Agricultural Impact Assessment

PREPARED FOR:

Aggregate Resources Act Licence Application & Zoning By-Law Amendment
J-AAR Materials Limited
583398 Hamilton Road, South-West Oxford

File no. 18218B

June 2025

Your Vision

Designed | Planned | Realized

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MHBC | PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

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1.0 Introduction

MacNaughton Hermsen Britton Clarkson Planning Ltd. (MHBC) has been retained by J-AAR Materials Limited ('J-AAR') to complete an Agricultural Impact Assessment (AIA) for a proposed new Class A Pit below the ground water table on lands located at 583398 Hamilton Road and legally described as Part Lots 26 and 27, Broken Foot Concession, South-West Oxford, Oxford County (i.e. "the subject lands").

The area proposed to be licenced is approximately 49.4 ha (122.1 ac), with approximately 45.3 ha (111.9 ac) proposed for extraction. Per Ontario Regulation 244/97 (O. Reg. 244/97), in the case of a pit, below the water table means at or less than 1.5 metres above the maximum level of the predicted ground water table. The pit is proposed to operate at 1 metre above the maximum level of the ground water table, and as such is considered to be a below the water table pit. The lands proposed to be Licenced are currently used for agriculture (currently cash crop production). The subject lands include one residential dwelling, a shed, a dairy barn, and a manure tank on the portion of the lands along Hamilton Road; this portion of the property is not proposed to be within the Licenced area. Surrounding land uses include rural residential uses along Hamilton Road, agricultural uses to the east and south, and agricultural businesses and aggregate operations to the east.

The lands are leased by J-AAR from the Bardoel family who are well known farmers in the area. The Bardoels own and farm adjacent lands to the north, east, and south of the proposed licenced area. The Bardoels were consulted in the preparation of the Aggregate Resource Act (ARA) Site Plan for the proposed Bardoel Pit.

J-AAR intends to submit an application with the Ministry of Natural Resources and Forestry (MNRF) for a Class 'A' Licence, for a Pit Below Water under the Aggregate Resources Act, and a Township of South-West Oxford Zoning By-law Amendment to permit aggregate extraction on the subject lands.

This report has been prepared to be consistent with the Province's Draft Agricultural Impact Assessment Guidelines, released in March 2018 by the Ministry of Agriculture, Food and Rural Affairs.

1.1 Data Collection and Review

In preparing the report, the following background materials at the provincial, upper tier and municipal levels were reviewed:

- Provincial Policy Statement (2024);
- Oxford County Official Plan (March 2023 consolidation); and,
- Township of South-West Oxford Zoning By-law 25-98 (September 2022 Consolidation).

A number of plans and reports were prepared in support of the applications and below is a list of reports that were also reviewed as part of the preparation of this Agricultural Impact Assessment:

- ARA Summary Statement & Planning Report (MHBC);
- Natural Environment Report (MTE);
- Hydrogeological Report & Maximum Predicted Water Table Report (Novaterra);
- Stage 1-2 Archaeological Assessment (Timmins Martelle);

- Noise Assessment (RWDI);
- Traffic Impact Study (SBM);
- Soil Survey and Canada Land Inventory Classification (DBH Soil Services Inc.); and,
- Aggregate Resources Act Site Plans (MHBC).

In addition to the plans and reports that were specifically prepared in support of the ARA application, the following materials were also reviewed:

- 2021, 2016, and 2011 Census of Agriculture and OMAFRA's Ontario business, agri-food, and farm data profile for Oxford County;
- Soil data resource information including Ontario Soil Survey reports and mapping, the provincial digital soil resource database, Canada Land Inventory Agricultural Capability mapping, Soil Suitability information and mapping (for specialty crops), and information from on-site investigations;
- Aerial photography (historic and recent) with effective user scale of 1:10,000 or smaller;
- OMAFRA's constructed and agricultural Artificial Drainage Mapping; and
- Parcel mapping/fabric of the area.

A land use survey was also conducted on February 27th, 2024 (with no snow cover), with additional information gathered from Google Satellite Imagery to gain a better understanding of the agricultural operations and activities in both the primary and secondary study areas. A summary of the land use survey is provided in Section 2.0 of this report. The potential for impacts will vary and mitigation is dependent on the type and sensitivity of the agricultural activities identified in the primary and secondary study areas.

1.2 Proposed Aggregate Extraction Operation

The subject lands are located on the south side of Hamilton Road approximately 2 kilometres southwest of the Town of Ingersoll in Oxford County (**Figure 1**). Phasing of the lands is illustrated on **Figure 2** of this Report.

The subject lands are bounded to the south, east, and west by agricultural uses. Directly east of the subject lands is a Provincially Significant Wetland (PSW) mapped as part of the Five Points Woods (PSW) Complex; setbacks from the PSW are identified on the Site Plan. Hamilton Road is located directly to the north/northwest of the subject lands. The total area of the Bardoel Pit proposed for extraction is 45.3 ha (111.9 ac), the majority of which is currently under agricultural production.

Extraction activities are proposed to be phased (three phases in total) such that extraction will commence at the central western portion of the subject lands and move northward (Phase 1), then recommence at the central western portion of the lands and move south then eastward (Phase 2), and then recommence in the southeastern portion of the lands and move northward (Phase 3). Only two phases will be open at any one time; the intent of this is to maintain access to different materials available in Phase 1 and 3 versus Phase 2. Progressive rehabilitation will closely follow extraction.

Per Ontario Regulation 244/97 (O. Reg. 244/97), in the case of a pit, below the water table means at or less than 1.5 metres above the maximum level of the predicted ground water table. The pit is proposed to operate at 1

metre above the maximum level of the ground water table, and as such is considered to be a below the water table pit. The existing agricultural operations on the subject lands will continue until such time as they are required for extraction. This will allow the agricultural use of the property to be maintained as long as possible. The operational plan is shown on **Figure 2** of this report.

Most of the subject lands are currently actively farmed as cash crops (mixture of hay and corn). A residential dwelling, a shed, a dairy barn, and a manure tank are located on the northwest portion of the lands along Hamilton Road. These structures are located outside of the proposed Licence boundary and will be retained during and post extraction. Data available through OMAFRA's Agricultural System Portal indicates that there is no constructed drainage or tile drainage on the lands.

The proposed Bardoel Pit is requesting a maximum annual extraction limit of up to 500,000 tonnes per year of aggregate. The pit is proposed to operate Monday through Friday, 7am to 7pm, and Saturday's 7am to 1pm with holiday closures. The pit operation will include extraction and processing operations from March to November (inclusive), with limited operations December through February, and shipping operations year-round. A truck entrance/exit is proposed off Hamilton Road.

J-AAR Materials Limited is applying for a new Aggregate (ARA) licence for a Class "A" Pit below the water table on the subject lands. Following the aggregate extraction operation, the intention is to maximize the area of land to be progressively rehabilitated to an agricultural condition. The proposed rehabilitation concept can be found on **Figure 3.**

1.3 Purpose of the Study

The purpose of this Agricultural Impact Assessment is to evaluate potential impacts on agriculture from the proposed aggregate extraction operation and to identify mitigation measures to abate these impacts to the extent feasible. This report is intended to provide information to support the preparation and implementation of effective progressive rehabilitation plans for agricultural rehabilitation including the provision of baseline pre-extraction documentation.

As part of this AIA, surrounding agricultural land uses, operations, and structures on properties within 1.5 kilometres of the subject lands have been documented to assess the potential impact from the proposed aggregate operation on the agricultural uses/operations and determine the extent of mitigation that may be required.

Furthermore, a soil survey and Canada Land Inventory (CLI) Evaluation was completed by DBH Soil Services Inc. to document the existing soil conditions and provide a more detailed assessment of the Canada Land Inventory (CLI) classification for the soil resources. Baseline information about the soils provides an interpretation of the agricultural capability of the soil to produce various types of crops as well as provide useful information to assess impacts on soil resources and inform the final agricultural rehabilitation.

Figure 1
Location Plan

LEGEND

Proposed Licensed Boundary

Proposed Limit of Extraction

DATE:	May 2024
SCALE:	1: 10,000
FILE:	18218A
DRN:	GC/CAC

north

K:\18218A- AAROC BARDOEL PIT\RPT\AIR PHOTO_MAY2024.DWG

PART LOTS 26 & 27,
BROKEN FRONT CONCESSION
Township of South-West Oxford
County of Oxford

Source: Google Satellite Imagery

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A. General

1. This site plan is prepared under the Aggregate Resources Act (ARA) for a Class 'A' Licence for a pit below the ground water table (to 1m of the water table) and follows the Aggregate Resource of Ontario: Site Plan Standards August 2020, specifically Operations for all sites (Number 33-56 in the standards).
2. Area calculations
   i. Licence Boundary 49.4 ha (122.1 acres)
   ii. Limit of Extraction 45.3 ha (111.9 acres)
3. The maximum number of tonnes of aggregate to be removed from this property is 500,000 tonnes in any calendar year.
4. No buildings or structures (including a scale and scale house) are proposed.
5. The maximum predicted water table within the limit of extraction varies between 268.35 masl in the northern portion of the site and 285.56 masl in the eastern portion of the site (Source: Novaterra Environmental, June 14, 2024). The maximum predicted water table is shown in each cross section on drawing 4 of 4.
6. The site lies within the Thames-Sydenham and Region Source Protection Area. Part of the subject site occupies an area designated as WHPA (Well Head Protection Area) associated with Ingersoll Municipal Well 3. No hydraulic relationship between Ingersoll Municipal Well 3 and the water table aquifer at the site was found (Source: Novaterra Environmental - March 20, 2025). See 'Hydrogeology' notes under Section M on this page for mitigation measures.
7. Agricultural production will continue in areas not under extraction.
8. Setbacks will be as shown and labelled on the Sequence of Operations Diagram and on the Existing Features Plan (page 1 of 4).
9. See this page for site plan overrides.

B. Hours of Operation

1. Hours of operation shall be Monday to Friday between 7:00 am and 7:00 pm and on Saturdays between 7:00 am to 1:00 pm. No operations are permitted on Sunday or statutory holidays.

C. Site Access and Fencing

1. The existing farm/field access on Thomas Road will remain for monitoring, maintenance and agricultural purposes. This access shall be gated, kept closed during hours of non-operation and maintained throughout the life of the licence. Aggregate trucks shall not be permitted to access the site in this location.
2. An operational entrance/exit is proposed at the existing access on Hamilton Road (as shown on the plan view). This access shall be gated, kept closed during hours of non-operation and maintained throughout the life of the licence. A potential operational entrance/exit is identified in the eastern corner of the site at Thomas Road. This access point requires Township approval prior to being used by aggregate trucks.
3. Portions of the licence boundary that are not currently fenced shall be fenced with post and wire fencing at least 1.2 metres in height and maintained for the life of the licence.
4. Fencing shall not be required where the licence abuts existing licence #16190 and in these locations, the boundary will be demarcated by 1.2m high marker posts that are visible from one to the other. If conditions in or around the licensed property change or if either licensed site is surrendered or sold, a 1.2m high fence will be installed. All fencing shall be maintained for the life of the extraction. Fencing shall also not be required next to the Five Points Woods Wetlands as an existing fence exists offset the licence boundary. Fencing will not be required next to the Bardoel residence and agricultural structures as there is existing fencing along the property boundaries at Hamilton Road, next to adjacent houses and the Five Points Woods Wetland (see Section N Variations from Control and Operation Standards). In all other locations along the boundary of the site, a fence of at least 1.2 m in height shall be erected and maintained.
5. A sign of at least 0.5 metres by 0.5 metres in size shall be erected and maintained at the main entrance that says in legible words "This site is licensed under the Aggregate Resources Act Licence # _____".

D. Drainage

1. During excavation surface drainage from active pit areas will be contained within the pit area. Drainage of undisturbed areas will continue and be in the directions shown on the Existing Features drawing on page 1 of 5.

E. Site Preparation

1. Prior to site preparation, a Spills Contingency Plan shall be developed to address any potential spills from equipment on-site.
2. Timber resources (if any) will be salvaged for use as saw logs, fence posts and fuel wood where appropriate. Non-merchantable timber, stumps and brush may be used or mulched for use in progressive rehabilitation. Excess material not required for uses mentioned above will be burned (with applicable permits).
3. During construction and earth-moving operations, sediment control measures will be put in place to prevent runoff of suspended solids from leaving the site (see Section M Technical Recommendations 1. Natural Environment).
4. Substantial storage of topsoil and minimize the storage of subsoil shall be minimized. Stripped soils, not required for berm construction, shall be moved directly to depleted areas where they will be immediately used for agricultural rehabilitation. Stripping areas shall be limited to what is required for the season of operation.
5. Topsoil/overburden stockpiles will be graded smooth and seeded to prevent erosion (if they are to remain for more than one year). Seeding shall not be required if these stockpiles have vegetated naturally in the first year.

F. Berms and Screening

1. Berms shall be constructed as specified in the locations shown on the Sequence of Operations and in accordance with the Technical Recommendations (4. Acoustic Assessment). Locations and heights for all berms are provided on the Sequence of Operations diagram, this page. The heights/elevations shown are the minimum required. Overburden may be stored in separate berms throughout the extraction area.
2. Berms shall not be located within three metres of the licence boundary, except for where provided in Section N. variations from Control and Operation Standards.
3. All proposed berms will be constructed in accordance with the "Typical Berm Detail" on this page and will be vegetated and maintained to control erosion using a low maintenance grass/legume seed mixture (e.g. MTO Seed Mix) composed of Creeping red Fescue, Perennial Ryegrass, Kentucky Bluegrass and White Clover. Temporary erosion control will be implemented as required.
4. Existing vegetation within the setbacks shall be maintained except where berms are required. There are no proposed tree screens at this site.

G. Site Drainage

1. No existing or proposed surface water diversions or discharge has and/or will occur on the proposed extraction area. There will be no dewatering or pumping of water in the extraction area.

H. Extraction Sequence

1. The operational plan depicts a schematic operations sequence for this property. Phases do not represent any specific or equal time period and blending requirements may require material from adjacent phases. Extraction shall be permitted in two phases simultaneously to facilitate the availability of different aggregate materials located within the Phases and to allow transition between phases.
2. The direction of extraction will be in accordance with the Sequence of Operations diagram shown on this page.
3. Progressive and final rehabilitation will be completed in direct correlation to the development of the pit as the extraction limits in each Phase are reached and enough area is available to ensure that rehabilitation activities will not interfere with the production and stockpiling of aggregate materials.

I. Extraction Details

1. The maximum depth of extraction is as shown as spot elevations on the Sequence of Operations drawing (this page). Extraction will occur in a maximum of 1 lift through the three phases as shown on the Sequence of Operations Diagram on this page and in accordance with the Ministry of Labour requirements. The maximum lift height will be 10 m.
2. Extraction will occur to within 1m of the maximum predicted water table. The pit floor will be located at an elevation of 271 to 287 masl. See Rehabilitation Plan (page 3) and Cross Sections (page 4) for excavation depths and final rehabilitation contours.
3. Aggregate stockpiles will be located on the pit floor and will follow the working pit face throughout the life of the operations of the pit. Stockpiles will not be located within 30m of the Licensed boundary, except for the western boundary as per agreement with adjacent operator (see Variations from Control and Operational Standards table on this page).
4. Internal haul road locations will vary as extraction progresses and will transport materials to the northern operational entrance/exit. Dust will be mitigated on site. Water or another provincially approved dust suppressant will be applied to internal haul roads as often as required to mitigate dust.

J. Equipment and Processing

1. Equipment used on-site may include portable crushers, a portable screening plant, loaders, stacker and trucks.
2. No permanent processing areas are proposed on site. Portable processing equipment (crusher and screener) may be used on site and will be restricted to the 'Processing Plant Region'. The portable equipment shall be located below grade on the pit floor in close proximity to the extraction face in order to maximize acoustical shielding and within the 'Processing Plant Region'. See Note M 'Noise' and Sequence of Operations diagram for location of 'Processing Plant Region'.
3. Within the 'Processing Plant Region', the processing equipment shall remain a minimum of 30 metres from the licence boundary (except where the licence boundary abuts existing licence #16190 - see Section N Variations from Control and Operation Standards) and 90 metres from a property with a residential use. All processing equipment is subject to noise controls and applicable permitting under MECP Environmental Compliance Approvals.
4. Dust will be mitigated on site. Water or another provincially approved dust suppressant will be applied to processing areas as often as necessary to mitigate dust. Processing equipment will be equipped with dust suppression or collection devices where the equipment creates dust and is being operated within 300 metres of a sensitive receptor.

K. Fuel Storage

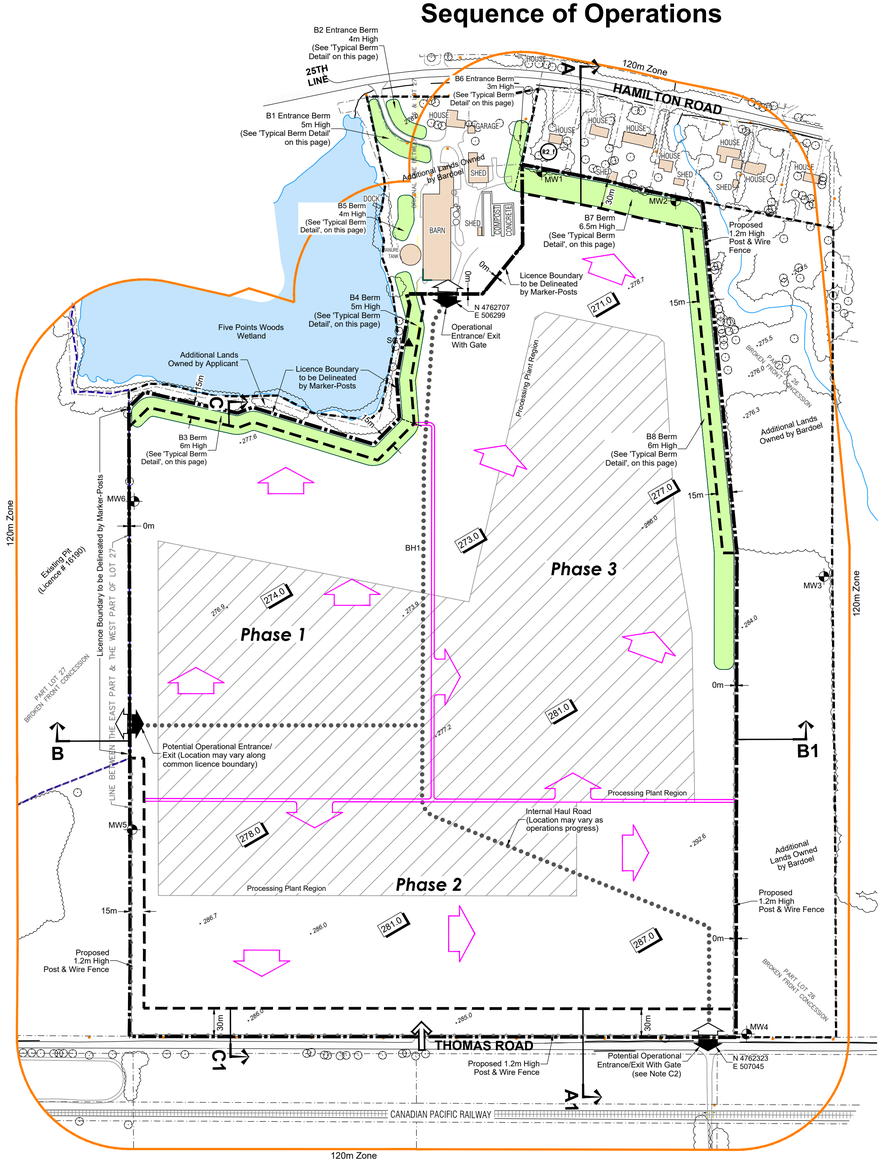
1. No fuel or associated products will be stored on site. Mobile fuelling will occur in accordance with the Gasoline Handling Act, as amended, the Gasoline Handling Code and regulations, as amended, and Liquid Fuels Handling Code.
2. Mobile fuelling shall not occur within 30 m of any waterbody.
3. A Spills Contingency Plan shall be prepared and implemented prior to site preparation. The Spills Contingency Plan shall be available on-site and all employees and contractors shall be informed and required to comply with this plan.

L. Scrap and Recycling

1. No recycling is proposed.
2. Scrap may be stored on-site within the 'Processing Plant Region' and shall be removed on an on-going basis.
3. Scrap shall only include material generated directly as a result of the aggregate operation such as refuse, debris, scrap metal, lumber, discarded machinery and equipment.
4. Scrap shall not be stored within 30 metres of any body of water, or the licence boundary.
5. The site shall be kept in an orderly condition.

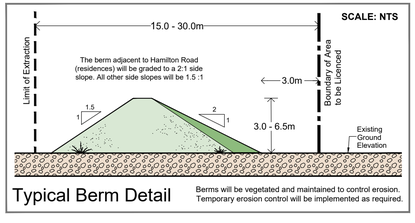
M. Technical Recommendations (Page 3 of 4)

Sequence of Operations



N. Variations from Control and Operation Standards

No.	O.Reg 244/97 Section 0.13	Variation	Rationale
1.	(1)1	A gate will not be required along the potential entrance adjacent to Licence #16190.	Gate not required next to existing pit licence (0 m setback).
2.	(1)10.i	Setback reduced to 0m from 15m along portions of the western, northern and eastern limits of site.	Per executed common boundary agreement, material can be extracted along the common boundary with Licence #16190. The northern and eastern limits of the site are adjacent to the additional lands owned by the Bardoel's (lessor).
3.	(1)13.i	Stockpiling/processing may take place within 30m along the boundary of Licence #16190.	Per executed common boundary agreement, material can be processed/stockpiled along the common boundary with Licence #16190.
4.	(1)16	Berms may be located within 3m boundary of the site where indicated on the Sequence of Operations.	Berms may be located within this area and on the lands owned by the Bardoel's (lessor).
5.	(3)(a)	Fencing shall not be required where the licence abuts existing Licence #16190. Fencing shall not be required next to the Five Points Woods Wetlands. Fencing shall not be required next to the Bardoel residence and agricultural structures for the lands owned by the Bardoel's (lessor).	Fencing not required along existing licensed pit and per executed common boundary agreement. Fencing exists along the property boundaries at Hamilton Road, next to adjacent houses and the Five Points Woods Wetland.



Legal Description

Pt Lt 26-27 Con Broken Front West Oxford,
Township of Southwest Oxford
Oxford County

Legend

- Boundary of Area to be Licensed
- Additional Lands Owned by Bardoel (Lessor)
- Existing Licensed Boundary — LICENCE #16190
- Existing Fence — 1.2m POST & WIRE FARM FENCE UNLESS OTHERWISE NOTED
- Existing Vegetation
- Public Road
- Building/Structure — LOCATION AND USE FOR BUILDINGS ON-SITE AND WITHIN 120m ARE SHOWN ON THIS PAGE.
- Farm/Field Access
- MW6 / SG1 Monitoring Well/ Staff Gauge — NOVATERRA ENVIRONMENTAL (2017)
- Existing Spot Height Elevation — METRES ABOVE SEA LEVEL
- A1 Cross Sections — SEE PAGE 4 OF 4 FOR EXISTING AND REHABILITATED CROSS SECTIONS
- Limit of Extraction — ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELLED DISTANCES
- Operational Entrance
- Proposed Haul Route
- Direction of Excavation — REFER TO NOTES (THIS PAGE) FOR ADDITIONAL DETAILS
- Processing Plant Region — (NO CRUSHING/SCREENING OUTSIDE THIS REGION)
- Proposed Fence — 1.2m POST & WIRE FARM FENCE UNLESS OTHERWISE NOTED
- Acoustic Berm — SEE "TYPICAL BERM DETAIL" AND NOTES ON PAGE 2 OF 4
- Optional Storage Berm — SEE "TYPICAL BERM DETAIL" AND NOTES ON PAGE 2 OF 4
- 272.0 Proposed Spot Elevation — MAXIMUM DEPTH OF BELOW WATER EXTRACTION
- #2.1 Receptor Locations — WITHIN 120m OF THE SITE

Site Plan Amendments

No.	Date	Description	By

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
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MNR Approval Stamp

Stamp

NEAL DeRUYTER

north

J-AAR Materials Limited
3003 Page Street
London, Ontario
N5V 4J1
Tel: (519) 652-2104

Applicant's Signature

Kevin Aarts
J-AAR Materials Limited

Project

Bardoel Pit

ARA Licence Reference No.

Pre-approval review:

For Submittal to MNR - June 2025

Plan Scale **1:3,000 (Arch D)**

SCALE
50 0 50 100
METRES

Plot Scale 1:3 [1mm = 3 units] MODEL
Drawn By G.C./DGS
Checked By N.D.
File No. **18218A**

File Name

OPERATIONAL PLAN

Drawing No.

2 OF 4

K:\18218A- AAROC Bardoel Pit\A\Bardoel Pit Operplan2of4 June2025.dwg

Notes:

A. General

1. This site plan is prepared under the Aggregate Resources Act (ARA) for a Class 'A' Licence for a pit below the ground water table (to 1m of the water table) and follows the Aggregate Resource of Ontario: Site Plan Standards August 2020 (Notes 60-68).
2. Area calculations:
   i. Licence Boundary: 49.4 ha (122.1 acres)
   ii. Limit of Extraction: 45.3 ha (111.9 acres)
3. The rehabilitated landform for this site will be agriculture.

B. Phasing

1. As excavation reaches the limit of extraction and/or maximum depth in each phase, progressive rehabilitation shall commence.
2. Progressive rehabilitation will follow the direction and sequence of extraction identified on the plan view and described in the notes on page 2 of 4.
3. Each Phase of extraction shall undergo progressive rehabilitation in direct correlation to the development of the pit as the extraction limits in each Phase are reached and enough area is available to ensure that rehabilitation activities will not interfere with the production and stockpiling of aggregate materials. Internal haul roads are permitted to remain in progressively rehabilitated areas, where necessary, but shall be removed as part of final rehabilitation.
4. Progressive rehabilitation shall commence in Phase 1. Progressive rehabilitation shall closely follow the northerly direction of extraction in Phase 1 and Phase 3 and the southward and easterly direction of extraction in Phase 2.
5. Progressive rehabilitation activities will include grading and sloping, placement of overburden and topsoil, agricultural rehabilitation activities, and seeding of side slopes.

C. Slopes and Grading

1. Progressive rehabilitation will utilize a variety of rehabilitation techniques including:
   a. Backfilling extraction faces;
   b. Backfilling the pit floor
2. Side slopes shall vary but will be a maximum of 10:1 and shall be created using on-site material and imported materials.
   a. The 10:1 slopes shown on the drawing shall be created in phase 2 and 3 using on-site or imported material.
3. Access ramps shall be incorporated into the side slopes in the locations shown on the plan view. Ramps shall not exceed a 10:1 (horizontal to vertical) slope.
4. Importation of Excess soil:
   a. Excess soil as defined in Ontario Regulation 244/97, may be imported to this site to facilitate the establishment of the following rehabilitation:
      i. side slopes and access ramps
      ii. top dressing to establish vegetation/agricultural crops.
   b. Liquid soil, as defined in Ontario Regulation 406/19 under the Environmental Protection Act, is not authorized for importation to the site.
   c. The quality of excess soil imported to the site for final placement must be equivalent to or more stringent than the applicable excess soil quality standards as determined in accordance with Ontario Regulation 244/97 as amended from time to time and must be consistent with site conditions and the end use identified in approved rehabilitation plan.
   d. Where a qualified person is retained or required to be retained in accordance with Ontario Regulation 244/97, the quality, storage, and final placement of excess soils shall be done according to the advice of the qualified person.
   e. Excess soil imported to facilitate rehabilitation as described on this site plan shall be undertaken in accordance with Ontario Regulation 244/97 under the Aggregate Resources Act, as amended from time to time.
   f. The cumulative total amount of excess soil that may be imported to this site for rehabilitation purposes is 350,000 m³.
10. The final rehabilitated landforms established using the rehabilitation techniques mentioned above will consist of side slopes and a relatively flat floor (that allows for surface drainage across the rehabilitated field).

M. Technical Recommendations (from page 2 of 4)

1. **Natural Environment: "Bardoel Pit Natural Environment Report (NER)" March 31, 2025 (Source: MTE Consultants Inc.)**
   a. As per the Novaterra Environmental Ltd. Hydrogeological Level 1 and Level 2 Assessment Report (2024), develop and implement a groundwater monitoring and contingency plan as required.
   b. No extraction shall occur between the License Boundary and the Extraction Limit. Buffers (including berms) shall be seeded.
   c. No extraction shall occur within 15m of the significant woodland to protect the candidate bat maternity trees. Buffers (including berms) shall be seeded.
   d. Maintain a 15 m buffer from the woodland to protect the candidate bat maternity trees.
   e. If minor vegetation clearing or pruning is required, avoid the work during migratory bird breeding season (April 1 to August 31) to ensure that no active nests are removed or disturbed, in accordance with the MBCA. If works are proposed during the breeding season, the area should be checked for nesting birds by a qualified professional prior to any vegetation removal or ground disturbance. If nesting birds are present, works in the area shall not proceed until after August 31 or until the nest has been confirmed inactive (e.g., young have fledged).
   f. Major site grading activities during construction phases shall be timed to avoid breeding, nesting and migration periods of amphibians and turtles (i.e., generally April 1 to September 31). Site personnel should be advised to take particular care when working in this active period for wildlife and instructed how to respond appropriately to wildlife encounters.
   g. Advise workers of potential incidental encounters with wildlife and the necessary protections. If an animal enters the work site, work at that location will stop and the animal should be permitted to leave without being harassed. If there are repeat observations of wildlife in the work area, barrier fencing may be used to direct wildlife away from active construction and toward natural areas.
   h. Temporary berm slopes adjacent to the PSW and significant woodland shall be graded at 2:1 and vegetated immediately into prevent erosion and sedimentation into the features.
   i. Prior to construction phases, robust sediment and erosion control fencing shall be installed along outer berm toe-of-slope adjacent to the PSW and the significant woodland. Erosion and sediment control fencing will act as a barrier to spills and disturbance that may impact the adjacent wetlands and woodlands, as well as aid in keeping existing vegetation intact. Sediment and erosion control fencing will be installed according to the Erosion and Sediment Control Guide for Urban Construction (TRCA, 2019).
   j. Soil stockpiles shall be established in locations where natural drainage is directed away from the adjacent wetlands and woodlands. No soil should be stockpiled in close proximity to wetlands or the adjacent woodland feature to the east. If this is not possible and there is a possibility of any stockpile slumping and moving toward the edge of these features, the stockpiles should be protected with alternative sediment and erosion control measures. Access to the stockpile should be confined to the up-gradient side.
   k. Sediment and erosion control fencing shall be inspected prior to construction and extraction operations to ensure it was installed correctly and during construction/extraction to ensure that the fencing is being maintained and functioning properly. Any issues that are identified are to be resolved in the same day.
   l. Sediment and erosion control fencing shall not be removed until adequate re-vegetation and site stabilization has occurred. Additional re-vegetation plantings and/or more time for vegetation to establish may be required; however, two growing seasons are typically sufficient to stabilize most sites.
   m. No heavy equipment, vehicles or other equipment is to enter adjacent natural areas. Limits of construction shall be delineated with Erosion and Sediment Control fencing prior to construction phases.
   n. Implement Best Management Practices (BMPs) for all refueling, fuel, and lubricant storage and equipment maintenance activities.
   o. Prohibit refueling and maintenance activities within 30 m of any waterbody.
   p. Implement a spill contingency plan during construction.
   q. Creation of suitable Bank Swallow habitat (e.g., soil stockpiles) during extraction should be avoided. Best management practices for deterring nesting during extraction activities shall be implemented (MNR, 2017). These measures shall include but are not limited to grading stockpiles, eliminating near vertical extraction faces, reducing slopes to 70 degrees or less beginning at the start of April until at least July 20 of any year.
   r. All necessary lighting for operations shall be directed downward and directed away from the adjacent PSW and significant woodland features.
   s. Boundaries of the extraction limits and license boundaries adjacent to the natural heritage features are clearly staked prior to construction phases. Monitoring shall occur during all construction phases to ensure boundaries are respected and the adjacent natural features remain unaffected.
   t. Ongoing weekly ESC monitoring shall occur for the duration of construction phases (e.g., berm construction and deconstruction) to ensure ESC measures are installed and maintained in good condition, including the establishment of seeding on the outer berms.

2. **Hydrogeology: "Hydrogeological Level 1 and Level 2 Assessment Proposed Bardoel Pit" March 20, 2025 and "Maximum Predicted Water Table Report" March 2025 (Source: Novaterra Environmental Limited)**
   a. Fuel storage onsite shall be in compliance with the Technical Standards and Safety Act 2000 and the Liquid Fuels Handling Code 2001, as may be amended.
   b. Maintenance and refueling of mobile excavation equipment and other vehicles shall take place in the fuel storage area. Crushers, stackers, and screening plants shall be refueled and maintained on the pit floor during daylight hours. Any minor drips or spills shall be immediately cleaned up and properly disposed of.
   c. The Licensee shall ensure that a spill contingency plan is developed prior to any operation of the pit and followed during the operations.
   d. The monitoring program shall consist of twice-annual (Spring and Fall) water level measurements at six monitoring wells (MW1, MW2, MW3, MW4, MW5 and MW6) and one staff gauge (SG1). Monitoring wells shall be maintained until the operation is completed and the site is rehabilitated.
   e. After issuance of the pit license, an initial report summarizing baseline conditions at the site shall be prepared and shall include all monitoring data up to the end of the calendar year in which the license was issued, and shall be submitted to the MNR. Subsequent monitoring data collected at the site shall be regularly reviewed to assess changes to hydrogeological conditions and shall be reported to the MNR only if major changes are observed; otherwise, the data will be made available to the MNR upon request.
   f. If complaints regarding groundwater interferences are received, the "Water Supply Interference Complaint Response Procedures" shall be followed and the licensee shall take appropriate measures as deemed necessary by the MECP and/or MNR to rectify the problem(s).

3. **Archaeology: "Stage 1-2 Archaeological Assessment Proposed Aggregate Pit Bardoel Farm" April 10, 2024 (Source: TMHC)**
   a. The Stage 2 assessment resulted in the identification of archaeological material in four locations, none of which qualify for Stage 3 assessment based on provincial criteria. As such, the subject property is considered free of archaeological concern and no further archaeological assessment is recommended. Should the licensing area change to encompass new lands that have not been subject to survey in this study, further archaeological assessment will be required prior to licensing approval.

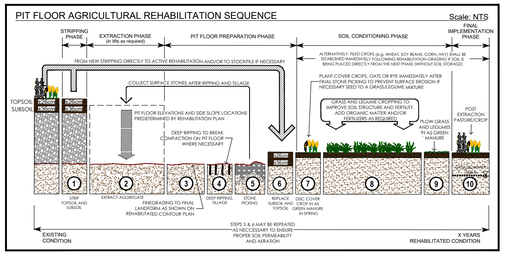
4. **Acoustic Assessment: "J-AAR Bardoel Farm Pit Acoustic Assessment" March 28, 2025 (Source: RWDI)**
   a. In summary, the following berms shall be required:

Berm	Minimum Height	Timing
B1	5m	Prior to Phase 1
B2	4m	Prior to Phase 2
B3	6m	Prior to Phase 1
B4	5m	Prior to Phase 1
B5	4m	Prior to Phase 1
B6	3m	Prior to Phase 2
B7	6.5m	Prior to Phase 3
B8	6m	Prior to Phase 3

   b. Berms constructed in previous extraction phases will remain for the subsequent phases.
   c. Crushing and screening activities are required to operate within the Processing Plant Region shown on the Sequence of Operations. Berms are required around the processing plant to further reduce sound levels at the receptors. These berms are required to be 8 m high. The berms must at least break line-of-sight and surround the plant on all sides except for an open section to allow for incoming and outgoing haul trucks. An example of the shape of the processing plant berm is shown in Figure 3 for scenario N1 in the Acoustic Assessment. Examples for the other scenarios are presented in Figure D1 of Appendix D.
   d. A berm is required to be solid, with no gaps or opening, and shall satisfy a minimum face density of 20kg/m². It could take the form of an earthen berm, acoustic barrier, stockpiles, working face, or a combination satisfying the requirement of a berm. Berms shall at least break the line-of-sight to the receptors.

5. **Agricultural Impact Assessment: "Agricultural Impact Assessment - Proposed Bardoel Pit" June 2025 (Source: MHBC)**
   The following recommendations are made to reduce the impacts of the proposed pit on the surrounding agricultural uses in the Primary and Secondary Study Area. Recommendations are also made for final and progressive rehabilitation to ensure the pit is returned to the same average soil capabilities and agricultural condition as pre-extraction:
   a. Extraction will occur in phases to minimize the amount of disturbed area. Later phases of the operation that are not currently in extraction should remain in agricultural production for as long as realistically possible.
   b. Agricultural rehabilitation shall be in accordance with the agricultural rehabilitation sequence schematic on the Rehabilitation Plan to ensure best practices are followed throughout the progressive rehabilitation of the pit.
   c. Prior to the commencement of stripping, agricultural baseline conditions shall be established by a qualified professional for the entire extraction area, using an accredited lab for any analytical testing. Soil inspections shall be conducted at a density to allow for sufficient coverage of the area. The parameters for the baseline conditions soil testing shall be determined by the qualified professional and shall include items such as soil macro and micronutrients, soil chemistry (e.g., pH, etc.), organic matter, soil texture and structure and bulk density.
   d. Progressive rehabilitation procedures that avoid substantial storage of topsoil and minimize the storage of subsoil shall be implemented. Stripped soils, not required for berm construction, shall be moved directly to depleted areas where they will be immediately used for agricultural rehabilitation. Stripping areas shall be limited to what is required for the season of operation.
   e. During pit operations, access to the agricultural rehabilitation areas and undisturbed areas used for agricultural purposes will be maintained.
   f. Topsoil and subsoil shall be replaced across the site at approximately the same pre-extraction depths as documented in the DBH Soil Report, 2024. For areas of the site to be returned to an agricultural condition, the minimum topsoil depth to be replaced will be 26 cm and the minimum subsoil depth to be replaced will be 36 cm.
   g. Soil will be handled under suitable conditions. Travel over soils and rehabilitated areas shall be minimized to reduce compaction. Ripping / tilling the soil will occur, where necessary, to alleviate soil compaction and shall avoid the mixing of soil materials / layers during the process.
   h. Once grading is completed, a vegetation cover (such as perennial crops) shall be immediately established within the agricultural rehabilitation area in order to reduce erosion, add organic matter to the soil and improve soil structure. A grass-legume cover crop shall be established throughout rehabilitation and maintained for up to five years and ploughed under annually in order to promote and increase organic matter. Alternatively, field crops (e.g. wheat, soy, corn, hay) shall be established immediately following rehabilitation grading.
   i. After final rehabilitation, soil testing shall be completed by a qualified professional to analyze soil conditions to demonstrate that pre-extraction soil capability (CLI Class 2 soil capability) has been restored. Adjustments to cropping practices and/or soil amendments may be required based on the results of the soil testing and shall be undertaken in consultation with the property owner. A report shall be submitted by a qualified professional following final rehabilitation and provided to MNR prior to Licence surrender to demonstrate that the agricultural area has been rehabilitated back to the pre-extraction soil capability (CLI Class 2 soil capability).
   j. Best management practices shall be implemented with respect to the storage and application of organic material, fertilizers, and pesticides.

6. **Traffic: "Traffic Impact Study - 583398 Hamilton Road" October 2024 (Source: Strik Baldinelli Moniz Ltd.)**
   a. The site access location meets minimum sight distance requirements, however, it is recommended that the small trees and brush in the Hamilton Road right of way within 10 m of the south edge of pavement along the frontage of the site be removed in order to ensure their foliage does not obstruct the sightline to the east of the site access.
   b. No road improvements are required to accommodate the proposed gravel pit.



D. Topsoil and Overburden

1. All on-site topsoil and overburden shall be used in progressive and final rehabilitation.
2. Refer to Agriculture notes (see note M. 'Technical Recommendations' on this page for details regarding the handling and placement of topsoil and overburden.

E. Drainage

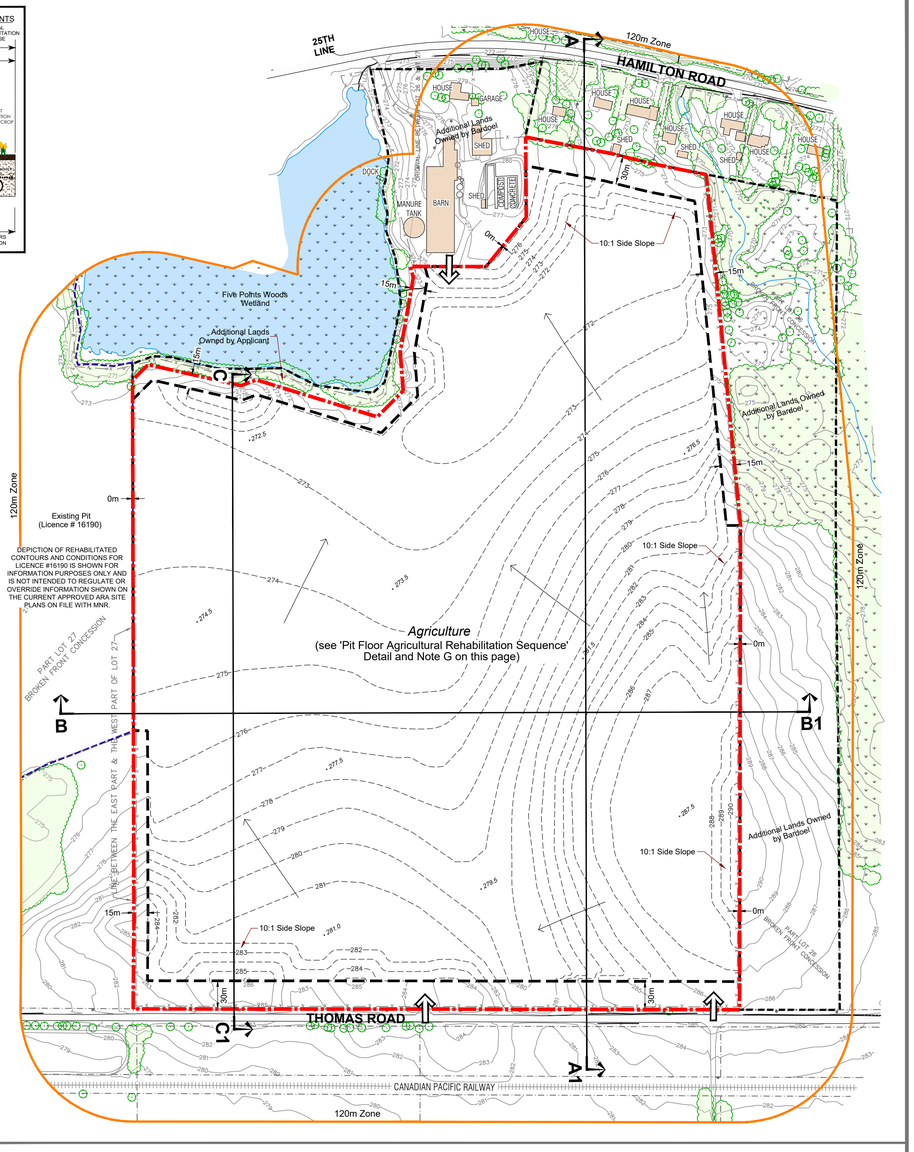
1. The final surface drainage will follow the rehabilitation contours and directional arrows shown on the plan view.
2. A surface water collection area shall be located in Phase 3.

F. Agricultural Rehabilitation

1. Within the extraction area, 45.3 ha shall be returned to an agricultural condition (in accordance with the "Pit Floor Agricultural Rehabilitation Sequence" detail on this drawing) with an average soil capability classification of CLI Class 2. The areas returned to an agricultural condition shall consist of the pit floor and maximum 10:1 slopes.
2. The technical recommendations from the Agricultural Impact Assessment, included in note N.1, shall be implemented during progressive and final rehabilitation to restore 45.3 ha of the extraction area to an agricultural condition.

G. General

1. All equipment shall be removed from the site.
2. No buildings, structures or haul roads will remain on site.
3. Access ramps shall remain to access the rehabilitated floor.
4. The final maximum predicted water table varies between 268.35 masl in the northern portion of the site and 285.56 masl in the eastern portion of the site. The maximum predicted water table is shown in each cross section on drawing 4 of 4.
5. The final end use is agricultural.



Legal Description

Pt Lt 26-27 Con Broken Front West Oxford,
Township of Southwest Oxford
Oxford County

Legend

- Boundary of Area to be Licensed
- Additional Lands Owned by Bardoel (Lessor)
- Existing Licensed Boundary (LICENCE #16190)
- Contour with Elevation (METRES ABOVE SEA LEVEL)
- Existing Fence (1.2m POST & WIRE FARM FENCE UNLESS OTHERWISE NOTED)
- Existing Vegetation
- Public Road
- Building/Structure (LOCATION AND USE FOR BUILDINGS ON-SITE AND WITHIN 120m ARE SHOWN ON THIS PAGE)
- Farm/Field Access
- Cross Sections (SEE PAGE 4 OF 4 FOR EXISTING AND REHABILITATED CROSS SECTIONS) — A1
- Limit of Extraction (ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELED DISTANCES)
- Proposed Contour and Elevation (METRES ABOVE SEA LEVEL (MASL))
- Proposed Elevation (RAHABILITATED ELEVATION (MASL))
- Direction of Surface Drainage
- Candidate Significant Wildlife Area

Site Plan Amendments

No.	Date	Description	By

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR, KITCHENER, ON, N2B 3X9 | P: 519.576.3650 | WWW.MHBCPLAN.COM

MNR Approval Stamp

Stamp

J-AAR Materials Limited
3003 Page Street
London, Ontario
N5V 4J1
Tel: (519) 652-2104

Applicant's Signature

Kevin Aarts
J-AAR Materials Limited

Project

Bardoel Pit

ARA Licence Reference No.

Pre-approval review:

For Submittal to MNR - June 2025

Plan Scale **1:3,000 (Arch D)**

SCALE
50 0 50 100
METRES

Plot Scale 1:3 [1mm = 3 units] MODEL

Drawn By G.C./DGS

Checked By N.D.

File No.

File Name

REHABILITATION PLAN

Drawing No.

3 OF 4

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2.0 Study Area

The agricultural land use assessment completed as part of this AIA was based on a study area comprised of a 'Primary Study Area' and 'Secondary Study Area.' The Primary Study Area is comprised of the lands within 120 metres of the proposed area to be licenced that will be directly affected by aggregate extraction. The Secondary Study Area encompasses a radius of 1.5 kilometers from the subject lands that has the potential to be directly and indirectly impacted by the proposed aggregate extraction operations.

A plan identifying the adjacent properties, existing crops, and existing barns within the study area is included as **Figure 4** of this report. The inventory of existing agricultural land uses, cropping practices and structures is based on observations made during a site visit completed on February 27th, 2024 (with no snow cover and identification of crop stubs from the previous season), review of air photography and input from the current landowner. A review of 2021, 2016, and 2011 Census of Agriculture data was also undertaken to confirm if the agricultural uses in the Study Areas are representative of agricultural production patterns and livestock types in the broader region.

2.1 Primary Study Area

Based on the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) 'Draft Agricultural Impact Assessment (AIA) Guidance Document' (herein referred to as 'OMAFRA AIA Guidelines'), the primary study area when conducting an Agricultural Impact Assessment for mineral aggregate resource extraction consists of the proposed licence area and lands within 120 metres of the licenced area. As shown in **Figure 4,** the predominant land use within the primary study area is agricultural. Agricultural uses within the primary study area consist of typical cash crops and a dairy operation. Current agricultural production includes corn and hay. In terms of agricultural structures, a shed, a dairy barn, and a manure tank are located on the northwestern portion of the lands along Hamilton Road. These structures are located outside of the proposed licence boundary and will be retained during and post extraction. There are no visible signs of extensive agricultural improvements to the lands proposed to be licenced (e.g. new fencing, tile drainage). The subject lands are located on Hamilton Road (Highway 9), east of the existing J-AAR Walmsley Pit (Licence No. 2157) where much of the material proposed to be extracted on the subject lands is planned to be transported for processing.

2.2 Secondary Study Area

According to the OMAFRA AIA Guidelines, the secondary study area should include lands that will be potentially impacted by the development and should, at a minimum, include lands adjacent to the primary study area. For mineral

aggregate operations, the extent of the secondary study area varies depending on the scale and extent of the proposed mineral aggregate operation and on agriculture in the surrounding area. To be conservative, the secondary study area for this AIA includes lands within 1.5 kilometers of the proposed licenced boundary.

As shown on **Figure 4**, land uses within the secondary study area consist of a mixture of agriculture (cash crops and livestock), environmental features (wetlands, valley lands, and woodlands), and lands within the Ingersoll Urban Boundary. Surrounding crops include corn and soy (north, east, and west); and, hay, corn, and wheat (south). Several livestock operations are within the Secondary Study Area including a dairy operation (north); horse stables, dairy farms, and a turkey operation (north of the river); and a dairy farm (south). Appendix A includes a more detailed summary of the agricultural uses and structures within the secondary study area that existed on the day of the field observations. Comments on the physical characteristics of existing farm structures are based solely on roadside observations and not supported by any formal structural assessment. When roadside visibility was limited due to visual obstruction, aerial photography has been used.

Based on the site visit, the agricultural lands within the Primary and Secondary Study Areas reflect typical agricultural cropping practices that are predominant throughout southern and central Ontario (soybean, corn, and forage production). No extensive land improvement investment such as tile drainage, irrigation or other specialized cropping practices or equipment were observed or documented within the Primary or Secondary Study Areas. The Parker Drain runs through the wetland in the northwestern corner of the property and across the adjacent lands to the west.

Large-scale livestock production is present within the Study Area, notably a dairy operation is present on the subject lands (outside of the proposed licenced area) and just south of the subject lands. Both operations are confined to barns. The equestrian, turkey, and dairy barns located north of the subject lands are well separated from the subject lands by the river and valley lands.

The surrounding area (Secondary Study Area) also includes a cluster of aggregate pits, primarily to the west and south of the site: Wilford Pit (Licence No. 16190), Langford Pit (Licence No. 2337), Ross Pit (Licence No. 2194), Cold Springs Pit (Licence No. 15819), Newbigging (Putnam) Pit (Licence No. 2248), Horley Pit (Licence No. 2306), and Erwin South Pit (Licence No. 626094). More aggregate operations exist beyond the Secondary Study Area to the south-west of the site.

In addition to the farm operations referenced in Figure 4 and Appendix A, there are a number of rural residential lots within the Secondary Study Area, primarily along Hamilton Road/Highway 9. A number of these lots were likely created through rural residential severances.

Overall, the Secondary Study Area is representative of normal livestock and cropping practices for this area.

2.3 Census of Agriculture & Ontario Business, Agri-Food, and Farm Data Profile for Oxford County

The 2021 and 2016 Census of Agriculture and OMAFRA's Ontario business, agri-food, and farm data profile for Oxford County were reviewed to provide an overview of agricultural production patterns and parcel size in the County.

North American Industry Classification System (NAICS) data for 2011, 2016, and 2021 were utilized to determine trends in farm types within the County. In 2021, regarding crop production, Oxford County crop farming was dominated by oilseed and grain farming (40.3% of all farms), predominantly other grain farming (34.3% of oilseed and grain farms) and soybean farming (28.3 %)[1]. Oilseed and grain farming has increased in the County since 2011 (increase of 23.29 % in number of oilseed and grain farms from 2011 to 2021). As of 2021, the next most common category of crop framing in Oxford County is 'other crop farming' (6.5%), which primarily includes hay farming (42% of other crop farming). Other crop farming has increased since 2011 (increase of 24.76%). Oilseed and grain farming and other crop farming, primarily hay farming, are the most common crop type within the study area, which is reflective of agricultural patterns throughout Oxford County.

In terms of livestock, cattle ranching and farming comprised 24.4% of farms (of which 39.1% of farms were beef cattle and 60.9% dairy cattle) in Oxford County. Cattle farming has exhibited a 7.91% increase in number of farms since 2011. Several dairy and beef farms are located within the study area. Poultry farming comprises 8.2% of farms within the County; number of poultry farms have increased by 45.13% since 2011. Other animal farming comprises 6.4% of farms within the County, primarily horse and other equine production 50.0%. Several equine farms were observed within the study area.

In terms of parcel size, in 2021 the greatest number of farms (26.88%) were within the 10 - 69-acre farm size, followed by 23.64% of farms falling in the 70 – 129-acre range[2]. The amount of lands in crop production has increased since 2011 from 138,044[3] hectares to 175,130[4] hectares, representing an increase in cropland of 26.87%.

Based on the site visit, the agricultural activities within the Primary Study Area appear to be indicative of broader agricultural trends in Oxford County. The surrounding crops include typical cash crops such as soybeans and corn, as well as hay and other forage crops. Surrounding livestock includes dairy cattle, beef cattle, turkeys, and horses.

Overall, both the Primary and Secondary Study Areas are representative of normal agricultural production for this area and do not consist of specialized farming practices or specialty crops. The proposed rehabilitation approach, discussed in further detail below, will return the lands to a primarily agricultural condition that is consistent with the average parcel size and agricultural production found in the County of Oxford.

[1] Table 32-10-0231-01 Farms classified by farm type, Census of Agriculture, 2021

[2] Table 32-10-0232-01 Farms classified by total farm area, Census of Agriculture, 2021

[3] Table 32-10-0406-01 Land use, Census of Agriculture, 2011 and 2016, inactive

[4] Table 32-10-0249-01 Land use, Census of Agriculture, 2021

3.0 Field Data Collection

3.1 Soil and CLI Capability

The Canada Land Inventory (CLI) system uses soil attributes to create a seven-class system of land use capabilities. Class 1, 2 and 3 soils are capable of sustained common field crop production. Class 4 soils are limited for sustained agriculture while Class 5 is capable for use of permanent pasture and hay. The sixth class is best utilized for wild pasture and Class 7 is for soils or landforms that are not capable for use for arable culture or permanent pasture. According to the Canada Land Inventory Soils Map produced by the province, (see **Figure 5**), the subject lands are comprised of Class 2 soils. These soil types are considered prime agricultural soils (see Section 4.1 of this report for further discussion on this matter).

To confirm the soil type and classification and to help inform the rehabilitation plans, a Soil Survey and Canada Land Inventory Classification was prepared by DBH Soil Services Inc. (DBH). A copy of the Soil Survey is included as **Appendix B** of this report. On-site soil surveys were conducted on May 16th, 2024, to more accurately map and classify the soil resources of the soil materials on the subject lands. The soil survey included a number of tasks including:

- Completion of a review of published soil data;
- Review of published Canada Land Inventory (CLI) ratings for the soils in the area surrounding the subject lands;
- Review of aerial photography and interpretation of the soil polygons, disturbed soil areas and miscellaneous landscape units (i.e. streams, wayside pits);
- On-site soil survey; and
- Mapping to illustrate the location of the subject lands, the occurrence of soil polygons and appropriate CLI capability ratings.

A total of 32 soil inspection sites within the proposed licenced area were examined and the information was then correlated with soil descriptions in order to produce the soils map. A soil map identifying the soil series present on the subject lands is shown on **Figure 6**.

The onsite soil survey identified two soil series, and one miscellaneous soil groups. The two soil series were identified as Brisbane Sandy Loam and London Loam. The miscellaneous soil group comprised the lands associated with existing laneway that extends from Thomas Road north to the main farm building area.

The following tables summarize the relative percent area occupied by each capability class for the subject lands:

Table 1: Canada Land Inventory – Bardoel Pit

Canada Land Inventory Class (CLI)	Licence Area		Limit of Extraction	
	Area (ha)	Percent Occurrence (%)	Area (ha)	Percent Occurrence (%)
Class 1	4.6	9.3	4.1	9.1
Class 2	32.0	64.7	29.6	65.3
Class 3	4.8	9.9	4.4	9.7
Class 4	8.0	16.1	7.2	15.9
Class 5	-	-	-	-
Class 6	-	-	-	-
Class 7	-	-	-	-
Not Rated	-	-	-	-
Totals	49.4	100.0	45.3	100.0

The proposed licensed area is comprised of approximately 83.9 percent Canada Land Inventory (CLI) class 1 – 3 soils, with CLI class 1 of approximately 9.3 percent, CLI class 2 of approximately 64.7 percent, and CLI class 3 of approximately 9.9 percent. The remaining mineral soils (CLI class 4 – 7) comprise approximately 16.1 percent of the licenced area. The Extraction Area comprises approximately 84.1 percent CLI class 1 – 3 soils, with CLI class 1 of approximately 9.1 percent, CLI class 2 of approximately 65.3 percent, and CLI class 3 of approximately 9.7 percent. The remaining mineral soils (CLI class 4 – 7) comprise approximately 15.9 percent of the Limit of Extraction Area. The presence of the Class 1, 2 and 3 soils mean that the subject lands are considered prime agricultural lands.

Concerning drainage on the properties, an evaluation was done by DBH through a correlation of observations noted during windshield surveys, aerial photographic interpretation, and a review of the OMAFRA's Artificial Drainage System Mapping. Based on the information available, it does not appear that drainage systems are registered to the subject lands. As well, observations noted during the surficial soil survey indicated that the lands are not irrigated, and that the property is not set up for the use of irrigation equipment. Therefore, no additional investment in agriculture is associated with these lands.

The Hoffman Productivity Index (HPI) is a tool that is used to relate the productivity of lands to the CLI soil capability. The value is derived from the sum of the percent occurrence of each CLI Soil Capability Class on the parcel multiplied by the productivity index corresponding to the soil class. Based on the findings from the Soil Survey prepared by DBH Soil Services Inc., the calculated Soil Productivity Rating is 0.75 or a CLI class 2 equivalent for the proposed licenced area, and 0.72 or a CLI Class 2 equivalent for the proposed extraction area.

The DBH analysis confirms that a large portion of the subject lands is comprised of Class 2 soils. The presence of the Class 1, 2, and 3 soils mean that the subject lands are considered prime agricultural lands.

3.2 Microclimate for Specialty Crop Production

Climate data was obtained from the OMAFRA document titled "Agronomy Guide for Field Crops – Publication 811 (June 2009)". The subject lands are located within the 3100-3300 average accumulated Crop Heat Units (CH-MI) area in Ontario. The Crop Heat Units (CHU) index was originally developed for field corn and has been in use in Ontario for 30 years. The CHU ratings are based on the total accumulated crop heat units for the frost-free growing season in each area of the province. CHU averages range between 2300 near North Bay to over 3500 near Windsor. The higher the CHU value, the longer the growing season and greater are the opportunities for growing value crops. The property is located within the 3100-3300 average accumulated Crop Heat Units (CH-MI) and as such, the agricultural lands are not subject to special climatic conditions. Given the typical climatic conditions, there are limited opportunities for growing speciality crops, and therefore, the properties have not been identified as a specialty crop area in the Oxford County Official Plan and do not meet the criteria as identified by the Province.

Figure 4: **Agricultural Land Use**

Bardoel Pit
Township of Southwest Oxford
Oxford County

LEGEND

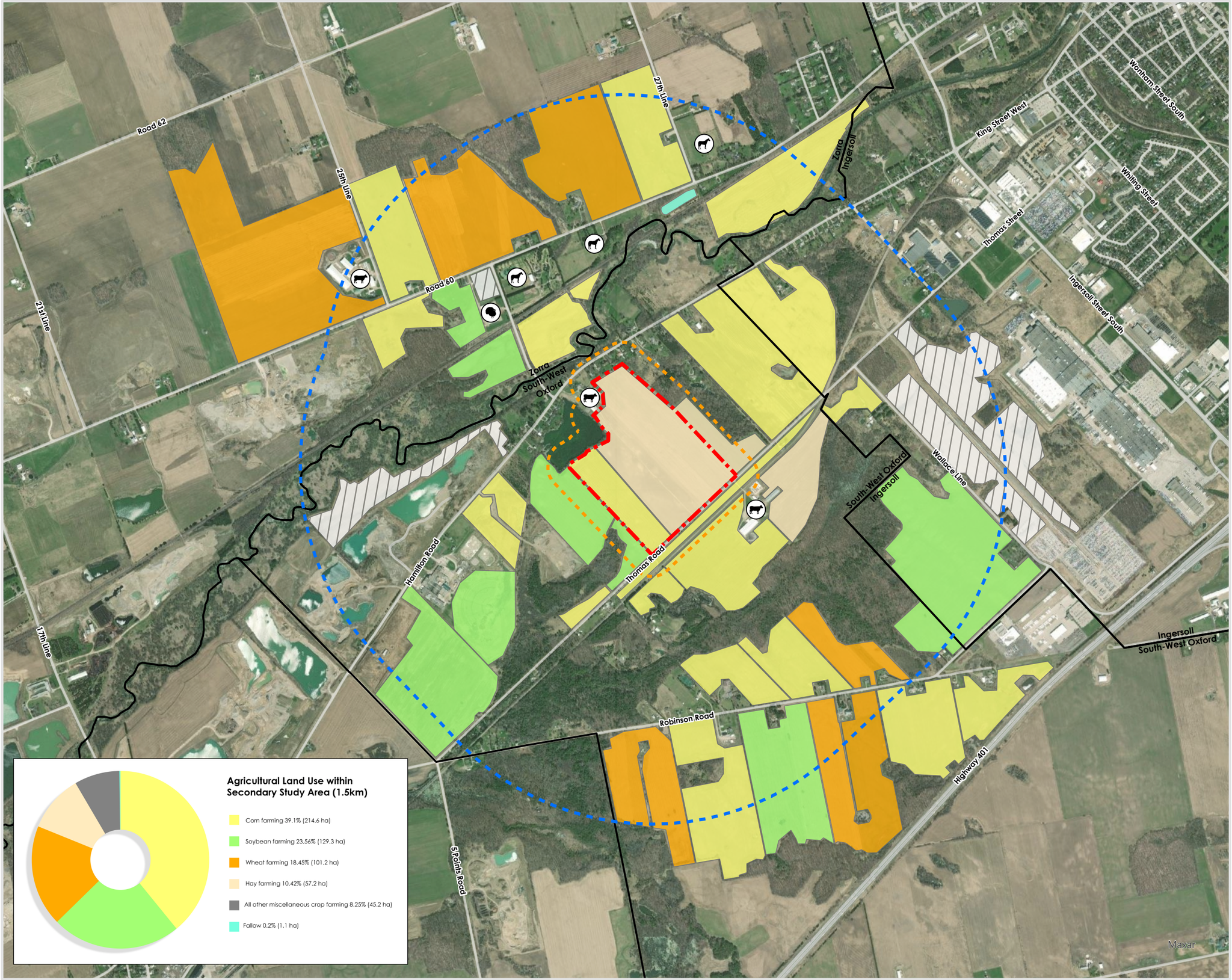
- Boundary of Area to be Licensed
- Primary Study Area (120m)
- Secondary Study Area (1.5km)
- Municipal Boundary

Livestock

- Dairy cattle and milk production (3)
- Horse and other equine production (3)
- Turkey production (1)

Agricultural Land Use

- Corn farming
- Hay farming
- Soybean farming
- Wheat farming
- Fallow
- All other miscellaneous crop farming



Sources:
- Land Use information based on field visit February, 2024.
- Contains information licensed under the Open Government Licence – Ontario.

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200-540 BINGEMANS CENTRE DR, KITCHENER, ON, N2B 3X9
P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

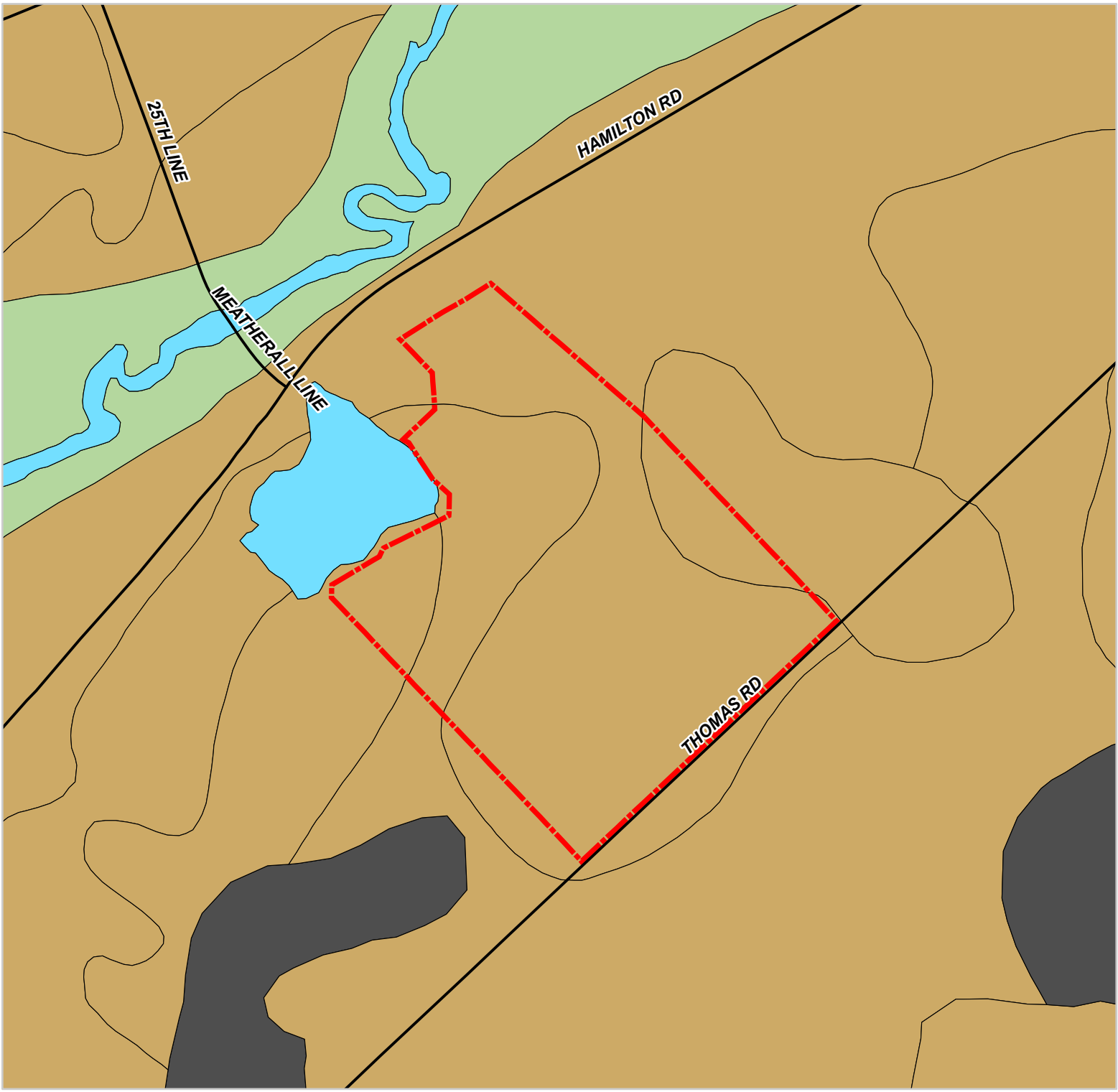

Figure 5
CLI Soil Mapping

PART OF LOTS 26 & 27,
BROKEN FRONT CONCESSION
Township of South-West Oxford
County of Oxford

Legend

Subject Lands

Soil Class

- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
- Class 6
- Class 7
- Organic
- Water
- Other

Source: Land Information Ontario (LIO) Open data

Date: May 2024

Scale: 1:10,000

File: 18218A

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MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

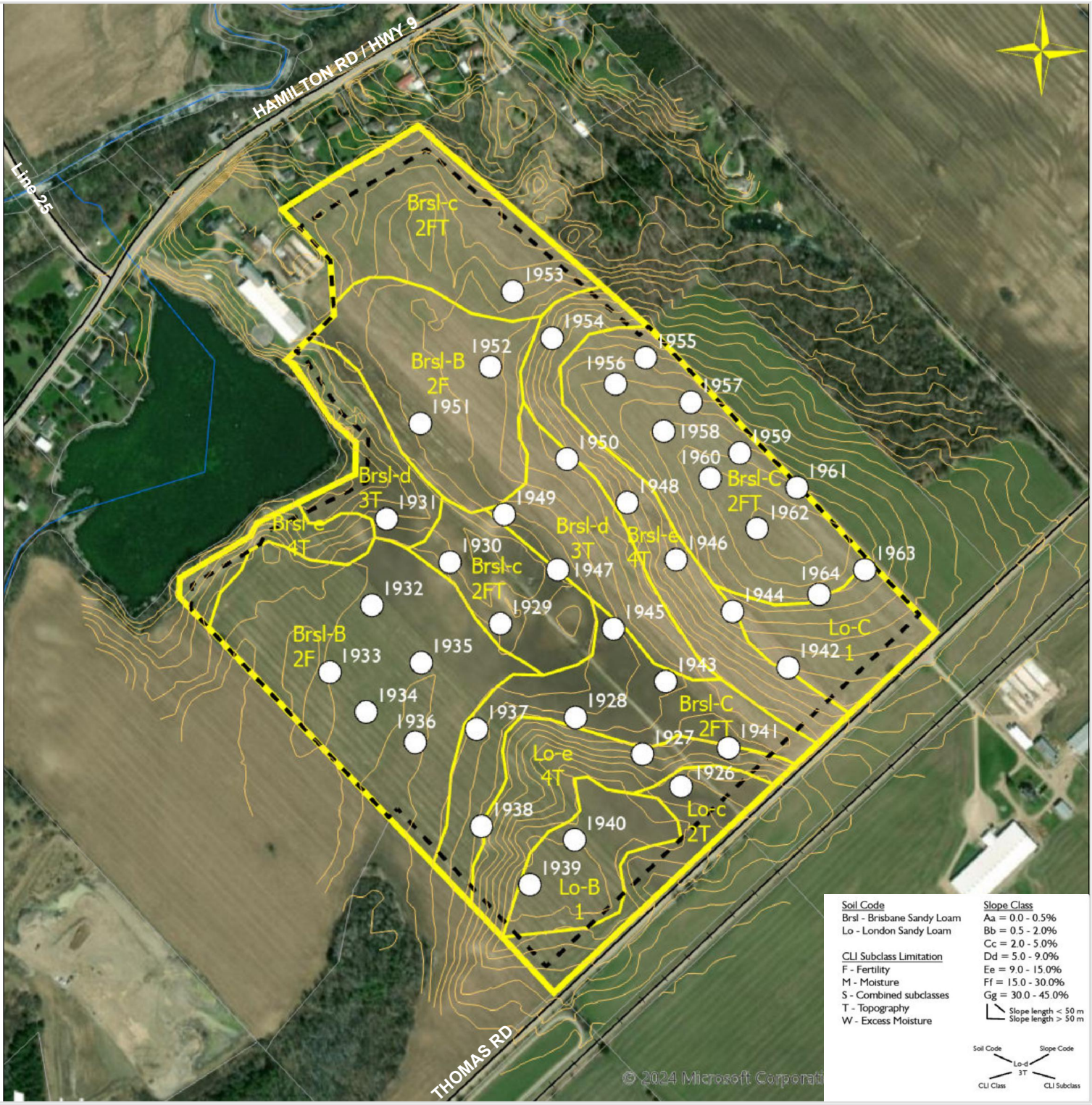

Figure 6
Detailed Soil Survey

PART LOTS 26 & 27,
BROKEN FRONT CONCESSION
Township of South-West Oxford
County of Oxford

LEGEND

- Soil Inspection Locations
- Contour Line (MHBC)
- Railway (MNRF)
- Roads (Oxford County)
- Watercourse (MNRF)
- License Area
- Limit of Extraction
- Parcel Data (Oxford County)
- Soil Polygon Boundary

Sources:
Aerial Imager: Maxar, 2024
Soil Survey: DBH Soil Services Inc, June 2024.

DATE:	August 2024
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FILE:	18218A
DRN:	CCF

north

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4.0 Planning Policy Framework

A number of key documents were reviewed as part of this Agricultural Impact Assessment to provide a comprehensive assessment of the policy framework from an agricultural perspective regarding the proposed aggregate extraction operation. The following is review of the land use policy framework related to the subject lands.

4.1 Provincial Planning Statement 2024

The final version of the Provincial Policy Statement, 2024 (PPS) was released on August 20th, 2024 and took effect on October 20th, 2024. The PPS, 2024 integrates the PPS and Growth Plan into a single planning document that will apply province wide.

The PPS defines "Prime agricultural areas" as:

> "*areas where prime agricultural lands predominate. This includes areas of prime agricultural lands in associated Canada Land Inventory Class 4 through 7 Lands, and additional areas where there is a local concentration of farms which exhibit characteristics of ongoing agriculture. Prime agricultural areas may be identified by the Ontario Ministry of Agriculture and Food using guidelines developed by the Province as amended from time to time. A prime agricultural area may also be identified through an alternative agricultural land evaluation system approved by the Province.*"

Further, the PPS defines Prime agricultural land as:

> *"specialty crop areas and / or Canada Land Inventory Class 1, 2 and 3 lands, as amended from time to time, in this order of priority for protection."*

The PPS defines agricultural condition as:

> *in regard to prime agricultural land outside of specialty crop areas, a condition in which substantially the same areas and same average soil capability for agriculture will be maintained,* ***restored or enhanced*** (emphasis added to illustrate change)

Further, the PPS defines specialty crop areas as:

> "*areas designated using guidelines developed by the province, as amended from time to time. In these areas, specialty crops are the predominantly grown, such as tender fruits (peaches, cherries, and plums), grapes, other fruit crops, vegetable crops, greenhouse crops, and crops from agriculturally developed organic soil, usually resulting from:*
>
> *a) Soils that have suitability to produce specialty crops, or lands that are subject to*

special climatic conditions, or a combination of both;

b) *Farmers skilled in the production of specialty crops; and*
c) *A long-term investment of capital in areas such as crops, drainage, infrastructure and related facilities and services to produce, store, or process specialty crops."*

The lands and surrounding areas have not been identified or designated as a specialty crop area by the province or the municipality and neither do the lands exhibit characteristics of a specialty crop production as defined by the PPS. Accordingly, the subject lands are not within a specialty crop area.

As previously noted, based on the Canada Land Inventory mapping and the soil survey completed by DBH Soil Services Inc., 83.9% of the proposed licenced area consists of Class 1, 2, and 3 soils and CLI class 4 – soils comprise approximately 16.1% of the subject lands. In accordance with Section 4.3.2 of the PPS, Oxford County identifies prime agricultural lands within the County as Agricultural Reserve.

In prime agricultural areas, the PPS permits agriculture uses, agriculture-related uses and on-farm diversified uses. In accordance with the Provincial Policy all types, sizes and intensities of agricultural uses and normal farming practices are promoted and protected in prime agricultural areas.

Policy 4.3.5.1 of the PPS, 2024 permits the extraction of mineral aggregate resources as a non-agricultural use in prime agricultural areas. Policy 4.3.5.2 of the PPS requires that:

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

Relevant to the proposed pit, Policy 4.5.4 provides:

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

Policy 4.5.4 permits the extraction of mineral aggregate resources as an interim use in prime agricultural areas on prime agricultural land, requires rehabilitation back to an agricultural condition, and requires preparation of an Agricultural Impact Assessment to demonstrate that impacts to the prime agricultural areas are addressed.

Overall, this Agricultural Impact Assessment analyzes potential impacts of the operations on agricultural lands and provides measures to ensure that these impacts are mitigated. As well, the operation is planned to be rehabilitated to an agricultural condition as defined in the PPS, 2024. Table 2 outlines how much land will be rehabilitated.

Table 2: Agricultural Land to be Rehabilitated.

a) Total area to be licenced	49.4 hectares
b) Total area to be extracted	45.3 hectares
c) Total existing agricultural land to be extracted	45.3 hectares
d) Total land to be rehabilitated	45.3 hectares
e) Area to be rehabilitated to agricultural condition (including 10:1 slopes)	45.3 hectares
f) Percentage of agricultural land to be rehabilitated back to agricultural condition	100%

45.3 hectares of existing agricultural land is to be extracted. Of the 45.3 hectares currently in agricultural production, 43.9 hectares will be rehabilitated to an agricultural condition, in which substantially the same area and same average soil capability for agriculture are restored.

The rehabilitation plan (Section 6.0) prescribes a process / methodology to rehabilitate and restore the licenced area. Rehabilitation is consistent with PPS Policy 4.5.4.1, returning a majority of the lands to an agricultural condition. Agricultural rehabilitation will be maximized.

Based on the proposed rehabilitation plan, approximately 100% of the area to be extracted will be returned to an agricultural condition. Based on the Soil Survey results, rehabilitation will be required to return the lands to an average of CLI Class 2 soil capabilities.

Given the foregoing, it is our opinion that the associated rehabilitation plans for the proposed pit are consistent with the PPS 2024.

4.2 Oxford County Official Plan (March 2023 Consolidation)

The Oxford County Official Plan was adopted by Oxford County in 1995 and approved by the Ministry of Municipal Affairs and Housing in 1996. Official Plan Amendment Number 269 (OPA 269) was adopted by Council May 25th, 2022, and approved by the Ministry of Municipal Affairs and Housing on February 8th, 2024. OPA 269 provides updated policies that apply to the existing 'Agriculture Reserve' designation, along with affiliated changes to section cross references and definitions to support and implement the agricultural policies. These updates were conducted to ensure compliance with applicable legislation, policies, and guidelines.

The Official Plan designates the subject lands as "Agricultural Reserve" within a 'Limestone Resource Area' (Schedule S-1); the lands are also located within a Wellhead Protection Area (Schedule C-5). The wetland in the northwest corner of the property is identified as a 'Provincially Significant Wetland' (Schedule C-1). A comprehensive analysis of Official Plan policies has been undertaken in the Planning Report and ARA Summary Statement; this AIA focuses on mineral and petroleum resource policies as they relate to the Agricultural Reserve designation and prime agricultural lands.

The Official Plan recognizes that the agricultural land base makes up a significant portion of the County and that the County is comprised of large areas of prime agricultural land with considerable agricultural potential. The policies of Section 3.1 of the Official Plan endeavor to manage development in the prime agricultural area in a manner that is supportive of a strong agriculture industry.

Policy 3.1.3 provides that the Agricultural Reserve designation identifies the rural area of the County which is intended for long term agricultural use. Further, Policy 3.1.4 permits sand and gravel, oil, gas and gypsum extraction and ancillary uses as permitted as interim uses within the Agricultural Reserve designation, in accordance with the policies of Section 3.4 (Resource Extraction Policies) of the Official Plan. Overall, the Official Plan recognizes that the County's agricultural land base should be protected, and the use of the land should be predominately related to agriculture, with aggregate resource extraction as permitted interim use.

Oxford County contains significant reserves of mineral aggregate resources, including bedrock-derived crushed stone and naturally occurring sand and gravel and plays an important role in mineral aggregate resources production in the Windsor-Woodstock corridor. While the County is a major producer of mineral aggregate resources for the local, area and provincial markets, the locations where the mineral aggregate resources have been identified are, for the most part, overlain by prime agricultural lands. The challenge facing Oxford County is to protect deposits of mineral aggregate resources for future extraction while similarly protecting agricultural land.

In terms of aggregate extraction on agricultural lands, Policy 3.4.1.1 aims to protect prime agricultural areas for long-term use for agriculture and ensure that as much prime agricultural land as possible is kept in agricultural production for as long as possible and that extraction occurs in a coordinated and progressive manner. In addition, the policy requires that impacts from mineral aggregate extraction on surrounding agricultural operations and lands be mitigated to the extent feasible. Further, the County places priority on the rehabilitation of prime agricultural lands to an agricultural condition (Policies 3.4.1.3.5 & 3.4.1.3.6).

The Official Plan recognizes that aggregate operations are an appropriate use in the agricultural area of the County. The proposed new pit licence will minimize and mitigate impacts on adjacent and surrounding agricultural uses through measures outlined in the operational plan and summarized in **Section 5.0** of this Report, including through rehabilitation of the subject lands back to an agricultural condition.

4.3 Township of South-West Oxford Zoning By-law No. 25-98

The subject property is zoned General Agricultural (A2) within a Limestone Resource Overlay in the County's Zoning By-law; the Provincially Significant Wetland in the northwest corner is indicated by the Environmental Protection 1 Overlay. This zone permits a variety

of agricultural and agricultural-related uses. A zoning by-law amendment is required to permit the proposed extractive use of the subject property.

Figure 7
County of Oxford Official Plan Schedule "S-1": Township of South-West Oxford Land Use Plan

PART LOTS 26 & 27,
BROKEN FRONT CONCESSION
Township of South-West Oxford
County of Oxford

LEGEND

- License Boundary
- Agricultural Reserve
- Open Space
- Environmental Protection
- Limestone Resource Area
- Rural Cluster
- Floodline

Source:
County of Oxford (Sept. 28, 2022)

DATE:	May 2024
SCALE:	NTS
FILE:	18218A
DRN:	CAC

north

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MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
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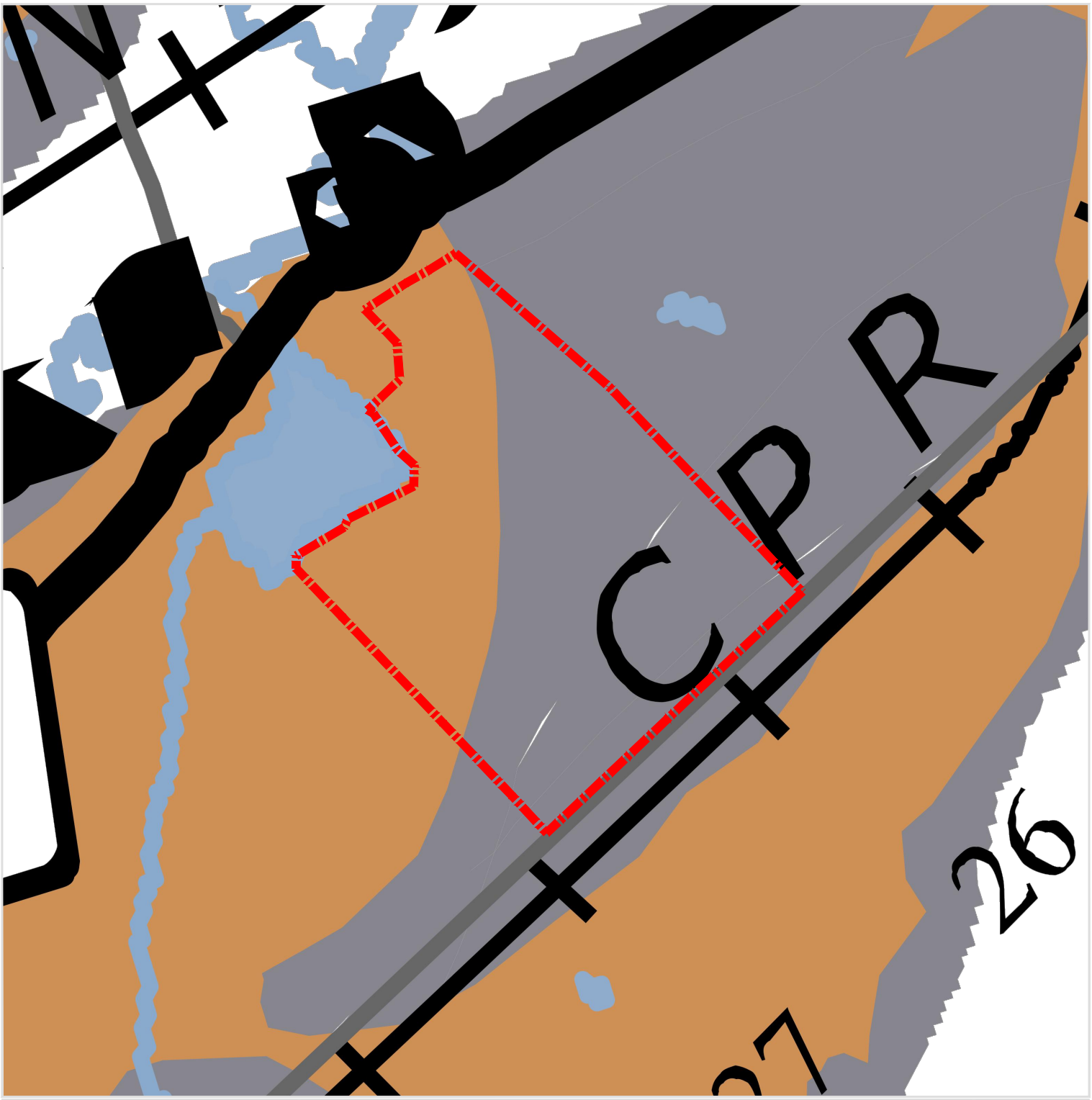

Figure 8
County of Oxford Official Plan Appendix 2-1 Mineral and Petroleum Resources

LEGEND

- License Boundary
- Sand and Gravel Resource Area
- Limestone Resource Area
- Municipal Limits
- Railroads

DATE:	May 2024
SCALE:	1:10,000
FILE:	18218A
DRN:	CAC

north

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PART LOTS 26 & 27,
BROKEN FRONT CONCESSION
Township of South-West Oxford
County of Oxford

Source:
County of Oxford (Jan. 11, 2017)

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5.0 Assessment of Impact

The following section provides an assessment of the potential impacts of the proposed pit on components of the Agricultural System.

5.1 Reduction/Loss of Agricultural Land and Infrastructure

The Bardoel Pit is proposed to extract 45.3 hectares (112 acres) of land currently in agricultural production (cash crops), the majority of which are lands with an average soil capability of CLI Class 2 soils. There is no removal of agricultural structures proposed, and therefore no loss of agricultural infrastructure is associated with the proposed pit. The type and nature of the agricultural uses on the subject lands are typical of Oxford County and of cropping practices throughout southern/central Ontario, as confirmed through a review of 2021 and 2016 Census of Agriculture and OMAFRA's Ontario business, agri-food, and farm data profile for Oxford County.

According to the ARA rehabilitation plans, a total of approximately 43.9 hectares (108.5 acres) of the subject lands will be returned to agriculture. Thus, the rehabilitation of the subject land results in 100% of the agricultural land being returned to an agricultural condition. As a result, there is a no permanent loss of farmland from the proposed pit.

5.2 Fragmentation of Agricultural Lands

Agriculture uses and activities benefits from being adjacent to the other agricultural operations and if lands are fragmented, there is potential to negatively impact farming practices on the isolated farm parcels. The proposed Bardoel Pit will not result in creating isolated agricultural lands as the aggregate operation is an interim use and will be returned to an agricultural condition. Further, agricultural production will continue throughout the operation based on the proposed phasing plan.

The 2021 Census of Agriculture indicates that the average farm size for Oxford County is within the 10 - 69-acre farm size with grain and oilseeds being the most predominant crop production. Rehabilitation efforts will return 43.9 hectares (108.5 acres) back to an agricultural condition to support grains and oilseed production (corn, soy, and wheat), which meets the average farm size in Oxford County.

The land uses within the surrounding area, and more particularly within the secondary study area, are interspersed with existing rural residential lots, agricultural operations, licenced aggregate operations, and natural heritage features. The location of the Ingersoll settlement area east of the subject lands also contributes to the existing fragmentation of the agricultural system regardless of the proposed

pit. Additionally, much of the adjacent lands to the west of the pit contain existing aggregate operations, indicating pre-existing fragmentation of the agricultural landscape. The Site Plans indicate that the majority of the Bardoel Pit will be rehabilitated back to an agricultural condition.

When the aggregate operation is returned to an agricultural after use, the lands will be less fragmented and comprise of a more consistent agricultural landscape. As a result, the proposed aggregate operation and final rehabilitated landform will have a negligible impact on agricultural land fragmentation in the area.

5.3 Hydrogeology

Management of water resources is an important consideration for farm operations, particularly for watering field/ vegetable crops and hydrating livestock. Changes to the hydrologic and/or hydrogeologic conditions in the area surrounding the subject lands could have a negative impact on farm operations and crop yields.

The proposed aggregate operation on the subject lands is proposed at a maximum depth of extraction of 1 metres above the maximum predicted high-water table across the site. Since aggregate extraction is above the water table, no dewatering will occur. A Maximum Predicted Water Table Report was prepared by Novaterra Environmental Ltd. (March 2025) in support of the proposed Class 'A' pit below-water-table licence application.

Based on the hydrogeological investigation, Novaterra concludes that the pit floor will remain a minimum of 1.0 metres above the maximum predicted water table elevation on-site. No discharge to any surface water bodies or courses, and no drawdown of the water table is expected because of the proposed extraction activities. While a portion of the site is located within a wellhead protection area (WHPA) associated with Ingersoll Municipal Well 3, no hydrologic relationship was determined to exist between Well 3 and the water table at the subject site; site activities are also not expected to pose a threat to the Ingersoll's drinking water. Fluctuations in groundwater levels are expected to remain in the normal range of annual variation for the groundwater system.

The hydrogeological site assessment and associated calculations indicate that the proposed mining of sand and gravel deposits will not have any adverse effect on water resources, natural environment in the area, and domestic water wells including Ingersoll Municipal Well 3. The Maximum Water Table Elevation Report provides a number of mitigation measures to be included on the Site Plan, including: A private well monitoring survey to be conducted prior to extraction and an initial report summarizing background conditions at the site with updated water level data prepared within 3 months after the end of the calendar year of licence issue.

5.4 Traffic

A Traffic Impact Study was prepared by Strik Baldinelli Moniz (SBM, August 2024). The proposed gravel pit will occupy an approximate 45.3 hectares (112 acres) with a maximum annual extraction limit of 500,000 tonnes of material. Access to the site will be accommodated through the existing driveway location on Hamilton Road. The pit is proposed

to operate Monday through Friday, 7am to 7pm, and Saturday's 7am to 1pm with holiday closures. The pit operation will include extraction and processing operations from March to November (inclusive), with limited operations December through February, and shipping operations year-round.

The Traffic Impact Assessment forecasted that the proposed gravel pit could generate up to 32 trips in each of the AM and PM peak hours (16 in and 16 out). Turning movement counts were conducted in December which is not a time that reflects peak farming operations. Turning movement volumes at all study area intersections were increased by 20% to better reflect peak-season volumes. Any farming equipment travelling through the study area intersections was included in the 'heavy vehicle' count. Overall, the addition of the aggregate operation is not anticipated to have significant impact on study area intersections. It is expected that at least 80% of the truck traffic will travel to/from the west (towards London), therefore the primary haul route will be west along Oxford Road 9 (becomes Middlesex Road 29 two kilometers west of the site), with some trucks splitting off to the north or south on Middlesex Road 30 (in Putnam). The Middlesex County roads through Putnam already accommodate truck traffic from the many existing gravel pits in the area, therefore the minor additional truck traffic generated from the proposed gravel pit should not have any noticeable impact, and area residents are already accustomed to heavy truck traffic.

Trucks heading to/from the east are primarily expected to follow Oxford Road 9 (Hamilton Road and King Street West) to Oxford Road 10 (Ingersoll Street), with the majority going to/from the south for access to Highway 401 and some local loads going north. This route travels through the industrial area in the west end of Ingersoll, which already accommodates significant heavy truck traffic, therefore impact from the site generated traffic is expected to be extremely minimal.

Overall, the haul route is located primarily on arterial roads, which are designed and meant to carry high volumes of traffic. Agricultural traffic on these arterial roads is not anticipated to be high as this type of traffic would avoid high volume routes and be directed towards local roads. Additionally, site traffic is expected to have an extremely minimal impact on haul routes overall.

5.5 Noise Impact

Noise is an additional potential impact from aggregate operations. An Acoustic Assessment has been prepared by RWDI (March 2025) to consider noise controls for the proposed Bardoel Pit. Recommendations required to be incorporated into the aggregate operation include:

- Construction of perimeter berms in accordance with Site Plan Note M4a and Figure 3 of the Acoustic Assessment
- Operation of crushing and screening activities within the Processing Plant Region only, as shown on the Operations Plan and on Figure 3 of the Acoustic Assessment.

From an agricultural perspective, implementation of the recommendations of the Acoustic Assessment will ensure surrounding agricultural uses are not negatively impacted.

5.6 Natural Environment Impacts

J-AAR Materials Ltd. retained MTE Consultants Inc. to prepare a Natural Environment Report (NER) to support the application for licence under the ARA and associated land use planning approvals. The purpose of the NER is to describe the existing natural environmental conditions on and within 120 metres of the subject lands (i.e. Licence Boundary) and to determine whether there are any significant natural heritage features present. The NER also discusses the potential for negative impacts on any identified significant natural heritage features and provides appropriate recommendations for preventative, mitigative, and remedial measures. This section summarizes the findings and conclusions of the NER.

The Five Points Woods Pond, a classified Provincially Significant Wetland (PSW) is located northwest of the proposed Bardoel Pit. Based on the topography of the surrounding area, all surface water is expected to flow in the northwesterly direction to the PSW pond. A minimum 30-metre buffer will be applied to protect the feature and its function.

A contiguous woodland feature is identified to the east of the subject lands where no removal of the feature is proposed. A candidate significant wildlife habitat is associated with the adjacent natural vegetation communities. A 15-metre buffer from the dripline will be applied to protect the ecological function of the woodland.

The report identified and accounted for potential impacts to endangered and threatened species. A 15-metre buffer will be maintained from the three (3) candidate bat maternity trees along the east side of the subject lands and the one (1) on the west side.

Appropriate setbacks have been identified and implemented in the pit design to protect the identified significant natural heritage features. No extraction or any disturbance related to the pit will occur in these setback areas and the setbacks will remain undisturbed as self-sustaining vegetation. Further, sediment and erosion control measures will be installed and monitored, and all stockpiled aggregates will be stored in a location that will prevent the movement of sediment laden runoff into the PSW.

The NER concluded that with the implementation of the report recommendations into the ARA Site Plans, the proposed Bardoel Pit is not anticipated to have any negative impacts on the PSW, candidate significant wildlife habitat, significant woodlands, or candidate bat maternity roosts identified on lands adjacent to the Licence boundary

5.7 Summary of Net Impacts

The following table is consistent with Table 3 (*Minimize and Mitigate Impacts*) found in section 3.2.2 of the Province's *Draft Agricultural Impact Assessment Guidelines*. The purpose of this table is to provide a summary of how the proposed pit minimizes or mitigates impacts on surrounding agricultural uses.

Table 3: Summary of Net Impacts

Objective	Mitigation Measure	Description
Minimize the loss of agricultural land	Select areas with less agricultural land and lower priority agricultural lands	The lands are primarily comprised of Class 2 soils. A large proportion of the designated primary and secondary aggregate resource identified in the Oxford County Official Plan are coincident with prime agricultural areas (Class 1-3 soils). As a result, it would be difficult to locate any new aggregate operations within the County that would avoid prime agricultural areas.
	Rehabilitate the land	A majority of the proposed pit will be rehabilitated to the same average soil capability. Of the 41.4 hectares of the subject lands considered to be prime agricultural land (Class 1 -3 lands), 45.3 hectares are proposed to be extracted with 100% proposed to be rehabilitated to the same average soil capability (i.e. Class 2). The shallow depth of the pit allows for agricultural rehabilitation to comprise the fullest extent possible with 10:1 slopes. Slopes will be created using a combination of on-site material and imported material.
	Phased Extraction	Extraction and rehabilitation will be phased to ensure that agricultural activities continue on the lands until it is needed to be extracted. Each phase of extraction shall undergo progressive rehabilitation in direct correlation to the development of the pit as the extraction limits in each phase are reached and enough area is available to ensure that rehabilitation activities will not interfere with the production and stockpiling of aggregate materials. Generally, as agricultural lands are removed for extraction, other phases will be progressively rehabilitated.
Minimize the fragmentation of agricultural land	Maintain farm parcels	The proposed pit will not result in creating isolated agricultural lands, as the lands will

		be returned to primarily an agricultural condition.
Minimize impacts on farmland and agricultural operations	Minimum Distance Separation	MDS I and II setbacks are not required for mineral aggregate resources.
	Select compatible land uses; put lower impact development adjacent to farmland and operations	The proposed pit would be buffered from adjacent agricultural land uses through the provision of setbacks, berms, and existing vegetation.
	Design to support agriculture (e.g. help farms to continue to operate; help prevent and reduce trespassing and vandalism)	Conflicts between the proposed pit and the surrounding agricultural land uses will be minimized through the implementation of physical and visual barriers (vegetative berms) as required by the ARA site plans. The haul route is located on arterial roads, which are designed and meant to carry high volumes of traffic. Agricultural traffic on these arterial roads is not anticipated to be high as this type of traffic would generally avoid high volume routes and be directed towards local roads. Additionally, the proposed operations are forecasted to have minimal impacts to traffic on proposed haul routes. Portable processing equipment will follow the extraction face and can only be located within the 'Processing Plant Region' as identified in the Noise Report. This region can generally be described as an area that is 150 metres from the north and southern property lines, 30 metres from the eastern property line, and 0 metres from the western property line. This area is strategically located in to reduce impacts related to noise and dust, and the mobility of the processing area will allow for extracted lands to undergo progressive rehabilitation back to a predominately agricultural condition.
Minimize and mitigate changes in water quality or quantity	Implement a groundwater monitoring program	A private well monitoring survey to be conducted prior to extraction and an initial report summarizing background conditions at the site with updated water level data prepared within 3 months after the end of

		the calendar year of licence issue. These will be implemented as a site plan condition and a requirement under the ARA.
Mitigating impacts during construction or operations (e.g. mitigate dust, noise)	Adjust operational procedures to accommodate agriculture in the area	This area of the County is characterized by higher levels of aggregate activities; surrounding agricultural uses are accustomed to the operational procedures associated with mineral resource extraction. Dust suppression will be applied as required by O. Reg. 244/97 under the Aggregate Resources Act There are no specialty crops or large livestock operations in the primary study area, and no specialty crops within the secondary study area. With the incorporation of the recommended noise mitigation measures recommended in the Noise Impact Assessment no impacts to large livestock operations existing within the secondary study area are anticipated.
	Vegetative berms	A setback of 30 metres is proposed from the southern property line and the northern property line where it abuts rural residential properties. A 0m setback is proposed along the shared boundary with the adjacent licenced area to the west. A 15m setback is provided from the significant woodland on the lands to the west. These setbacks will create buffering between the proposed pit and surrounding land uses (including agricultural operations).
	Maintain, restore, or construct farm infrastructure	The subject lands do not include any farm infrastructure that is proposed to be removed. The existing barn, associated structures, manure tank, and dwelling will be retained, and agricultural practices are planned to continue within these buildings throughout the life of the pit (these buildings/structures

		are located outside of the proposed licence boundary).
Mitigate ongoing impacts from new development	Implement measures that can be in place post development to support compatibility with agriculture	All planting associated with the berms will be non-invasive species and will not impact agricultural rehabilitation or production when the lands are returned to an agricultural condition. The balance of the site will be rehabilitated to primarily an agricultural condition, similar to what existed prior to extraction.
Education to achieve greater compatibility between agricultural and non-agricultural uses	Education and awareness	J-AAR will educate the public on rehabilitation efforts to demonstrate the importance and impact of agricultural rehabilitation. J-AAR plans to continue to build internal expertise and knowledge on agricultural rehabilitation, including through working closely with local farmers.

6.0 Proposed Rehabilitation Plan

The subject lands are proposed to be rehabilitated back to an agricultural condition with the pit floor area being returned to the pre-extraction soil conditions. As previously noted, 100% of the area to be extracted will be rehabilitated back to an agricultural after use.

The objectives of the rehabilitation plan are to:

- Return the lands to an agricultural use as quickly as possible;
- Maintain or improve soil capability; and,
- Restore farmland on the pit floor.

The following agricultural rehabilitation best practices should be implemented to maximize the post-extraction condition of the property for an agricultural uses.

6.1 Rehabilitation

Figure 9 of this report illustrates the recommended agricultural rehabilitation sequence, which reflects the additional best practices discussed below. Rehabilitation should follow the extraction sequence.

To the extent possible, agricultural operations on the site should be maximized during pit operations. Later phases of extraction should be maintained in active agricultural condition for as long as possible. The phasing of the operation can be seen on the Operations Plan (**Figure 2**).

During operations, access will be maintained to undisturbed areas to facilitate their continued use for farming.

6.2 Soil Handling and Stripping

All large woody vegetation should be removed prior to stripping and any large roots, stumps, and stones (in excess of 150mm) encountered during stripping should be removed from the topsoil being placed in stockpiles or used directly in progressive rehabilitation. If required, additional stone removal may be required following cultivation. Once the site has been properly graded and stones and debris have been removed and any final grading has occurred, the soils should be tilled to prepare the seedbed.

The vegetation or crop cover on the area to be stripped should be considered. Where the lands to be stripped are under a perennial cover (e.g. hay), the area may need to be mowed and the vegetation removed prior to stripping and incorporating the sod into the topsoil. In the case that soils become bare or crop residue minimal in any areas of the site, planting a perennial crop well in advance of stripping would be beneficial to add organic matter to the soil and improve soil structure. The use of herbicides and pesticides should be minimized

and only considered in specific circumstances (e.g., noxious weed control).

As much as possible, stripped soils should be moved directly to areas undergoing rehabilitation to an agricultural after-use. This practice reduces the area that is disturbed at any one time and reduces the time land is out of agricultural production. It also reduces long-term soil storage and the double handling of soil materials, which can have a negative impact on soil structure and nutrients. In addition, topsoil and subsoil should be stripped, stored, and re-applied separately. Implementing progressive rehabilitation phasing that avoids long-term soil storage should occur to the extent feasible.

To avoid impacts on soil structure resulting from compaction, soil material should only be handled under suitable and unsaturated conditions, and a wet weather shut down procedure should be established to address soil moisture conditions during stripping operations. Stripping when the soil is frozen should not occur as the potential mixing of topsoil and subsoil increases under frozen conditions.

Depths of soil being removed during stripping should be monitored. Based on the Soil Survey completed by DBH, the existing (A horizon) topsoil depths range from approximately 0 - 48 cm in depth with subsoil (B horizon) depths generally found at a depth of 25 – 100 cm below the surface. After spreading each layer of topsoil/subsoil, compaction should be remediated by tilling of the soils. Mixing of layers should be avoided (e.g. do not till below the upper most/latest applied soil horizon).

In terms of soil storage, subsoil and overburden stripped from Phase 1 should be stored in perimeter berms. The topsoil from Phase 1 may need to be temporarily stored in soil stockpiles and seeded. Further erosion protection measures may be needed along the base of the stockpile. It is important to move stripped soil directly to the area being progressively rehabilitated.

6.3 Create Appropriate Post-Extraction Landform

The proposed operation will utilize 10:1 slopes to avoid the creation of a ridge between the rehabilitated lands and the adjacent agricultural field and achieve continuity of the agricultural landscape. The side slopes should be graded to the desired slope prior to the replacement of topsoil and subsoil. The side slopes should be ripped/tilled to alleviate any compaction and to minimize potential for erosion. A permanent vegetative cover should be provided to stabilize the slopes. Subsoil and topsoil can be placed directly over the top the overburden on the side slopes provided the topsoil be uniformly placed at a depth of approximately 10 to 15 cm to ensure the establishment of a perennial vegetative cover where possible and subject to material availability. Replacement of soil resources should be minimized on non-agricultural side slopes.

Slope contours on the pit floor should be as uniform as possible and large regularly shaped fields should be created. Any grading should ensure there are no irregular undulations or depression areas on the rehabilitated pit floor, except for the surface water collection area identified in Phase 1. Where irregular landforms are created due to the extent of the side sloping, backfilling to grade should be considered to maximize agricultural area. Pre-extraction depths of each soil horizon on the pit floor should be replaced.

To facilitate the development of an appropriate post-extraction landform, imported materials will be required to create necessary side slopes.

6.4 Soil Compaction

Soil compaction should be minimized by handling soils under suitable and unsaturated conditions and using wide track equipment or other equipment designed to minimize compaction. To the extent possible, travel over soils and rehabilitated areas should be minimized. After spreading each layer of topsoil / subsoil, compaction is to be remediated by ripping or tilling the soils. Any ripping / tilling during this process should avoid mixing of soil materials / layers (i.e. do not rip below the upper most / latest applied soil horizon).

6.5 Fertility Analysis and Soil Amendments

When replacing and handling topsoil, subsoil or overburden, these materials should be handled separately and under suitable and unsaturated conditions. Replaced soil should be free of stones and any debris. Once the topsoil has been replaced, the seedbed prepared and a cover crop sown, a soil fertility analysis should be undertaken on the site using methods consistent with OMAFRA's soil fertility sampling guidelines. The samples are to be sent to an accredited laboratory to provide a complete analysis of the soil fertility and nutrient content to determine the appropriate amount and type of soil amendments and / or fertilizer required to restore or improve the soil to pre-extraction conditions. The soil fertility analysis should include all the soil parameters sampled and analyzed from the samples collected for the pre-extraction site conditions.

A grass-legume cover crop – consisting of an agricultural seed mix of Annual Rye (50%), Oats (23%), Winter Rye (23%), White Clover (4%) – may be established initially and maintained for up to five (5) years to maximize results. Cover crops should be plowed under annually to promote and increase organic matter. Cover crops should be monitored at least twice during the growing season to ensure success of cover crop and control weed growth. Over-seeding and reseeding may be necessary to control weeds and ensure successful cover crop establishment. In some phases where soil and subsoil are stripped and directly placed within a rehabilitated area, cropping in the first year of rehabilitation may be possible and would occur in consultation with the farmer working the land.

As required, soil amendments should be added to the site to restore the soil fertility and organic matter concentrations to a minimum of the pre-extraction conditions (Class 2 soil capabilities) outlined in **Table 1**. Soil amendments may include fertilizers, manure, compost, arbuscular mycorrhizal fungi (AMF), agricultural lime, or planting of fallow crops.

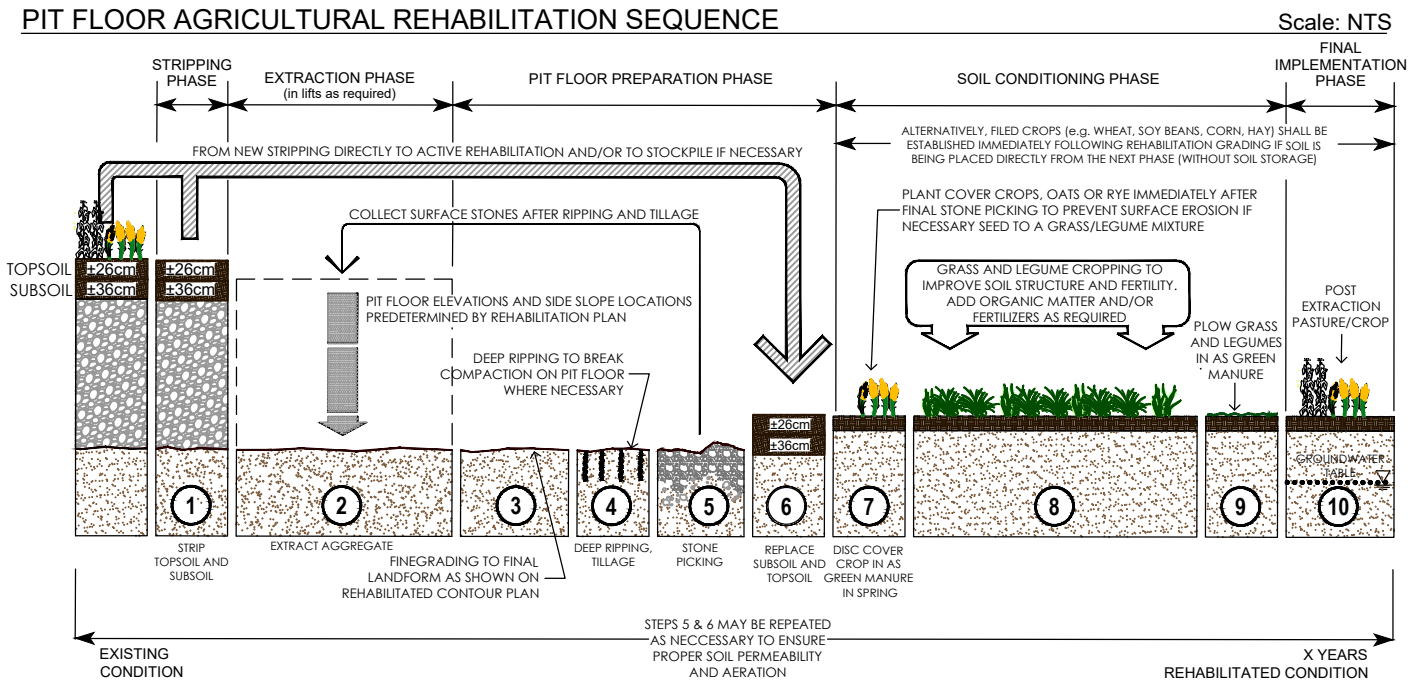

Figure 9

Recommended Pit Floor Agricultural Rehabilitation Sequence

PART LOTS 26 & 27,
BROKEN FRONT CONCESSION
Township of South-West Oxford
County of Oxford

Source: ARA Site Plans (MHBC Planning)

DATE:	May 2024
SCALE:	NTS
FILE:	18218A
DRN:	GC/CAC

K:\18218A- AAROC BARDOEL PIT\RPT\AGRICULTURAL REHABILITATION SEQUENCE.DWG

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
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7.0 Recommendations

Based on our analysis, the following recommendations are made to reduce the impacts of the proposed pit on the surrounding agricultural uses in the Primary and Secondary Study Area. Recommendations are also made for final and progressive rehabilitation to ensure the pit is returned to the same average soil capabilities and agricultural condition as pre-extraction:

1. Extraction will occur in phases to minimize the amount of disturbed area. Later phases of the operation that are not currently in extraction shall remain in agricultural production for as long as realistically possible.
2. Agricultural rehabilitation shall be in accordance with the agricultural rehabilitation sequence schematic on the Rehabilitation Plan to ensure best practices are followed throughout the progressive rehabilitation of the pit.
3. Prior to the commencement of stripping, agricultural baseline conditions shall be established by a qualified professional for the entire extraction area, using an accredited lab for any analytical testing. Soil inspections shall be conducted at a density to allow for sufficient coverage of the area. The parameters for the baseline conditions soil testing shall be determined by the qualified professional and shall include items such as soil macro and micronutrients, soil chemistry (e.g., pH, etc.), organic matter, soil texture and structure and bulk density.
4. Progressive rehabilitation procedures that avoid substantial storage of topsoil and minimize the storage of subsoil shall be implemented. Stripped soils, not required for berm construction, shall be moved directly to depleted areas where they will be immediately used for agricultural rehabilitation. Stripping areas shall be limited to what is required for the season of operation.
5. During pit operations, access to the agricultural rehabilitation areas and undisturbed areas used for agricultural purposes will be maintained.
6. Topsoil and subsoil shall be replaced across the site at the same pre-extraction depths, as documented in the DBH Soil Report, 2024, which is approximately 26 centimeters for topsoil and 36 centimeters for subsoil, in accordance with the agricultural schematic on the plan.
7. Soil will be handled under suitable conditions. Travel over soils and rehabilitated areas shall be minimized to reduce compaction. Ripping / tilling the soil will occur, where necessary, to alleviate soil compaction and shall avoid the mixing of soil materials / layers during the process.
8. Once grading is completed, a vegetation cover (such as perennial crops) shall be immediately established within the agricultural rehabilitation area to reduce erosion, add organic matter to the soil and improve soil structure. A grass-legume cover crop shall be established throughout rehabilitation and maintained for up to five years and ploughed under annually to promote and increase organic matter. Alternatively, field crops (e.g. wheat, soy, corn, hay) shall be established immediately following rehabilitation grading.

9. After final rehabilitation, soil testing shall be completed by a qualified professional to analyze soil conditions to demonstrate that pre-extraction soil capability has been restored. Adjustments to cropping practices and/or soil amendments may be required based on the results of the soil testing and shall be undertaken in consultation with the property owner. A report shall be submitted by a qualified professional following final rehabilitation and provided to MNR prior to Licence surrender to demonstrate that the agricultural area has been rehabilitated back to the pre-extraction soil capability (CLI Class 2 soil capability).
10. Best management practices shall be implemented with respect to the storage and application of organic material, fertilizers, and pesticides.

8.0 Summary

In summary, the proposed mineral aggregate extraction on the subject lands is not anticipated to have a negative impact on the long-term agricultural uses and operations on the subject lands and within the primary / secondary study areas. This opinion recognizes the following:

- Provincial and local planning policies recognizes that mineral aggregate extraction operations are an interim land use. Mineral aggregate extraction is a permitted use within prime agricultural areas in accordance with provincial policy.
- The subject lands are not within a specialty crop area.
- The subject lands will be rehabilitated back to an agricultural condition with the same average soil capability that currently exists
- 45.3 hectares (100%) of the existing agricultural lands will be returned to an agricultural condition.
- Impacts from dust and noise will be mitigated through implementation of prescribed conditions and technical requirements/ recommendations and berming.
- Implementation of the recommended rehabilitation plan including the recommended best practices in this Report will ensure a successful agricultural rehabilitation process.

Respectfully submitted,

MHBC

Pierre Chauvin, BSc (Agr.) MA, MCIP, RPP
Partner

A

Appendix A: Secondary Study Area Review

The following properties are indicated on **Figure 4** of this Report.

Farm No. 1 – 563438 & 563440 Thomas Road

This farm consists of two large dairy barns on adjoining lots under the same ownership and is located south of the subject lands with frontage on Thomas Road. The farmstead includes a residential facility, two dairy barns, and ancillary structures (including several silos). The lands directly surrounding the farmstead were in corn production (2023).

Farm No. 2 – 254373 Line 25/603302 Road 60

This farm is located on the east side of Line 25 and south side of Road 60, northwest of the subject lands. One residential dwelling, two stables, one coverall indoor arena, a garage, a driveshed, and several paddocks with lean-to shelters can observed from aerial imagery (view from road screened by trees). Surrounding lands do not appear to be cropped.

Farm No. 3 – Cuddy Stud Farm at 25434 Line 25/603268 Road 60

This farm is located on the west side of Line 25, northwest of the subject lands. Along the Line 25 frontage, four turkey barns are present and surrounded by biosecurity fencing; a small farm office building is also present. A dwelling and detached garage are located along the Road 60 frontage. The portion of the lands along Line 25 was in fallow, and the western half of the site was observed to have been under soy and corn production in 2023 (as observed in February 2024).

Farm No. 4 – 254451 Line 25

This large dairy operation is located northwest of the subject lands, within the outer limits of the Secondary Study Area. The farm unit consists of four dairy barns, two storage/drive sheds, three concrete uncovered liquid manure tanks, four solid concrete manure storage stalls, three silos, and a residential dwelling. The lands surrounding the farm were under wheat production in 2023.

Farm No. 5 – Landfair Stable (603340 Road 60)

This farm is located on the south side of Road 60, northwest of the subject lands. Aerial photos indicate that the property contains a single detached home, stable, and paddocks. Based on Google maps, the property is a working equestrian facility that breeds Standardbreds for harness racing.

Farm No. 6 – 60427 Road 60

This farm is located on the north side of Road 60, and contains a single detached home and detached garage, a barn, and several horse paddocks. None of the land appears to be under crop production.

B

Appendix B: Soil Survey and Canada Land Inventory Classification – DBH Soil Services Inc.

DOCUMENT TRANSMITTAL

Document:	**SOIL SURVEY AND CANADA LAND INVENTORY (CLI) EVALUATION** **AAROC – BARDOEL PIT** **583398 HAMILTON ROAD** **TOWNSHIP OF SOUTH-WEST OXFORD** **OXFORD COUNTY** **DRAFT**		
Prepared for:	Ms. Chelsea Major MHBC – Urban Design & Landscape Architecture 540 Bingemans Centre Drive Suite 200 Kitchener, ON N2B 3X9	Date Our Ref. No. Your Ref. No.	June 13, 2024 2024 - 15
Attention:	Ms. Major	DRAFT ☑	FINAL

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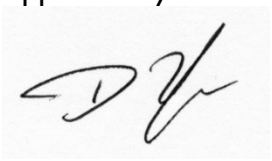
Approved by:



Dave Hodgson, P. Ag.
President
DBH Soil Services Inc.

SOIL SURVEY AND CANADA LAND INVENTORY (CLI) EVALUATION
AAROC – BARDOEL PIT
583398 HAMILTON ROAD
TOWNSHIP OF SOUTH-WEST OXFORD
OXFORD COUNTY
DRAFT

Prepared for:

Ms. Chelsea Major
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DBH Soil Services Inc.

June 13, 2024

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1.0 BACKGROUND

DBH Soil Services Inc. was retained to complete a Soil Survey and Canada Land Inventory (CLI) classification assessment for an area identified as:

AAROC – Bardoel Pit
583398 Hamilton Road
Part Lots 26 and 27
Broken Front Concession
Township of South-West Oxford
Oxford County

This area is comprised of one parcel identified by the Municipal Property Assessment Corporation (MPAC) Roll Number 32110110201530000000. The Roll Number was identified in the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) AgMaps online mapping (https://www.lioapplications.lrc.gov.on.ca/AgMaps/Index.html?viewer=AgMaps.AgMaps&locale=en-CA).

A visual representation of the property size, shape and relative location is presented as Image 1 (below) reproduced from Agmaps (OMAFRA) online mapping viewer. The parcel is highlighted in a light blue colour.

Image 1 Agmaps (OMAFRA) Imagery

Source: AgMaps online mapping (https://www.lioapplications.lrc.gov.on.ca/AgMaps/Index.html?viewer=AgMaps.AgMaps&locale=en-CA)

For the purposes of this Soil Survey and CLI evaluation, this parcel is henceforth referred to as the Study Area.

The Study Area lands comprise approximately 62.9 ha (155.4 acres) of which much of the lands are used for agricultural crop production. The non-cropped lands included a laneway running roughly north south through the middle of the parcel, from Thomas Road to the main farm building area. No areas of ponded water or stream courses were observed on the parcel. A pond was noted to the immediate northwest on an adjacent property.

A large dairy operation and farmstead was located on the northern portion of the Study Area with main access from Hamilton Road. The dairy farm buildings will remain outside the License Area and Limit of Extraction Area lands.

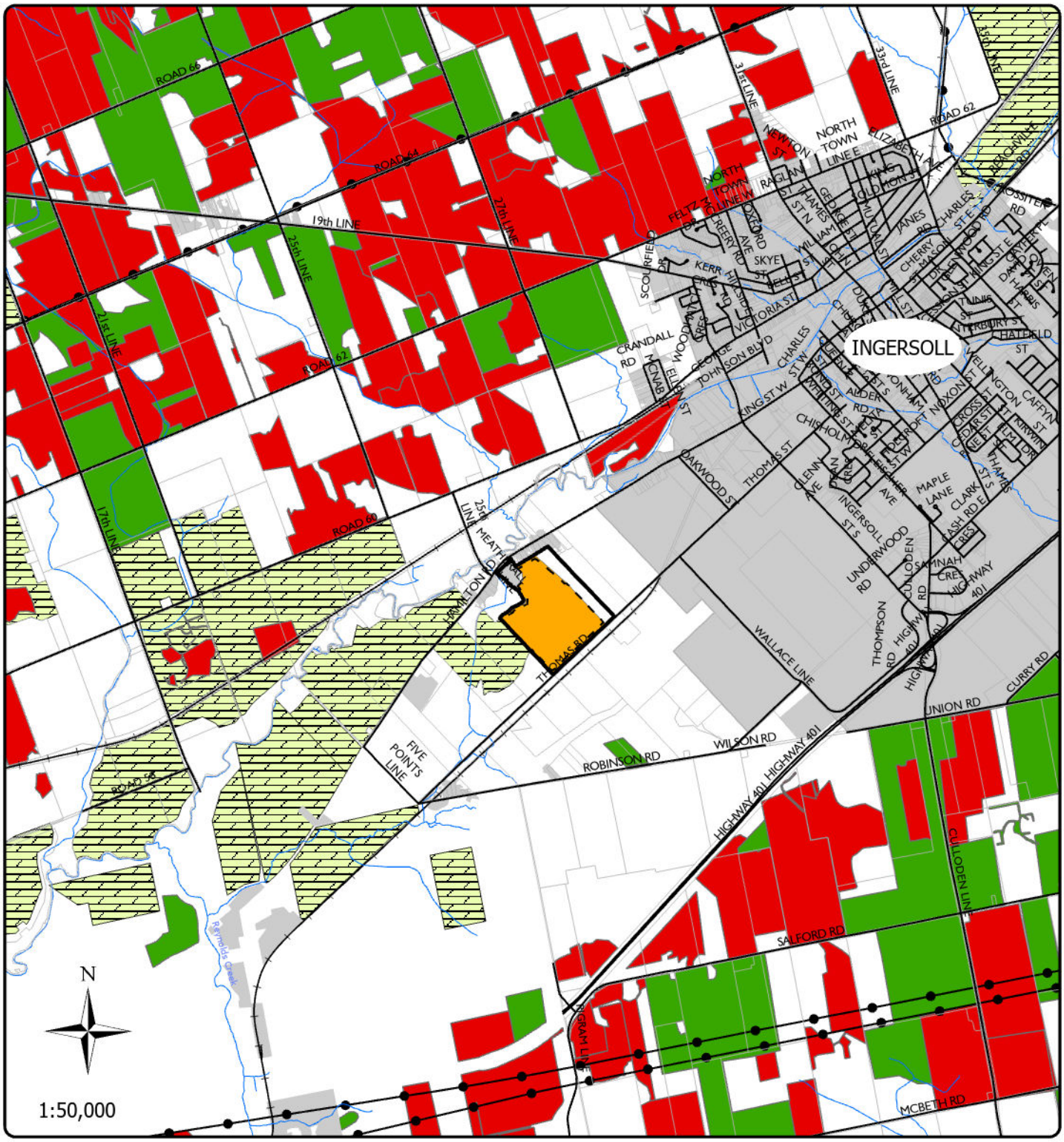
The Study Area is roughly bounded: on the west by agricultural fields; on the north by a pond, Hamilton Road, and rural residential units; on the east by woodlands and agricultural fields; and on the south by Thomas Road.

The Study Area is located approximately 650 m west of the boundary of Ingersoll, and approximately 2.0 km north of Highway 401.

This report was completed to document the existing soil conditions and to provide a more detailed assessment of the CLI classification of the soil resources onsite. This report documents the methodology, findings, conclusions, and mapping completed for this study.

Figure 1 illustrates the relative location of the Study Area with respect to the above-mentioned geographical and cultural features.

Figure 1 also illustrates the License Area and the Limit of Extraction Area lands which are components located within the Study Area.



Legend

- Oxford County Roads
- Railway (MNRF)
- Utility Line (MNRF)
- Watercourse (MNRF)
- Aggregate Authorized Active (MNRF)
- Built-up Area (MNRF)
- License Area
- Limit of Extraction
- Parcels (Oxford County)
- Study Area

Tile Drainage (OMAFRA)

- Random
- Systematic

Figure 1

Location

DBH Soil Services Inc.

June 2024

2.0 METHODOLOGY

2.1 FIELD DATA COLLECTION

2.1.1 SOIL INVESTIGATION

Basic soils (and CLI) information was provided in the OMAFRA soils and mapping report "*Soil Survey of Oxford County" (Report No. 28 of the Ontario Soil Survey, Wicklund, R.E., and N.R. Richards, 1961)*, and the "*Upgrade of Soil Survey Information for Oxford County" (COESA Report No.: RES/MON-005/95 (December 1996) (report and mapping)*.

Digital mapping was provided by OMAFRA through the Land Information Ontario (LIO) warehouse website. The digital mapping was provided at a scale of 1:50000. Mapping at this scale is of a general nature when referring to site-specific planning; therefore, detailed soils or soil verification assessments are often required for farm scale or lot size planning initiatives and applications for amendments to Official Plans and/or Zoning By-Laws.

In an effort to 'standardize' the approach or methodology used in detailed soil surveys, OMAFRA created guidelines for detailed soil surveys in a document titled "*Guidelines for Detailed Soil Surveys for Agricultural Land Use Planning".* This OMAFRA document was available online until recently. Recent email conversations with staff from OMAFRA indicated that OMAFRA is transitioning from the older government website to a new centralized website. It was noted that this document is slated for transition but has not been added to the new site. Further, OMAFRA will be updating the document to include more detailed instructions as to the depths of soil inspection, and to indicate that detailed soil survey is useful in more than just agricultural land use planning. Staff from OMAFRA have indicated that in the interim, the document can still be identified (included as Appendix A), with further reference being made to the Mapping Systems Working Group documents as follows:

Soil Mapping System for Canada: (https://sis.agr.gc.ca/cansis/publications/manuals/1981-smsc/index.html).

Soil Survey Handbook: (https://sis.agr.gc.ca/cansis/publications/manuals/1987-9/index.html).

The original OMAFRA guidelines (Appendix A) were created in response to concerns with the accuracy of published mapping and classification of soil materials and that the existing information is of too general a nature to adequately describe and interpret the soil properties for site-specific planning purposes.

The standards for completing a detailed soil evaluation included the following tasks:

- Completion of a review of published soil information – County/Region Soil Report of the Ontario Soil Survey (OMAFRA),
- Conduct a review of published Canada Land Inventory (CLI) ratings for the soils of this area,

- Conduct an aerial photographic review and interpretation of the soil polygons, disturbed soil areas and miscellaneous landscape units (ie: streams, wayside pits),
- Conduct an onsite soil survey at an appropriate scale and survey density,
- Completion of mapping to illustrate the location of the property, the occurrence of the OMAFRA soil polygons and appropriate CLI capability ratings,
- Completion of a report outlining the methodologies employed, findings (including a discussion of relevant features identified) and a conclusion as to the relevance of the CLI classifications for the soil polygons on the property and how they relate to the Provincial Policy Statement.

Further, OMAFRA has provided a document titled "*Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario.*" (July 2023, online version).

A detailed onsite soil survey and surrounding land reconnaissance survey were conducted on May 16, 2024.

2.1.2 PHYSIOGRAPHY

Physiographic information and Quaternary Geology information was provided in *"The Physiography of Southern Ontario 3rd Edition", Ontario Geological Survey Special Volume 2, Ministry of Natural Resources, 1984*. A further review of the digital Physiographic from the Land Information Ontario website was completed.

Physiographic information provides details on the parent materials from which the soil developed in a specific area.

2.1.3 TOPOGRAPHY AND CLIMATE

Topographic information was provided by MHBC as a shapefile for Geographic Information System (GIS) assessment. The contour data is illustrated in Appendix B.

Additional contour data, mapping and assessments were reviewed and included the 1:10000 scale Ontario Base Mapping, LIO digital contour mapping, detailed soil survey assessment (using a handheld clinometer), aerial photo interpretation and windshield surveys.

Climate data was taken from the OMAFRA document titled "*Agronomy Guide for Field Crops – Publication 811" (2017)* and the *Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) "Factsheet – Crop Heat Units for Corn and Other Warm Season Crops in Ontario", 1993.*

3.0 FINDINGS

3.1 PHYSIOGRAPHY AND CLIMATE

The *Physiography of Southern Ontario* Physiographic Unit Map indicates that the Study Area is located in the Oxford Till Plain Physiographic Region. The Oxford Till Plain Physiographic Region is located in a central position in Southwest Ontario. The surface is drumlinized, particularly south of Woodstock. The till material is a pale brown, calcareous loam, and the dominant soil type is Guelph Loam.

Valleys cut across the till plain contain misfit streams (small streams within large valley systems) within old glacial spillways. Some parts of the spillway system contain gravel deposits.

3.2 TOPOGRAPHY

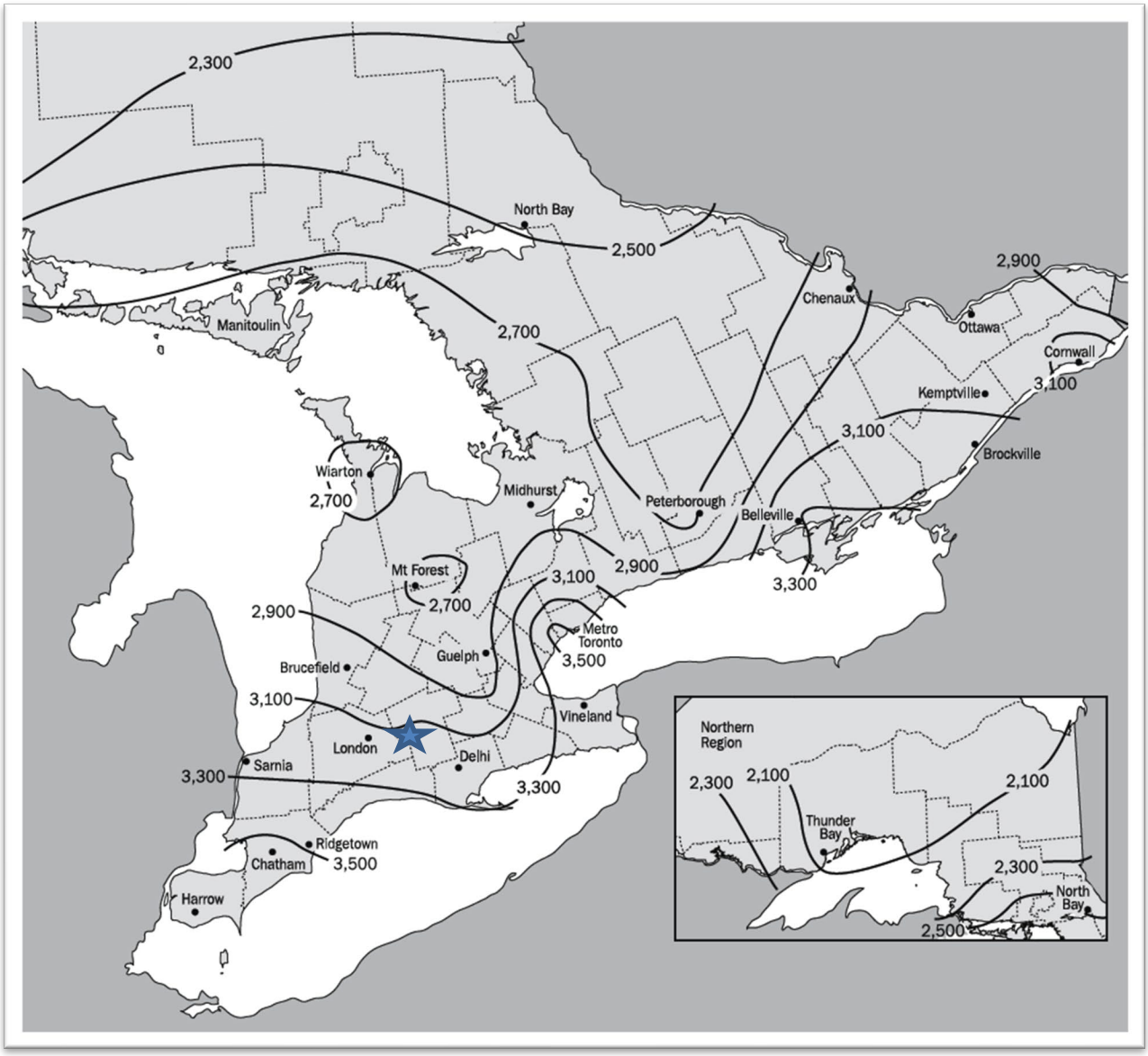
The topography of the Study Area is a mix of gently sloping lands, combined with steeper slopes located in the southern portion, and a small area of steeper slopes noted in the north adjacent to the pond located on the neighbouring parcel.

3.3 CLIMATE

The Study Area is located between the 3100 to 3300 average accumulated Crop Heat Units area in Ontario. The Crop Heat Units (CHU) index was originally developed for field corn and has been in use in Ontario for 30 years. The CHU ratings are based on the total accumulated crop heat units for the frost-free growing season in each area of the province. CHU averages range between 2500 near North Bay to over 3500 near Windsor. The higher the CHU value, the longer the growing season and greater are the opportunities for growing value crops.

Crop Heat Units for corn (based on 1971-2000 observed daily minimum and maximum temperature (OMAFRA, 2009)) map image is illustrated below. The approximate location of the Study Area is marked with a blue star.

Image 2 Crop Heat Units Mapping



Source: Agronomy Guide for Field Crops OMAFRA – Publication 811

3.4 DETAILED SOIL SURVEY

A detailed on-site soil survey was conducted to map and classify the soil resources of the soil materials on the License Area and the Limit of Extraction Area lands. The soil survey included the following tasks:

- Completion of a review of published soil information "*Soil Survey of Oxford County" (Report No. 28 of the Ontario Soil Survey, Wicklund, R.E., and N.R. Richards, 1961)*, and the "*Upgrade of Soil Survey Information for Oxford County "(COESA Report No.: RES/MON-005/95 (December 1996) (report and mapping)*,
- Conduct a review of published Canada Land Inventory (CLI) ratings for the soils of

this area,
- Conduct an aerial photographic review and interpretation of the soil polygons, disturbed soil areas and miscellaneous landscape units (ie: streams, boulder pavement, wayside pits),
- Conduct an on-site soil survey,
- Completion of mapping to illustrate the location of the property, the occurrence of soil polygons and appropriate CLI capability ratings,
- Completion of a report outlining the methodologies employed, findings (including a discussion of relevant features identified) and a conclusion as to the relevance of the CLI classifications for the soil polygons on the property.

The detailed soil survey of the License Area and Limit of Extraction Area lands, and reconnaissance of the surrounding area was conducted on May 16, 2024. Aerial photographic interpretation was used to delineate soil polygon boundaries by comparing areas, on stereoscopic photographs (and imagery), for similar tone and texture. Delineated soil polygons were evaluated for the purpose of verifying soil series and polygon boundaries. The evaluation was completed through an examination of the existing soil conditions to a minimum depth of 100 cm or to refusal. A handheld Dutch soil auger and/or Dutch stone auger was used to extract the soil material to a minimum depth of one metre (or to refusal).

Each soil profile was examined to assess inherent soil characteristics. Soil attributes were correlated with the "*Canadian System of Soil Classification" (CSSC) (Agriculture Canada, 1998)* and the "*Field Manual for Describing Soils in Ontario" (Ontario Centre for Soil Resource Evaluation, 1993)*. A handheld clinometer was used to assess percent slope characteristics. Soils were assigned to a soil map unit (series) based on soil texture (hand texturing assessment), soil drainage class and topography (position and slope).

Depth to free water within one metre of the soil surface was also recorded at inspection sites located on lower slope positions (where applicable). Names for the soil series and the CLI ratings were assigned to each soil polygon by correlating the soil series with soils information presented in the "*Soil Survey of Oxford County" (Report No. 28 of the Ontario Soil Survey, Wicklund, R.E., and N.R. Richards, 1961), and the Upgrade of Soil Survey Information for Oxford County (COESA Report No.: RES/MON-005/95 (December 1996) (report and mapping)* and with the CLI information presented on the 1:50000 scale manuscript mapping, and the OMAFRA digital soils data.

Observations noted at the time of the onsite soil survey included:
- The majority of the License Area and the Limit of Extraction Area lands were used for the production of common field crops and forage crops in the 2024 growing season.
- The lands were generally gently sloping, except for steeper slopes near the ponded area.
- Stones were noted on the surface of the soil throughout the License Area and Limit of Extraction Area lands.
- Stones were of varying sizes including gravel and cobble sizes.

- Stones were rounded (river stone).

Photographs 1 through 6 provide a depiction of the general conditions of the License Area and the Limit of Extraction Area lands.

Photograph 1 illustrates the hummocky topography looking north along the laneway that extends from Thomas Road towards the main farm buildings at the top of the photograph.

Photograph 1

Photograph 2 looks to the northwest at the small area of steeper sloping topography near the pond.

Photograph 2

Photograph 3 looks southwest at the undulating topography near Thomas Road, and the more gently sloping lands near the central portion of the parcel (right side of photograph).

Photograph 3

Photograph 4 illustrates the hummocky topography looked to the east of the laneway from Thomas Road to the main farm area.

Photograph 4

Photograph 5 illustrates a steeply sloping area (slopes down to the north) in the northeast portion of the License Area lands and Limit of Extraction Area lands.

Photograph 5

Photograph 6 looks to the northeast at a steeper side slope area.

Photograph 6

A total of 39 soil inspection sites were examined in the License Area and Limit of Extraction Area lands. Many of these soil inspection sites were limited to shallow depths (topsoil, A horizon only) due to refusal related to excess stoniness at the lower soil horizons.

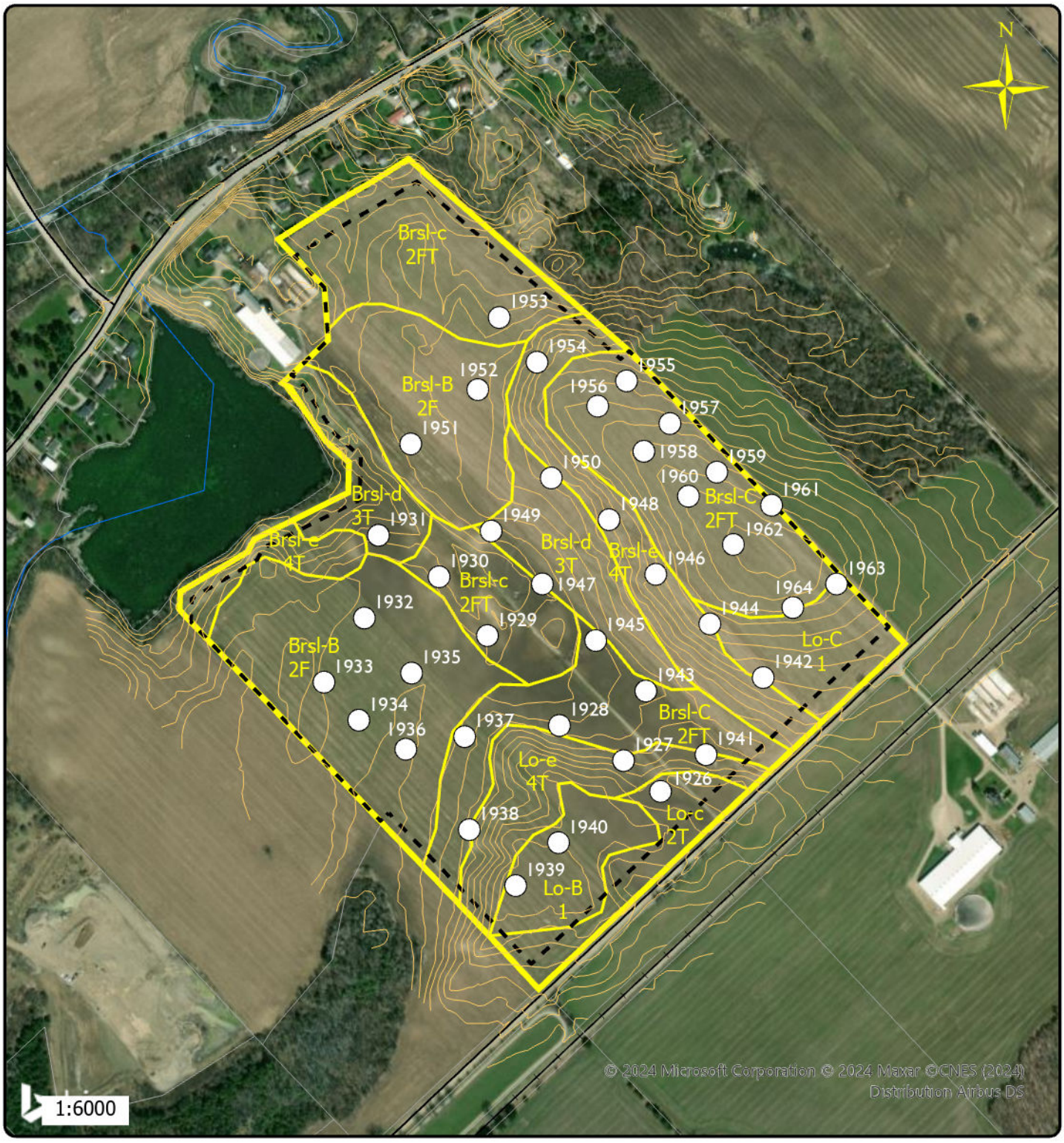
The soil inspection information was correlated with soil descriptions in the "*Soil Survey of Oxford County "(Report No. 28 of the Ontario Soil Survey, Wicklund, R.E., and N.R. Richards, 1961), the "Upgrade of Soil Survey Information for Oxford County" (COESA Report No.: RES/MON-005/95 (December 1996) (report and mapping), and* the OMAFRA digital soils data (Land Information Ontario, 2022), prior to the production of the soils map in Figure 2. Soil names used in the identification of the soil series on Figure 2 were taken from the "*Soil Survey of Oxford County" (Report No. 28 of the Ontario Soil Survey, Wicklund, R.E., and N.R. Richards, 1961), and the "Upgrade of Soil Survey Information for Oxford County" (COESA Report No.: RES/MON-005/95 (December 1996) (report and mapping)*.

It should be noted that the soil mapping provided with the "*Soil Survey of Oxford County" (Report No. 28 of the Ontario Soil Survey, Wicklund, R.E., and N.R. Richards, 1961)* makes use of slope groupings as follows:

SLOPE CLASSES

CLASS	% SLOPE	DESCRIPTION
B	0-2	Level to nearly level
C	2-5	Very gently sloping
D	5-9	Gently sloping
E	9-15	Moderately sloping
F	15-30	Strongly sloping
G	>30	Very strongly sloping

Source: *Soil Survey of Oxford County (Report No. 28 of the Ontario Soil Survey, Wicklund, R.E., and N.R. Richards, 1961).*



Legend

- Soil Inspection Locations
- Contour Line (MHBC)
- Railway (MNRF)
- Roads (Oxford County)
- Watercourse (MNRF)
- License Area
- Limit of Extraction
- Parcel Data (Oxford County)
- Soil Polygon Boundary

Soil Code
Brsl - Brisbane Sandy Loam
Lo - London Sandy Loam

CLI Subclass Limitation
F - Fertility
M - Moisture
S - Combined subclasses
T - Topography
W - Excess Moisture

Slope Class
Aa = 0.0 - 0.5%
Bb = 0.5 - 2.0%
Cc = 2.0 - 5.0%
Dd = 5.0 - 9.0%
Ee = 9.0 - 15.0%
Ff = 15.0 - 30.0%
Gg = 30.0 - 45.0%

Slope length < 50 m
Slope length > 50 m

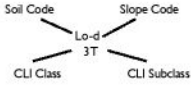


Figure 2

Detailed Soil Survey
and
Canada Land Inventory (CLI)

DBH Soil Services Inc.

June 2024

The standard slope groupings (as presented in the *Ontario Centre for Soil Resource Evaluation* document "*Field Manual for Describing Soils in Ontario", 4th Edition (1993)*) provides slope groupings as follows: Aa = 0.0 – 0.5 percent; Bb = 0.5 – 2.0 percent; Cc = 2.0 – 5.0 percent; Dd = 5.0 – 9.0 percent; Ee = 9.0 – 15.0 percent; Ff = 15.0 – 30.0 percent; and Gg = 30.0 – 45.0 percent. Capital letters represent simple slopes (slope lengths greater than 50 metres), while lower case letters represent complex slopes (slope lengths less than 50 metres).

On review of the OMAFRA document "*Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory In Ontario"* soils are rated for topography with slopes grouped similar to the description provided in the "*Field Manual for Describing Soils in Ontario"* and are presented as follows: <2; 2-5; 5-9; 9-15; 15-30; 30-60; and >60.

For the purposes of providing mapping and soil capability ratings that are consistent with the OMAFRA document *"Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory In Ontario"*, the slope groupings and mapping presented in this report reflect the standard percent slope groupings as are documented in the "*Field Manual for Describing Soils in Ontario"*, 4th Edition (1993).

The onsite soil survey identified two soil series, and one miscellaneous soil group. The soil series were identified as Brisbane Sandy Loam and London Loam. The miscellaneous soil group was identified as disturbed lands associated with the laneway that extends from Thomas Road north to the main farm building area. Due to the mapping scale and narrow footprint of the laneway, the laneway was not mapped, but its existence is noted.

Brisbane Sandy Loam is the imperfectly drained member of the Burford Soil catena. Brisbane soils are imperfectly drained loam materials occurring over coarse gravels. The gravel materials were deposited by glacial meltwater spillways. The deposits are stratified with a considerable range in size from fine sands to cobbles. The topography is level to gently undulating. Gravel, stones, and stones are present on the surface and throughout the soil profile.

London Loam is the imperfectly drained member of the Guelph Soil Catena. London soils developed on calcareous loam parent materials that developed on level upland areas where surface runoff is slow. The texture is predominantly loam and there are few stones or boulders in the upper soil profile.

A description of the soil at each inspection site is included in Appendix C.

3.5 ARTIFICIAL DRAINAGE

An evaluation of artificial drainage on the Study Area was completed through a correlation of observations noted during the windshield surveys, aerial photographic interpretation, and a review of the OMAFRA Artificial Drainage System Mapping. Figure 1 illustrates the tile drainage areas that are registered in the OMAFRA database.

Visual evidence supporting the use of subsurface tile drains would include observations of drain outlets to roadside ditches or surface waterways, and surface inlet structures (hickenbottom or french drain inlets).

Evidence in support of subsurface tile drainage on aerial photographs would be based on the visual pattern of tile drainage lines as identified by linear features in the agricultural lands and by the respective light and dark tones on the aerial photographs. The light and dark tones relate to the moisture content in the surface soils at the time the aerial photograph was taken.

OMAFRA Artificial Drainage System Maps were reviewed to determine if an agricultural tile drainage system had been registered to the Study Area. The OMAFRA maps revealed that no agricultural drainage systems were registered on the Study Area (Figure 1).

Absence of agricultural drainage systems is typical of areas where the soil developed on sandy or gravelly materials. The soil is generally open or coarse texture where water easily infiltrates and moves through the soil profile.

3.6 IRRIGATION

Observations noted during the surficial soil survey indicated that the Study Area is not irrigated, and that the property is not set up for the use of irrigation equipment. Visual evidence supporting the use of irrigation equipment would include the presence of the irrigation equipment (piping, water guns, sprayers, tubing, etc), the presence of a body of water capable of sustaining the irrigation operation and lands that are appropriate for the use of such equipment.

No irrigation equipment was observed onsite during the course of the on-site survey.

3.7 LANDFORMING

With the exception of the creation of a laneway to allow access to the property (and the farmstead area and farther to the west) there is no evidence of any landforming for the purposes of leveling or reducing slope for the enhancement of agricultural activities or operations.

3.8 SOIL CAPABILITY FOR AGRICULTURE

Basic information about the soils of Ontario is made more useful by providing an interpretation of the agricultural capability of the soil for various crops. The CLI system combines attributes of the soil to place the soils into a seven-class system of land use capabilities. The CLI soil capability classification system groups mineral soils according to their potentialities and limitations for agricultural use. The first three classes are considered capable of sustained production of common field crops, the fourth is marginal for sustained agriculture, the fifth is capable for use of permanent pasture and hay, the sixth for wild pasture and the seventh class is for soils or landforms incapable for use for arable culture or permanent pasture. Organic or Muck soils are not classified under this system. Disturbed Soil Areas are not rated under this system.

The OMAFRA document "*Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario"* defines CLI classification as follows:

Class 1 - Soils in this class have no significant limitations in use for crops. Soils in Class 1 are level to nearly level, deep, well to imperfectly drained and have good nutrient and water holding capacity. They can be managed and cropped without difficulty. Under good management they are moderately high to high in productivity for the full range of common field crops

Class 2 - Soils in this class have moderate limitations that reduce the choice of crops, or require moderate conservation practices. These soils are deep and may not hold moisture and nutrients as well as Class 1 soils. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management they are moderately high to high in productivity for a wide range of common field crops.

Class 3 - Soils in this class have moderately severe limitations that reduce the choice of crops or require special conservation practices. The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. Under good management these soils are fair to moderately high in productivity for a wide range of common field crops.

Class 4 - Soils in this class have severe limitations that restrict the choice of crops, or require special conservation practices and very careful management, or both. The severe limitations seriously affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. These soils are low to medium in productivity for a narrow to wide range of common field crops, but may have higher productivity for a specially adapted crop.

Class 5 - Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible. The limitations are so severe that the soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants and may be improved through the use of farm machinery. Feasible improvement practices may include clearing of bush, cultivation, seeding, fertilizing or water control.

Class 6 - Soils in this class are unsuited for cultivation, but are capable of use for unimproved permanent pasture. These soils may provide some sustained grazing for farm animals, but the limitations are so severe that improvement through the use of farm machinery is impractical. The terrain may be unsuitable for the use of farm machinery, or the soils may not respond to improvement, or the grazing season may be very short.

Class 7 - Soils in this class have no capability for arable culture or permanent pasture. This class includes marsh, rockland and soil on very steep slopes.

The OMAFRA document "*Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario"* defines the CLI subclassification as follows:

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

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

Each polygon identified on-site was classified according to the CLI rating system then correlated to the CLI classifications as presented in the "*Soil Survey of Oxford County" (Report No. 28 of the Ontario Soil Survey, Wicklund, R.E., and N.R. Richards, 1961), the "Upgrade of Soil Survey Information for Oxford County" (COESA Report No.: RES/MON-005/95 (December 1996) (report and mapping), and the OMAFRA digital soils data (Land Information Ontario, 2022)*, and the OMAFRA document "*Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for the Application of the Canada Land Inventory in Ontario"*.

Brisbane soils on simple (slope length greater than 50 m) "B" (slopes of 0.5 – 2.0 percent) were rated as CLI class 2F, on simple "C" and complex "c" (slope then less than 50 m) were rated as CLI class 2FT, on complex "d" (slopes of 5.0 – 9.0 percent) were rated as CLI class 3T, and on complex "e" (slopes of 9.0 – 15.0 percent) were rated as CLI class 4T.

London soils on simple "B" and "C" slopes were rated as CLI class 1, on complex "c" slopes were rated as CLI class 2T, on complex "d" slopes were rated as CLI class 3T, and on complex "e" slopes were rated as CLI class 4T.

Table 1 summarizes the relative percent area occupied by each capability class for the License Area and the Limit of Extraction Area lands.

Table 1 Canada Land Inventory – License Area and Limit of Extraction Area

Canada Land Inventory Class (CLI)	License Area (ha)	License Area Percent Occurrence	Limit of Extraction Area (ha)	Limit of Extraction Area Percent Occurrence
Class 1	4.6	9.3	4.1	9.1
Class 2	32.0	64.7	29.6	65.3
Class 3	4.8	9.9	4.4	9.7
Class 4	8.0	16.1	7.2	15.9
Class 5	-	-	-	-
Class 6	-	-	-	-
Class 7	-	-	-	-
Not Rated (Disturbed areas, ponded areas, and organic soil)	-	-	-	-
Totals	49.4	100.0	45.3	100.0

The License Area comprised approximately 83.9 percent CLI class 1 – 3 soils, with CLI class 1 of approximately 9.3 percent, CLI class 2 of approximately 64.7 percent, and CLI class 3 of approximately 9.9 percent. The remaining mineral soils (CLI class 4 – 7) comprise approximately 16.1 percent of the License Area.

The Limit of Extraction Area comprised approximately 84.1 percent CLI class 1 – 3 soils, with CLI class 1 of approximately 9.1 percent, CLI class 2 of approximately 65.3 percent, and CLI class 3 of approximately 9.7 percent. The remaining mineral soils (CLI class 4 – 7) comprise approximately 15.9 percent of the Limit of Extraction Area.

3.9 HOFFMAN PRODUCTIVITY INDEX (SOIL PRODUCTIVITY RATING)

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 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.

In developing the HPI, it was determined that a CLI class 2 land produced approximately 80% of the yield that would be associated with a CLI class 1 land. Further, a CLI class 3 land produced approximately 64% of the yield that would be associated with a CLI class 1 land, while a CLI 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 as illustrated in Table 2.

Table 2 Soil Productivity Index Ranges

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:

Soil Productivity Index =
(percent occurrence of class 1 lands x 1.0) + (percent occurrence of class 2 lands x 0.8) + (percent occurrence of class 3 lands x 0.64) + (percent occurrence of class 4 lands x 0.49) + (percent occurrence of class 5 lands x 0.33) + (percent occurrence of class 6 lands x 0.17) + (percent occurrence of class 7 lands x 0.02)

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 (Table 3) illustrates the range of values which can be directly correlated to the equivalent CLI class.

Table 3 Soil Productivity Index Range and Equivalent CLI

Soil Productivity Index Range	
Equivalent 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

An HPI calculation was completed for the License Area lands and the Limit of Extraction Area lands. The HPI value and subsequent CLI class are provided in Table 4.

Table 4 Soil (Hoffman) Productivity Rating and Equivalent CLI Class

	Soil (Hoffman) Productivity Rating	Corresponding CLI Class
License Area	0.753	2
Limit of Extraction Area	0.724	2

The calculated Soil Productivity Rating for the License Area lands was 0.753 or a CLI class 2 equivalent.

The calculated Soil Productivity Rating for the Limit of Extraction Area lands was 0.724 or a CLI class 2 equivalent.

4.0 SUMMARY AND CONCLUSIONS

DBH Soil Services Inc. was retained to complete a Soil Survey and Canada Land Inventory (CLI) classification assessment for an area identified as:

AAROC – Bardoel Pit
583398 Hamilton Road
Part Lots 26 and 27
Broken Front Concession
Township of South-West Oxford
Oxford County

The Study Area lands comprise approximately 62.9 ha (155.4 acres) of which much of the lands are used for agricultural crop production. The non-cropped lands included a laneway running roughly north south through the middle of the parcel, from Thomas Road to the main farm building area.

A large dairy operation and farmstead was located on the northern portion of the Study Area with main access from Hamilton Road. The dairy farm buildings will remain outside the License Area and Limit of Extraction Area lands.

The results of the Soil Survey assessment include the following:

- The Study Area is roughly bounded: on the west by agricultural fields; on the north by a pond, Hamilton Road, and rural residential units; on the east by woodlands and agricultural fields; and on the south by Thomas Road.

  The Study Area is located approximately 650 m west of the boundary of Ingersoll, and approximately 2.0 km north of Highway 401.

- The majority of the License Area and the Limit of Extraction Area lands were used for the production of common field crops.

- No ponded areas, seasonally ponded areas, or stream courses were noted on the License Area or Limit of Extraction Area lands.

- No irrigation equipment or irrigation systems were observed on the License Area or Limit of Extraction Area lands.

- There are no registered artificial tile drains associated with this property.

- The License Area comprised approximately 83.9 percent CLI class 1 – 3 soils, with CLI class 1 of approximately 9.3 percent, CLI class 2 of approximately 64.7 percent, and CLI

class 3 of approximately 9.9 percent. The remaining mineral soils (CLI class 4 – 7) comprise approximately 16.1 percent of the License Area.

The Limit of Extraction Area comprised approximately 84.1 percent CLI class 1 – 3 soils, with CLI class 1 of approximately 9.1 percent, CLI class 2 of approximately 65.3 percent, and CLI class 3 of approximately 9.7 percent. The remaining mineral soils (CLI class 4 – 7) comprise approximately 15.9 percent of the Limit of Extraction Area.

- The calculated Soil Productivity Rating for the License Area was 0.753 or a CLI class 2 equivalent.

- The calculated Soil Productivity Rating for the Limit of Extraction Area was 0.724 or a CLI class 2 equivalent.

5.0 REFERENCES

The following data sources were used to carry out the detailed Soil Survey and CLI assessment for this study:

- 1:10000 scale Ministry of Natural Resources (MNR) Aerial Photography, 1978,
- 1:10000 scale Ontario Base Map (1983) Ministry of Natural Resources:
    - 10 17 5050 47600

  1:50000 scale NTS Map No 40 P/2. 1984. Ministry of Energy Mines and Resources, Canada,
- 1:50000 scale NTS Map No 40 P/2. Canada Land Inventory (CLI) Capability Mapping,
- Agricultural Information Atlas (online resource, Ontario Ministry of Natural Resources),
- *Agronomy Guide for Field Crops (Publication 811). (2017).* Ontario Ministry of Agriculture, Food and Rural Affairs,
- ARDA Report No. 4, *The Assessment of Soil Productivity for Agriculture,*
- *Canadian System of Soil Classification (CSSC) (Agriculture Canada, 1998)* and the *Field Manual for Describing Soils in Ontario (Ontario Centre for Soil Resource Evaluation, 1993)*.
- *Classifying Prime and Marginal Agricultural Soils and Landscapes:* Guidelines for Application of the Canada Land Inventory in Ontario. OMAFRA. Online, 2023,
- *Draft Agricultural Impact Assessment (AIA) Guidance Document (March 2018),*
- *Google Earth Pro Imagery,*
- *Guidelines for Detailed Soil Surveys for Agricultural Land Use Planning (OMAFRA, 2022 online),*
- Guidelines on Permitted Uses in Ontario's Prime Agricultural Areas (Publication 851), Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), 2016,
- Online Soils data for the Province of Ontario (Land Information Ontario (LIO), 2023,
- Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Factsheet – Crop Heat Units for Corn and Other Warm Season Crops in Ontario, 1993,
- Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) AgMaps online mapping, (http://www.gisapplication.lrc.gov.on.ca/AIA/Index.html?viewer=AIA.AIA&locale=en-US),
- Ontario Ministry of Agriculture and Food - Land Use Systems Mapping,
- Ontario Ministry of Agriculture and Food - Artificial Drainage System Mapping,
- Oxford County Interactive Mapping, (https://www.oxfordcounty.ca/en/services-for-you/maps.aspx),
- *Provincial Policy Statement, 2020,*
- *Soil Mapping System for Canada:* (https://sis.agr.gc.ca/cansis/publications/manuals/1981-smsc/index.html),
- *Soil Survey Handbook:* (https://sis.agr.gc.ca/cansis/publications/manuals/1987-9/index.html),
- *Soil Survey of Oxford County (Report No. 28 of the Ontario Soil Survey, Wicklund, R.E., and N.R. Richards, 1961),*
- *The Physiography of Southern Ontario 3rd Edition, Ontario Geological Survey Special Volume 2, Ministry of Natural Resources, 1984,*
- *Upgrade of Soil Survey Information for Oxford County (COESA Report No.: RES/MON-005/95 (December 1996) (report and mapping),*
- Windshield and field surveys by DBH Soil Services staff, May 16, 2024.

APPENDIX A

OMAFRA ***Guidelines for Detailed Soil Surveys for Agricultural Land Use Planning***

Guidelines for Detailed Soil Surveys for Agricultural Land Use Planning

Table of Contents

Introduction

More detailed, property specific soil surveys are sometimes needed when a land use change (e.g., an official plan amendment) is being sought that would permanently remove the land from agriculture. The Planning Act establishes that decision makers such as municipalities and the Ontario Municipal Board must have regard for the Provincial Policy Statement of 1997. This statement provides direction on the protection of prime agricultural areas, and establishes criteria to be considered when prime agricultural lands are to be designated for non-agricultural land uses.

The following guidelines provide direction for land resource consultants and their clients undertaking detailed soil surveys for the assessment of agricultural crop capabilities and suitabilities. For these guidelines a "detailed" soil survey is one compiled at a working map scale of 1:10,000 or greater. These guidelines, or terms of reference, are a set of basic requirements to ensure that planners, landowners and consultants have the necessary detailed agricultural land resource information presented and reported in a standard form in order to make planning decisions or to advocate for changes to planning decisions.

The need for detailed soil information for some local decisions often arises from concerns with

1. the accuracy of the published soil information mapping, classification, and agricultural interpretations.
2. situations where the published information is too general for decisions about a specific area.

"Published soil information" refers to the county and municipal soil reports and maps, and also the Agricultural Capability maps. These map and report documents are all available from OMAF.

Soil Survey Components

1. The soil survey should be done according to generally accepted soil survey procedures and be based on an adequate density and distribution of soil profile and landscape inspections. A general guideline is one ground inspection per two square centimetres on the final map (Soil Mapping System for Canada, Agriculture Canada, 1981). At a scale of 1:10,000 this is one inspection per two hectares. Inspection locations and data should be included with the soil map and report.
   The "Field Manual for Describing Soils in Ontario" (Ontario Centre for Soil Resource Evaluation, 1993) provides guidelines for classifying soils and the landscapes in which they occur.
2. Soils of the subject area should be correlated with the soils classified in the published soil survey map and report for that county or municipality.
3. Agricultural capability for common field crops (corn, soybeans, small grains, forages) should be interpreted using the document "Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for the Application of the Canada Land Inventory in Ontario" (www.omafra.gov.on.ca/english/ag.html). As explained in this document, land and soils which are classified as "prime agricultural land" (CLI classes 1 to 3) have necessary capital improvements in place or it is physically feasible for the landowner/manager/farmer to make the necessary improvements. If it is not feasible to make improvements that would enable mechanized row cropping, then the land may be considered as less than "prime" (CLI class 4 or 5). The question of "feasibility" often arises about land with wetness limitations for which more drainage improvement is required for productivity to be optimized. Each case must be considered individually. The Agricultural Drainage System Mapping (OMAF) for the subject area is a necessary reference to help argue and answer the question of drainage improvement feasibility.
4. If the subject area lies within or adjacent to a larger area of specialty crop production, then its soil suitability for specialty crops needs to be evaluated. (Provincial Policy Statement, 1996). "Specialty crops" refer to fruit, vegetable and other crops grown commercially in Ontario and which cannot be grouped with the general "common field crop" types listed above. A definition of "Specialty crop land" is given in the Provincial Policy Statement. The following publications and guidelines are useful for evaluating land and soil quality for specialty crops:
   a. More recent soil survey reports (Brant, Elgin, Haldimand-Norfolk, Middlesex, and Niagara) include ratings of soil suitability for some specialty crops. The ratings published in these reports may also guide the interpretation of reasonably correlated soils in adjacent counties whose soil reports contain no such specialty crop interpretations.
   b. The publication "A Compilation of Soil, Water and Climatic Requirements for Selected Horticultural Crops in Southern Ontario" (Ontario Institute of Pedology Publication, 1989) outlines general landscape and moisture needs for more than 40 different tree fruit, small fruit and vegetable crops. It comprises many of the soil principles used to arrive at the soil suitability ratings given in soil survey publications cited in (a).
   c. Irrigation and/or artificial drainage are often necessary, depending on the site and crop. Climatic regime needs consideration. The longer the frost free period and the greater the heat units available, the greater the range and productivity of crops land tends to support.
   d. In general, soils which are interpreted to be "prime" (Class 1-3) for the common field crop types of corn, soybeans, small grains and forages will have viable suitability for a range of specialty crops. This is most true of sandy and

loamy soils. Clayey soils are suitable for a lesser range of specialty crops but may still be well suited for some crops.

References

Provincial Policy Statement, 1997. As it regards agriculture, see www.omafra.gov.on.ca/english/landuse/facts/provpoli.htm

The Canadian System of Soil Classification; Agriculture and Agri-Food Canada, 1998

Field Manual for Describing Soils in Ontario; Ontario Centre for Soil Resource Evaluation, 1993.

Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario; Ontario Ministry of Agriculture and Food, 2004

A Soil Mapping System for Canada: Revised; Agriculture Canada, 1981

Agricultural Drainage Systems Mapping, OMAF, 1983

A Compilation of Soil, Water and Climatic Requirements for Selected Horticultural Crops in Southern Ontario, Ontario Institute of Pedology, 1993

Qualifications

In order to ensure that all of the components for the detailed soil survey are completed properly, an experienced pedologist should be retained for any survey work. The Ontario Ministry of Agriculture and Food provides a list of consulting businesses with expertise in pedology.

Feedback and technical inquiries to: landuse@omafra.gov.on.ca

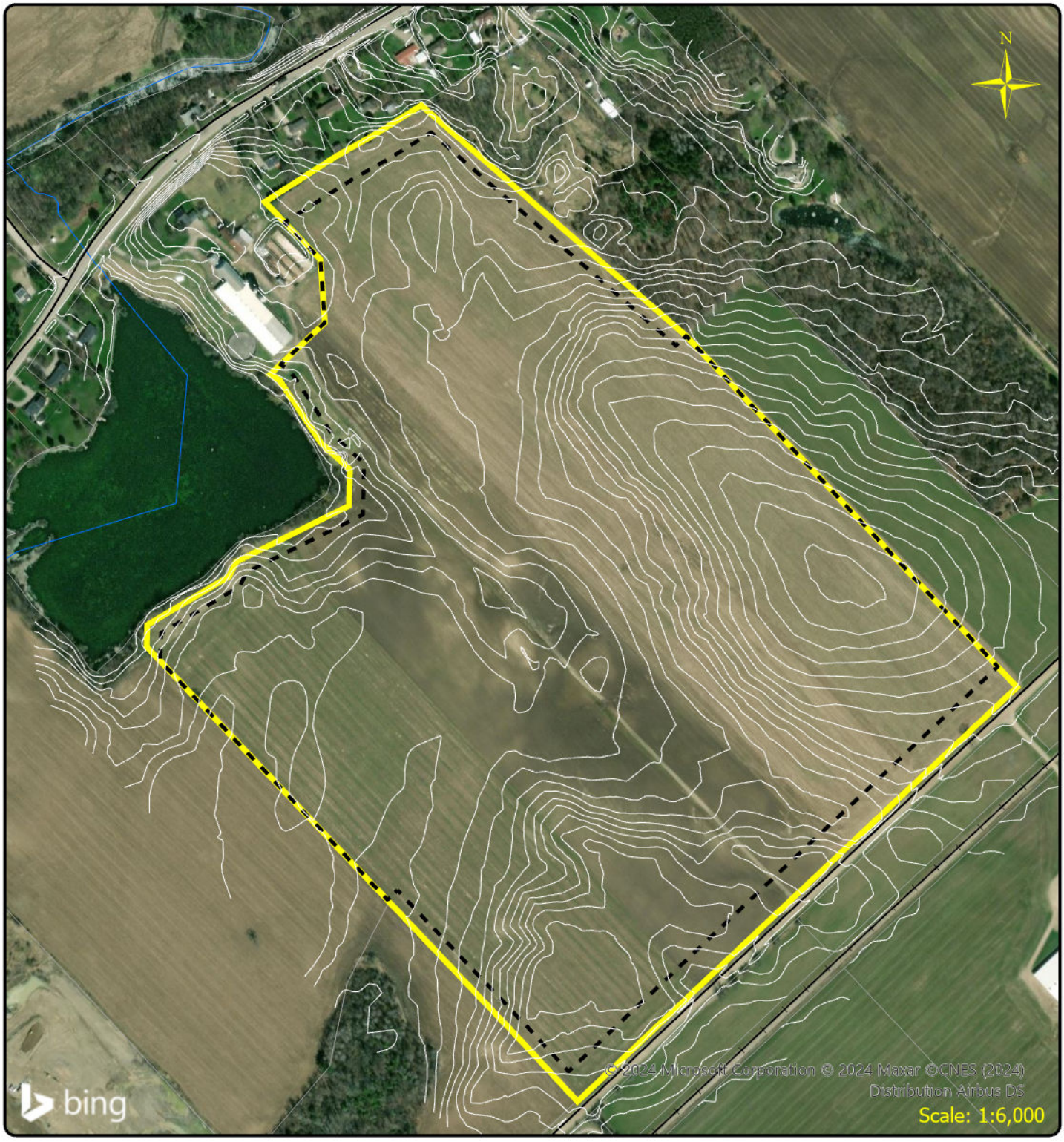
Related Links

- Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario
- Provincial Policy Statement Agricultural Policies

For more information:
Toll Free: 1-877-424-1300
Local: (519) 826-4047
E-mail: ag.info.omafra@ontario.ca

APPENDIX B

Contour Mapping



Legend

- Contour Data (MHBC)
- Roads (Oxford County)
- Railway (MNRF)
- Watercourse (MNRF)
- Limit of Extraction
- Parcel Data (Oxford County)
- Study Area (License Area)

Appendix B

Contours

DBH Soil Services Inc.

June 2024

APPENDIX C

Soil Inspection Data

Soil Inspection Site Number	Horizon	Depth of Horizon (cm)	Soil Texture	Drainage Class	Soil Series
1926	Ap Bmgj Bmgj Ckgj	0 – 27 27 – 48 48 – 85 85 – 100	SL SL SL/L SL	I - Imperfect	London
1927	Ap Bmgj Ckgj	0 – 30 30 – 90 90*	SL SL/L SL	I - Imperfect	London
1928	Ap AB Bmgj Bmgj	0 – 30 30 – 57 57 – 70 70 – 100	SL SL SL SL	I - Imperfect	London
1929	Ap Bmgj Bmgj	0 – 29 29 – 90 90 – 100	SL C SiCL	I - Imperfect	Brisbane
1930	Ap Bmgj Ckgj	0 – 26 26 – 48 48 – 90*	CL C C	I - Imperfect	Brisbane
1931	Ap	0 – 30	L	I - Imperfect	Brisbane
1932	Ap AB Bmgj Bmgj Ckgj	0 – 28 28 – 41 41 – 70 70 – 97 97*	L SL SL CL CL	I - Imperfect	Brisbane
1933	Ap B	0 – 26 27*	SL SL	I - Imperfect	Brisbane
1934	Ap AB Bmgj	0 – 28 28 – 41 41 – 50*	SL SL SL	I - Imperfect	Brisbane
1935	Ap Bmgj Ckgj	0 – 30 30 – 62 62 – 95	CL CL C	I - Imperfect	Brisbane
1936	Ap AB Bmgj	0 – 25 25 – 48 48 – 60*	L CL CL	I - Imperfect	Brisbane
1937	Ap AB Bmgj	0 – 26 26 – 40 40 – 70*	L L L	I - Imperfect	Brisbane
1938	Ap	0 – 30*	SL	I - Imperfect	London
1939	Ap Bmgj Ckgj	0 – 28 28 – 94 94 – 100	SL SL SL	I - Imperfect	London
1940	Ap Bmgj B	0 – 25 25 – 53 53 – 100	L CL/L CL/L	I - Imperfect	London
1941	Ap Bm Bmgj Ckgj	0 – 27 27 – 45 45 – 90 95 – 100	SL SL SL SL	I - Imperfect	London
1942	A	0 – 26*	SL	I - Imperfect	Brisbane

Soil Inspection Site Number	Horizon	Depth of Horizon (cm)	Soil Texture	Drainage Class	Soil Series
1943	Ap Bmgj	0 – 27 27 – 47*	SL SL	I - Imperfect	Brisbane
1944	Ap	0 – 25*	SL	I - Imperfect	Brisbane
1945	Ap	0 – 25*	SL	I - Imperfect	Brisbane
1946	Ap Btgj	0 – 27 27 – 31	SL CL/L	I - Imperfect	Brisbane
1947	Ap AB Bmgj	0 – 27 27 – 42 42 – 85*	SL CL/L CL/L	I - Imperfect	Brisbane
1948	Ap	0 – 28*	SL	I - Imperfect	Brisbane
1949	Ap	0 – 30*	SL	I - Imperfect	Brisbane
1950	Ap	0 – 30*	SL	I - Imperfect	Brisbane
1951	Ap	0 – 30*	SL	I - Imperfect	Brisbane
1952	Ap	0 – 28*	SL	I - Imperfect	Brisbane
1953	Ap AB	0 – 27 27 – 47	SL SL	I - Imperfect	Brisbane
1954	Ap AB Bmgj Bmgj	0 – 26 26 – 40 40 – 85 85 – 100	SL SL CL/L SL	I - Imperfect	London
1955	Ap Btgj	0 – 28 28 – 50*	SL SL	I - Imperfect	Brisbane
1956	Ap	0 – 26*	SL	I - Imperfect	Brisbane
1957	Ap AB Btgj	0 – 29 29 – 50 50 – 55*	SL SL SL	I - Imperfect	Brisbane
1958	Ap	0 – 28*	SL	I - Imperfect	Brisbane
1959	Ap Bmgj	0 – 27 27 – 52*	SL SL	I - Imperfect	Brisbane
1960	Ap Ae Btgj Bmgj	0 – 28 28 – 48 48 – 85 85 – 100	SL SL CL/L L	I - Imperfect	London
1961	Ap AB Bmgj Ckgj	0 – 28 28 – 47 47 – 75 75 - 100	SL L L SL	I - Imperfect	London
1962	Ap AB Ckgk	0 – 29 29 – 43 43 – 70*	SL CL SCL	I – Imperfect	Brisbane
1963	Ap Bmgj	0 – 30 30 – 50*	SL L	I – Imperfect	Brisbane
1964	Ap Bmgj Bmgj2 Ckgj	0 – 30 30 – 40 40 – 70 70 - 100	SL L L CL	I - Imperfect	London

Notes: * = refusal (stone, tree root, etc)
SL = Sandy Loam, L = Loam, CL = Clay Loam, SiCL = Silty Clay Loam
A horizon = topsoil. B horizon = subsoil. C horizon = parent material. O = Organic Soil

APPENDIX D

Curriculum Vitae

DBH Soil Services Inc
217 Highgate Court
Kitchener Ontario N2N 3N9

phone: (519) 578-9226
email: dhodgson@dbhsoilservices.ca

DAVID B. HODGSON, B.Sc., P. Ag.
PRESIDENT – Senior Pedologist/Agrologist

EDUCATION

- B.Sc. (Agriculture), 1983-1987; University of Guelph, Major in Soil Science
- Agricultural Engineering, 1982-1983; University of Guelph.
- Materials Science Technology, 1981-1982; Northern Alberta Institute of Technology (NAIT), Edmonton, Alberta.

AREAS OF PROFESSIONAL EXPERIENCE

2000 to Present — **Senior Pedologist/President. DBH Soil Services Inc., Kitchener, Ontario.**
Mr. Hodgson provides expertise in the investigation, assessment and resource evaluation of agricultural operations/facilities and soil materials. Dave is directly responsible for the field and office operations of DBH Soil Services and for providing advanced problem solving skills as required on an individual client/project basis. Dave is skilled at assessing soil and agricultural resources, determining potential impacts and is responsible for providing the analysis of and recommendations for the remediation of impacts to soil/agricultural/environmental systems in both rural and urban environments.

1992 to 2000 — **Pedologist/Project Scientist. Ecologistics Limited, Waterloo, Ontario.**
As pedologist (soil scientist), Mr. Hodgson provided expertise in the morphological, chemical and physical characterization of insitu soils. As such, Mr. Hodgson was involved in a variety of environmental assessment, waste management, agricultural research and site/route selection studies.
Dave was directly responsible for compiling, analysis and management of the environmental resource information. Dave is skilled at evaluating the resource information utilizing Geographic Information System (GIS) applications.

Dave was also involved the firms Environmental Audit and Remediation Division in the capacity of: asbestos identification; an inspector for the remediation of a pesticide contaminated site; and an investigator for Phase I and Phase II Audits.

SELECT PROJECT EXPERIENCE

Environmental Assessment Studies

- Agricultural Component of the Highway 401 Widening Milton to Wellington County Boundary, 2023 – ongoing.
- Agricultural Component of the Highway 6 Widening Hamilton 2022 – ongoing.
- Agricultural Component of the Bradford Bypass (Highway 400 to 404 link) 2021 – ongoing.
- Agricultural Component of the Green for Life (GFL) Environmental, Moose Creek, Eastern Ontario Waste Handling Facility (EOWHF) Expansion, 2020 – 2023.
- Agricultural Component of the Greater Toronto Area West (GTAW) Highway 413 Corridor Assessment, 2019 – ongoing.
- Peer Review of the Walker Environmental Group (WEG) Inc. Southwestern Landfill Proposal, Ingersoll, 2013 – 2021.
- Agricultural Component for the High-Speed Rail Kitchener to London –Terms of Reference, 2018,
- Agricultural Component of the Mount Nemo Heritage District Conservation Study – City of Burlington, 2014 – 2015.
- Agricultural Component of the Greater Toronto Area West (GTAW) Highway Corridor Assessment – Phase 2, 2014 – 2016.

- Peer Review of the Agricultural Component of the Walker Group Landfill – Ingersoll, 2013 – 2015.
- Agricultural Component of the Highway 407 East Extension Design and Build Phase, 2012 – 2013.
- Agricultural Component of the Beechwood Road Environmental Centre (Landfill/Recycling) – Napanee, 2012 – 2013.
- Agricultural Component of the Clean Harbors Hazardous Waste Landfill Lambton County 2009 – 2015.
- Agricultural Component of the Highway 401 widening Cambridge to Halton Region 2009 – 2012.
- Agricultural Component of the Upper York Sanitary Sewer Study, York Region, 2009 – 2013.
- Agricultural Component of the Greater Toronto Area West Corridor Environmental Assessment Study 2007 – 2013 (Phase 1).
- Agricultural Component of the Niagara to GTA Planning and Environmental Assessment Study, 2007 – 2013.
- Agricultural Component of the Highway 401 widening, Chatham, 2006 - 2007.
- Agricultural Component of the Trafalgar Road study, Halton Region, 2005.
- Agricultural Component of the Highway 404 Extension North, 2004.
- Agricultural Component of the Highway 404 – 400 Bradford Bypass, 2004.
- Agricultural Component of the Highway 407 East Extension, 2002 – 2010.

Agricultural Impact Assessment/Minimum Distance Separation Studies

- Whistle Bare Road, North Dumfries Minimum Distance Separation (MDS1 Assessment), 2024.
- Balsam Road, Pickering Minimum Distances Separation (MDS1) Assessment, 2024.
- Port Hope West Urban Boundary Expansion Scoped Agricultural Impact Assessment (including MDS1), 2023.
- Port Hope East Urban Boundary Expansion Scoped Agricultural Impact Assessment (including MDS1), 2023.
- Town of King Battery Energy Storage System (BESS) Agricultural Impact Assessment, 2023.
- City of London Agricultural Impact Assessment (including MDS1), 2023.
- Caledonia Secondary Plan Scoped Agricultural Impact Assessment (including MDS), 2023.
- Inglewood Well Agricultural Impact Assessment, 2023.
- Orangeville Battery Energy Storage System (BESS) Agricultural Impact Assessment, 2023.
- County Road 109 Realignment Agricultural Impact Assessment, 2023.
- Thornbury Acres Agricultural Impact Assessment (including MDS1), 2022 – 2023.
- Highway 6 Widening Hamilton Agricultural Impact Assessment, 2022 – ongoing.
- Whistle Bare Pit Agricultural Impact Assessment, 2022.
- Middletown Road Agricultural Impact Assessment (including MDS1), 2022.
- Claremont, Durham Region Minimum Distance Separation (MDS1), 2022.
- Grand Valley Settlement Area Boundary Expansion 2022 - ongoing.
- Hagersville Minimum Distance Separation (MDS1), 2022.
- East River Road Minimum Distance Separation (MDS1), County of Brant, 2022.
- Brampton Brick Norval Quarry, Agricultural Impact Assessment, 2022 – ongoing.
- Northfield Drive Minimum Distance Separation (MDS1), Waterloo Region, 2021
- Bradford Bypass Highway 400- 404 Link, Agricultural Impact Assessment, 2021 – ongoing.
- Wilfrid Laurier Milton Campus, Agricultural Impact Assessment (including MDS1), 2021 – 2023.
- Town of Lincoln Road Realignment, Agricultural Impact Assessment, 2021 – 2023.
- Britannia Secondary Plan, Agricultural Impact Assessment (including MDS1), Milton, 2021 – 2023.
- Reesor Road Minimum Distance Separation (MDS1), Markham, 2021.
- Maclean School Road Minimum Distance Separation (MDS1), County of Brant, 2021.
- Petersburgh Sand Pit, Agricultural Impact Assessment, 2021 – 2022.
- Milton, CRH Quarry Expansion, Agricultural Impact Assessment, 2020 – 2022.
- Grimsby, Specialty Crop Area Redesignation, Agricultural Impact Assessment, 2020 - 2022.
- Halton Hills, Premier Gateway Phase 2 Employment Lands Secondary Plan, Agricultural Impact Assessment (including MDS1), 2020 - 2021.
- Milton Education Village Secondary Plan, Agricultural Impact Assessment (including MDS1), 2020 - 2021.
- Woodstock, Pattullo Avenue Realignment, Agricultural Impact Assessment, 2020 - 2021.

- Smithville, West Lincoln Master Community Plan, Agricultural Impact Assessment (including MDS1), AECOM, 2019 – 2022.
- Kirby Road Agricultural Impact Assessment, HDR, Vaughan, 2019 – 2021.
- Elfrida Lands, City of Hamilton, Agricultural Impact Assessment Update, WSP, 2019 – 2021.
- Dorsay Development – Durham Region High Level Agricultural Assessment, 2019.
- Stoney Creek Landfill AIA Update – GHD, 2019.
- Town of Wilmot, Agricultural Impact Assessment (AIA) Aggregate Pit Study (Hallman Pit), 2018, on-going.
- Courtice Area Southeast Secondary Plan (Clarington) Agricultural Impact Assessment (AIA) (including MDS1), 2019,
- Town of Halton Hills, Minimum Distance Separation (MDS 1), August 2018,
- Cedar Creek Pit/Alps Pit (North Dumfries), Agricultural Impact Assessment (AIA), 2018 – 2021,
- Belle Aire Road (Simcoe County) Agricultural Impact Assessment (AIA) Study (including MDS1), 2019,
- Vinemount Quarry Extension (Niagara) Agricultural Impact Assessment (AIA) Study, December 2017.
- Grimsby – Agricultural Impact Assessment Opinion, November 2017.
- City of Hamilton, Urban Core Developments – Agricultural Capability Assessment, February 2017.
- Township of North Dumfries – Minimum Distance Separation (MDS 1), February 2017.
- Township of Erin, County of Wellington – Minimum Distance Separation 1(MDS1 Study), 2016.
- Halton Hills Employment Area Secondary Plan, Halton, 2015 - 2016.
- Peer Review of Agricultural Impact Assessment, Oro-Medonte Township, 2015.
- Greenwood Construction Aggregate Pit, Mono Township, 2014 - 2015.
- Innisfil Mapleview Developments, Town of Innisfil – Minimum Distance Separation (MDS 1), 2014.
- Loyalist Township – Minimum Distance Separation (MDS 1 & 2), 2014.
- Rivera Fine Homes, Caledon – Minimum Distance Separation (MDS 1), 2014.
- Town of Milton PanAm Velodrome – Minimum Distance Separation (MDS) 2012 – 2013.

Soil Surveys/Soil Evaluations

- Ontario Stone, Sand & Gravel Association Case Study Rehabilitated Pits, 2023 – ongoing.
- Soil Survey and Canada Land Inventory Evaluation, Neubauer Pit, 2023.
- Soil Survey and Canada Land Inventory Evaluation, David Pit, 2023.
- Soil Survey and Canada Land Inventory Evaluation, Pinehurst Road, 2023.
- Soil Survey and Canada Land Inventory Evaluation, Paris Plains Church Road Site, 2022.
- Soil Survey and Canada Land Inventory Evaluation, Mulmur Site, 2022.
- Soil Survey and Canada Land Inventory Evaluation, Port Colborne Site, 2022.
- Soil Survey and Canada Land Inventory Evaluation, Pike Site, 2022.
- Soil Survey and Canada Land Inventory Evaluation, New Dundee Road Site, 2022.
- Soil Survey and Canada Land Inventory Evaluation, Gehl Farm, 2022
- Soil Sampling, City of Kitchener, 2021 – 2022.
- Soybean Cyst Nematode Soil Sampling, Enbridge, 2021.
- Soil Survey and Canada Land Inventory Evaluation, Max Becker Enterprises, City of Kitchener, 2021
- Soil Survey and Canada Land Inventory Evaluation, Max Beck Enterprises, City of Kitchener, 2021 – 2022.
- Soil Survey and Canada Land Inventory Evaluation, Burlington, Nelson Quarry, 2020-2021.
- City of Kitchener, City Wide Soil Studies, 2020-ongoing.
- Soil Survey, Fallowfield Drive, City of Kitchener Development Manual Study, 2020 - ongoing.
- Soil Survey, Williamsburg Estates, City of Kitchener Development Manual Study, 2020 - 2021.
- Soil Survey, South Estates, City of Kitchener Development Manual Study, 2020 - 2021.
- Soil Survey and Canada Land Inventory Evaluation, Burlington, Nelson Quarry, 2019.
- Soil Survey and Canada Land Inventory Evaluation, Maryhill Pit, 2019.
- Soil Survey and Canada Land Inventory Evaluation, Glen Morris Pit, Lafarge Canada, 2018,
- Soil Survey and Canada Land Inventory Evaluation, Brantford Pit Extension, Lafarge Canada, 2018,
- Soil Survey and Canada Land Inventory Evaluation, Pinkney Pit Extension, Lafarge Canada, May 2018,
- Soil evaluation and opinion, King-Vaughan Road, March 2018,

- Soil Sampling, Upper Medway Watershed, Agriculture and Agri-Food Canada. December 2017 – June 2018.
- Soil Survey and Canada Land Inventory Evaluation, Hillsburgh Pit Extension, SBM St Marys, December 2017.
- Soil Survey and Canada Land Inventory Evaluation, Erin South Pit Extension, Halton Crushed Stone, December 2017.
- City of Kitchener, City Wide Urban Soil Assessments, 2016 – On-going.
- Soil Survey and Canada Land Inventory Evaluation, Solar Feed-In Tariff (FIT) Program Study, 2016.
    - Bruce County (15 sites)
    - Grey County (4 sites)
- Soil Survey and Canada Land Inventory Evaluation, Wasaga Beach area, County of Simcoe, 2016.
- Soil Survey and Canada Land Inventory Evaluation Study, MHBC Bradford, Simcoe County, 2016.
- Soil Survey and Canada Land Inventory Evaluation, Solar Feed-In Tariff (FIT Program Study), Carbon Foot Print Offsetters, Durham Region, 2015.
- Soil Survey and Canada Land Inventory Evaluation, Solar Feed-In Tariff (FIT Program Study), Abundant Solar Energy (12 Sites – Peterborough, Madoc, Havelock, Belleville), 2015.
- Soil Survey and Canada Land Inventory Evaluation, Solar Feed-In Tariff (FIT Program Study), City of Hamilton, 2015.

Municipal Comprehensive Review and Mapping Studies (MCR)

- Bruce County 2022 – 2023.
- Simcoe County, 2020 - ongoing.
- Northumberland County, 2020 - ongoing.
- Halton Region, 2019 - 2022.

Land Evaluation and Area Review Studies (LEAR)

- Land Evaluation and Area Review (LEAR) presentation for Lanark County Council, 2024.
- Land Evaluation and Area Review (LEAR) Town of Amaranth, 2023 – ongoing.
- Mapping Audit Bruce County. Assessment of Prime and Non-Prime Agricultural Lands, 2022.
- Mapping Audit Northumberland County. Comparison of Regional and Provincial Prime Agricultural Area Mapping – 2021 - ongoing.
- Mapping Audit Simcoe County. Comparison of Regional and Provincial Prime Agricultural Area Mapping – 2021 - ongoing.
- Mapping Audit Halton Region. Comparison of Regional and Provincial Prime Agricultural Area Mapping – 2019 - 2022.
- Land Evaluation and Area Review (LEAR) – Soils Component, in Association with AgPlan Ltd, Kanata/Munster. December 2017 – July 2018.
- Land Evaluation and Area Review (LEAR) – Soils Component, Prince Edward County, 2016 – 2017.
- Land Evaluation and Area Review (LEAR) – Soils Component, Peel Region, 2013 - 2014.
- Land Evaluation and Area Review (LEAR), Minto Communities, Ottawa, 2012 – 2013.
- GIS and LE component of Land Evaluation and Area Review (LEAR), York Region 2008 – 2009.
- Land Evaluation and Area Review (LEAR), Mattamy Homes, City of Ottawa – Orleans, 2008 – 2009.
- GIS for Manitoba Environmental Goods and Services (EG&S) Study. 2007 – 2008.
- GIS and LE component of Land Evaluation and Area Review (LEAR), Halton Region 2007 - 2008.
- GIS and LE component of Land Evaluation and Area Review (LEAR), City of Hamilton, 2003 – 2005.

Expert Witness

- Local Planning Appeal Tribunal (LPAT) Hearing, Greenwood Aggregates Limited, Violet Hill Pit Application, 2020.
- Ontario Municipal Board (OMB) Hearing, Burl's Creek Event Grounds 2018-2019.
- Town of Mono Council Meeting, Greenwood Aggregates Violet Hill Pit, January 2018.
- Ontario Municipal Board (OMB) Hearing, Burl's Creek Event Grounds, Simcoe County, 2015 – 2016.
- Ontario Municipal Board (OMB) Hearing, Town of Woolwich, Gravel Pit, 2012 – 2013.
- Ontario Municipal Board (OMB) Hearing, Mattamy Homes – City of Ottawa, 2011 – 2012.

- Ontario Municipal Board (OMB) Hearing, Town of Colgan, Simcoe County, 2010.
- Presentation to Planning Staff on behalf of Mr. MacLaren, City of Ottawa, 2005.
- Ontario Municipal Board (OMB) Hearing, Flamborough Severance, 2002.
- Preparation for an Ontario Municipal Board Hearing, Flamborough Golf Course, 2001.
- Ontario Municipal Board (OMB) Hearing, Stratford RV Resort and Campground – Wetland Delineation Assessment, 2000.
- Ontario Municipal Board (OMB) Hearing, Watcha Farms, Grey County, Agricultural Impact Assessment – Land Use Zoning Change, 1999-2000.
- Ontario Municipal Board (OMB) Hearing, Town of St. Vincent Agricultural Impact Assessment – Land Use Zoning Change, 1999 – 2000.
- Halton Agricultural Advisory Committee (HAAC), Halton Joint Venture Golf Course Proposal - Agricultural Impact Assessment for Zoning Change, 1999-2000
- Halton Agricultural Advisory Committee (HAAC), Sixteen Mile Creek Golf Course Proposal – Agricultural Impact Assessment for Zoning Change, 1999.
- Ontario Municipal Board (OMB) Hearing, Town of Flamborough, Environs Agricultural Impact Assessment for Zoning Change – Golf Course Proposal, 1999.
- Ontario Municipal Board (OMB) Hearing, Stratford RV Resort and Campground – Agricultural Impact Assessment, 1998.

Monitoring Studies

- Ontario Stone, Sand, and Gravel Association (OSSGA) Rehabilitation Study, 2023 – ongoing.
- Enbridge Soil Sampling for Soybean Cyst Nematode, various sites Lambton County, 2022
- Union Gas/Enbridge Gas 20" Gas Pipeline Construction Monitoring – Kingsville – 2019 - 2020.
- Union Gas/Enbridge Gas – Gas Pipeline Construction Monitoring for Tree Clearing. Kingsville Project. February/March 2019.
- CAEPLA – Union Gas 36" Gas Pipeline Construction Monitoring and Post Construction Clean Up – Agricultural Monitoring Panhandle Project. 2017 – 2018.
- CAEPLA – Union Gas 36" Gas Pipeline Construction Clearing Panhandle Project (Dawn Station to Dover Station) – Agricultural Monitoring, 2017 (Feb-March).
- City of Kitchener, Soil Sampling and data set analysis, 2017 – On-going.
- GAPLO – Union Gas 48" Gas Pipeline (Hamilton Station to Milton) Construction Soil and Agricultural Monitoring, 2016 – 2017.
- GAPLO – Union Gas 48" Gas Pipeline (Hamilton –Milton) Clearing – Agricultural Monitoring, 2016.

Publications

D.E. Stephenson and D.B. Hodgson, 1996. Root Zone Moisture Gradients Adjacent to a Cedar Swamp in Southern Ontario. In Malamoottil, G., B.G. Warner and E.A. McBean., *Wetlands Environmental Gradients, Boundaries, and Buffers*, Wetlands Research Centre, University of Waterloo. Pp. 298.

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Appendix C: CV

Education

University of Waterloo
Master of Arts, Regional Planning and Resource Development
1997

University of Guelph
Bachelor of Science in Agriculture
1993

Professional Associations

Registered Professional Planner (RPP)

Member, Canadian Institute of Planners (CIP)

Full member, Ontario Professional Planners Institute (OPPI)

Member of Parks & Recreation Ontario

Member of the WRHBA Kitchener Development Liaison Committee

Member of the Waterloo Region Homebuilders' Association Liaison Committee with the Region of Waterloo

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MHBC | PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

Pierre Chauvin

BSc(Agr), MA, MCIP, RPP

Pierre Chauvin joined the firm as a Planner in 1998. Mr. Chauvin provides urban and rural planning analysis and research services for public and private sector projects across Ontario.

His professional activities include project management, community planning, and land development. Pierre's experience ranges from residential and commercial development, environmental and recreational planning and resource management.

Pierre also has specific expertise in rural and agricultural planning. He has prepared agricultural impact assessments as part of settlement area expansions and development proposals. He also has experience with MDS and the Nutrient Management Act, and has provided expert agricultural and planning evidence at the Ontario Land Tribunal and other similar boards/tribunals.

Pierre holds a Masters degree in Regional Planning and Resource Development and a Bachelor of Science in Agriculture degree with a major in Natural Resources Management. Pierre is also a full member of the Canadian Institute of Planners and Ontario Professional Planners Institute.

Professional History

Partner, MacNaughton Hermsen Britton Clarkson Planning Limited (2013 – Present)

Associate, MacNaughton Hermsen Britton Clarkson Planning Limited (2004– 2013)

Planner/Senior Planner, MacNaughton Hermsen Britton Clarkson Planning Limited (1998 – 2004)

Assistant Planning Officer, Upper Grand District School Board (1997 – 1998)

Research Assistant (Nutrient Management), Land Resource Science Department, University of Guelph (1993 – 1995)

Professional Associations

Member of the Waterloo Region Homebuilder's Association and City of Kitchener Liaison Group

Member of the Waterloo Region Homebuilder's Association and Waterloo Region Liaison Group

Member of the Waterloo Region Homebuilder's Association Laison Group with the Townships of Woolwich and Wilmot

Past Chair of the Homebuilders' Association Liaison Committee with the Grand River Conservation Authority

Past Chair and member of the Industry Luncheon Committee, Guelph & District Homebuilders' Association

Past Member of Board of Directors, Guelph & District Homebuilders' Association

Past Member, Committee of Adjustment for the Township of Centre Wellington

Past Member, Heritage Centre Wellington Committee (LACAC)

Past Vice-Chair, Village of Elora Planning Advisory Committee

Selected Project Experience

Agricultural/Rural Planning

- Project lead to undertake a LEAR Study for the Township of Amaranth, County of Dufferin
- Project planner to undertake a review of the Minimum Distance Separation formulae for the Region of Peel and Town of Caledon as part of their LEAR Study.
- Review and provided opinion to the Township of Guelph-Eramosa regarding the revised Minimum Distance Separation Formulae.
- Project planner for the preparation of an agricultural assessment of potential growth areas as part of the City of Brantford Growth Strategy/Official Plan Review.
- Preparation of agricultural impact statements/assessments including MDS I & II assessments on behalf of various private sector clients in support of development and aggregate applications.
- Preparation of an agricultural assessment on behalf of the Township of Guelph/Eramosa to explore the feasibility and potential of a dual Agricultural/Rural designation approach in the Official Plan.

Parks & Recreation

- Project lead and consultant to the City of Port Colborne to complete a Parks and Recreation Master Plan.
- Project lead and consultant to the Town of Collingwood to complete a Parks and Recreation Master Plan.
- Project lead and consultant to the Town of Grimsby to complete a Parks and Recreation Master Plan.
- Project lead and consultant to the City of Kitchener to undertake a Business Case for the Doon Pioneer Park Community Centre Expansion.
- Project lead and consultant to the Town of Cobourg for the Cobourg Community Centre and YMCA Northumberland Joint Facility Needs Assessment.
- Project lead and consultant to the Town of Cobourg for the preparation a Recreation Strategy and Implementation Plan.
- Project Lead and Consultant to the Town of Caledon in the preparation of a Parks and Recreation Visioning Plan.
- Consultant to the Township of West Lincoln in the preparation of a Parks and Recreation Master Plan.

- Project planner, Township of Guelph-Eramosa Parks, Recreation and Culture Master Plan.

Source Water Protection

- Prepared Official Plan Amendment and policies as well as implementing Zoning By-law to implement the Source Water Protection Plan policies for the Counties of Norfolk, Elgin and Middlesex.
- Prepared Official Plan Amendment and policies to implement the Source Water Protection Plan policies for the County of Wellington.
- Consultant to Grand River Conservation Authority, County of Wellington and County of Perth in the development of Source Water Protection water quality policies for the Lake Erie Region Source Protection Plan.
- Prepared Official Plan Amendment and policies to implement the Groundwater Protection Strategy for the County of Wellington.

Official Plan/Zoning By-laws

- Project lead and consultant for the preparation of an Official Plan Update for the Municipality of Kincardine.
- Project lead and consultant to the Municipality of Kincardine for the preparation of a Comprehensive Zoning By-law Review (on-going).
- Project lead and consultant to the Township of Huron-Kinloss for the preparation of a Comprehensive Zoning By-law Review.
- Project lead and consultant for the preparation of an Official Plan Update for the Township of Huron-Kinloss.
- Project lead and consultant to the County of Norfolk to prepare an Issues and Report for the Hastings Drive Zoning By-law Study.
- Project planner for preparation of a Consolidated Zoning By-law for the City of Kawartha Lakes (involved consolidating 17 By-laws).

Special Studies & Other

- Consulting planner for the City of Stratford to review and process select development applications.
- Consulting planner for the County of Perth to review and process planning applications.
- Consulting planner for the County of Bruce to review Consent and Minor Variance applications for the Lakeshore and Peninsula Hubs.
- Project planner for the Municipality of North Perth to complete a Secondary Plan and Master Servicing Plan for North-East Listowel (on-going).
- Project Lead and planner for the Upper Grand District School Board for the approval of new secondary school in the City of Guelph.
- Consultant to the Upper Grand District School Board regarding the justification and approval of a new secondary school in the Township of Centre Wellington, including a settlement area expansion.
- Consultant to the Huron-Perth Catholic District School Board regarding the justification and approval of a new elementary school in the Town of North Perth, including an agricultural impact assessment for a proposed expansion of the settlement boundary to accommodate the school.
- Justification of an urban expansion in the former Town of Listowel (Municipality of North Perth) and preparation of a Plan of Subdivision for a 50 acre property. The justification included an assessment of agricultural impacts and servicing considerations.
- Consultant to the City of Woodstock regarding the justification and approval of the East Woodstock Secondary Plan & Design Study. Prepared Official Plan Amendment and policies to implement the Secondary Plan.
- Consultant to the Town of North Perth on the Southeast Listowel Community Plan.

- Project planner providing planning services to the Township of Guelph-Eramosa. Review of applications, and preparation and presentation of planning reports to Council.
- Review and/or preparation of numerous planning approvals relating to draft plan of subdivisions, draft plan of condominiums, site plans, Official Plan amendments, Zoning By-law amendments, consents and minor variances throughout the Region of Waterloo, the Counties of Wellington, Perth, Bruce, Oxford, Huron and surrounding areas.
- Advisor to various aggregate producers regarding the review of new Official Plan policies in the Region of Durham and County of Oxford.
- Project Planner to the Aggregate Producers' Association of Ontario on the review of the Oak Ridges Moraine Conservation Plan.
- Coordinating the design and preparation of site plans under the Aggregate Resources Act. Research and preparation of Planning Reports and Aggregate Resources Act Reports for license and permit applications, including work for companies such as Lafarge Canada, Dufferin Aggregates, Federal White Cement and Beachville Lime Limited.

Awards / Publications / Presentations

2017	Designing Public Spaces to Support Vibrant Communities – Presentation on Park Land Dedication and Implications of Bill 73, September 15, 2017
2012	OPPI – Southwest District – Presentation on Source Water Protection Planning and Implementation, October 25, 2012
2012	Ontario Sand and Gravel Association – Presentation on Implications of Source Water Protection on Aggregate Operations, November 8, 2012.
2004	B. Hermsen and P. Chauvin, 2004. Elementary Schools and Residential Absorption Rates in New Neighbourhoods. Spring 2004 Ontario Expropriation Association Newsletter.
2003	Nutrient Management Act - Presentation to the Municipal Law Seminar Series, in co-operation with Kearns McKinnon LLP, February 26, 2003.
1997	Planning and Development of Recreational Trails on Private Lands: A Case Study of the Grand Valley Trails Association. Unpublished M.A. Thesis, School of Urban and Resource Development Planning, Faculty of Environmental Studies, University of Waterloo, Ontario

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