general terms, one database was prepared with a cross section of production, economic, and socio-cultural components. The production component concentrated on field crops. A second database was prepared specifically for fruits and vegetables. These two databases were combined to form a relatively long list of agricultural indicators. This large database was subsequently reduced in size for a limited number of analyses so that the importance of a particular set of agricultural indicators (such as yield, for example) was emphasized. Not all census years between 1925 and 2006 were analysed for all the different data sets. This was not possible because some years, particularly the 1930-1950 ones, did not have sufficient data to

allow for the creation of different agricultural variable subsets, for example. Regardless, all census years (at 10-year intervals between 1931 and 1991) had a minimum of twelve different score outcomes - 6 different data sets multiplied by 2 different analysis methods (SAW and CCD).

The combination of different variables to produce a single value has traditionally presented problems and colloquially is known as the "combining apples and oranges" problem. The problem of combination has been reduced by choosing methods that compare indicators using a standardized quantitative scale. As described previously, each data set could be analysed using four different methods as follows:

(1) Simple additive weighting (SAW);
(2) Concordance (CCD);
(3) Friedman (FRIED); and
(4) Cluster Analysis (Ward's Method) (CLUSTER).

For the simple additive weighting and concordance methods, the data were standardized based on the maximum and minimum indicator values for each variable. Standardization used the following formula:

Standardized Score = 100 x (Raw Data Value) - (Minimum Raw Data Value) (Maximum Raw Data Value) - (Minimum Raw Data Value)
Therefore, all scores range between the values 0 and 100.

In the case of the Friedman and the CLUSTER analyses, data were standardized using Z-scores (the number of standard deviations a raw data variable is different from the mean for that variable). The results of the CLUSTER analysis did not yield scores that could be used in the overall evaluation; instead, the classification was used to see if it supported the scores assigned using the other methods. In addition, the final scores using the Friedman non-parametric test were standardized using the aforementioned equation so that scores for different Counties/Regions ranged from 0-100 as they did using the SAW and CCD methods.

The multi-attribute analyses completed in this report used only simple additive weighted and concordance methods.

The agricultural databases were also set up to allow for the calculation of the inverse of any variable. The need to allow for the calculation of an inverse value was based on the fact that it is difficult to state categorically that an agricultural variable is clearly positive or negative. As an example, the increasing use of chemical fertilizers can be viewed as negative because more fertilizer use increases the probability of water pollution if fertilizer applications are excessive. Alternatively, increases in amounts of fertilizer used can be interpreted as a positive indication of increased economic activity. Because multi-attribute analysis combines variables by multiplication and/or by addition, for example, variables needed to be set up so that they all have the same general meaning as follows:

- high variable numerical value equals high agricultural value which is interpreted as having a good or positive characteristic.

For fertilizer use, the data would be used as presented with a high value indicating at positive contribution to economic activity. In the second analysis that data would be inverted to reflect a positive characteristic that little fertilizer use is better for the environment.