



**HIGH LEVEL AGRICULTURAL ASSESSMENT FOR
AGRICULTURAL CAPABILITY, LIVESTOCK OPERATIONS
AND IDENTIFICATION OF AGRI-FOOD NETWORK
OPERATORS
DURHAM REGION**

Prepared for Dorsay Development Corporation

Prepared by DBH Soil Services Inc.

October 2019



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AGRI-FOOD NETWORK OPERATORS**

Prepared for:

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October 2019



High Level Agricultural Assessment for Agricultural Capability, Livestock Operations and Identification of Agri-Food Network Operators

Executive Summary

A high level assessment of agriculture was completed for the Subject Lands (Veraine) and 6 additional Study Areas located within the Whitebelt (agricultural areas) in Durham Region. The high level assessment comprised a review of secondary data that was supplied by Land Information Ontario (LIO) and included data from the Ministry of Natural Resources (MNR) and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). Additional secondary data included the use of online digital imagery from a variety of sources including the OMAFRA Agricultural Systems Portal, the OMAFRA Agricultural Information Atlas, Google Earth, Birdseye and Bing.

The high level assessment compared the 7 Areas (Subject Lands and 6 additional Study Areas) for soil capability through the Canada Land Inventory (CLI), artificial tile drainage, agricultural facilities (barns), agricultural lands use, and OMAFRA agricultural assets mapping.

A review and assessment of the Canada Land Inventory (CLI) mapping and datasets provided a single equivalent CLI rating to the Subject Lands and each of the 6 additional Study Areas. It was determined that the Study Area and each of the 6 additional Study Areas were rated similarly for Canada Land Inventory, all with an equivalent CLI rating of Class I.

The review and assessment of the artificial tile drainage indicated that there was no tile drainage identified in Area 5, while Area 7 has the greatest portion of systematic tile drainage at 21.6 percent. The Subject Lands comprise 7.6 percent of systematic tile drainage, while Area 2 has 2.1 percent, Area 3 has 13.6 percent, Area 4 has no systematic tile drainage, and Area 7 has 18.0 percent systematic tile drainage.

A review and assessment of agricultural facilities for the Subject Lands, each of the 6 additional Study Areas and their respective 1500 metre buffer illustrated that there are agricultural barns located in each Area and each buffer area. A comparison was made of the occurrence of barns by hectare to derive a 'density' of barns in each Area. This assessment indicated that Area 3 had the highest density with 0.11. All other Areas had similar densities ranging from 0.01 to 0.03 barns per hectare.

A review and comparison of agricultural land use was completed for the Subject Lands and the 6 additional Study Areas. The review illustrated similar land use patterns comprising cropping of common field crops (corn, soybean, wheat and pasture lands) for each Area. Smaller areas of orchard crop were noted in Areas 1 and 7. A large area of nursery crop was noted in Area 2, while a large area of extensive field vegetables was noted in Area 4. None of the Areas includes Provincially designated Specialty Crop lands.

On review of the available secondary source data, it is evident that each of the Areas comprises agricultural lands, with the amount of agricultural lands varying with each Area. Similar statements can be made on review of the tile drainage, land use, number of barns within each Area, number of barns within each 1.5 km buffer, and agrifood network operations (assets).

There is no definitive Area that would be more appropriate to pursue for development than any other based solely on the agricultural merit. Each Area has similar characteristics, qualities and apparent capabilities for agriculture based on soils and infrastructure.



Introduction

DBH Soil Services Inc. was retained to complete a high level review/assessment study for lands (identified as the Veraine Lands). These lands refer to two large blocks of land, located immediately west of the Pickering/Whitby boundary. One block of lands is located immediately north of Highway 407, while the second, smaller block of lands is located immediately south of Highway 407.

For the purposes of this study, these lands are henceforth referred to as the Subject Lands. Figure 1 illustrates the approximate location of the Subject Lands.

This report addresses the need for a three part study for the Subject Lands and additional Study Areas; and that the study would include:

1. A high level comparison of agricultural capability of the Subject Lands compared to others in the Durham Region Whitebelt;
2. A high level identification of livestock operations in and adjacent to the Subject Lands, as well as the potential MDS constraints without doing a full MDS analysis; and
3. Identification of any agri-food network operations within and adjacent to the Subject Lands.

In an effort to provide substance for comparative purposes, it was necessary to have additional areas identified to allow for comparison to the Subject Lands. An additional 6 areas were identified for the comparative purposes. These 6 additional areas are referred to as the Study Areas.

This assessment provides a comparison of the original Subject Lands with the additional 6 areas, for a total of 7 areas (Areas).

Study Areas 1, 2 and 3 are located adjacent to the Highway 407 and west of the hamlet of Brooklin. Study Areas 4 and 5 are located north east of the hamlet of Brooklin. Study Area 6 is located east of the hamlet of Brooklin and north of the City of Oshawa. Study Area 7 is located farther east of the areas 1 – 6, and is illustrated between the urban areas of Bowmanville and Newcastle. The southern boundary of Study Area 7 is the Highway 401 and Highway 35/115.

Figure 1 illustrates the approximate locations of the Subject Lands and additional 6 Study Areas. Table 1 illustrates the approximate size (in Hectares (ha)) for each of the Areas (Subject Lands and additional 6 Study Areas).

Table 1 Areas and Approximate Size

Area Number	Hectares
1	1458.0
2	664.3
3	120.5
4	247.9
5	188.2
6	237.0
7	1933.0

A review of the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Agricultural Systems Portal (online data) indicates that the Subject Lands and the additional 6 Areas include portions of the Greenbelt Plan area, portions of the Prime Agricultural Area (as defined by the Agricultural Land Base in the Greater Golden



Horseshoe), and are all located within the Growth Plan for the Greater Golden Horseshoe area. A review of Google Earth also indicates that the Subject Lands include the hamlet of Kinsale. The Subject Lands are also divided by the Highway 407, with roughly 78.7 percent of the Subject Lands (1151 ha) located north of Highway 407 and the remaining 21.3 percent located south of Highway 407.

Policy

Clearly defined and organized environmental practices are necessary for the conservation of land and resources. The long term protection of quality agricultural lands is a priority of the Province of Ontario and has been addressed in the *Provincial Policy Statement (2014)*. Further, in an effort to protect agricultural lands, the Province of Ontario has adopted policy and guidelines to provide a framework for managing growth. These four provincial land use plans: *Greenbelt Plan (2017)*; *the Oak Ridges Moraine Conservation Plan (2017)*; *the Niagara Escarpment Plan (2017)*; and *the Growth Plan for the Greater Golden Horseshoe (GGH) (2019)* support the long term protection of farmland. The four provincial land use plans have policy plans that require Agricultural Impact Assessments (AIA) in the GGH. Additionally, the Ontario Ministry of Agriculture, Food and Rural Affairs has recently produced a document that identifies the requirements of Agricultural Impact Assessments. This document is titled “**Draft Agricultural Impact Assessment (AIA) Guidance Document (March 2018)**.”

With further respect to the Provincial policy, the Ontario Ministry of Agriculture, Food and Rural Affairs has a Minimum Distance Separation guideline (*The Minimum Distance Separation (MDS) Document: Formulae and Guidelines for Livestock Facility and Anaerobic Digester Odour Setbacks, Publication 853, (2016)*) that must be addressed as well. A ‘high level’ review of MDS was completed for this project. The high level review provides an indication of the number of barns (agricultural facilities capable of housing livestock) in each of the 7 areas.

The Growth Plan for the Greater Golden Horseshoe (GPGGH, 2019)

A review of the boundaries of the Growth Plan for the Greater Golden Horseshoe area was completed. It was determined that the Subject Lands and the additional 6 Study Areas are located within the Growth Plan for the Greater Golden Horseshoe Area.

The respective policies for the Agricultural System are as follows:

4.2.6 Agricultural System

1. An Agricultural System for the GGH has been identified by the Province.
2. Prime agricultural areas, including specialty crop areas, will be designated in accordance with mapping identified by the Province and these areas will be protected for long-term use for agriculture.
3. Where agricultural uses and non-agricultural uses interface outside of settlement areas, land use compatibility will be achieved by avoiding or where avoidance is not possible, minimizing and mitigating adverse impacts on the Agricultural System. Where mitigation is required, measures should be incorporated as part of the non-agricultural uses, as appropriate, within the area being developed. Where appropriate, this should be based on an agricultural impact assessment.
4. The geographic continuity of the agricultural land base and the functional and economic connections to the agri-food network will be maintained and enhanced.
5. The retention of existing lots of record for agricultural uses is encouraged, and the use of these lots for non-agricultural uses is discouraged.

6. Integrated planning for growth management, including goods movement and transportation planning, will consider opportunities to support and enhance the Agricultural System.
7. Municipalities are encouraged to implement regional agri-food strategies and other approaches to sustain and enhance the Agricultural System and the long-term economic prosperity and viability of the agri-food sector, including the maintenance and improvement of the agri-food network by:
 - a) providing opportunities to support access to healthy, local, and affordable food, urban and near-urban agriculture, food system planning and promoting the sustainability of agricultural, agri-food, and agri-product businesses while protecting agricultural resources and minimizing land use conflicts;
 - b) protecting, enhancing, or supporting opportunities for infrastructure, services, and assets. Where negative impacts on the agri-food network are unavoidable, they will be assessed, minimized, and mitigated to the extent feasible; and
 - c) establishing or consulting with agricultural advisory committees or liaison officers.
8. Outside of the Greenbelt Area, provincial mapping of the agricultural land base does not apply until it has been implemented in the applicable upper- or single-tier official plan. Until that time, prime agricultural areas identified in upper- and single-tier official plans that were approved and in effect as of July 1, 2017 will be considered the agricultural land base for the purposes of this Plan.
9. Upper- and single-tier municipalities may refine provincial mapping of the agricultural land base at the time of initial implementation in their official plans, based on implementation procedures issued by the Province. For upper-tier municipalities, the initial implementation of provincial mapping may be done separately for each lower-tier municipality. After provincial mapping of the agricultural land base has been implemented in official plans, further refinements may only occur through a municipal comprehensive review.

Draft Agricultural Impact Assessment Guidance Document (OMAFRA, 2018)

The OMAFRA Draft Agricultural Impact Assessment Guidance Document provides comment on the Background for the Technical AIA Guidelines in Section 1.5 – Components of an AIA where it is indicated that there are ten components:

1. An Introduction
2. Process - consultation
3. Study Area Identification
4. Study Methodology
5. Description of soils, land use etc.
6. Assessment of Impacts
7. Mitigation Measures
8. Net Impacts
9. Study Recommendations and Conclusion and
10. Appendices

AIA's may vary in detail depending on the *nature, scale and extent of the development*.

Methodology

With respect for the need of a high level assessment, and the time constraints for delivery of a report, it was determined that the best option for assessment would be to examine secondary source or data that is available



from the Provincial and Municipal Governments, along with a review of online imagery (Google Earth, Birdseye Imagery, Bing Mapping, the Agricultural Systems Portal (OMAFRA) and the Agricultural Information Atlas (OMAFRA) to assist in the determination of the location of agricultural facilities (barns and accessory agricultural buildings). No onsite or roadside reconnaissance surveys were completed as part of this assessment.

Digital data in the form of shapefiles were downloaded from the Land Information Ontario online warehouse to allow an assessment of soils/Canada Land Inventory, agricultural tile drainage (locations and system type), agricultural resources (land use), road networks, streams, utility lines, lots/concessions, water bodies and Agricultural Assets (OMAFRA data for the location of cold storage, wineries, abattoirs, frozen food manufacturers and distilleries). Personal communication with staff from OMAFRA indicated that each of these data sets was the most recent, updated data.

Soils/Canada Land Inventory (CLI)

The Soils/Canada Land Inventory (CLI) data was provided for the southern portions of Ontario. A clipping procedure in ArcGIS software for the Areas into the soils data resulted in a data file that contained the provincial soils data for the 7 Areas. A review of this data indicated that each soil polygon contained a primary and a secondary soil series (a complex soil polygon). A primary soil series will comprise 50 percent or greater amount of the soil polygon, while a secondary soil series will comprise 50 percent or less amount of the overall soil polygon. Figures 2 – 4 illustrate the Provincial CLI data that is assigned to each soil polygon within each Study Area. The percent occurrence of each CLI class (and subclass) is provided as a text label associated with each polygon within each Area.

The complex soil polygons reference two soil series, which may be associated with two separate and different slope classes. This allows for a complex soil polygon that contains two different CLI class with different subclasses.

For the purposes of allowing for a direct comparison of soil capability between each of the Areas, an additional step must be completed to transform the complex soil polygons into an equivalent single CLI rating. This process was completed through the use of the Hoffman Productivity Index (Soil Productivity Index). The Hoffman Productivity Index was published in ARDA Report No. 4, “The Assessment of Soil Productivity for Agriculture”, and is used to equate the relative productivity of land to the Canada Land Inventory (CLI) soil capability. Appendix A documents the process.

Table 2 illustrates the approximate Canada Land Inventory area in ha associated with each Study Area.



Table 2 Canada Land Inventory (CLI) for each Area.

Areas	Canada Land Inventory (CLI)							Organic	Totals
	CLI1	CLI2	CLI3	CLI4	CLI5	CLI6	CLI7		
1	1349.4	0.0	0.0	0.0	97.8	0.0	0.0	11.2	1458.4
2	596.6	0.2	0.0	0.0	67.6	0.0	0.0	0.0	664.4
3	120.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	120.5
4	243.4	0.0	0.0	0.0	4.6	0.0	0.0	0.0	248.0
5	167.3	0.0	0.0	0.0	20.9	0.0	0.0	0.0	188.2
6	207.1	0.0	29.9	0.0	0.0	0.0	0.0	0.0	237.0
7	1716.4	55.9	53.4	0.0	107.3	0.0	0.0	0.0	1933.0
totals	3551.3	56.1	83.3	0.0	298.2	0.0	0.0	11.2	4849.5

On completion of the Hoffman Productivity Index process, a single CLI equivalent rating was assigned to each Area. Table 3 illustrates the respective Soil Productivity Index and CLI Equivalent Rating that was assigned to each Area.

Table 3 Area CLI Equivalent Values

Areas	Soil Productivity Index	CLI Equivalent Rating
1	94.7	I
2	93.2	I
3	100.0	I
4	98.8	I
5	92.6	I
6	95.4	I
7	94.7	I

As illustrated in these values, where the Soil Productivity Index Value is related back to an equivalent CLI rating, each Area has an identical CLI Equivalent Rating, thereby illustrating that each of the Areas has a high soil capability rating. This indicates that the soil capability is similar across the Areas, with no one Area to be considered as significantly neither better nor worse than any other Area.

Agricultural Tile Drainage

In an effort to determine the ‘investment’ related to agriculture in an area, there are certain factors that illustrate the investment or capital put back into the agricultural lands. An investment indicates a plan to continue to farm in an area. Investments in agriculture include (but are not limited to): tile drainage; barns; silos; grain dryers; grain storage; and fencing. For this study, tile drainage, land use, and the number of barns in each Area were reviewed.

Agricultural Tile Drainage refers to the investment in agriculture, due to the costs associated with the installation and maintenance of a tile drainage system. Random tile drainage systems refer to the ‘random’ placement of a tile or series of tiles in an effort to drain smaller, low areas within a field. A systematic tile drainage system



refers to the installation of a larger, more complex system of tiles across an entire field, often seen as a herringbone pattern on aerial photography. A systematic tile drainage system would have a higher cost associated with it when compared to a random system.

It should also be noted that not all soils require tile drainage. Soils that are well drained would not require tile drainage and would not benefit from the investment. Tile drainage is an investment in draining soils that are poorly draining or have standing/ponded water at certain times of the year. In these instances, tile drainage allows for water to drain from the soil profile to allow for earlier time on the field for cropping.

A review of the OMAFRA tile drainage shapefile data clipped to the areas illustrated the documented extent of tile drainage in each Study Area. The data has been presented to illustrate the type of drainage system, the area (ha) and the percent occurrence within each Area.

Table 4 illustrates the tile drainage data for each Area.

Table 4 Tile Drainage Systems for each Area

Agricultural Tile Drainage Systems (OMAFRA)			
Area	System Type	Area (ha)	Percent of Area
1	Random	4.7	0.3
	Systematic	110.1	7.6
2	Random	52.9	8.0
	Systematic	14.0	2.1
3	Random	0.0	0.0
	Systematic	16.4	13.6
4	Random	8.6	3.5
	Systematic	0.0	0.0
5	Random	0.0	0.0
	Systematic	0.0	0.0
6	Random	0.0	0.0
	Systematic	51.3	21.6
7	Random	203.3	10.5
	Systematic	348.6	18.0
	Totals	810.1	



Agricultural Facilities – Barns

A review of a variety of online imagery was used to determine the location of each barn within the respective Areas. It was noted earlier in this report that a high level overview of Minimum Distance Separation (MDS I) was required. A review of the OMAFRA document “The Minimum Distance Separation (MDS) Document – Formulae and Guidelines for Livestock Facility and Anaerobic Digester Odour Setbacks (Publication 853, 2016) was completed to determine the extent of a zone around the Study Areas that is to be monitored. A review of Guideline #6 indicates that:

“A separate MDS I setback shall be required to be measured from all *existing livestock facilities* and *anaerobic digesters* on *lots* in the surrounding area that are reasonably expected by an approval authority to be impacted by the proposed application.

As part of municipal consideration of planning or building permit applications, all *existing livestock facilities* or *anaerobic digesters* within a 750 m distance of a proposed Type A land use and within a 1,500 m distance of a proposed Type B land use shall be investigated and MDS I setback calculations undertaken where warranted.”

Further, a review of Guideline #34 – Type B Land Uses (more sensitive) states:

“For the purposes of MDS I, proposed Type B land uses are characterized by a higher density of human occupancy, habitation or activity including, but not limited to:

- new or expanded *settlement area* boundaries; an official plan amendment to permit *development*, excluding industrial uses, on land outside a *settlement area*;
- a zoning by-law amendment to permit *development*, excluding industrial uses or *dwelling*s, on land outside a *settlement area*; and
- the creation of one or more *lots* for *development* on land outside a *settlement area*, that results in four or more *lots* for *development*, which are in immediate proximity to one another (e.g., sharing a common contiguous boundary, across the road from one another, etc.), regardless of whether any of the *lots* are vacant. Because of the increased sensitivity of these uses, a new or expanding Type B land use will generate an MDS I setback that is twice the distance as the MDS I setback for a Type A land use. This is reflected in the value of Factor E which is 2.2 for Type B versus 1.1 for Type A.”

These guidelines indicate that if any proposed development will result in a higher density of human occupancy, then all barns out to 1.5 km beyond the respective Areas must be documented for potential livestock capacity, manure systems and have MDS I calculations completed. This must be completed in addition to an MDS review of all barns capable of housing livestock within each respective area.

Table 4 illustrates the respective Study Area, Study Area buffer (1.5 km) and the number of barns associated with each (Area and Area buffer). With respect to MDS I, each barn within the Study Area and the respective buffer area must be identified, documented and have an MDS I calculation completed. In order to complete the MDS I calculations, interviews should be conducted with each land owner, where there is a barn capable of housing livestock, to determine the relative size, livestock type, capacity, manure storage system and location of each barn on their respective property(s).

It should be noted that the location of the barns identified in this report is based on a visual assessment of online imagery, and may not reflect the actual barn locations due to potential changes over time since the imagery was taken. Potential changes may include the construction of new barns, or the demolition of an existing barn. An infield assessment will need to be completed to provide a more accurate assessment of barn location.

Figures 8 – 10 illustrate the approximate location of barns identified through an online review of imagery.

Table 5 illustrates the numbers of barns located within each respective Study Area and associated 1.5 km buffer.



Table 5 also illustrates a percent occurrence of the density of barns per hectare located within an Area (number of barns divided by the area in ha associated with each Area).

Table 5 Areas and Barn Sum Totals

Area	Number of Barns in each Area	Number of Barns in each 1.5 km buffer	Number of Barns per Hectare
1	38	90	0.03
2	20	87	0.03
3	13	52	0.11
4	6	37	0.02
5	2	41	0.01
6	4	36	0.02
7	63	87	0.03
total	146		

It is evident from the figures and Table 5 that each Area and Area Buffer has some degree of barns. It is also apparent that the larger (by area) Areas have more barns within their boundaries than do the smaller (by area) Areas.

On a comparison of the density of barns (number of barns per hectare) within each Study Area, Study Area 3 comprises the largest density of barns per hectare with 0.11. The other Study Areas are relatively similar when comparing barn density, ranging from 0.01 to 0.03.

Agricultural Land Use

A review of the OMAFRA Agricultural Resources (land use) data was completed for each Study Area. ArcGIS was used to clip the OMAFRA land use data to the Areas. On completion of the clip operation, area calculations were completed for each land use area within each Area. Figures 11 – 13 illustrate the respective agricultural resource (land use) for each Study Area.

It should be noted that none of the Study Areas are Provincially designated lands for the production of Specialty Crops. Special crops such as tree fruit, vegetables, market garden and nursery production can occur anywhere a land owner, farmer or operator chooses to do so, and may be grown in areas that are not Provincially designated. Special crops grown outside a Provincially designated Special Crop area would not have the same protection status that would be shown to lands within Provincially designated Special Crop areas.

Agricultural land use is another factor in identifying potential investment in agriculture. Certain types of land use will require greater investment than others. As an example, vineyards require investment in systems for crop support, irrigation and frost control (wind machines); fruit tree farms require investment in fencing (to mitigate trespass), frost control, and irrigation. Other land uses such as row cropping, continuous corn, and hay, would require investment in more portable field equipment.

A review of the OMAFRA Agricultural Resources (land use) data illustrated that each Study Area had similar land uses. The majority of the Study Areas appear to comprise lands used for the production of common field crop (corn, soybean, wheat and pasture lands). Smaller areas of orchard crop were noted in Subject Lands and Study Area 7. A large area of nursery crop was noted in Study Area 2, while a large area of extensive field vegetables was noted in Study Area 4.



Table 6 illustrates the respective land uses and areas (ha) on an Area basis.

Table 6 Areas Land Use

Agricultural Resource Data (1983) (Percent Occurrence) Within Each Area																	
Area	IDLE AGRICULTURAL LAND (5-10 YEARS)	IDLE AGRICULTURAL LAND (OVER 10 YEARS)	CORN SYSTEM	GRAZING SYSTEM	HAY SYSTEM	PASTURE SYSTEM	MIXED SYSTEM	GRAIN SYSTEM	ORCHARD	CONTINUOUS ROW CROP	WOODLAND	BUILT UP	RECREATION	NURSERY	EXTENSIVE FIELD VEGETABLES	Unknown	SOD FARM
1	2.0	0.5	34.4	1.7	12.1	8.8	5.1	8.8	1.1	22.7	1.6	1.2	0.0	0.0	0.0	0.0	0.0
2	0.6	1.0	35.8	0.0	6.0	2.3	24.8	8.3	0.2	9.3	3.9	0.0	0.0	7.8	0.0	0.0	0.0
3	0.0	0.3	61.4	0.0	1.6	0.0	31.4	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	33.8	0.0	7.5	5.5	30.0	15.3	0.0	0.0	0.0	0.0	0.5	0.0	7.4	0.0	0.0
5	0.0	0.0	15.0	0.2	6.6	45.8	0.0	0.0	0.0	31.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	7.0	0.0	8.5	0.0	37.6	15.1	0.0	30.8	0.0	0.0	0.9	0.0	0.0	0.0	0.0
7	2.0	0.5	34.4	1.7	12.1	8.8	5.1	8.8	1.1	22.7	1.6	1.2	0.0	0.0	0.0	0.0	0.0

Agricultural Assets – OMAFRA

The Growth Plan for the Greater Golden Horseshoe (2019) and the Greenbelt Plan (2017) both support the protection of farmland in the Greater Golden Horseshoe area by providing direction on the identification and protection of the provincially mapped agricultural system. The agricultural system includes a continuous agricultural land base and an agrifood network that work together. An agrifood network includes infrastructure, services and assets.

Communication with staff at OMAFRA regarding the data that is available on the Agricultural Systems Portal online mapping (including infrastructure, services and assets) indicated that certain data is available as a network login through online ArcMAP services. Direction was given from OMAFRA staff to login to the service and search for “Ontario Agricultural Systems”. An online search was conducted with data related to Provincially Licensed Meat Plants (chicken, fowl, ducks, geese, fancy poultry, rabbits, turkey, alpaca, beef, buffalo, deer, elk, emus, ostrich, rhea, goats, lamb, sheep, pigs, veal, light calves) frozen food manufacturers, distilleries and refrigerated warehousing/storage provided.

Figure 14 provides mapping that includes the aforementioned data set. As illustrated on Figure 14, there are no Agricultural Assets located within or adjacent to any of the Study Areas or on the Subject Lands.



Conclusions

DBH Soil Services Inc. completed a review of secondary source data to address the need for a three part study for the Subject Lands and additional Study Areas; and that the study would include:

4. A high level comparison of agricultural capability of the Subject Lands compared to others in the Durham Region Whitebelt;
5. A high level identification of livestock operations in and adjacent to the Subject Lands, as well as the potential MDS constraints without doing a full MDS analysis; and
6. Identification of any agri-food network operations within and adjacent to the Subject Lands.

On review of the available secondary source data, it is evident that the Subject Lands and each of the Study Areas comprises agricultural lands, with the amount of agricultural lands varying with each Area.

The soils and Canada Land Inventory (CLI) comparison between the Subject Lands and the 6 additional Study Areas revealed that the soils and soil capability within all the areas are generally good soils with high soil capability.

A review of the OMAFRA Artificial Tile Drainage mapping identified a mix of systematic and random tile drainage systems within the northern portion of the Subject Lands and no tile drainage systems in the southern portion. Five of the six additional Study Areas contained some tile drainage systems, with the exception of Study Area 5, which had no tile drainage systems identified.

A review of the many online imagery sources for this area identified numerous barns (agricultural facilities) were located within the Subject Lands and the 6 additional Study Areas. Further, that numerous barns were located within the 1500 m buffer zones around the Subject Lands and the 6 additional Study Areas.

A review of the OMAFRA 1983 land use data indicated that the Subject Lands and the 6 additional Study Areas are generally used for the production of common field crops (corn, soybean, wheat, pasture/forage). Smaller areas of market garden crops, orchards and nursery crop were identified in the OMAFRA data for the Subject Lands and Areas 2, 4 and 7. Neither the Subject Lands nor any of the 6 additional Study Areas are located within a Provincially designated specialty crop area.

A review of the OMAFRA Agri-Food Network Operators data sets that were identified by OMAFRA for inclusion in GIS did not reveal any local Agri-Food infrastructure on the Subject Lands or within any of the 6 additional Study Areas.

Therefore, on review of the second data, with no additional reconnaissance roadside evaluations, it is determined that there is no definitive Area (including the Subject Lands and the 6 additional Study Areas that would be more appropriate to pursue for development than any other based solely on the agricultural merit. Each Area has similar qualities and apparent capabilities for agriculture based on soils and infrastructure.

The potential for development of a particular Area will also need to take into account other planning comparisons such as: traffic studies; locational studies, environmental studies (birds, vegetation, water courses, landfills, etc). These additional studies may provide a determination of one Area being better suited than another.



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The forgoing represents a high level agricultural resource and capability study as based on secondary data sources for an area defined as the Subject Lands and 6 additional Study Areas.

Sincerely

DBH Soil Services Inc.

A handwritten signature in black ink, appearing to read "D Hodgson", is placed over a light gray rectangular background.

Dave Hodgson, P. Ag
President



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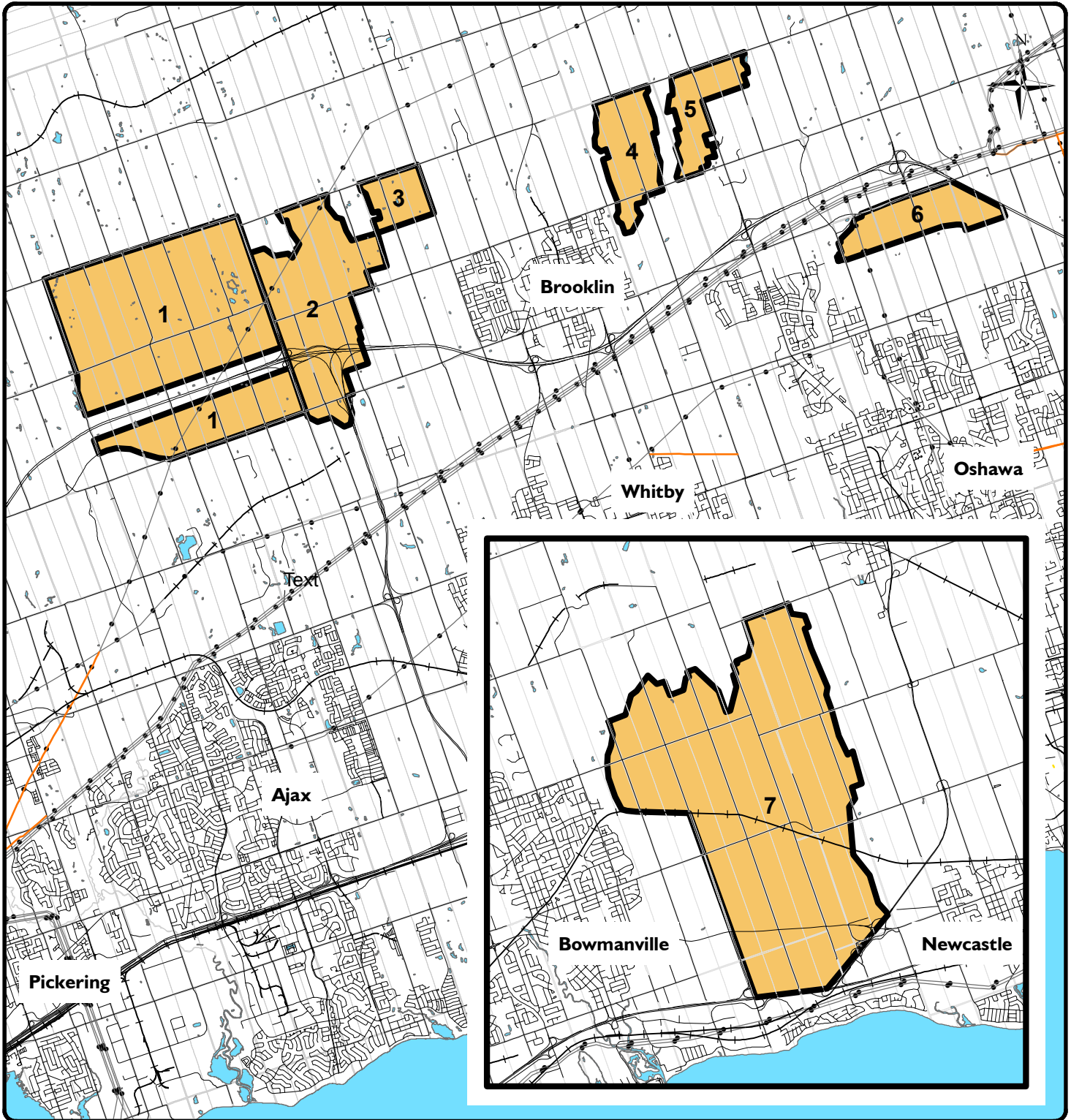
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The Minimum Distance Separation (MDS) Document: Formulae and Guidelines for Livestock Facility and Anaerobic Digester Odour Setbacks, Publication 853. 2016.



Legend

- +— Railway
- Roads
- Utilities**
 - Hydro Line
 - Natural Gas Pipeline
 - Unknown Pipeline
 - Unknown Transmission Line
 - Water Pipeline
- Lots
- Waterbodies
- Study Areas

Figure 1
Location

DBH Soil Services Inc.
October 2019

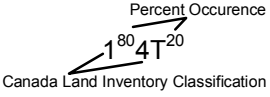


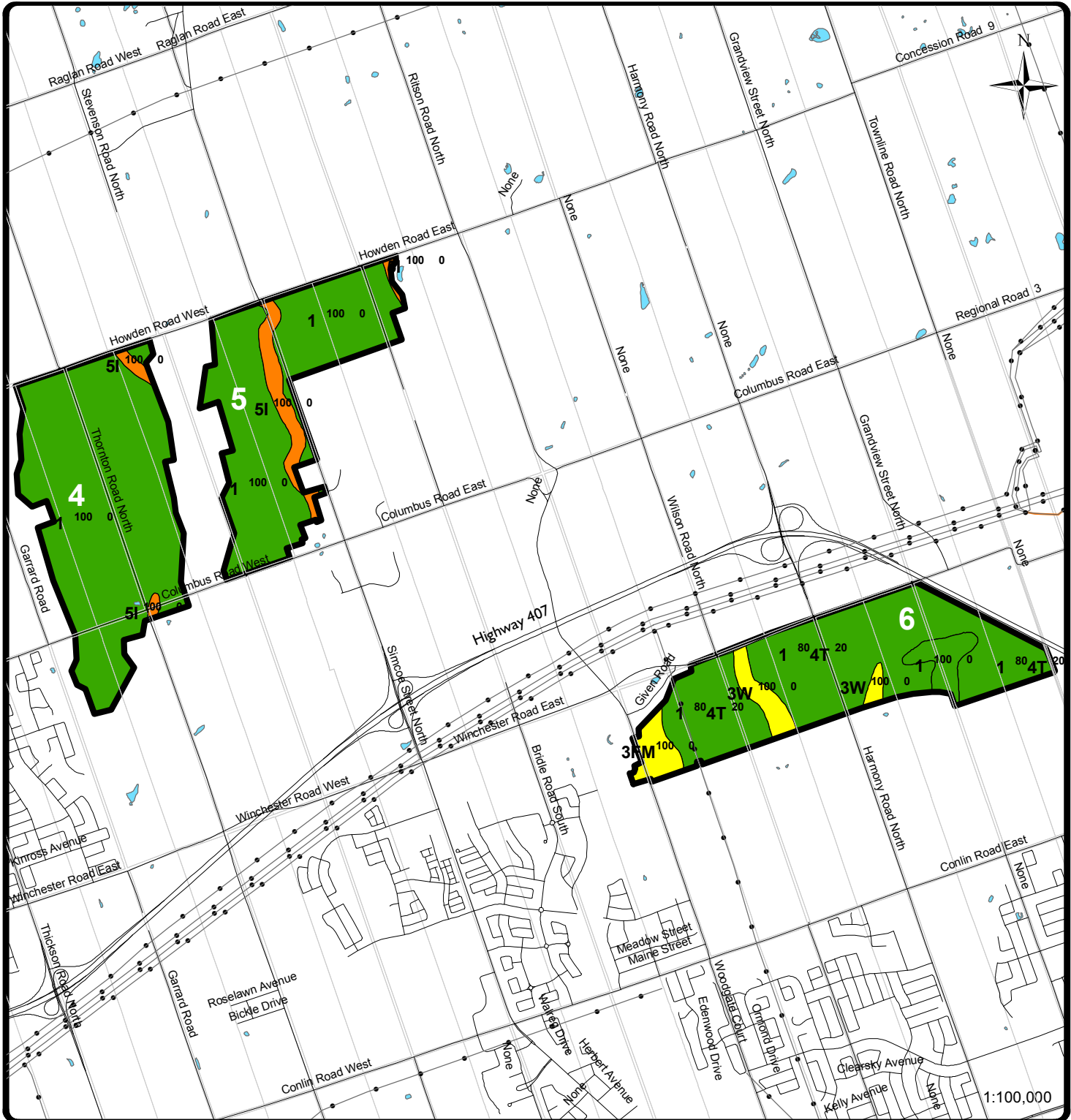
Figure 2
Canada Land Inventory (CLI)
Study Areas 1 - 3

DBH Soil Services Inc.
October 2019

Legend

- +— Railway
- Roads
- Utilities**
- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Lots
- Waterbodies
- ▭ Study Areas
- Canada Land Inventory (CLI)**
- Class 1
- Class 2
- Class 3
- Class 5
- Organic Soils





Legend

- +— Railway
- Roads
- Utilities**
- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Lots
- Waterbodies
- Study Areas
- Canada Land Inventory (CLI)**
- Class 1
- Class 2
- Class 3
- Class 5
- Organic Soils

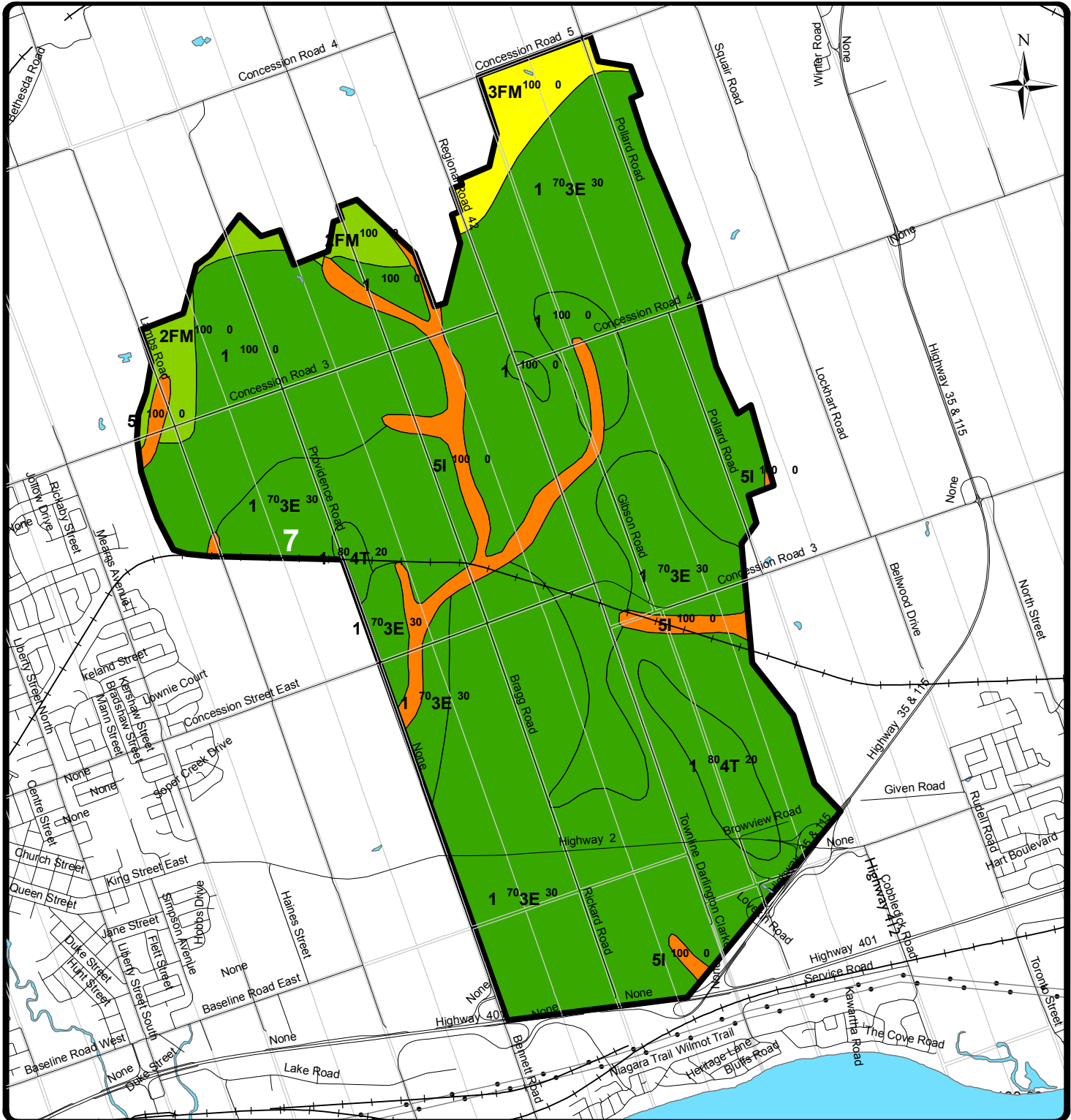
Percent Occurrence

Canada Land Inventory Classification

1 80 4T 20

Figure 3
 Canada Land Inventory (CLI)
 Study Areas 4 - 6

DBH Soil Services Inc.
 October 2019



Legend

- +— Railway
- Roads
- Utilities**
- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Lots
- Waterbodies
- ▭ Study Areas
- Canada Land Inventory (CLI)**
- Class 1
- Class 2
- Class 3
- Class 5
- Organic Soils

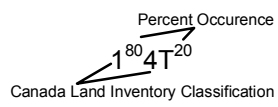
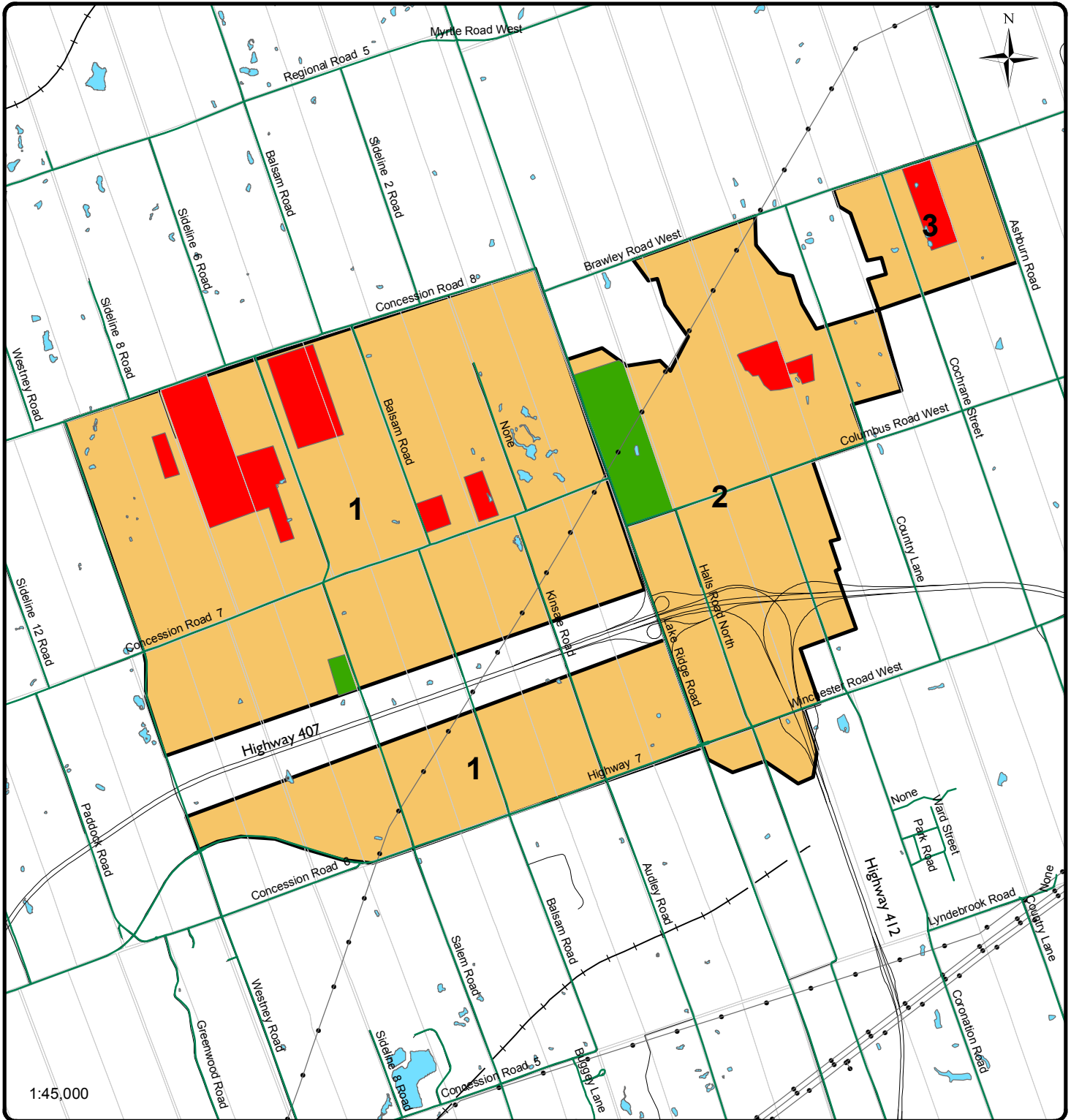


Figure 4
Canada Land Inventory (CLI)
Study Area 7

DBH Soil Services Inc.
October 2019



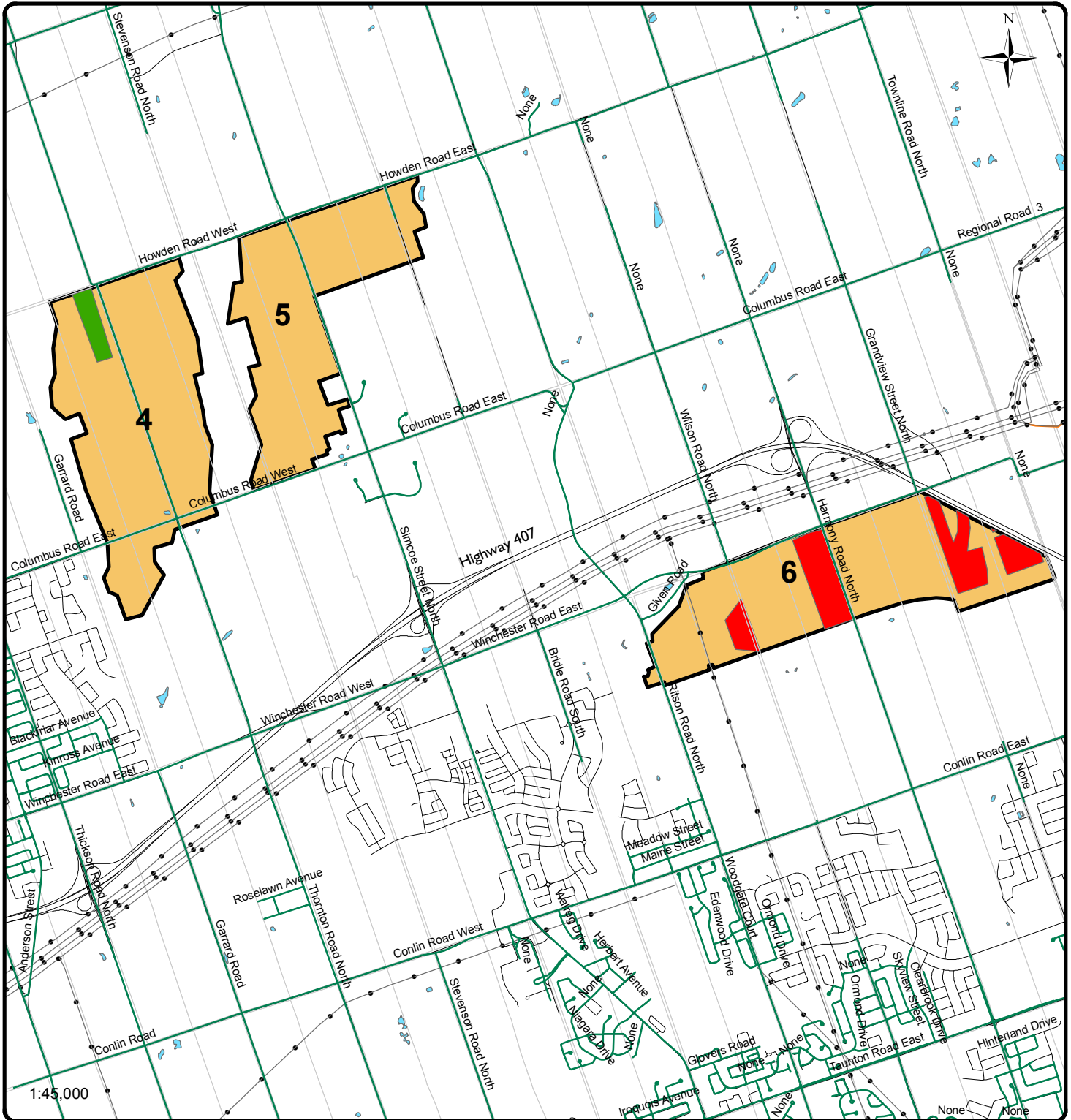
1:45,000

Legend

—+— Railway	□ Lots
— Roads	■ Study Areas
Utilities	System Type
•— Hydro Line	■ Random
— Natural Gas Pipeline	■ Systematic
— Unknown Pipeline	
— Unknown Transmission Line	
— Water Pipeline	
■ Waterbodies	

Figure 5
 Tile Drainage
 Study Areas I - 3

DBH Soil Services Inc.
 October 2019



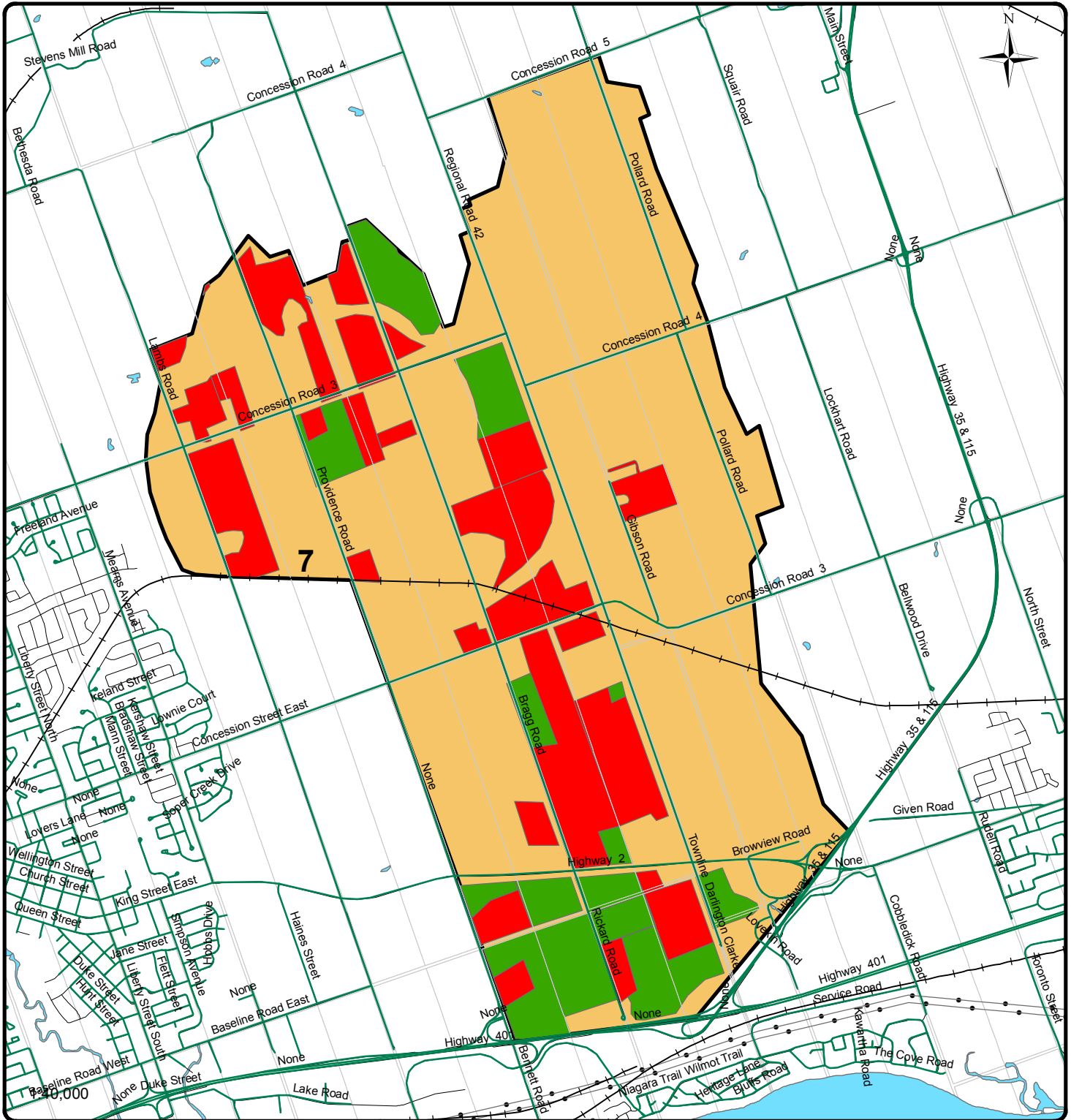
1:45,000

Legend

—+— Railway	□ Lots
— Roads	■ Study Areas
Utilities	System Type
•— Hydro Line	■ Random
— Natural Gas Pipeline	■ Systematic
— Unknown Pipeline	
— Unknown Transmission Line	
— Water Pipeline	
■ Waterbodies	

Figure 6
 Tile Drainage
 Study Areas 4 - 6

DBH Soil Services Inc.
 October 2019



Legend

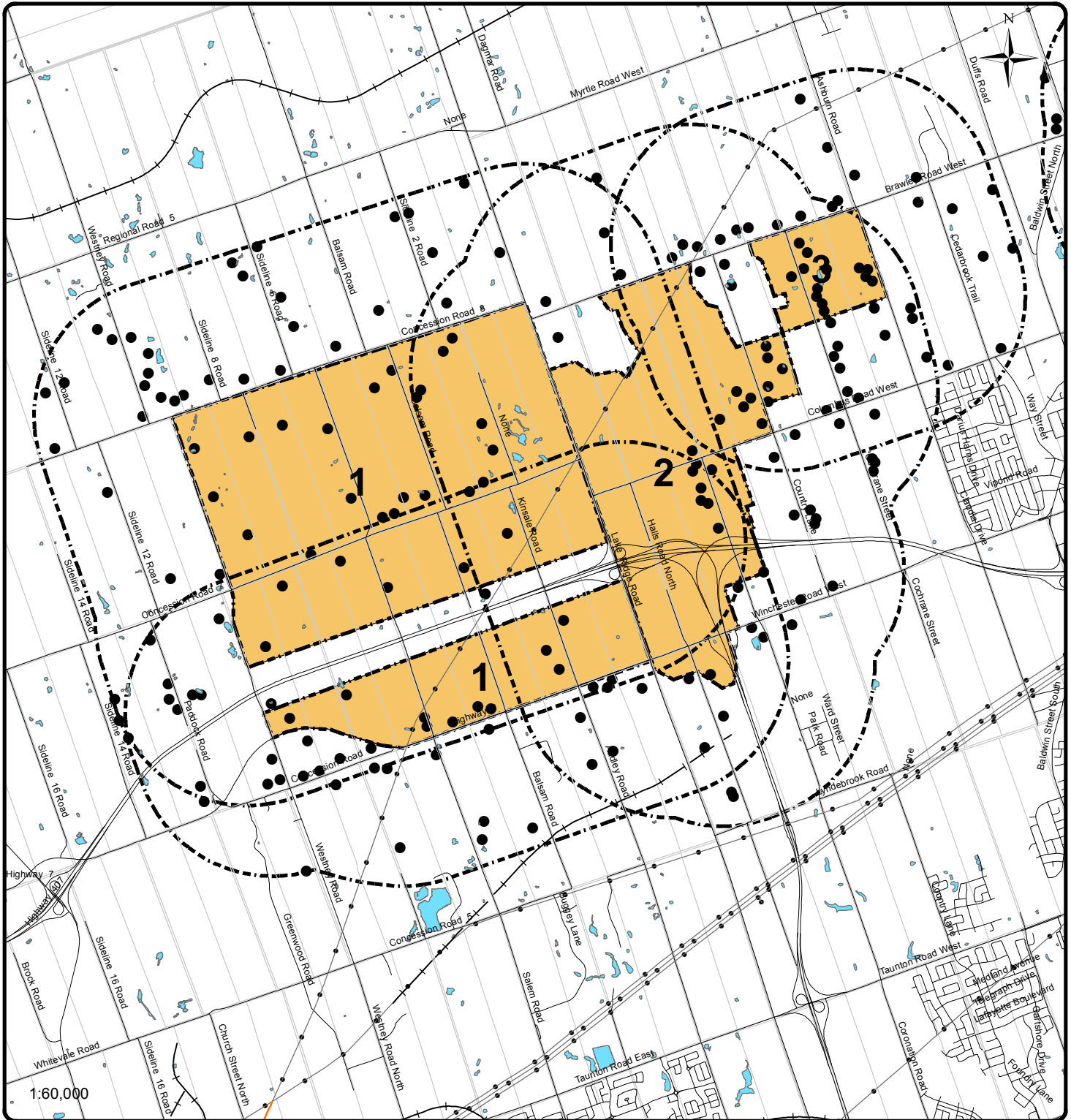
- Railway
- Roads
- Utilities**
- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Waterbodies
- Lots
- Study Areas
- System Type**
- Random
- Systematic

Figure 7

Tile Drainage
Study Area 7

DBH Soil Services Inc.

October 2019



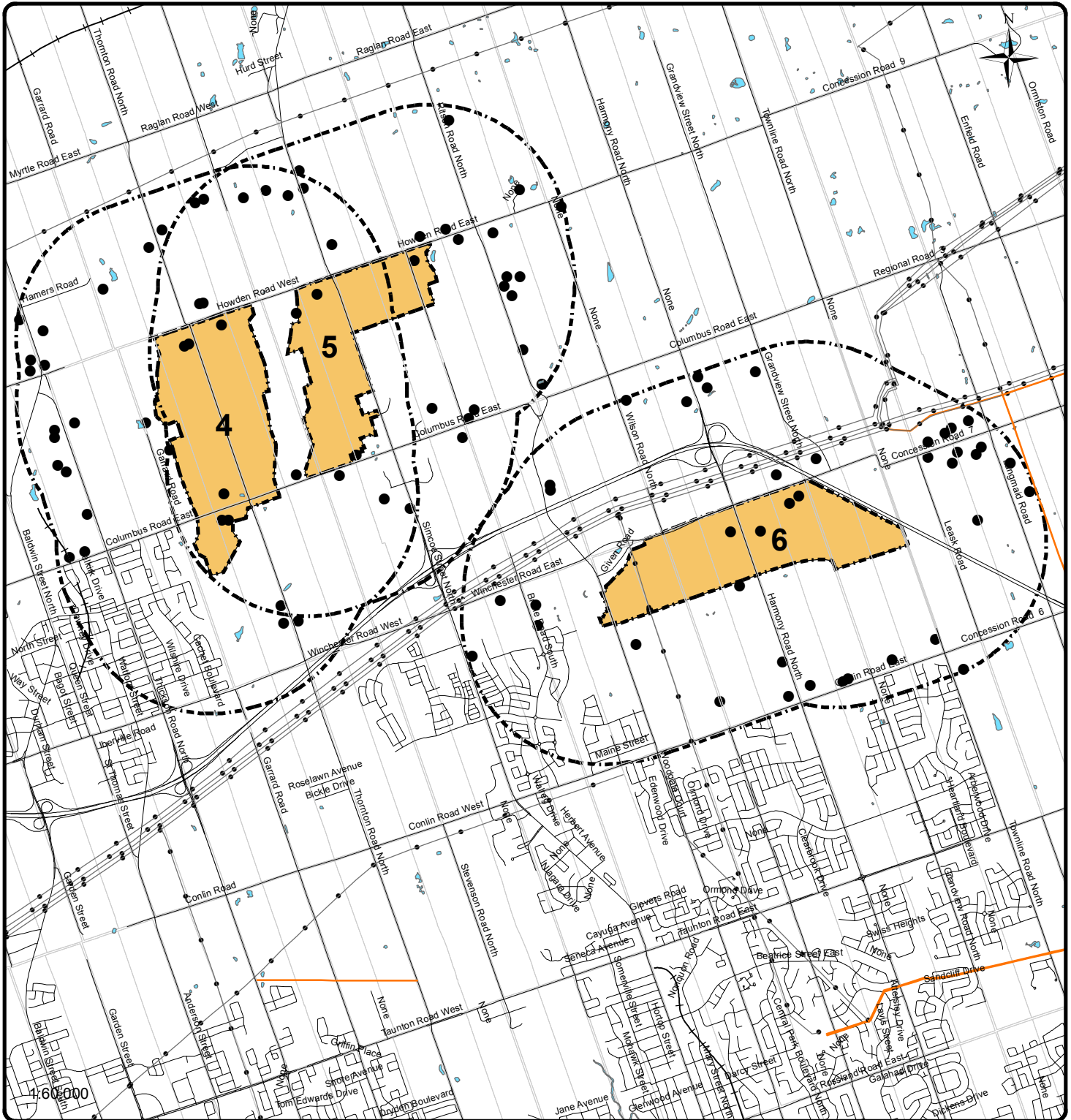
Legend

- Barns
- Railway
- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Roads
- Waterbodies
- Lots
- Study Areas
- - - Study Area Buffer (1.5 km)

Figure 8 Agricultural Facilities
Barns
Study Areas 1 - 3

DBH Soil Services Inc.

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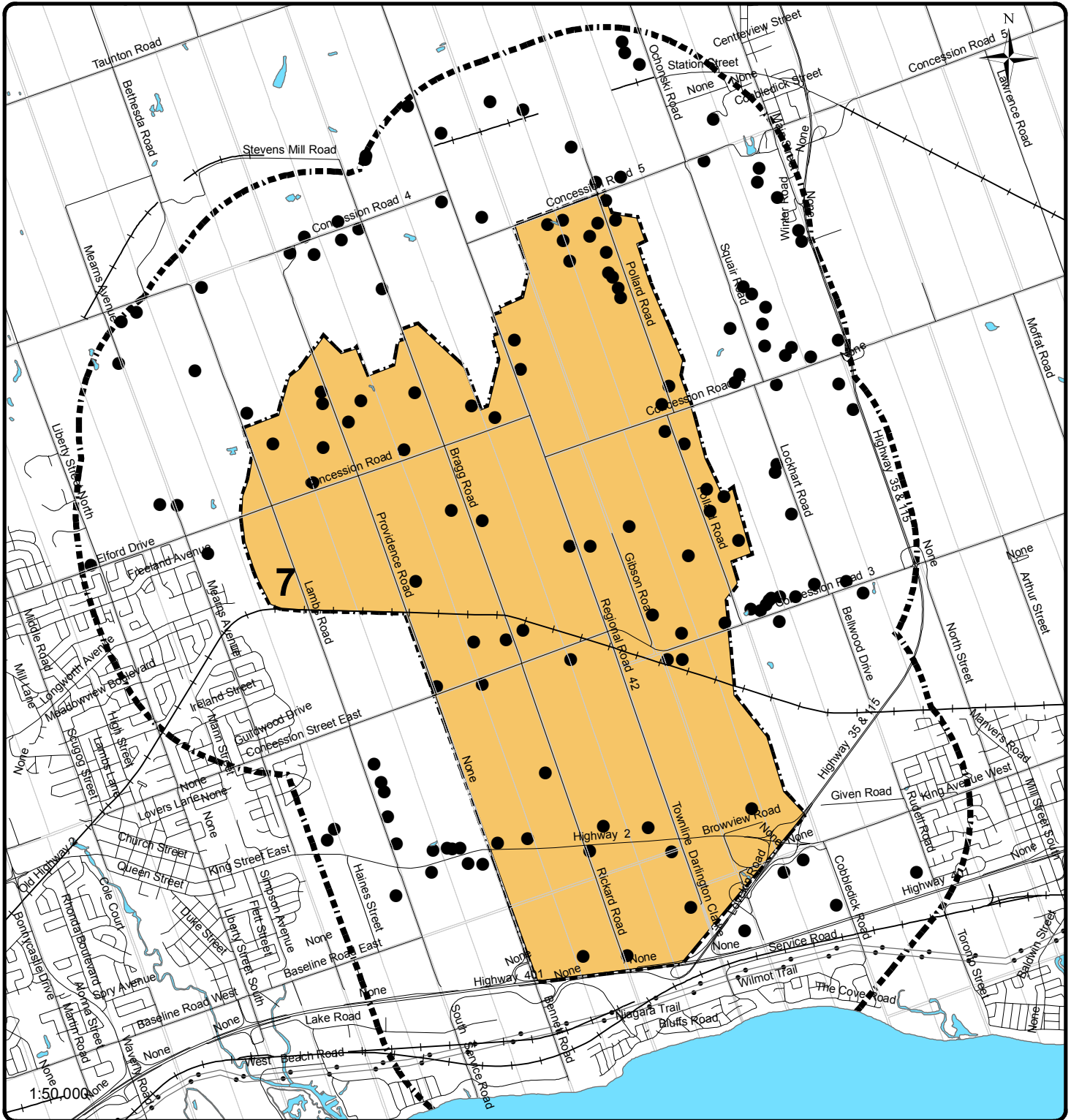


Legend

- Barns
- Railway
- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Roads
- Waterbodies
- Lots
- Study Areas
- Study Area Buffer (1.5 km)

Figure 9 Agricultural Facilities
Barns
Study Areas 4 - 6

DBH Soil Services Inc.
October 2019



Legend

- Barns
- Railway
- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Roads
- Waterbodies
- Lots
- Study Areas
- ▤ Study Area Buffer (1.5 km)

Figure 10 Agricultural Facilities
Barns
Study Area 7

DBH Soil Services Inc.
October 2019



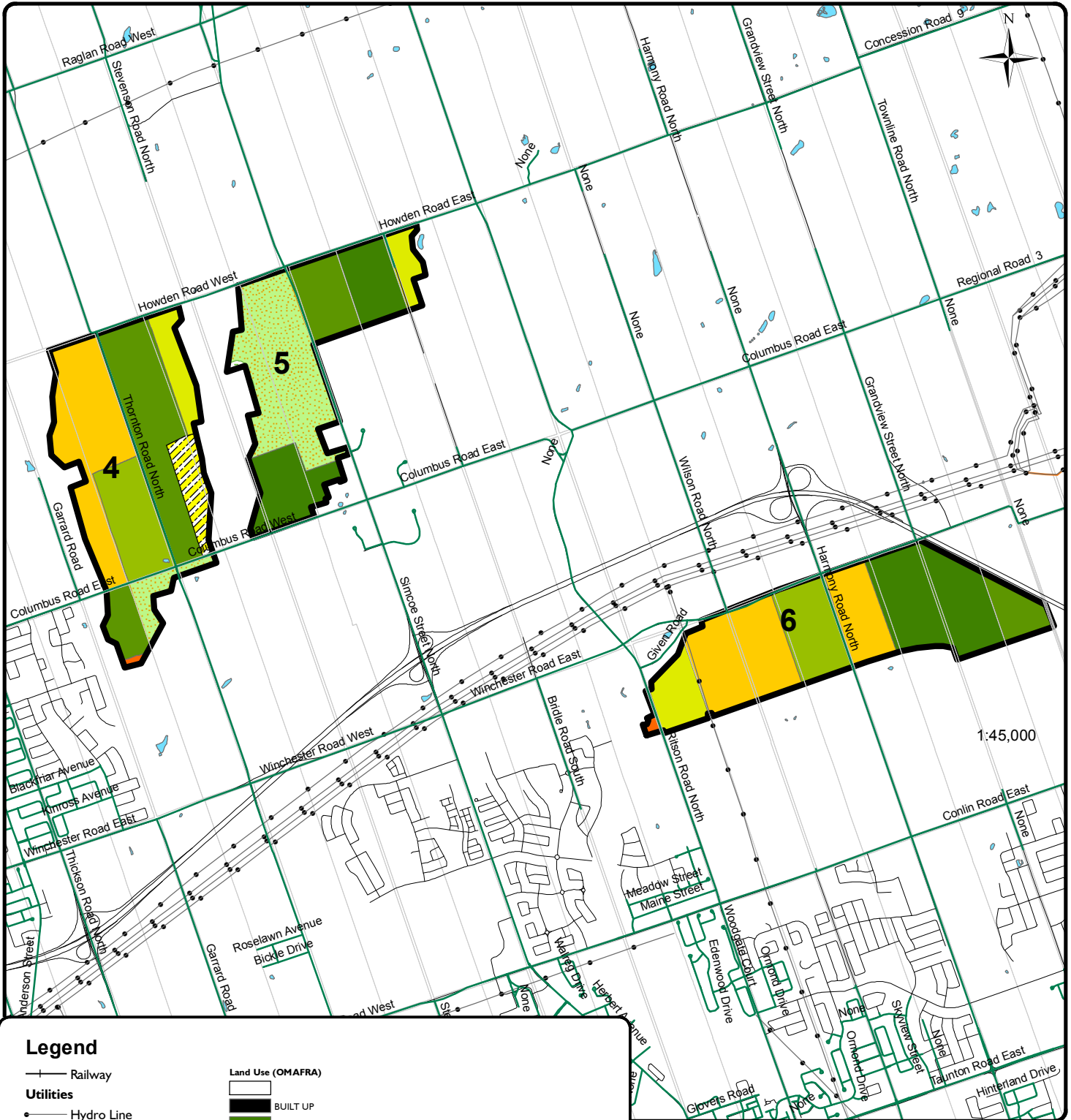
Legend

- Railway
- Utilities**
- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Roads
- Waterbodies
- Lots
- Study Areas**

- Land Use (OMAFRA)**
- BUILT UP
 - CONTINUOUS ROW CROP
 - CORN SYSTEM
 - EXTENSIVE FIELD VEGETABLES
 - GRAIN SYSTEM
 - GRAZING SYSTEM
 - HAY SYSTEM
 - IDLE AGRICULTURAL LAND (5-10 YEARS)
 - IDLE AGRICULTURAL LAND (OVER 10 YEARS)
 - MIXED SYSTEM
 - NURSERY
 - ORCHARD
 - PASTURE SYSTEM
 - RECREATION
 - SOD FARM
 - WOODLAND

Figure 11
Land Use (OMAFRA)
Study Areas 1 - 3

DBH Soil Services Inc.
October 2019



Legend

— Railway

Utilities

- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Roads
- Waterbodies
- Lots
- Study Areas

Land Use (OMAFRA)

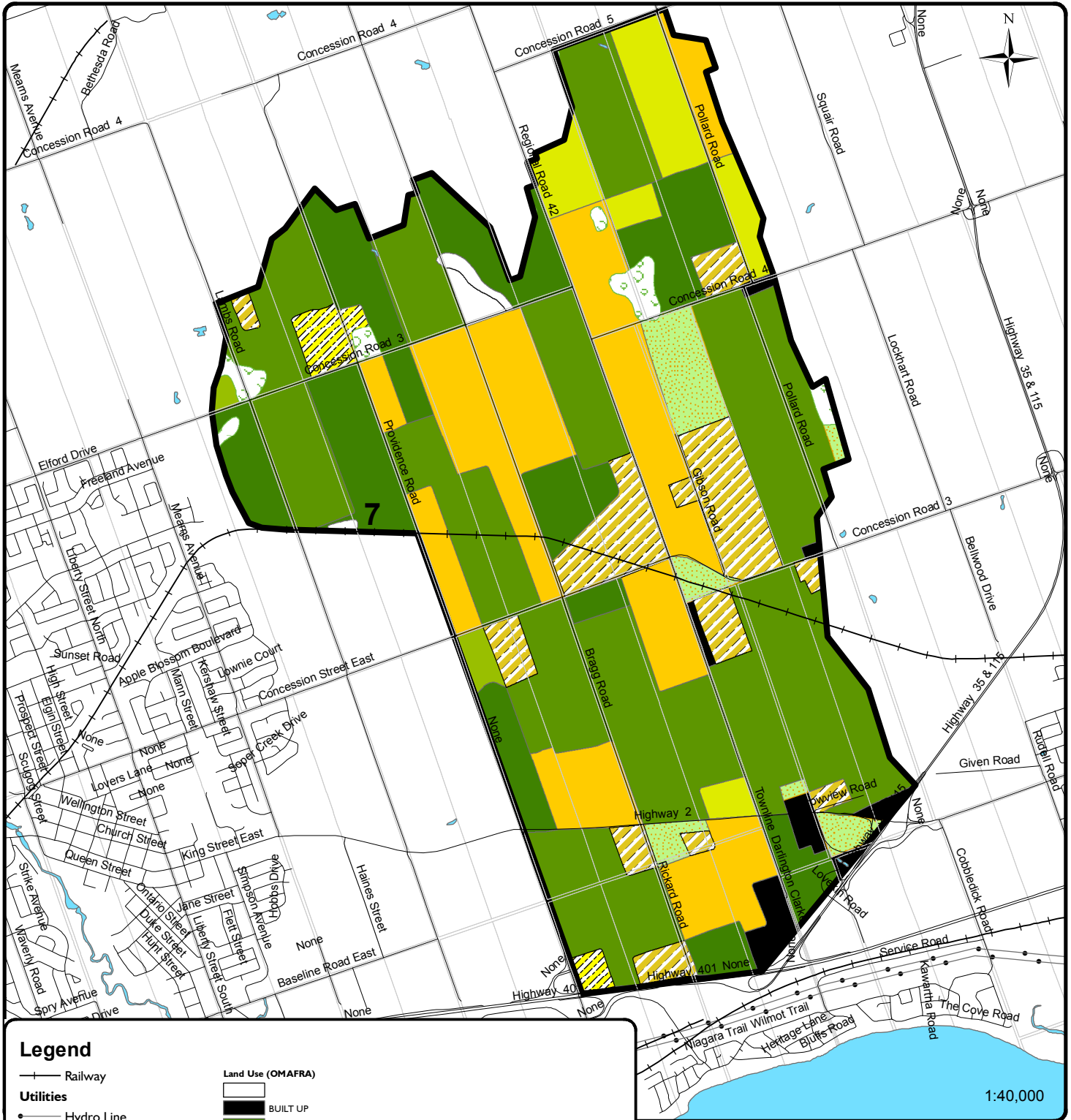
- BUILT UP
- CONTINUOUS ROW CROP
- CORN SYSTEM
- EXTENSIVE FIELD VEGETABLES
- GRAIN SYSTEM
- GRAZING SYSTEM
- HAY SYSTEM
- IDLE AGRICULTURAL LAND (5-10 YEARS)
- IDLE AGRICULTURAL LAND (OVER 10 YEARS)
- MIXED SYSTEM
- NURSERY
- ORCHARD
- PASTURE SYSTEM
- RECREATION
- SOD FARM
- WOODLAND

Figure 12

Land Use (OMAFRA) Study Areas 4 - 6

DBH Soil Services Inc.

October 2019



Legend

- | | |
|-----------------------------|--|
| —+— Railway | Land Use (OMAFRA) |
| Utilities | BUILT UP |
| ● Hydro Line | CONTINUOUS ROW CROP |
| — Natural Gas Pipeline | CORN SYSTEM |
| — Unknown Pipeline | EXTENSIVE FIELD VEGETABLES |
| — Unknown Transmission Line | GRAIN SYSTEM |
| — Water Pipeline | GRAZING SYSTEM |
| — Roads | HAY SYSTEM |
| Waterbodies | IDLE AGRICULTURAL LAND (5-10 YEARS) |
| Lots | IDLE AGRICULTURAL LAND (OVER 10 YEARS) |
| Study Areas | MIXED SYSTEM |
| | NURSERY |
| | ORCHARD |
| | PASTURE SYSTEM |
| | RECREATION |
| | SOD FARM |
| | WOODLAND |

Figure 13
**Land Use (OMAFRA)
 Study Area 7**

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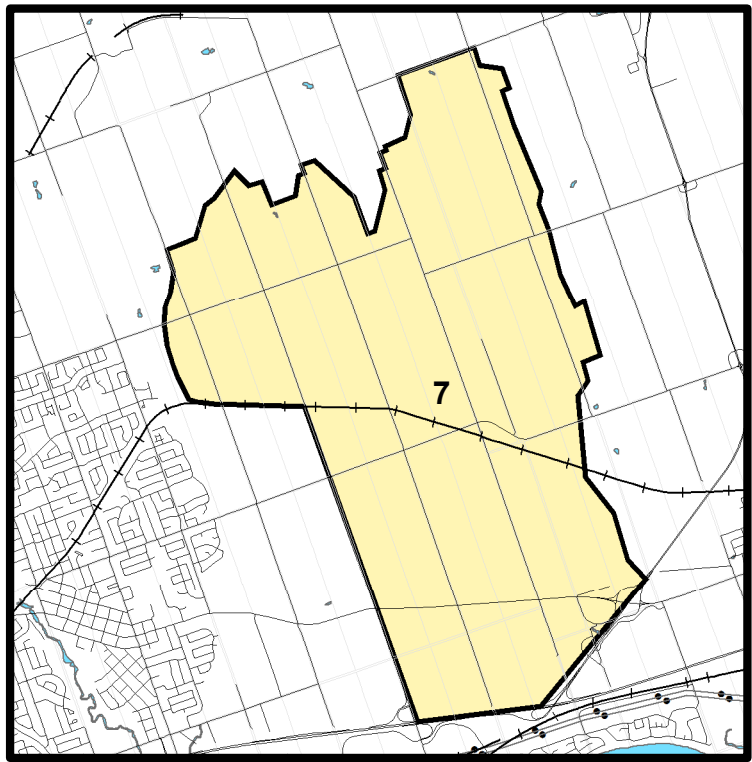
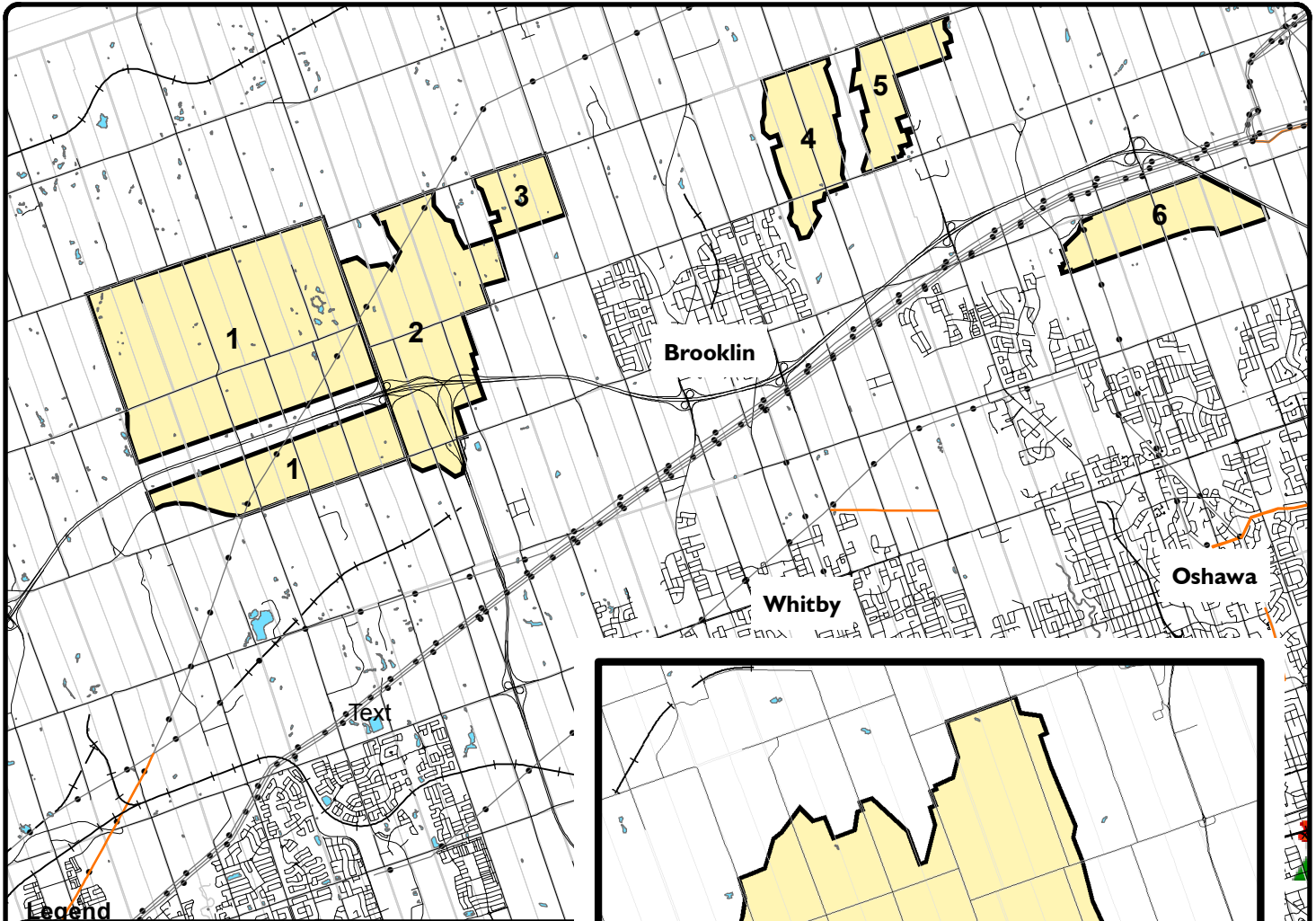


Figure 14

Agricultural Assets (OMAFRA)

DBH Soil Services Inc.

October 2019

Legend

- Railway
- Roads
- Utilities**
- Hydro Line
- Natural Gas Pipeline
- Unknown Pipeline
- Unknown Transmission Line
- Water Pipeline
- Lots
- Waterbodies
- Study Areas
- Provincially Licenced Meat Plants
- Chicken, Fowl
- Ducks, Geese
- Fancy Poultry
- Rabbits
- Turkey
- Alpaca
- Beef
- Buffalo
- Deer, Elk
- Emus, Ostrich, Rhea
- Goats, Lamb, Sheep
- Pigs
- Veal, Light Calves
- Frozen Food Manufacturing 31141 (GHFFA)
- Point layer
- Refrigerated Warehousing and Storage 49312 (GHFFA)
- Breweries (Ontario Craft Brewers)
- Livestock Auctions (Farms.Com)
- Renderers (OMAFRA)

APPENDIX A

HOFFMAN PRODUCTIVITY INDEX

Hoffman Productivity Index (Soil Productivity Index)

The Hoffman Productivity Index (HPI) is a tool that was published in ARDA Report No. 4 “The Assessment of Soil Productivity for Agriculture” and is used to relate the productivity of lands to the Canada Land Inventory (CLI) soil capability.

These indices are also referred to as the Soil Productivity Index and are used to calculate and assign a parcel or polygon a single value which represents the overall productivity of that parcel or polygon.

The single value is derived from the sum of the percent occurrence of each CLI Soil Capability Class on the parcel or within the polygon multiplied by the productivity index corresponding to the soil class.

Certain assumptions are made when using the productivity index. The HPI assumes that if the same level of management is applied to areas of differing CLI classes, then the productivity for each class will differ. Hoffman determined the average yields produced for common field crops on lands with CLI classes 1 to 4 within Ontario.

It was determined that a CLI class 2 land produced approximately 80% of the yield that would be associated with a class 1 land. Further that a class 3 land produced approximately 64% of the yield that would be associated with a class 1 land, while a class 4 land produced approximately 49%. Values for class 5 through class 7 lands were extrapolated. As a result, it was determined that the productivity ranges were as follows:

Soil Productivity Index Ratings	
CLI Class	Soil Productivity Index
1	1.0
2	0.8
3	0.64
4	0.49
5	0.33
6	0.17
7	0.02

A parcels or polygons HPI or Soil Productivity Index is calculated as follows:

$$\begin{aligned} \text{Soil Productivity Index} = & \\ & (\text{percent occurrence of class 1 lands} \times 1.0) + (\text{percent occurrence of class 2 lands} \times 0.8) + \\ & (\text{percent occurrence of class 3 lands} \times 0.64) + (\text{percent occurrence of class 4 lands} \times 0.49) + \\ & (\text{percent occurrence of class 5 lands} \times 0.33) + (\text{percent occurrence of class 6 lands} \times 0.17) + \\ & (\text{percent occurrence of class 7 lands} \times 0.02) \end{aligned}$$

Once a Soil Productivity Index value is calculated for the parcel or polygon, the value can be related back to a CLI Equivalent. The following table illustrates the range of values which can be directly correlated to the equivalent CLI class.

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