AGRICULTURAL REPORT

PROPOSED DOLOSTONE QUARRY

PART OF LOT 1, CONCESSION 11 AND
LOTS 2 AND 3, CONCESSION 11
GEOGRAPHIC TOWNSHIP OF EAST FLAMBOROUGH
CITY OF HAMILTON

JUNE, 2004

PREPARED FOR:

LOWNDES HOLDINGS CORP.

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LOWNDES HOLDINGS CORP. - PROPOSED DOLOSTONE QUARRY
AGRICULTURAL REPORT
EXECUTIVE SUMMARY

Stovel and Associates Inc. was retained by Lowndes Holdings Corp. to prepare an Agricultural Report for a proposed aggregate development. Lowndes Holdings Corp. has acquired 154 ha (380 acres) described as Part of Lot 1 and Lots 2 and 3, Concession 11, geographic Township of East Flamborough, now the City of Hamilton. Lowndes Holdings Corp. has identified a Provincially significant Amabel dolostone deposit, approximately 34 m thick.

The Agricultural Report documents the quality and quantity of agricultural soils on the site.

A soil survey of the subject land was completed in 2003. The purpose of the soil survey was to examine and identify the onsite soils and to refine soil capability for agriculture mapping, based on the Canada Land Inventory soil classification system. The majority of the soils on the subject property were found to have developed from a stony, morainal till deposit. Outwash deposits, lacustrine deposition and organic soils were also identified.

Seven soil series were identified on the site. These soil series include the following: Dumfries, Killean, Lily, Burford, Toledo, Farmington and Muck. The subject land is comprised of Class 2 to 7 soils. There are only 12 ha of Classes 2-3 soils. The majority of the site (approximately 91.2 %) is made up of Class 4-7 soils and Organic soils.

Based on this information, the site is not considered to be prime agricultural land. Mapping from the Regional Official Plan confirms that the subject land is not part of an area predominated by Class 1-3 agricultural soils.

Given the findings of the soil survey, the subject land should not be considered to be *prime agricultural land* in a *prime agricultural area*, as referred to in the Provincial Policy Statement. Further, rehabilitation to substantially the same area and same average soil quality for agriculture should not be a policy requirement.

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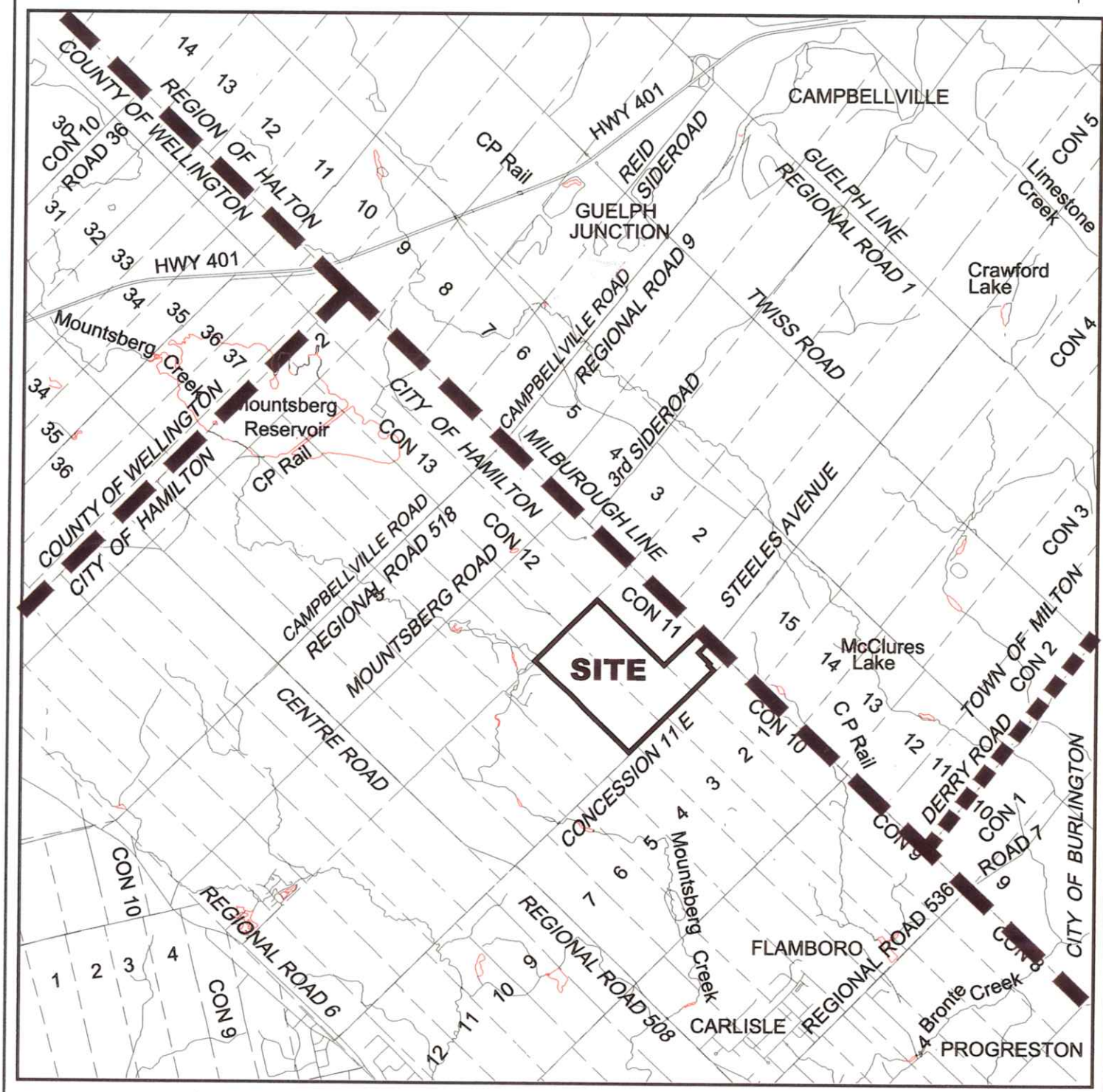


Source: Long Environmental Limited, 2004.

Not To Scale

Prepared For:	Prepared By:		
LOWNDES HOLDINGS CORP.	**STOVEL and Associates Inc.**	**LOCATION MAP**	MAP NO: **1**

DATE: JUN., 2004 FILE: 24-11-m1.dwg

AGRICULTURAL REPORT

1.0 INTRODUCTION

1.1 Background

Stovel and Associates Inc. were retained by Lowndes Holdings Corp. to prepare an Agricultural Report for a proposed aggregate development. Lowndes Holdings Corp. has acquired 154 ha (380 acres) described as Part of Lot 1 and Lots 2 and 3, Concession 11, geographic Township of East Flamborough, now the City of Hamilton (Map 1). Concession 11 East Road forms the southern boundary of the subject land.

This Agricultural Report will document the quality and quantity of agricultural soils on the site.

1.2 Development Area and Onsite Land Uses

The proposed development will involve the extraction of consolidated aggregate above and below the water table. The licence sought will be a Category 2 - Class "A" - Quarry Below Water. The excavation area for the proposed dolostone quarry may be about 93 ha (231 acres).

Much of the site is forested and/or in a natural state, i.e. wetland, creek, stream bed. A portion of the site has been previously cleared and cultivated for agricultural production.

The site does not contain any significant structures related to agricultural production. There are no active livestock facilities, silos, manure storage tanks or fence paddocks. The lands in question are not tile drained.

1.3 Study Objectives

The objectives of this study are to:

i) provide an overview of relevant background information;
ii) describe the local terrain setting;
iii) conduct a soil survey to determine the onsite soil series and assess the agricultural classification of the onsite soils, using the Canada Land Inventory - Soil Capability for Agriculture system; and
iv) discuss the provincial policies with respect to agricultural rehabilitation requirements for new quarries.

2.0 METHODS

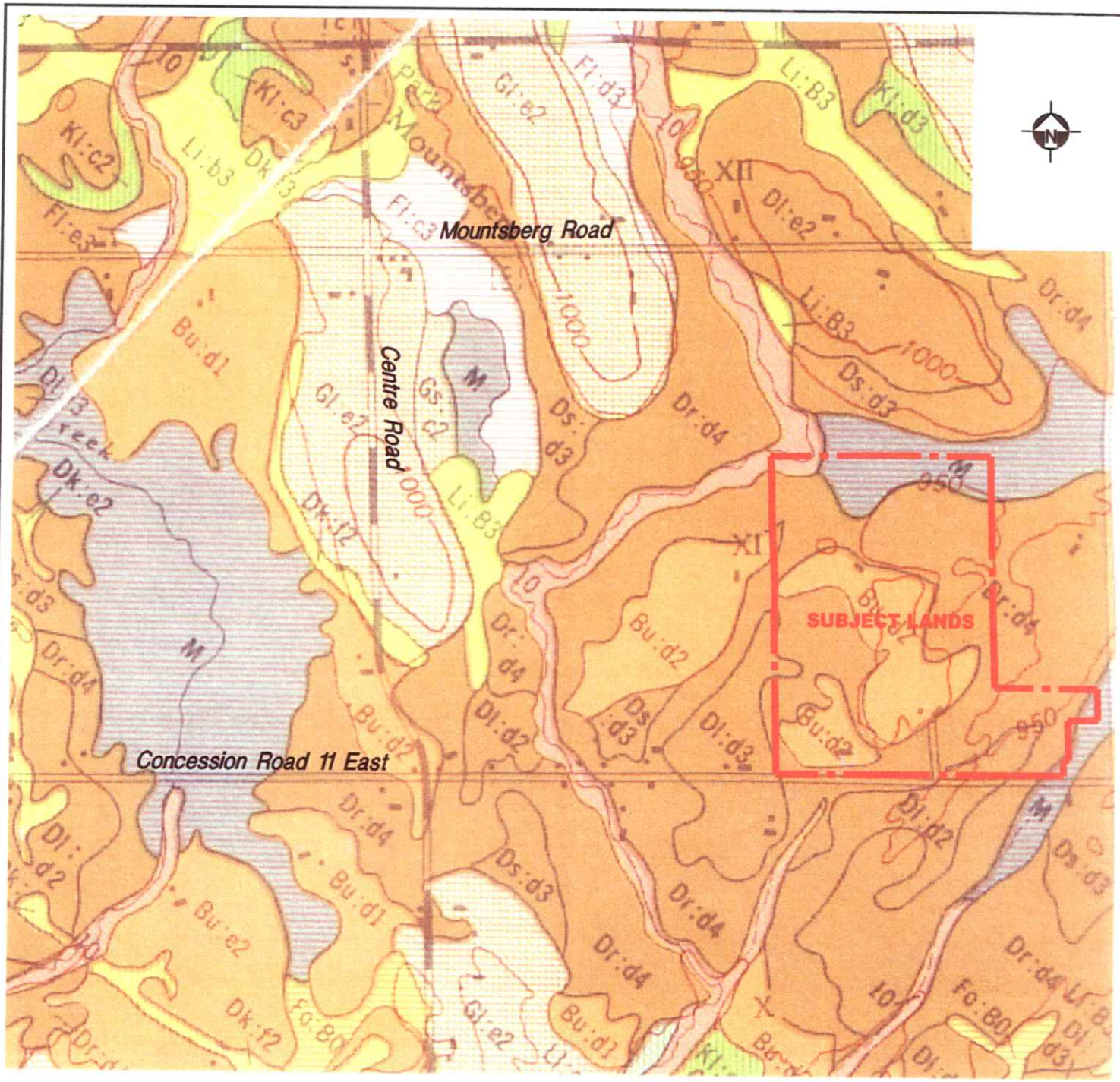
2.1 Background Data

A variety of background information sources were reviewed during the course of this study. Among these sources were:

- Physiography of Southern Ontario (*Chapman and Putnam, 1984*);
- Soils of Wentworth County - Report No. 32 of the Ontario Soil Survey *(Presant, Wicklund and Matthews, 1965*);
- Canada Land Inventory - Soil Capability for Agriculture (1:50,000 manuscript mapping);
- aerial photography and contour mapping of the site and surrounding area; and
- surface microdrainage mapping of the site and near surrounding area.

2.2 Field Studies

A soil survey of the subject land was completed on October 24, 2003. The purpose of this soil survey was to describe the onsite soils and to refine soil capability for agriculture mapping, based on the Canada Land Inventory soil classification system. The upper one metre (1 m) of the soils was exposed at several locations through the use of a hand auger. Soil profiles were exposed and the soils were described in terms of soil texture, drainage, slope class, and evidence of stones. A map of the site was prepared to illustrate the findings of the soil survey (see Map 3). As part of the soil survey, various depths of the A (topsoil), B (subsoil) and C horizons were recorded.



LEGEND

Symbol	Soil Series	Drainage	Parent Material	Capability Rating
Dr	Dumfries loam - rocky phase	Good	Gravelly sandy loam till	6r
Gl	Guelph loam	Good	Loam till	1
Bu	Burford loam	Good	Gravel	2fm
10	River Course	Poor	Alluvium	7ei
M	Muck	Very Poor	Organic	0

Descriptions of CLI –
Soil Capability for Agriculture
Subclasses

Subclass	Description
w	excessive wetness
f	low fertility
t	topography
m	droughty
e	erosion
p	excessive stoniness
s	combination of d, f, or m
r	depth to bedrock
i	soils subjected to innundation by streams or lakes

0 1000m

Scale 1 : 25,000

Source: Soils of Wentworth County Survey No. 32., CLI Map No. 40P/8-Galt

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STOVEL and Associates Inc.

SOILS & CLI

MAP NO: **2**

DATE: JUN., 2004 FILE: 24-11-m2.dwg

3.0 DESCRIPTION OF THE SOIL RESOURCES

3.1 General Overview

The subject land is located in the Flamborough Plain physiographic region (*Chapman and Putnam, 1984*). The Flamborough Plain is an isolated tract of shallow drift on the Niagara cuesta northwest of Hamilton. This limestone plain has been named the Flamborough Plain since it spans Flamborough Township and extends north to Acton. The Flamborough Plain is about 150 square miles in size bounded to the northwest by the Galt Moraine, and on the south by the silts and sands of glacial Lake Warren. A few drumlins are found scattered over the limestone plain and swamps are plentiful. What little overburden there is on the bedrock apart from the drumlins, is either bouldery till or sand and gravel.

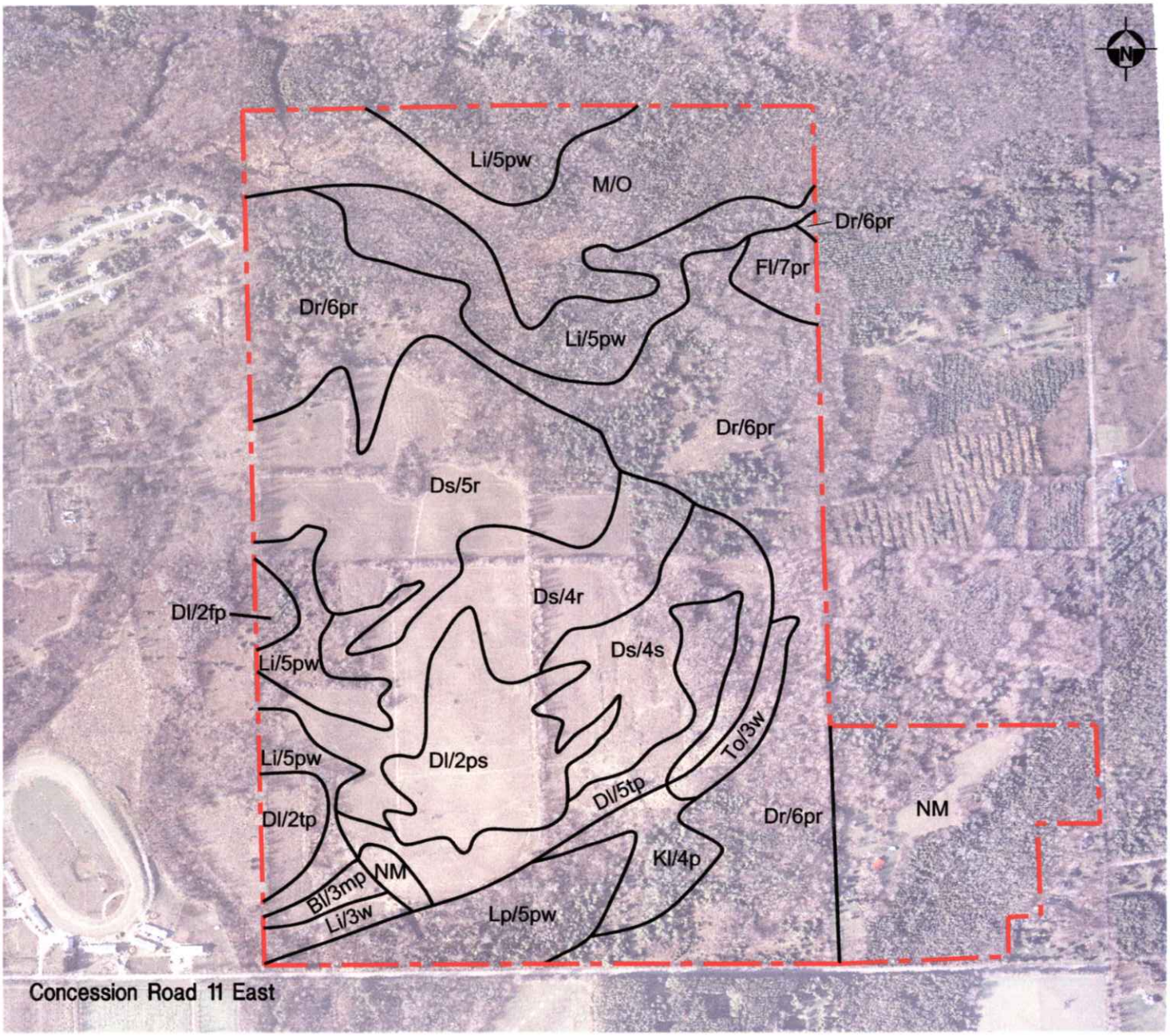
Good soil is not plentiful on the Flamborough Plain. The soil tends to be either too wet or too stony and shallow. Thus most of the area is still in woods or pasture. The cultivated soil is found mainly on the drumlins and deeper gravel terraces. The swamps serve as water reservoirs and produce cedar lumber, black muck or marl.

Map 2 illustrates the distribution of soils on the subject land and environs, based on background mapping at a scale of 1:63,360. The site is mapped mainly as Dumfries loam - rocky phase. The parent material of the Dumfries soil is a calcareous gravelly, sandy loam which usually contains many dolomitic stones and boulders. The Dumfries loam - rocky phase is usually well-drained. These soils are difficult to cultivate due to the number and size of rock outcrops and boulders. Most of the land that has been cleared is used only for pasture, and would probably be best suited for wildlife and recreational purposes (*Presant, Wicklund, and Matthews*, 1965).

A small portion of the subject land has also been mapped as Burford loam. The Burford loam is a well-drained soil that has developed on gravel deposits. A wide variety of crops are grown on this soil including spring and winter wheat, hay and corn. The gravel subsoil, which permits rapid water drainage, may also lead to moisture deficiencies during dry summers. The underlying gravel is in demand and areas associated with these soils often are used for gravel pits.

The northern limits of the site are mapped as Muck. Muck soils are poorly drained soils consisting of deposits in which 16 inches or more of organic materials have accumulated. Most of the Muck soils in the area remain in a natural state, either as swamp land or marsh.

In the extreme northwest corner of the property, a stream course is mapped. Stream courses are most common in the northern portion of Flamborough Township because of the prevalence of stony till and shallow soil deposits. The soil deposits along the stream course are often variable in texture, including loam, silt loam and sandy loam materials.



Soil Series — Lp/5pw — CLI Rating

Symbol	Soil Series	Drainage	Parent Material	CLI Rating
Dl	Dumfries loam	Good	Gravelly, sandy loam till	2ps, 4s, 5tp
Ds	Dumfries - shallow phase	Good	Gravelly, sandy loam till	5r
Dr	Dumfries - rocky phase	Good	Gravelly, sandy loam till	6pr
Kl	Killean loam	Imperfect	Loam till	4p
Ll	Lily loam	Poor	Loam till	5pw
Lp	Lily - peaty phase	Very Poor	Loam till	5pw
Bl	Burford loam	Good	Outwash sand & gravel	3mp
To	Toledo silt loam	Poor	Lacustrine silty clay loam	3w
Fl	Farmington loam	Excessive	Excessive Bedrock	7pr
M	Muck	Very Poor	Organic	O
NM	Area Not Mapped	(Disturbed or Not Part of Study Area)		

Descriptions of CLI - Soil Capability for Agriculture Subclasses

Subclass	Description
w	excessive wetness
f	low fertility
t	topography
m	droughty
e	erosion
p	excessive stoniness
s	combination of d, f, or m
r	depth to bedrock
i	soils subjected to innundation by streams or lakes

0 — 400m

Scale 1 : 10,000

Prepared For:
LOWNDES HOLDINGS CORP.

Prepared By:
STOVEL and Associates Inc.

ONSITE SOILS

MAP NO: **3**

DATE: JUL., 2004 FILE: 24-11-m3.dwg

Because streams actively flow for most of the year causing erosion and flooding conditions, The lands adjacent to stream courses generally are not suitable of use for crop production.

3.2 Onsite Soils and Soil Capability for Agriculture

Based on the findings of the detailed soil survey, the majority of the soils on the subject property were found to have developed from a stony, morainal till deposit. Outwash deposits, lacustrine deposition and organic soils were also identified.

Seven soil series were identified on the site. These soil series include the following: Dumfries, Killean, Lily, Burford, Toledo, Farmington and Muck. These soil series and their phases are described in the following paragraphs.

Dumfries Soil Series
Dumfries soils are classified as grey brown luvisol. These soils have developed from a well-drained, coarse textured till and occur on the hummocky, often steeply sloping, irregular slopes typical of the Galt and Paris moraines. Gravelly kame deposits, small, poorly drained, depressional areas and organic soils are often found in close association with Dumfries soils. Three phases of the Dumfries soil series were identified on the property and include - Dumfries loam, Dumfries shallow phase and Dumfries rocky phase.

Dumfries loam soils occur in the south-central portion of the subject land on slopes ranging from 1.5% to 12%. The surface horizon consists of a dark coloured loam to sandy loam with a neutral soil reaction. The B horizon is dark brown to brown and often consists of a loamy Bm and finer textured Bt horizon. These soils are easily eroded on steeper slopes and evidence of eroded conditions was observed in some areas. In these locations, the soil reaction at the surface is alkaline and the underlying B horizon is absent. The parent material is a calcareous, gravelly sandy loam. Dolostone cobbles, stones and boulders are common throughout the soil profile.

Removal of surface stones is required for cultivation and these soils often suffer from droughtiness, low inherent fertility and topographic limitations. These soils are rated CLI Class 2ps on nearly level slopes, 4s on gentle slopes and 5tp on moderate slopes.

The Dumfries shallow phase is mapped on areas where the bedrock is encountered within one metre of the surface. The areas mapped as Dumfries shallow phase also have significant inclusions of Dumfries loam and the Dumfries rocky phase. A more detailed delineation of this soil is difficult because of irregular, undulating nature of the underlying bedrock.

This soil is rated as CLI Class 5r and is severely limited by a number of factors including the depth to bedrock (rockiness), stoniness, droughtiness, and low inherent fertility. It is best suited to permanent pasture although some field crops can be produced in areas where stone removal is viable.

The Dumfries rocky phase is often mapped in association with the Farmington soil series. The rocky phase has more than 30 cm of loamy textured soil material overlying the dolostone bedrock. However, bedrock outcrops and large boulders frequently occur at the surface making cultivation of these soils very difficult. Where these soils have been cleared they are mostly used as permanent pasture. The CLI rating for these soils is Class 6pr.

Killean Soil Series

The Killean soil series has developed from parent material similar to the Dumfries soil series. Killean soils are imperfectly drained due to the relatively high water table along the southern boundary of the property and occur on very gentle slopes (2-5%). In addition, to an auger hole placed in this soil unit, a test pit was also excavated by the proponent. The test pit confirmed the presence of many large stones and boulders that occur throughout the soil profile. The presence of large stones and boulders severely limits agricultural production and subsequently these soils are rated as CLI Class 4p.

Lily Soil Series

The Lily soil series has also formed from till similar to the composition of the Dumfries soil series. This soil is poorly to very poorly drained. Two phases of the Lily soil series were identified - the Lily loam and the Lily peaty phase.

The Lily loam is mapped in the northern and western portions of the subject land on nearly level slopes (0.5% to 2.0 %). This soil series occupies the lower elevations on the property and the water table is at or near the surface. These soils are very stony and large boulders are common. As a result of the excessive soil moisture and stoniness, these soils are rated as CLI Class 5pw.

The Lily peaty phase is similar to the Lily loam, however, the depth of the organic material over the till is up to 40 cm in depth. Stones and boulders are encountered throughout the soil profile including at the surface. It is likely that the area mapped as Lily peaty phase also includes some inclusions of organic soils (Muck) as well as Lily loam. This soil has been rated CLI Class 5pw because of limitations resulting from excessive soil moisture and stoniness.

Burford Soil Series

Burford soils are well drained, outwash deposits of loam overlying stratified sands and gravels. On the subject land, a small area of Burford has been mapped along the edge of the Dumfries till and most likely represents an old terrace. A significant portion of this deposit has been extracted for its gravel content and is mapped as "Gravel Pit". The loamy material overlying the gravel is at least 60 cm in depth and contains some gravel and cobbles. The parent material consists of stratified fine sands, sands and gravels of varying thickness.

The Burford loam soil series on the site is limited by droughtiness and low inherent fertility. These soils are rated as CLI Class 3mp.

Toledo Soil Series
A long narrow soil unit has been mapped between the Dumfries loam and the Dumfries rocky phase in the southeastern portion of the property. This area is mapped as Toledo silt loam. Toledo soils are poorly drained lacustrine deposits of silty clay loam and silty clay. The silt loam phase of the Toledo soils have a loamy surface texture.

The CLI rating for the Toledo soil mapped on the site is Class 3w as a result of the soils poor drainage.

Farmington Soil Series
Farmington soils have developed over limestone or dolostone bedrock. Surface horizons consist of a loamy Ah. The B horizon may or may not be present. The total depth of mineral soil overlying the bedrock does not exceed 30 cm. Bedrock outcroppings are common as are large stones and boulders. These soils are well to excessively drained and suffer from droughtiness during the growing season. Due to the frequency of bedrock outcrops and the excessive stoniness, Farmington soils are rated CLI class 7pr and have no value for agriculture.

Muck
The northern portion of the site is mapped as Muck. Muck soils belong to the Organic great soil group. Muck soils consist of a minimum of 40 cm of organic material. On the subject property, Muck soils may be underlain by mineral soil or bedrock. Muck soils are very poorly drained and occur on depressional topography. Although these soils are usually stone-free, on the subject property the organic deposits have accumulated on and adjacent to the Dumfries rocky phase. As a result, stones may be encountered at the surface and at depth.

Organic soils are not rated by the CLI soil classification system for agriculture. The majority of Muck soils in this area are not suited nor utilized for agricultural purposes.

Summary
In summary, the subject property is characterized by predominantly low capability soils. The majority of the site is mapped as Dumfries loam, Dumfries shallow phase and Dumfries rocky phase.

Agricultural production of common field crops is restricted to the central portion of the property on the Dumfries loam and portions of the Dumfries shallow phase. The main limitations for agricultural production include stoniness, shallowness to bedrock and poor drainage.

4.0 DISCUSSION

This section of the report provides a discussion of the provincial policy requirements related to agricultural rehabilitation.

4.1 Provincial Policy Statement

The *Provincial Policy Statement* (May 22, 1996) provides direction to approval authorities with respect to mineral aggregate applications. Mineral resources are to be protected for long term use (Section 2.2.1) and as much of the mineral aggregate resources as is realistically possible will be made available to supply mineral resource needs, as close to markets as possible (Section 2.2.3.1).

Specific direction is provided to approval authorities when new mineral aggregate development applications are proposed for agricultural lands:

2.2.3.6 *In prime agricultural areas, on prime agricultural land, extraction of mineral aggregates is permitted as an interim use provided that rehabilitation of the site will be carried out whereby substantially the same areas and same average soil quality for agriculture are restored.*

On these prime agricultural lands, complete agricultural rehabilitation is not required if:

a) there is a substantial quantity of mineral aggregates below the water table warranting extraction; or

b) the depth of planned extraction in a quarry makes restoration of pre-extraction agricultural capability unfeasible; and

c) other alternatives have been considered by the applicant and found unsuitable; and*

d) agricultural rehabilitation in remaining areas will be maximized.

*Note: *Other alternatives* include resources in areas of classes 4 to 7 agricultural lands, resource on lands committed to future urban uses, and resources on prime agricultural lands where rehabilitation to agriculture is possible.

Prime Agricultural Areas are defined as:

> *...an area where prime agricultural land predominates. Prime Agricultural Areas may also be identified through an alternative agricultural land evaluation system approved by the Province.*

Prime Agricultural Land is defined as:

> *...land that includes specialty crop lands and/or Canada Land Inventory Classes 1, 2 and 3 soils, in this order of priority for protection.*

As described in Section 3 of this report, the subject land is comprised of Class 2 to 7 soils. There are only 12 ha of Classes 2-3 soils. The majority of the site is made up of Class 4-7 soils and Organic soils (approximately 91.2 %). Based on this information, the site is not considered to be prime agricultural land. Mapping from the Regional Official Plan confirms that the subject land is not part of an area predominated by Class 1-3 agricultural soils.

Given the findings of the soil survey, the subject land should not be considered to be *prime agricultural land* in a *prime agricultural area*. Further, rehabilitation to substantially the same area and same average soil quality for agriculture should not be a policy requirement.

5.0 CONCLUSIONS

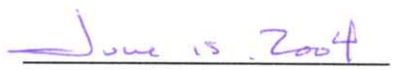
Lowndes Holdings Corp. has acquired 154 ha (380 acres) described as Part of Lot 1 and Lots 2 and 3, Concession 11, geographic Township of East Flamborough, now the City of Hamilton. The client has identified a Provincially significant Amabel dolostone deposit, approximately 34 m thick. Lowndes Holdings Corp. proposes to establish a dolostone quarry on part of the site, for the purpose of extracting consolidated aggregate. As part of the study documentation program, the proponent has requested Stovel and Associates Inc. to prepare an Agricultural Report.

The findings of the Agricultural Report are as follows:

- the site is comprised mainly of low quality agricultural lands. Class 4-7 soils and Organic soils make up approximately 91.2% of the site;
- the main limitations of the site for agricultural purposes are related to excessive stoniness, shallow depth of soil to bedrock and poor drainage;
- soil and overburden depths vary over the site, but in many areas are less than one metre in depth;
- the subject land is not considered to be *Prime Agricultural Land* in a *Prime Agricultural Area*; and
- agricultural rehabilitation should not be a provincial policy requirement since the site is not considered to be *Prime Agricultural Land* in a *Prime Agricultural Area*.

This report was prepared under the direction of Robert P. Stovel, M.Sc., M.C.I.P., R.P.P., P.Ag., President of Stovel and Associates Inc.

Robert P. Stovel



June 15, 2004

TAB 1

The Canada Land Inventory
Soil Capability Classification for Agriculture

THE CANADA LAND INVENTORY

Report No. 2–1965
(Reprinted - 1969, 1972)

SOIL CAPABILITY CLASSIFICATION FOR AGRICULTURE

DEPARTMENT OF
THE ENVIRONMENT

ACKNOWLEDGEMENTS

The first step in the assessment of our soil resources is to examine and describe the various soils, to map their location and extent, and to show their relationship by an orderly system of soil classification.

The Canada Land Inventory wishes to acknowledge the co-operation and work done by the Canada Department of Agriculture, Provincial Governments, and Agricultural Colleges who have jointly been carrying on such soil surveys for many years.

Acknowledgement is also made to the Soil Conservation Service, United States Department of Agriculture, for assistance through its publications and by direct contact, in the development of this Canadian classification.

THE CANADA LAND INVENTORY

This report, describing a classification system of soil capability for agricultural use, is one of a series of reports to be published on the methods and results of the Canada Land Inventory. The Objectives, Scope and Organization of the Canada Land Inventory are described in Report No. 1 (available from the Department of Forestry of Canada).

The Canada Land Inventory is a comprehensive survey of land capability and use for various purposes. It includes assessments of land capability for agriculture, forestry, recreation and wildlife; information on present land use; and assessments of social and economic factors relative to land use. It is being undertaken as a co-operative federal-provincial program administered under the Agricultural Rehabilitation and Development Act (ARDA) of June 1961.

The classification system of soil capability for agriculture was developed for use across Canada by the National Soil Survey Committee in co-operation with the federal and provincial ARDA Administrations. It is being applied throughout the agricultural portion and adjoining forest fringe areas of Canada by the Soil Survey organizations with financial support from ARDA.

The classification system is being applied at various map scales, but generally at a scale of 1 inch = 1 mile. The maps will be used for area measurements and analysis with other Land Inventory data. A series of coloured maps will be published presenting generalized data at a scale of 1:250,000, based on the National Topographic System. These maps will be printed by the Department of Mines and Technical Surveys and may be purchased from the Queen's Printer, Ottawa, as they become available.

The Soil Capability Classification

The soil capability classification for agricultural purposes is one of a number of interpretive groupings that may be made from soil survey data. As with all interpretive groupings, the capability classification is developed from the soil-mapping units. In this classification the mineral soils are grouped into seven classes according to their potentialities and limitations for agricultural use.

The first three classes are considered capable of sustained production of common cultivated crops, the fourth is marginal for sustained arable culture, the fifth is capable of use only for permanent pasture and hay, the sixth is capable of use only for wild pasture, while the seventh class is for soils and land types (including rock outcrop and small unmappable bodies of water) considered incapable of use for arable culture or permanent pasture. While the soil areas in classes one to four are capable of use for cultivated crops they are also capable of use for perennial forage crops. Soil areas in all classes may be suited for forestry, wildlife and recreation. For the purposes of this classification, trees, tree fruits, cranberries, blueberries and ornamental plants that require little or no cultivation are not considered as cultivated or common field crops.

The capability classification, applied in Canada, consists of two main categories: (1) the capability class, and (2) the capability subclass.

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

The *subclass* is a grouping of soils with *similar kinds of limitations and hazards.* It provides information on the kind of conservation problem or limitation. The class and subclass together provide the map user with information about the degree and kind of limitation for broad land-use planning, and for the assessment of conservation needs.

The capability classification is applied to virgin as well as to presently cultivated lands, with the exception of organic soils. Research data, recorded observations, and experience are used as the basis for placing soils in capability classes and subclasses. In areas where such information is lacking, soils are placed in capability classes and subclasses by interpretation of soil characteristics in accordance with experience gained on similar soils elsewhere. The level of generalization of the soil

FIGURE 1: This field has no significant limitations for the production of field crops and is therefore placed in capability Class 1.

FIGURE 2: Classes 2, 3, and 5 are present in this illustration. Class 2 has moderate slopes, indicated by subclass T, that require some soil conservation measures for sustained use for arable crops. Class 5 has steep slopes which makes this area unsuitable for arable field crops but it is capable of improvement for production of perennial forage crops. Class 3 has a continuing limitation of wetness that restricts its use for field crops.

capability classification is indicated by the map scale on which the information is published.

This classification is not a guide to the most profitable use of land but it is an inventory of our agricultural soil resources and a guide to better land use in Canada.

Assumptions

This soil capability classification is based on certain assumptions which must be understood by those using the soil capability maps and statistical data derived from these maps if they are to obtain full benefit from such information and avoid making erroneous deductions.

1. The soil capability classification is an interpretive classification based on the effects of combinations of climate and soil characteristics, on limitations in use of the soils for agriculture, and their general productive capacity for common field crops. Shrubs, trees or stumps are not considered as limitations to use unless it is unfeasible to remove them.
2. Good soil management practices that are feasible and practical under a largely mechanized system of agriculture are assumed.
3. The soils within a capability class are similar with respect to degree but not to kind of limitations in soil use for agricultural purposes. Each class includes many different kinds of soil and many of the soils within any one class require unlike management and treatment. The subclass provides information on the kind of limitation and the class indicates the intensity of the limitation. Capability Class 1 has no subclasses. Information for specific soils is included in soil survey reports and in other sources of information.
4. Soils considered feasible for improvement by draining, by irrigating, by removing stones, by altering soil structure, or by protecting from overflow, are classified according to their continuing limitations or hazards in use after the improvements have been made. The term "feasible" implies that it is within present day economic possibility for the farmer to make such improvements and it does not require a major reclamation project to do so. Where such major projects have been installed, the soils are grouped according to the soil and climatic limitations that continue to exist. A general guide to what is considered a major reclamation project is that such projects require co-operative action among farmers or between farmers and governments. (Minor dams, small dykes, or field conservation measures are not included.)
5. The capability classification of the soils in an area may be changed when major reclamation works are installed that permanently change the limitations in use for agriculture.
6. Distance to market, kind of roads, location, size of farms, characteristics of land-ownership and cultural patterns, and the skill or resources of individual operators are not criteria for capability groupings.
7. Capability groupings are subject to change as new information about the behaviour and responses of the soils becomes available.

Capability Classes

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

Soils in Class 1 are level or have very gentle slopes, they are deep, well to imperfectly drained and have a good water-holding capacity. They are easily maintained in good tilth and productivity, and damage from erosion is slight. They are moderately high to high in productivity for a wide range of field crops adapted to the region.

Class 2—*Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices.*

Soils in Class 2 are deep and have a good water-holding capacity. The limitations are moderate and the soils can be managed and cropped with little difficulty. The soils are moderately high to high in productivity for a fairly wide range of field crops adapted to the region.

The limitation of soils in this class may be any one of the following: adverse regional climate; moderate effects of accumulative undesirable characteristics; moderate effects of erosion; poor soil structure or slow permeability; low fertility correctable with consistent moderate applications of fertilizers and usually lime; gentle to moderate slopes; occasional damaging overflow; and wetness correctable by drainage but continuing as a moderate limitation.

Soils in this class are not generally suited to as wide a range of crops as the soils in Class 1. Also more intensive conservation measures, tillage practices, or special soil-conserving systems may be required. The combinations of practices vary from place to place depending on the climate, soil and regional cropping systems.

Class 3—*Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices.*

Soils in Class 3 have more severe limitations than those in Class 2 and conservation practices are more difficult

▲ FIGURE 3: Classes 2, 3, 4, 5, and 7 are illustrated. The Class 2 area has a moderate limitation because of occasional damaging overflow; the Class 3 areas are affected by topographic and fertility limitations; the Class 4 and 5 areas are downgraded from Class 3 because of steepness of slope. The Class 7 area is considered to be non-agricultural because of steepness of slopes and generally rough topography.

▼ FIGURE 4: The main limitation in the Class 2 and Class 3 land shown here is topography. The Class 2 land requires some special conservation measures to prevent damage from water erosion while the Class 3 area, owing to its greater slopes, requires more intense conservation measures to control water erosion. The Class 5 area, while severely eroded, may be used for perennial forage crops.

to apply and maintain. Under good management these soils are fair to moderately high in productivity for a fairly wide range of field crops adapted to the region.

In this class the limitations that restrict cultivation, ease of tillage, planting and harvesting, the choice of crops, the application and maintenance of conservation practices, are a combination of two of those described under Class 2 or one of the following: moderate climatic limitations including frost pockets; moderately severe effects of erosion; intractable soil mass or very slow permeability; low fertility correctable with consistent heavy applications of fertilizers and usually lime; moderate to strong slopes; frequent overflow accompanied by crop damage; poor drainage resulting in crop failures in some years; low water-holding capacity or slowness in release of water to plants; stoniness sufficiently severe to seriously handicap cultivation and necessitating some clearing; restricted rooting zone; moderate salinity.

Each soil in this class may have one or more alternative uses or practices required for use but the alternatives may be fewer than for soils in Class 2.

Class 4 — *Soils in this class have severe limitations that restrict the range of crops or require special conservation practices or both.*

Soils in Class 4 have such limitations that they are only suitable for a few crops, or the yield for a range of crops is low, or the risk of crop failure is high. The limitations may seriously affect such farm practices as the timing and ease of tillage, planting and harvesting, and the application and maintenance of conservation practices. These soils are low to medium in productivity for a narrow range of crops but may have higher productivity for a specially adapted crop.

The limitations include the adverse effects of a combination of two or more of those described in Classes 2 and 3 or one of the following: moderately-severe climate; very low water-holding capacity; low fertility difficult or unfeasible to correct; strong slopes; severe past erosion; very intractable mass of soil or extremely slow permeability; frequent overflow with severe effects on crops; severe salinity causing some crop failures; extreme stoniness requiring considerable clearing to permit annual cultivation; very restricted rooting zone, but more than one foot of soil over bedrock or an impermeable layer.

Class 4 soils in subhumid and some arid regions may produce good yields of regionally cultivated crops in years of high rainfall; low yields in years of average rainfall and failures in years below average rainfall. During years of low precipitation even though no crop is expected, special management practices are required to minimize wind erosion, maintain productivity and conserve moisture. These measures include emergency tillage and crops used only for the primary purpose of preventing soil deterioration. These treatments and others must be applied more frequently and more intensively than on soils in Class 3.

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

Soils in Class 5 have such serious soil, climatic or other limitations that they are not capable of use for sustained production of annual field crops. However, they may be improved by the use of farm machinery for the production of native or tame species of perennial forage plants. Feasible improvement practices include clearing of bush, cultivation, seeding, fertilizing and water control.

The limitations in Class 5 include the adverse effects of one or more of the following: severe climate; low water-holding capacity; severe past erosion; steep slopes; very poor drainage; very frequent overflow; severe salinity permitting only salt tolerant forage crops to grow; stoniness or shallowness to bedrock that make annual cultivation impractical.

Some soils in Class 5 can be used for cultivated field crops provided unusually intensive management is used. Some of the soils in this class are also adapted to special crops such as blueberries, orchard crops, or the like, requiring soil conditions unlike those needed by the common crops. Cultivated field crops may be grown in Class 5 areas where adverse climate is the main limitation but crop failures occur under average conditions.

Class 6 — *Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible.*

Soils in Class 6 have some natural sustained grazing capacity for farm animals but have such serious soil, climatic or other limitations as to make impractical the application of improvement practices that can be carried out in Class 5. Soils may be placed in this class because their physical nature prevents improvement through the use of farm machinery, or the soils are not responsive to improvement practices or because of a short grazing season, or because stock watering facilities are inadequate. Such improvement as may be effected by seeding

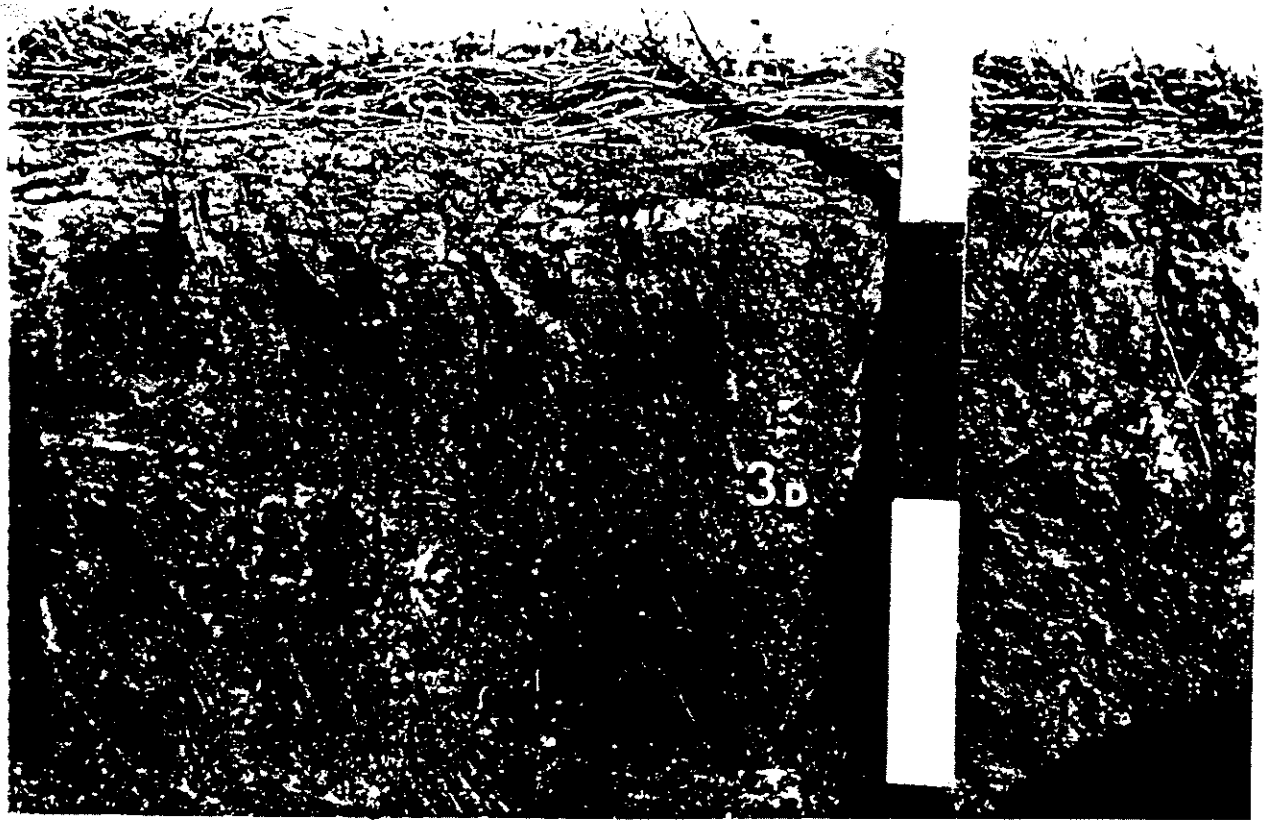
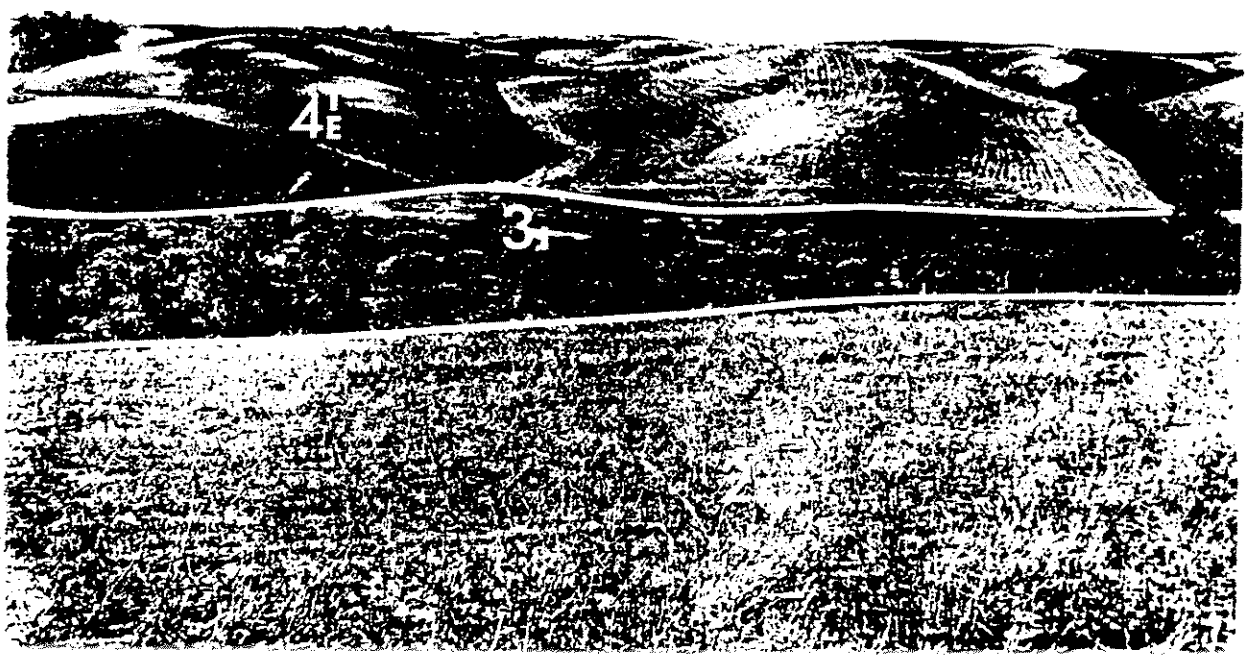


FIGURE 5: This soil profile illustrates a soil that is placed in Class 3 because of a poorly structured, dense subsoil that severely limits permeability and root development.

FIGURE 6: The Class 4 land shown in the background has suffered considerable damage from erosion and is difficult to farm on account of its steep slopes and irregular topography. While still capable of use for annual field crops under good management, further damage from erosion would reduce its capability to Class 5. The Class 2 land has gentle to moderate slopes that require some conservation measures to protect it from erosion. The Class 3 area is affected by frequent overflow which would cause some crop damage if farmed. This area, if cleared, could be used for the production of some annual field crops.



and fertilizing by hand or by aerial methods shall not change the classification of these soil areas.

The limitations in Class 6 include the adverse effects of one or more of the following: very severe climate; very low water-holding capacity; very steep slopes; very severely eroded land with gullies too numerous and too deep for working with machinery; severely saline land producing only edible, salt-tolerant, native plants; very frequent overflow allowing less than 10 weeks effective grazing; water on the surface of the soil for most of the year; stoniness or shallowness to bedrock that makes any cultivation impractical.

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

The soils or lands in Class 7 have limitations so severe that they are not capable of use for arable culture or permanent pasture. All classified areas (except organic soils) not included in Classes 1 to 6 shall be placed in this class. Bodies of water too small to delineate on the map are included in this class.

Class 7 soils may or may not have a high capability for trees, native fruits, wildlife and recreation. Hence no inferences can be made as to the capability of the soils and land types in this class beyond the scope of their capability for agriculture.

Capability Subclasses

Subclasses are divisions within classes that have the same kind of limitations for agricultural use. Thirteen different kinds of limitations are recognized at the subclass level. A brief discussion of these subclasses and their designation on maps follows:

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

Undesirable soil structure and/or low permeability (D): This subclass is used for soils difficult to till, or which absorb water very slowly or in which the depth of rooting zone is restricted by conditions other than a high water table or consolidated bedrock.

Erosion (E): Subclass E includes soils where damage from erosion is a limitation to agricultural use. Damage is assessed on the loss of productivity and on the difficulties in farming land with gullies.

Low fertility (F): This subclass is made up of soils having low fertility that either is 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 lack of available plant nutrients, high acidity or alkalinity, low exchange capacity, high levels of carbonates or presence of toxic compounds.

Inundation by streams or lakes (I): This subclass includes soils subjected to inundation causing crop damage or restricting agricultural use.

Moisture limitation (M): This subclass consists of soils where crops are adversely affected by drouthiness owing to inherent soil characteristics. They are usually soils with low water-holding capacity.

Salinity (N): This subclass includes soils with enough soluble salts to adversely affect crop growth or restrict the range of crops that may be grown. Such soils are not placed higher than Class 3.

Stoniness (P): This subclass is made up of soils sufficiently stony to significantly hinder tillage, planting, and harvesting operations. Stony soils are usually less productive than comparable non-stony soils.

Consolidated bedrock (R): This subclass includes soils where the presence of bedrock near the surface restricts their agricultural use. Consolidated bedrock at depths greater than 3 feet from the surface is not considered as a limitation, except on irrigated lands where a greater depth of soil is desirable.

Adverse soil characteristics (S): On the 1:250,000 scale capability maps this subclass will be used in place of subclasses D, F, M and N either individually or collectively. On larger scale maps it may be used in a collective sense for two or more of these subclasses (see guidelines).

Topography (T): This subclass is made up of soils where topography is a limitation. Both the percent of slope and the pattern or frequency of slopes in different directions are important factors in increasing the cost of farming over that of smooth land, in decreasing the uniformity of growth and maturity of crops, and in increasing the hazard of water erosion.

Excess water (W): Subclass W is made up of soils where excess water other than that brought about by inundation is a limitation to their use for agriculture. Excess water may result from inadequate soil drainage, a high water table, seepage or runoff from surrounding areas.

▲ FIGURE 7: The Class 4 area in the foreground is severely affected by drouthiness because of the low water-holding capacity of the gravelly soil. The steep slopes of the area denoted as Class 7 preclude its use for agriculture.

▼ FIGURE 8: Adequate drainage of this area by the farmer is not feasible. Hence this land is rated as Class 5, only suitable for certain perennial forage crops.

Cumulative minor adverse characteristics (X): This subclass is made up of soils having a moderate limitation caused by the cumulative effect of two or more adverse characteristics which singly are not serious enough to affect the class rating.

Conventions in use of subclasses and map symbols.

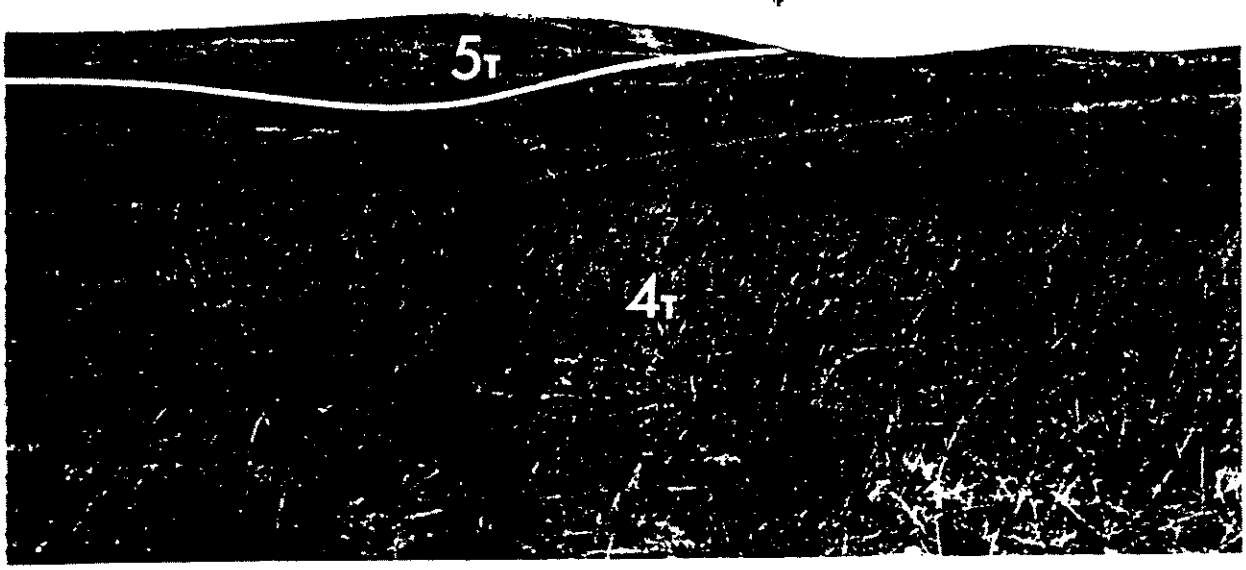
1. A subclass is used only when the limitation it represents has been a factor in determining the class. However, on published maps no more than two subclasses are shown.
2. On maps large arabic numerals denote the capability classes and small capital letters placed after the class numerals denote the subclasses. In map units comprising more than one class, small arabic numerals placed after each class numeral as superscripts denote the proportion of each class out of a total of 10.

Organic Soils*

The interpretive soil capability classification is not applied to organic soils since, in general, there is insufficient information on these organic soil areas to make such an interpretive judgement.

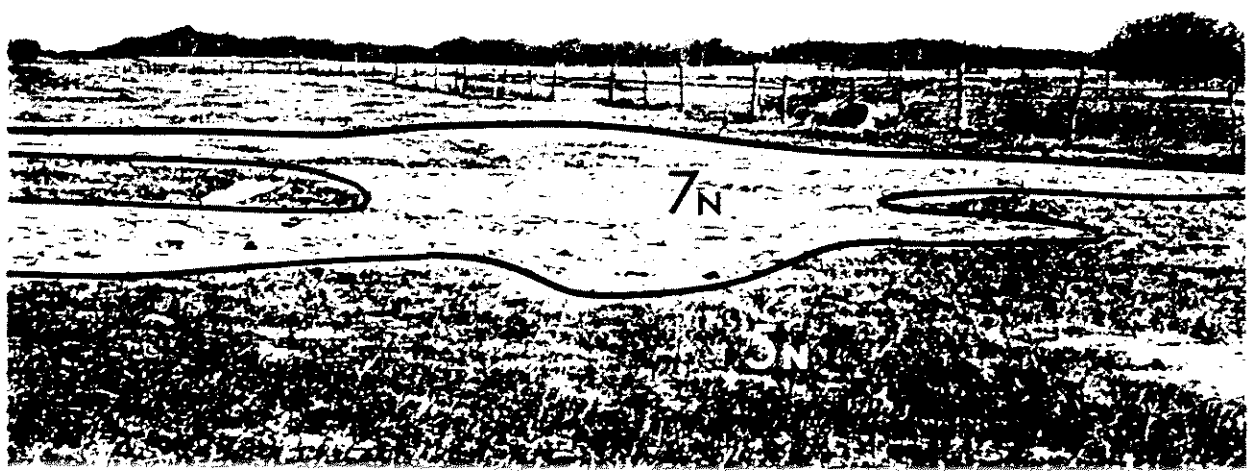
Organic soils are designated by the letter O alone.

*The definition of organic soils as prepared by the National Soil Survey Committee reads as follows: Soils that contain 30 per cent or more of organic matter and have a depth of 12 inches or more of consolidated organic material.



▲ FIGURE 9: This photograph was taken in the Brown Soil Zone of the prairies where the drouth hazard limits the top class of soil to Class 3C. The areas shown here have been further downgraded to Classes 4 and 5 because of topographic limitations.

▼ FIGURE 10: Strongly saline soils are of limited or of no use for agriculture. In the area marked as Class 5, salt tolerant forage crops can be established and maintained, while the area marked as Class 7 contains an excessive salt concentration that prevents the growth of useful vegetation.



APPENDIX I

Guidelines for Placing Soils in Capability Classes

Guidelines for placing soils in classes and subclasses in a country as diverse as Canada are required at both national and regional levels. For this purpose the regions agreed on are Eastern Canada, Western Canada, and the West Coastal area. The guidelines presented here are national in scope but some of them may require modification for regional application.

Subclass "C" is made up of soils where climate (temperature and precipitation) is a major limitation. Hazards of crop damage due to hail, rain, snow and winds are not included. This subclass denotes a significant adverse departure from what is considered as the median climate of the region. Subclass "C" may be used either on a subregional or local basis.

The soils placed in this subclass because of adverse subregional climate will be those soils that have no limitations except climate. Hence they will be the highest class soils of the subregion. Soils with other significant limitations or hazards to use will be placed in lower classes as the subregional climate will affect all of them. Subregions are large areas of land that can be clearly defined as having adverse climates compared to the median climate.

Locally, crop-damaging frosts will be the chief climatic factor in placing soils in this subclass. The evaluation of local adverse temperature effects on class designations must be based on both intensity and frequency. Since there is no way to indicate local frosty areas except by the subclass symbol "C" and since the soils in such areas may have other serious limitations, there is no restriction on using the symbol "C" with symbols for other limitations for local areas with adverse climates.

The median climate may be broadly defined as one with sufficiently high growing-season temperatures to bring field crops to maturity in a frost-free period exceeding 90 days and with sufficient precipitation to permit crops to be grown each year on the same land without a high risk of crop failure. Precise guidelines in regard to significant departures from the median as they affect the class designations have yet to be established but the following general subregional guidelines have been adopted.

Western Canada:

Median climate—most of the Black and Dark Gray soil zones.

Brown soil zone—generally highest class 3C.
Dark Brown soil zone—generally highest class 2C.
Gray Wooded soil zone below 3,000 feet—generally highest class 2C.

Eastern Canada:

Median climate—the Acadian, Great Lakes-St. Lawrence, and Deciduous forest regions.

Boreal forest region—generally highest class 2C.

There are a number of areas having a significant adverse departure from the median climate but these may be regarded as local variations.

Subclass "D" is made up of soils adversely affected by soil structure and/or permeability. It includes soils where the depth of rooting zone is restricted by soil conditions other than wetness (high water table) or consolidated bedrock. No guidelines were established for class designations.

Subclass "E" is made up of soils where actual damage from erosion is a limitation to agricultural use. Damage is to be assessed on the loss in productivity and/or the difficulties imposed by gullies in farming the affected soil areas. No attempt was made to develop specific guidelines for class designations.

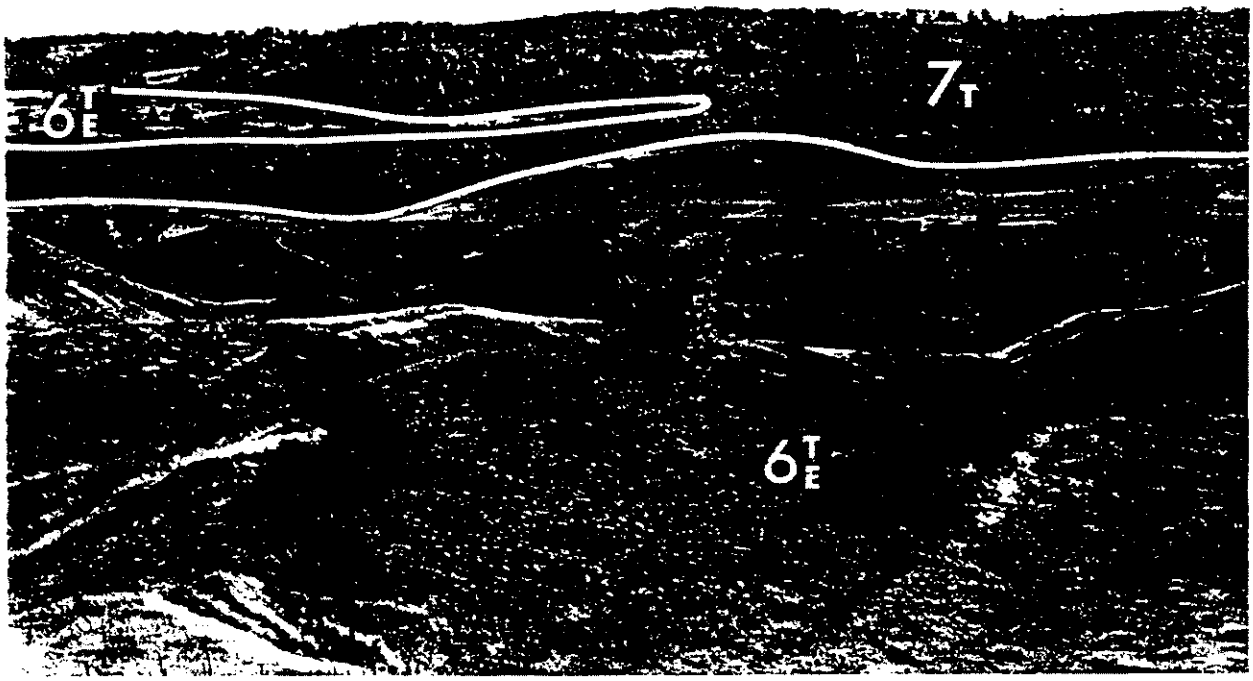
Subclass "F" is made up of soils having low fertility that either is correctable with constant and careful management in the use of fertilizers and amendments, or is difficult to correct in a feasible way. The limitations may be due to lack of available nutrients, high acidity or alkalinity, high levels of carbonates, toxic elements, inadequate cation exchange capacity, high fixation of plant nutrients.

The following guidelines are suggested for class designations.

Class 2: Soils highly responsive to fertilizers and amendments.

Class 3: Soils only moderately responsive to fertilizers and amendments.

Class 4: Soils in which the low fertility status cannot be improved with feasible management practices.



▲ FIGURE 11: The soil areas marked as Class 6 are so rough and eroded as to be capable of being used only as wild pasture. Regeneration of trees on the cleared areas will be very slow so that the areas will provide wild pasture for many years. The area classified as 7, if cleared, would also provide wild pasture. However, areas that require land clearing must have a higher capability than Class 6 to be rated other than Class 7.

▼ FIGURE 12: Non-agricultural land because of numerous rock outcrops and very shallow soils.

Class 7: Soils containing toxic elements to vegetation, or plants poisonous to farm animals, which cannot be removed with feasible management practices.

Subclass "I" is made up of soils subjected to inundation by streams or lakes.

The following limits were adopted subject to regional interpretation.

Class 2I: Occasional damaging overflow.

Class 3I: Frequent overflow with some crop damage.

Class 4I: Frequent overflow with severe crop damage including some years without a crop.

Class 5I: Very frequent overflow with effective grazing period longer than 10 weeks.

Class 6I: Very frequent overflow with effective grazing period shorter than 10 weeks and longer than 5 weeks.

Class 7I: Land inundated for most of the growth period.

Subclass "M" is a group of soils adversely affected by drouthiness owing to inherent soil characteristics. These are usually coarse-textured soils with low water-holding capacity but some fine-textured soils with high water-holding capacity may be placed in this subclass. Drouthiness caused by soil characteristics must not be confused with climatic drouth.

The following general guidelines were accepted.

This subclass will not be used for Class 2 soils.

As compared to soils under the same climatic conditions which do not have this limitation, the following general rules will apply.

Soils moderately affected by drouthiness—downgrade one class

Soils moderately severely affected by drouthiness—downgrade two classes

Soils severely affected by drouthiness—downgrade three classes

Soils very severely affected by drouthiness—downgrade four classes.

Subclass "N" is made up of soils adversely affected by the presence of soluble salts. Soils with enough salts to adversely affect crop growth or the range of crops which may be grown will not be placed in Class 1 or Class 2.

Class 3: Crops moderately affected. (Class 4 in those subregions where top class is 3c.)

Class 4: Crops seriously affected with crop failure in some years.

Class 5: Crops seriously affected on cultivated land with crop failures in most years but salt-tolerant forage crops can be established and maintained.

Class 6: Soils too salty except for native salt-tolerant grasses. If poisonous plants are present place in Class 7.

Class 7: Growth of useful native vegetation impossible.

Subclass "P" is made up of soils sufficiently stony as to significantly increase the difficulty of tillage, planting and harvesting.

The stoniness classes accepted by the N.S.S.C. in 1955 and 1963 will be used in establishing capability classes except that stoniness classes 1 and 2 would not be considered as limitations.

Stoniness 3—Class 3 or Class 4

Stoniness 4—Class 4 or Class 5

Stoniness 5—Class 6 or Class 7.

Subclass "R" is made up of soils where the depth of the rooting zone is restricted by consolidated bedrock.

The effect of consolidated bedrock near the surface on crop production is variable in intensity in different climatic regions. Hence precise guidelines for all of Canada cannot be established. As a general guide, where depth to bedrock is less than 12 inches the soil will not be rated higher than Class 5, and where depth to bedrock is more than 3 feet the class rating will not be affected except under irrigation.

Subclass "S". On the 1:250,000 scale capability maps this subclass is used in place of D, F, M, and N. On larger scale maps "S" should only be used: (1) for two of these limitations when some other limitation also is present and (2) when more than two of them are present. The reason for this convention on the use of "S" on maps having a greater scale than 1:250,000 is that, while it is desirable to denote the limitations as specifically as possible, it is usually impractical to show more than two subclasses for each class. The following examples may serve to illustrate this convention:

2_{F} not 2_{S}

3^{F}_{M} preferred to 3_{S}

but 4^{F}_{MT} should be 4^{S}_{T}

Subclass "T" is made up of soils where the topography (slope and pattern) is a limitation in agricultural use.

The following guidelines for subregions with median climates are based on topographic classes and symbols adopted by the N.S.S.C. in 1963. In this system capital letters are used for single slopes (regular surface) and lower-case letters are used for multiple slopes (irregular surface).

Class 1 —0 *to* 5% Aa, Bb, C

Class 2T—2 *to* 5% c; 6 *to* 9% D

Class 3T—6 *to* 9% d; 10 *to* 15% E

Class 4T—10 *to* 15% Ee

Class 5T—16 *to* 30% Ff

Class 6T—31 *to* 60% Gg

Class 7T—60+% Hh

In subregions having adverse climates compared to the median climate the effect of topography as it affects the class placement above Class 6 is subject to regional interpretation. For example in 3C subregions, soil areas with topography d, E and e have topographic limitations and hence would have to be placed in Class 4 or Class 5. Topography Gg places the affected soil areas in Class 6 irrespective of climate.

Subclass "W" is made up of soils where excess water, apart from that brought about by inundation, is a limitation in their use for agriculture. Excess water may be the result of poor soil drainage, high water table, seepage, or runoff from surrounding areas. Usually soils needing drainage have some permanent limitation that precludes placing them in Class 1 even after drainage.

If drainage is considered feasible at the farm level, wet soils will be classified according to their continuing limitations or hazards after drainage. If drainage cannot be effected without community action then wet soils will be classified on the basis of their present limitations.

Since the problem of classifying wet soils will require regional application of the N.S.S.C. Soil Moisture Classes no national guidelines were proposed. With further study regional guidelines may be developed.

Subclass "X" is made up of soils having a moderate limitation caused by the cumulative effect of two or more adverse characteristics which singly are not serious enough to affect the class rating. This subclass should only be used for soils that have no other limitation except subregional climatic limitations. Hence this subclass will be used alone and since it only represents a moderate limitation the soils will only be downgraded one capability class from the best possible soils in a climatic region. Thus with this subclass the capability classes will be as follows:

Median climatic subregions			2X
2C	"	"	3X
3C	"	"	4X

(See guidelines for subclass C, subregional climates)

TAB 2

Robert P. Stovel, M.Sc., P. Ag., MCIP, RPP
Curriculum Vitae

Robert P. Stovel M.Sc., P.Ag., M.C.I.P.,R.P.P.

EDUCATION

M.Sc, Rural Planning, University School of Rural Planning and Development, University of Guelph, 1988.

B.A. Geography, Wilfrid Laurier University, 1986.

MEMBERSHIPS AND ASSOCIATIONS

Ontario Institute of Agrologists.
Ontario Professional Planners Institute.
Canadian Institute of Planners.
Aggregate Producers Association of Ontario - Land Use Committee (Present)

POSITIONS HELD

1995 - Present: Stovel and Associates Inc., Fergus, Ontario - President.

1993 - 1995: Ecological Services For Planning Ltd., Guelph, Ontario - Senior Project Manager.

1988 - 1992: Ecological Services For Planning Ltd., Guelph, Ontario - Rural Planner.

1986 - 1987: Environmental Consultant. Waterloo, Ontario.

EXPERIENCE

- extensive project experience in preparing agricultural impact assessments, alternate site evaluation studies and agricultural rehabilitation plans in Ontario. These projects have required considerable government and non-government agency liaison, interdisciplinary team coordination and the integration of a variety of scientific disciplines.

Agricultural Impact Assessments

- prepared the agricultural components for municipal road projects in King Township (Weston Road) and the City of Stratford.

- completed agricultural assessments for waste management master plans in Victoria County and Peterborough County. This process involved the review of alternate sites, the assessment of potential impacts on agriculture and the development of mitigative protocol to be implemented as part of the EPA approvals.

- managed the agricultural component of waste management master plans in Essex County and the Regional Municipality of Haldimand-Norfolk.

- retained by to assess potential impacts of highway development on proposed works in Peterborough (Highway 7) and Essex County (Highway 3).

- prepared route selection and agricultural impact assessment reports for the proposed development of an 8" pipeline in Orillia (Ontario Energy Board in 1994).

- coordinated the environmental and agricultural assessment component for the proposed Ontario Hydro corridor development from Bowmanville to Napanee.

- completed agricultural impact assessments for proposed golf course developments in the County of Wellington and the Regional Municipality of York. These studies addressed the potential impacts of golf courses (i.e. Mad River, Chestnut Hill, Cardinal Golf Course, Wildwinds Golf Course, River Valley Golf and Country Club, and Corwhin Highlands) on the local agricultural community.

- calculated minimum distance separation (MDS 1) requirements for various types of livestock operations.

- retained by the County of Grey to conduct peer review of agricultural impact assessments.

- retained by the Township of Centre Wellington to complete background agricultural investigations as part the development of a new Official Plan.

- retained by the Town of Halton Hills to complete agricultural investigations as part of the proposed expansion of Glen Williams.

- assisted in the preparation of the agricultural impact assessment and alternate site evaluation study for a proposed new town site in the Town of East Gwillimbury.

- assisted in the preparation of the alternate site evaluation for the proposed Cardinal Golf Course (Highway 9 - York Region). This was the first alternate site evaluations completed in the GTA and led to the development of a process that was accepted by the Ministry of Agriculture and Food.

- assisted in the preparation of agricultural rehabilitation plans for the Batterman Pit (Grey County), Puslinch Pit (Wellington County), Weber Pit (Wellington County), Sutton Wayside Pit (Wellington County), May Wayside Pit (Wellington County), Looby Pit (Dufferin County), Inverhaugh Pit (Wellington County) and Schwartz Pit (Grey County).

- provided testimony as an agricultural expert and rural planner at the OMB.

Sean Colville, B.Sc., A. Ag.

EDUCATION

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

MEMBERSHIPS

Ontario Institute of Agrologists.

POSITIONS HELD

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

EXPERIENCE

- Extensive project experience preparing agricultural impact assessments for non-farm developments and linear facilities. These studies involve the interpretation of the Provincial and Municipal agricultural policies, a detailed analysis of agricultural and non-agricultural land use interactions, determination of the impacts of resource consumption and potential conflicts to surrounding agricultural operations including application of the Minimum Distance Separation. Determination of the agricultural resources includes an assessment and interpretation of on site soil and climatic data to interpret the agricultural capability/suitability of the site using the Canada Land Inventory system of soil classification and soil suitability ratings for specialty crops.

Class Environmental Assessments (Agricultural Components)

- Managed the agricultural component for Niagara's Mid-Term Waste Management study which looked at the potential environmental impacts of extending the life of three existing landfills in the Region. The agricultural component of the study involved an assessment of the agricultural resources and potential impacts to agriculture on and adjacent to the three sites.

- Conducted an agricultural impact assessment for Bennett Environmental Inc.'s proposed thermal treatment facility to be located in Kirkland Lake. The assessment included a review of the agricultural areas and operations potentially affected by the thermal treatment facility, assessment of the potential pathways for bioaccumulation of contaminants in crops and other agricultural products and the potential economic impacts to the agricultural community.

- Conducted agricultural resources inventories for several landfill projects including Canadian Waste Services sites in the Counties of Richmond and Lambton and for municipal sites in Victoria and Peterborough

- Participated in several route selection and impact assessment for several pipeline studies throughout Ontario. These studies involved a review of the soils and land uses along identified alternative routes to determine potential constraints for pipeline construction and potential impacts to agricultural resources and

agricultural operations.

Agricultural Impact Assessments

- Conducted an agricultural impact assessment for a proposed urban boundary expansion of the village of Fonthill in the Town of Pelham. This was a multi-year study which involved an assessment of the agricultural resources on and adjacent to the expansion lands, a land use and land tenure analysis and an assessment of the potential impacts to agriculture as a result of urban boundary expansion.

- Conducted an agricultural impact assessment and alternate site study for a proposed industrial development within the Town of Grimsby. The proposed development required an Official Plan Amendment to expand the urban boundaries of the Town of Grimsby. The agricultural impact assessment first investigated the potential impacts of the development on agriculture on and adjacent to the site. This involved a review of the soil capability/suitability and climatic characteristics of the site, a land use survey and a review of ownership patterns. Provincial policy permits urban boundary expansion on lands if there are no other areas of lower agricultural capability and lower agricultural priority. To address this policy, an alternate site study was completed that evaluated land parcels adjacent to the urban boundary of a size capable of accommodating the proposed development. To evaluate the alternate sites, a methodology based on the provinces' LEAR evaluation system was devised and accepted by the Regional planning department.

- Prepared an agricultural impact assessment for a proposed golf course and residential development situated on agriculturally designated lands between the growing urban areas of Stittsville and Kanata. The agricultural assessment included a detailed assessment of the soils and soil capability on the Subject Lands and a review of the City's prime agricultural areas. In addition, the agricultural impact assessment involved a land use survey and an assessment of ownership patterns within the agriculturally designated lands to determine the long-term feasibility of the lands for agricultural production given the development pressures and trends experienced in this area relative to other agricultural areas in the City of Ottawa. One of the methods used in the evaluation involved a review and update of the LEAR analysis provided by the City of Ottawa.

Agricultural Rehabilitation Studies

- Development of a progressive agricultural rehabilitation plan for Walker Brothers Quarries Ltd. quarry expansion project in Niagara Falls, Ontario. Also prepared and implemented the vegetation screening and naturalization concepts for which annual monitoring reports are prepared for review by the City of Niagara Falls and the Ministry of Natural Resources

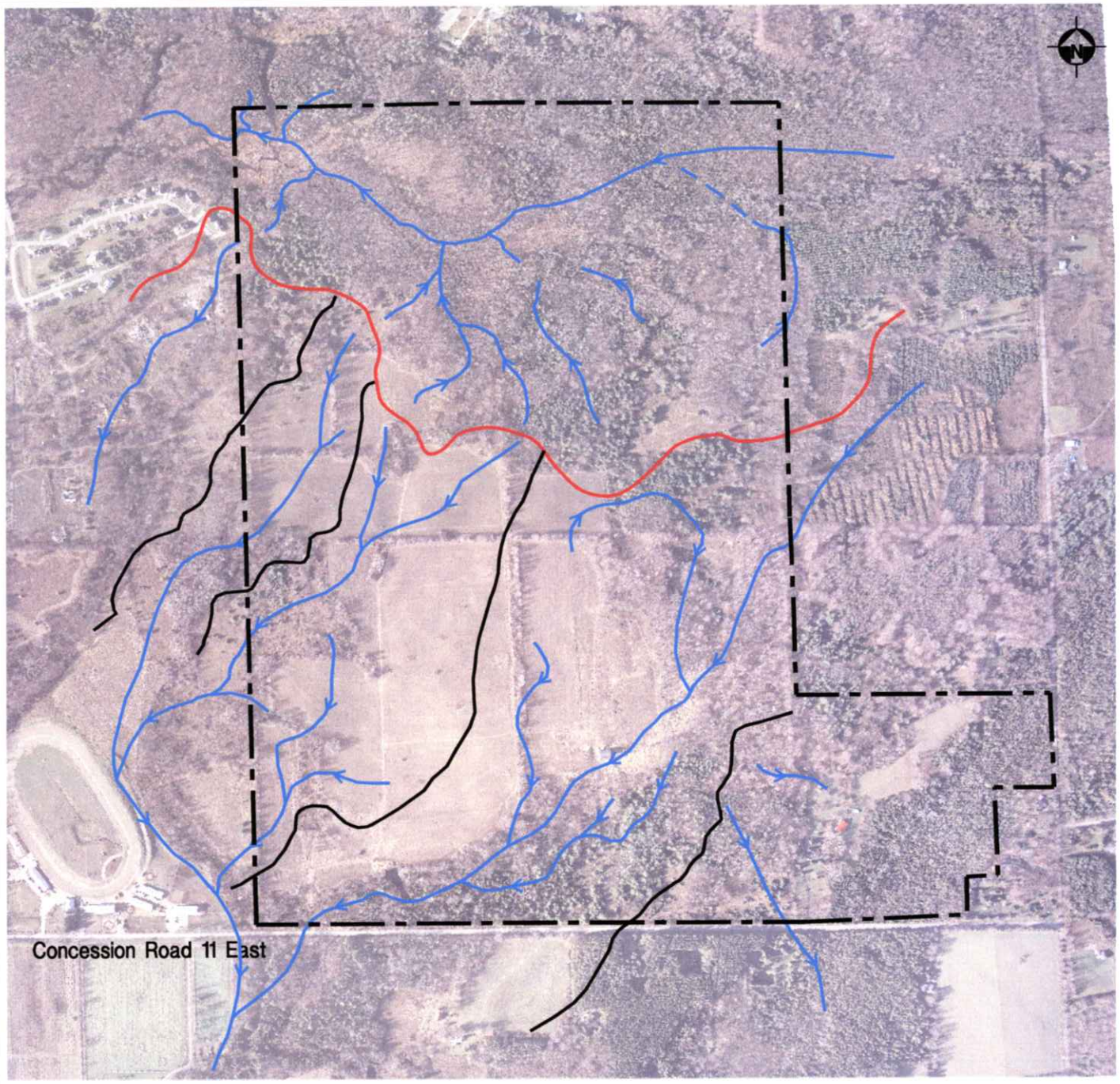
- Soil and crop monitoring, and post construction monitoring for TransCanada Pipeline, Union Gas, and Enbridge pipeline construction projects. Projects often included the development of restoration recommendations to improve soil conditions and crop yields following post-construction monitoring

- Conducted agricultural monitoring of construction activities for the TCPL pipeline from Binbrook to Highway 406. This pipeline easement traverses through Short Hill Provincial Park (an ESA and ANSI) and several kilometers of agricultural lands including vineyard and orchard lands

- Development of rehabilitation recommendation for Hendervale Stables. Construction of Highway 407 temporarily disturbed a portion of agricultural land. Soil baseline data was obtained prior to construction. Mitigation measures deigned to reduce potential impacts were developed and rehabilitation recommendations provided to restore the sites agricultural capability

TAB 3

Microdrainage Map



Legend

- Subject Lands
- Major Catchment Area
- Minor Catchment Area
- Intermittent Drainage Routes

0 400m

Scale 1 : 10,000

Source: Property Boundaries from Long Environronmental Limited, 2004. Aerial Photograph from Northway - Photomap.

Prepared For:	Prepared By:		
LOWNDES HOLDINGS CORP.	**STOVEL and Associates Inc.**	**MICRODRAINAGE**	MAP NO: **4**

DATE: JUL., 2004 FILE: 24-11-m4.dwg