

**THE IMPACT OF TOWNSHIP ZONING  
BY-LAWS ON ONTARIO  
SWINE FARMS**

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By

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and

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# ABSTRACT

## The Impact of Township Zoning Requirements on Ontario Swine Farms

A survey of 177 townships located in southwestern Ontario (from Barrie to Windsor) was undertaken to analyze the impact zoning by-laws may have on swine farms. The by-laws used in the study were those applicable to swine farms for the year of 1996. The zoning regulations were categorized to determine which townships were restrictive, somewhat restrictive or non-restrictive with respect to erecting a swine building. The township restrictiveness ratings were determined by calculating what percent of a 100 acre farm a swine building could be placed on. The township classifications for the 100 acre parcel were as follows: restrictive - build on less than 50% of the 100 acre parcel; somewhat restrictive - build on 50% to 75%; non-restrictive - build on greater than 75% of the model farm. In addition, the restrictiveness ratings were applied to three different farm types: 1,000 head finishing barn; 100 sow farrow to finish; and 600 sow farrow to wean.

The objectives of the study were:

1. to catalogue and analyze the agricultural zoning by-laws at the township level and determine inconsistencies,
2. to determine the relationships between agricultural zoning, complaints, and the growth of the hog industry,
3. to assess the impact of present agricultural zoning on swine barns of different sizes and types, and
4. to develop a restrictiveness rating that might help formulate a policy position for the Ontario swine industry on zoning regulations affecting swine production.

The information requested from the township offices was completed in two stages. The first stage was a request for the relevant pages from the zoning by-laws which affect agricultural livestock. As well, individual township information was sought regarding the number of building permits issued for swine in 1996. The second stage involved contacting townships directly which had three or more building permits issued for swine to obtain information regarding capital investment in the swine industry.

Results from the study showed five main points and they are:

i) Uneven Zoning Between Townships - Of the 177 townships surveyed close to 50% of the townships were classified as restrictive when the neighbour was located on the middle of the farm side lot line. The restrictiveness rating dropped to less than 3% when the neighbour was located further from the lot lines irregardless of farm type. The range in % of the farm that the swine building could be placed on varied greatly by township and ranged from 13.28% to 95.68%. This wide range in area to build a swine barn and variance in restrictiveness rating illustrate the unevenness of township zoning across the study area.

ii) Township By-laws are not More Restrictive on One Swine Building Type Over Another - Township restrictiveness ratings varied little as farm type changed between the 3 model barns used i.e. 1,000 head finishing, 100 sow farrow to finish and 600 sow farrow to wean.

iii) Neighbour Location Impacts Greatly on the Ability to Build a Swine Barn - Three different neighbour scenarios were used to analyse the impact on township restrictiveness rating. When the neighbour was located on the lot line, close to 50% of the townships were classified as restrictive. However, when the neighbour was located in the middle of the adjacent farm less than 3% of the townships were classified as restrictive.

iv) No Relationship Between Township Restrictiveness and Complaint Numbers - Complaints were randomly distributed between restrictive and non-restrictive townships. Similarly when complaints and population density were analyzed, there was a lack of evidence to suggest that there was much relationship between the two also.

v) No Relationship Between Township Restrictiveness and Capital Investment - Hog growth has continued to occur in the traditional hog production areas even though they have some of the more restrictive by-laws.

These results would indicate that swine growth is most likely to occur in the traditional hog producing areas since existing township legislation has done little to impede expansion. The counties of Huron and Perth account for 33% of Ontario's hog marketings and are classified as mainly restrictive irregardless of farm type or neighbour location yet they account for 38% of the 293 building permits issued for swine in 1996. Care must be exercised when developing township by-laws since stronger legislation does not necessarily mean fewer complaints.

# **SECTION ONE INTRODUCTION**

## **1.1 INTRODUCTION**

The Ontario swine industry has been undergoing rapid change and consolidation at the production level. Some producers are exiting the business while others are expanding either existing facilities or entering into production loops to focus on one phase of multi step hog production. The result of this consolidation in producer numbers coupled with recent strong hog prices has been increased activity in the construction of new barns. This re-capitalization of the Ontario industry is causing concern for rural neighbours (both farm and non-farm) who wonder about the impact these “larger, intensive” livestock operations will have on the environment. These larger units require considerably more capital and organizational sophistication, and often draw these resources from outside the family-farm structure.

Environmental issues have been identified as one of the most important factors in the expansion of the Ontario hog industry. A number of expansion projects have already been delayed or cancelled because of environmental considerations. The 3 principal concerns being raised are water and air pollution and odour. These environmental concerns pertain primarily to the storing, handling and application of manure. The expansion and intensification of the industry has the potential to increase environmental effects of hog production because they concentrate a greater amount of production waste i.e. manure on one site. Water polluted by nitrates, phosphates, salts, and bacteria poses a risk to the health of humans, animals and aquatic ecosystems.

Pork production is an important component of Ontario’s economy. In 1996, the Ontario hog industry accounted for \$748 million of farm receipts, or 11.53 percent of total agricultural sales in Ontario. It is estimated that total industry output from the \$748 million at the farm gate is worth \$4.51 billion to the Ontario economy. Ontario hog production represents 25.7% of Canadian farm cash receipts for hogs and has 26.83% of the total pig numbers in Canada.

## **1.2 PURPOSE**

Many farmers and rural communities have raised concerns about the intensification of swine buildings and the environmental effects that this may pose. In general, the main purpose of this study is to enhance the understanding of the relationships between agricultural zoning and swine production. The specific study objectives are:

1. to catalogue and analyze the agricultural zoning by-laws at the township level and determine inconsistencies,
2. to determine the relationships between agricultural zoning, complaints, and the growth of the hog industry,

3. to assess the impact of present agricultural zoning on swine barns of different sizes and types, and
4. to develop a restrictiveness rating that might help formulate a policy position for the Ontario swine industry on zoning regulations affecting swine production.

This project will focus on the inconsistencies which currently exist in agricultural zoning by-laws in each township in southwestern Ontario. It does this by analyzing the minimum distance separation from the nearest neighbour.

### **1.3 LIVESTOCK BUILDING LEGISLATION IN ONTARIO**

#### **1.3.1 Agricultural Code of Practice**

In Ontario, guidelines to protect the environment and limit the size of operations were established in 1976 by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) in a document called the Agricultural Code of Practice. This code of practice set out guidelines for establishing new and expanding livestock buildings in relation to existing residential uses. It also provided guidelines for distances to be maintained between new residential uses and existing livestock operations. These calculations took into account the type of livestock, type of manure, whether it was a new building or expansion, the total number of animals which would go through the facility during the year and the type of neighbouring use. The calculations provided a distance between farm and non-farm uses in order to minimize potential conflicts which could arise between them. It also recommended 180 days of manure storage capacity.

#### **1.3.2 MDS I and MDS II**

The Agricultural Code of Practice was replaced in 1995 by three OMAFRA documents: Guide to Agricultural Land Use; Minimum Distance Separation I (MDS I); and Minimum Distance Separation II (MDS II). The Guide to Agricultural Land Use provides recommendations for manure management issues such as the storage and application of manure. It suggests 200 days of manure storage capacity. This booklet also provides guidelines for general land use issues including methods to protect water supplies, noise reduction and dead animal disposal.

The MDS I and MDS II documents outline the calculations involved to determine the minimum distance requirements between conflicting uses. Factors considered in the calculation include: the type of livestock in the facility (i.e. swine, dairy, poultry); the type of manure (liquid versus solid); and the expansion factor or the percentage increase in size the building would be undergoing. The number of animal places in the barn is also included in this calculation. This differs from the original Agricultural Code of Practice because the code of practice determined the total number of animals which would pass through the facility during the course of a year.

The MDS calculations provide minimum distance requirements between a livestock barn and a neighbouring dwelling, residential, commercial and institutional zones, side and rear lot lines and the nearest road allowance. Calculations can also be done for the distance between manure storage facilities and a neighbouring dwelling or residential zone but they will not be reviewed in this study.

MDS I is used for siting new residential development in relation to existing farm uses. This calculation is used when residential construction is being planned in order to give consideration to neighbouring livestock operations and to provide a reasonable distance between them. This distance allows the farm to carry on normal farming practices and the distance from the farm should minimize complaints from the neighbouring use. MDS II is used to guide farmers in siting new or expanding livestock facilities in order to provide sufficient distance between the new structure and existing non-farm uses. Similar to MDS I a farmer must maintain a minimum distance between the livestock facility and existing or proposed residential uses. The calculation is also used for distances to be maintained in proximity to commercial and industrial uses. This recommended distance is intended to reduce the number of complaints, protect the environment and provide the farm with an opportunity for future expansion without having a negative impact on neighbouring uses. The MDS II calculation is provided in Appendix 1.

The MDS I and MDS II calculations are Provincial Policy and are not enforceable unless they have been incorporated into the local zoning by-law which can regulate agriculture. Local by-laws are generally updated every five years and at this point MDS I and II can be incorporated and made mandatory.

### **1.3.3 LOCAL REQUIREMENTS**

In addition to MDS calculations, local zoning regulations may be in place that can affect where swine production occurs. Some of these factors include the requirement for increased manure storage capacity, the need for a nutrient management plan, and having to maintain greater distance to a waterway. Extra expenses could be incurred by farmers having to comply with these additional requirements.

## **SECTION TWO METHODOLOGY**

### **2.1 IMPORTANCE OF STUDY**

The potential for Ontario hog production to expand significantly and respond to increased demand for pork is tremendous. This increased demand is stimulated by many factors but the main driver in the offshore markets are improved consumer financial conditions in the Pacific Rim. Even without additional offshore demand for pork, Ontario processors have been operating below full slaughter capacity due to insufficient market hog numbers. Thus, it is important to determine the potential impacts of zoning regulations on both existing and expanding hog operations so this increased demand for pork can be captured in an environmentally sustainable, profitable way. This study will outline those townships which are restrictive and less restrictive according to the minimum distance required from the nearest neighbour.

### **2.2 LIMITATIONS OF THE STUDY**

This report attempts to review only those by-laws which regulate intensive agriculture. The definition used for intensive agriculture has been swine production that provides the main occupation for the owner or is the commodity which is the major use of the land or buildings. Most townships had agricultural zoning requirements within their by-laws and those present for 1996 were used in this study. However, in some cases the information presented for some of the townships has now changed due to recent by-law revisions. This study does not reflect townships changing their by-laws after 1996.

The second limitation to this report is the complaint numbers used. The data supplied by the MOE is somewhat inaccurate because it does not adjust for those complaints which were swine related but were not identified as such by the complainant. Further, the MOE numbers do not reflect the total number of complaints lodged against swine farms in Ontario because many people will contact OMAFRA or their local municipal office first before complaining to the MOE. However, complaints received by OMAFRA that resulted from abnormal farming practices are forwarded to the MOE.

The third limitation to the study is the data collected regarding capital investment for it was incomplete and/or soft in several situations. Some townships simply did not forward their building permits to the researchers. Further, to calculate the amount of investment in each township, the estimated value of construction was used which may not reflect actual building costs. In some townships the estimated value of construction included: penning; feeding systems; the manure system; and other internal materials while for other townships the permits were just for the building itself. As well, some building permits represented projects done entirely by contractors while other buildings were to be completed using owner labour which was not included in the value for the work to be done. In addition, some townships also assess the permit fee based on the value of construction and thus it may be to the individual producer's advantage to under estimate the construction value.

Lastly, there may also be a small number of building permits included in the study which did not or have not resulted in the actual construction of a building.

A fourth limitation to this study was that some information was not received by the researchers in hard copy and was only discussed on the telephone. The researchers may have interpreted the zoning requirements differently from that explained by local township staff.

## 2.3 ASSUMPTIONS

The main assumptions used in this study are as follows:

**1. 1996 Data** - The researchers assumed that all by-law information received was for the 1996 year.

**2. Farm Types** - In order to facilitate a township comparison of building restrictiveness three “benchmark” farms were used. Farm type 1 was a 1000 head feeder hog operation, farm type 2 was a 100 sow farrow to finish operation while farm type 3 was a 600 sow farrow to wean operation. All three farms are assumed to have outside liquid manure storage in a concrete, uncovered tank. All facilities have been sited on a square 100 acre farm and are considered to be new operations. All front, side and rear yard requirements as well as the minimum distance from the nearest neighbour have been calculated when necessary for each farm type.

**3. Neighbour Locations** - Each farm type has been used in three different situations which will show the effect a neighbour will have on the ability to site a barn on the 100 acres. Neighbour location A is the extreme case and places the neighbour right on the side lot line at exactly the mid-point of the length of this line. Neighbour location B assumes there is another square 100 acre farm right next door and the neighbour is exactly in the middle of this farm and back from the road by the front yard requirement for a residence in the agricultural zone. This situation assumes there are no other buildings on this adjacent property. Neighbour location C assumes there are 100 acre square farms on each side of the study farm and that there are residences on each farm but no other buildings. Again, each neighbour will be exactly in the middle of each farm and back from the road the distance of the front yard requirement for a residence.

**4. By-laws Used** - Some townships use the provincial MDS II calculations even though this is not a requirement in the by-law. For these townships the information contained in the by-law has still been used.

## 2.4 POPULATION AND SAMPLE

In this study 177 townships were surveyed in southwestern Ontario including the large urban regions in the Toronto/Niagara/Haldimand-Norfolk area classified as “Town of s” (i.e. Town of Oakville). These “Towns” were included due to the size of these areas and the desire to include as many agricultural areas in these regions as possible. However, there are some instances of predominantly rural townships in the rest of the study area which have not been included because they are labelled as simply a Town (example - Town of Bosanquet). Only those municipalities designated as townships have been used in the study with the exception of the Toronto/Niagara/Haldimand-Norfolk area as outlined above.

The list of townships/town of s (will now be referred to as townships) was obtained from the 1996 Ontario Municipal Directory. The initial mailing to collect data was addressed to the Clerk or similar position for each township and a copy of the letter and survey form is provided in Appendix 2. Information was obtained from each township office or from the local or county Planning office. The incentive to participate was a report of the findings outlining zoning comparisons for each township. It was the feeling of many offices that this could provide insight into future by-law modifications. Complete information was received by mail or through personal communication with 176 townships.

Information from building permits such as the value of each project, type of building and size of building was later requested from the township offices.

## 2.5 METHODOLOGY

### 2.5.1 BY-LAW DEFINITIONS USED

The type of by-law information supplied by the townships is listed below. A summary of the findings is provided in Appendix 3. Values for minimum distance to the road, neighbour and residential zone are reflective of farm type 1 requirements. Explanations for the information supplied are as follows:

(i) Lot frontage - This value represents the amount of the lot which borders on the road. This affects the shape of a parcel of land. For example assume two farms are each 100 acres in size. Farm A has lot frontage of 300 m and is 1334 m deep. Farm B has lot frontage of 632 m and is 632 m deep. Although both farms are the same size (100 acres) the resulting shape of each is very different - Farm A is rectangular and Farm B is square.

(ii) Minimum Distance to the Road - This is the distance which must exist between the road allowance and the edge of a building. This is also referred to as the front yard requirement. The provincial MDS II calculations provide a value for this by taking into consideration the type of animals in the facility, the number of animal spaces in the barn, the expansion factor and the type of manure. Some townships which do not use the provincial MDS II calculations have arbitrarily set numbers in the by-law which state a

minimum distance requirement for the front yard and this has been recorded for these areas. Other townships have only provided a minimum distance which must exist between the edge of a building and the centreline of a road. In these cases the road is assumed to be a township road and this number is recorded.

(iii) Minimum Distance from the Nearest Neighbour - This represents the minimum distance which must exist between the edge of a livestock building and the nearest neighbour's dwelling. The provincial MDS II calculations provide a value for this taking into account the type of animals, the number of animal spaces, the expansion factor and the type of manure.

For townships which do not use these calculations the minimum distance from the nearest neighbour was obtained in one of two ways. Many townships have arbitrarily stated minimum distances which must exist between a livestock barn and a neighbour and this has been recorded for these areas. Other townships do not state a minimum distance value at all and this means that technically a barn could be built very close to a neighbour with only the side yard requirements for both the neighbouring lot and the farm separating the two uses. Neither the house or the barn can be constructed within the side yard requirements as stated in the by-law. For these townships the side yard requirement for a dwelling is added to the side yard requirement for the livestock barn to determine the absolute minimum distance which must exist between the barn and the neighbour's dwelling.

There were also several townships which made reference to the Agricultural Code of Practice for minimum distance requirements in the by-law. For townships which did not establish values and did not outline a minimum distance calculation in the by-law but instead simply stated compliance with the Agricultural Code of Practice, then the 1995 MDS II calculations have been used. This has been done because MDS II replaced the Agricultural Code of Practice. Other townships use the MDS II calculations in practice however it is the 1976 formula which is actually included in the by-law. For these townships the older calculation is used because this study compares what is contained in the by-law.

(iv) Minimum Distance from a Residential Zone - This value has been calculated in the same manner as the minimum distance from the nearest neighbour. For those townships which do not state a minimum distance from a residential zone, it is assumed to be the same as the minimum distance from the nearest neighbour.

(v) Manure Storage, # days - This value indicates the minimum amount of manure storage capacity that an operation must have. For example, a by-law might state that a farm must have enough capacity to store the amount of manure generated on the farm in a 200 day time period. Several townships stated a minimum number of days for manure storage. This number did not change according to the number of animals housed in the building.

For those townships which only stated that the operation must comply with the Agricultural Code of Practice and no other information was offered, then a 200 day

minimum requirement has been assumed. This assumption is made because the Agricultural Guide to Land Use which replaced the code of practice recommends 200 days. For those townships which make reference to the 1976 code, 180 days has been assumed because this is what was recommended by that document. Some townships indicated that the Agricultural Code of Practice shall apply when siting a new facility. For these townships no value has been included for the amount of manure storage because the statement refers only to the siting of the barn and does not take into account other issues such as manure storage capacity. It is assumed a manure storage requirement does not exist.

(vi) Minimum Distance to Waterway - This distance is the minimum distance which must exist between a new structure and an open waterway. A waterway for the purpose of this study is assumed to be an open municipal drain up to 4 ½ m wide or the equivalent size watercourse. The new structure is assumed to be a liquid manure storage facility. Several townships have a requirement in a Manure Management By-Law or in the agricultural section of the zoning by-law for these structures to be built a minimum distance from a watercourse. These values have been recorded. Other townships do not outline this in the agricultural section but do state setback requirements in the general by-law provisions. These distances require construction of any type of building to be set back the minimum distance. These values have been included for these townships. There were many townships which did not have this requirement in the by-law at all and indicated that approval from another agency such as the local Conservation Authority would be required before a building permit is issued. For these townships there has been no value recorded.

(vii) Minimum Lot Area - This is the minimum farm size requirement in the agricultural zone. This value ranges from very small to quite large. Although existing farms may or may not meet this requirement, it is the intention of some townships to encourage lot consolidation in order to have larger parcels of land available which could accommodate larger farming operations.

## **2.5.2 TOWNSHIP CLASSIFICATION SYSTEM**

The focus of this project has been to rate each township based on restrictiveness as determined by the minimum distance required from the nearest neighbour. The rating has been calculated as a percentage of the 100 acre farm on which each farm type (1000 head finishing barn, 100 sow farrow to finish, 600 sow to wean) could be sited taking the location of a neighbour into consideration. The front, side, and rear yard requirements have also been accounted for because these represent areas of the farm which can not be built in.

The three farm types have been analyzed to determine how different production systems may be affected by township zoning requirements. Each farm type was placed on a square, 100 acre piece of vacant land, the size of the building was determined for each based on calculations from the document *Interpretation of Swine Building Plans to Establish Herd Size of Minimum Distance Calculations* (Frank Kains) and this was

subtracted from the total land area. The minimum distance from the nearest neighbour and front, side and rear yard requirements were determined and subtracted from this area and then assessed as a percentage of the total land area. This was completed for each farm type using three different neighbour locations. All distance measurements and calculations are in metric to accommodate the minimum distance and yard requirements which have been recorded in metric. The following sections outline the calculations which were used to determine the restrictiveness rating.

### **2.5.3 MODEL BARN SIZES**

The size of the barn was determined by the number of animals to be housed in the barn multiplied by the square footage required per animal. The area allotted for each animal has been increased by one square foot in all farm types compared to those numbers recommended by Kains to make an allowance for alleys and office areas.

#### **(i) Farm Type 1 - 1,000 Feeder Hog Facility**

10 square feet per hog x 1,000 hogs = 10,000 sq feet

Conversion to metric = 10,000 sq feet x .09 m<sup>2</sup> = 900 m<sup>2</sup>

#### **(ii) Farm Type 2 - 100 Sow Farrow to Finish**

100 sows x 111 square feet per sow = 11,100 square feet

Conversion to metric = 11,100 square feet x .09 m<sup>2</sup> = 999 m<sup>2</sup>

The 111 square feet per sow takes into account the area needed for sows, boars, weaners and finishing pigs.

#### **(iii) Farm Type 3 - 600 Farrow to Wean**

600 sows x 31 square feet per sow = 18,600 square feet

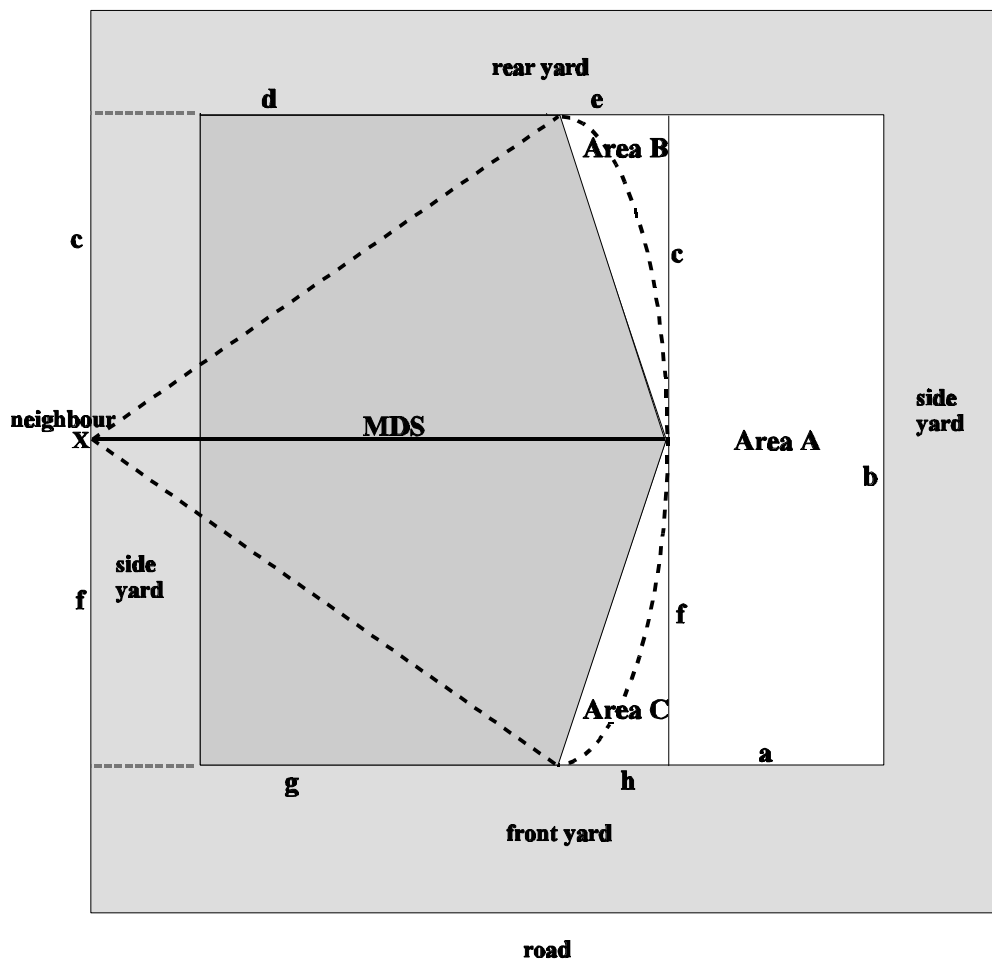
Conversion to metric = 18,600 square feet x .09 m<sup>2</sup> = 1674 m<sup>2</sup>

The 31 square feet per sow accounts for the sows and 2 boars.

### **2.5.4 NEIGHBOUR LOCATION A - ON THE SIDE LOT LINE**

This location places the neighbour's dwelling directly on the side lot line of the farm at exactly the mid-point of the side length. This is an extreme scenario because it would not be possible for a building to be located on a lot line and there has been no allowance made for a side yard requirement on the neighbouring parcel of land. Front, side and rear yard requirements on the sample farm have been accounted for. Please refer to Diagram 1.

**Diagram 1**



The minimum distance requirement for each farm type has been drawn perpendicular to the side lot line from the neighbour's location **X** and is labeled **MDS**. **MDS** is the minimum distance separation requirement which must exist between the neighbour's dwelling and the new barn and is not necessarily the Provincial **MDS II** value. The farm is assumed to be 632.455 m<sup>2</sup>. Areas A, B, and C were then calculated as follows:

Area A:

- 1) 632.455 - **MDS** - side yard = a
- 2) 632.455 - front yard - rear yard = b
- 3) a x b = Area A

Area B:

- 1)  $\frac{1}{2} (632.455) - \text{rear yard} = c$
- 2)  $s(\text{MDS}^2 - c^2) = d$
- 3)  $\text{MDS} - d = e$
- 4)  $\frac{1}{2} (e \times c) = \text{Area B}$

Area C:

- 1)  $\frac{1}{2} (632.455) - \text{front yard} = f$
- 2)  $s(\text{MDS}^2 - f^2) = g$
- 3)  $\text{MDS} - g = h$
- 4)  $\frac{1}{2} (h \times f) = \text{Area C}$

Total area available to build in = Area A + Area B + Area C

To determine the restrictiveness rating:

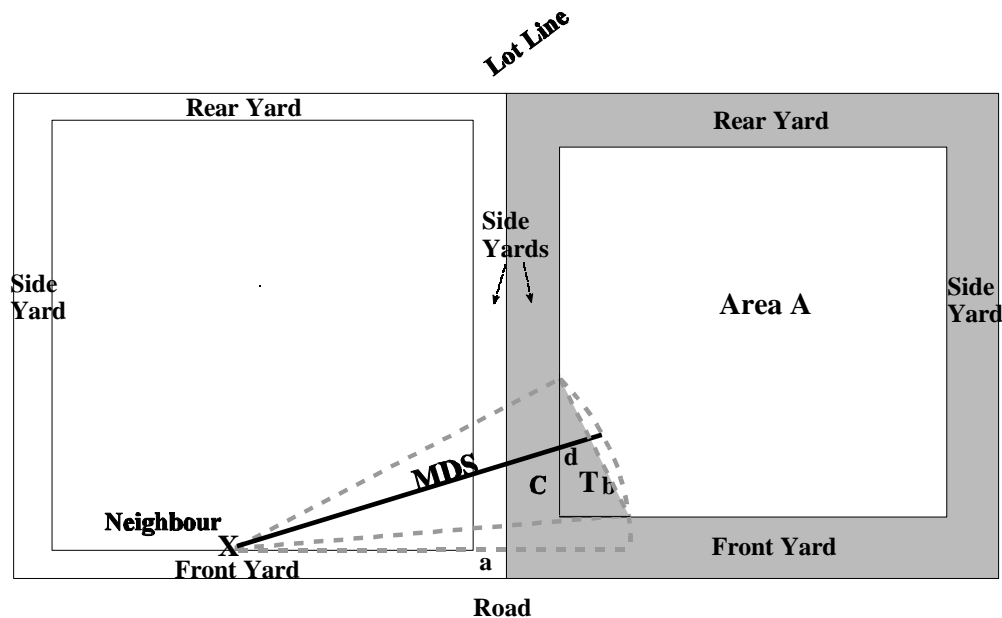
$$\frac{(\text{Total Area Available to Build In} - \text{Size of Barn}) \times 100\%}{\text{Total Area of Farm}} = \text{rating}$$

Areas B and C slightly overstate the amount of the farm which would actually be available to build on because the minimum distance requirement would restrict construction in a circle around the neighbour's dwelling. This is indicated by the arc. For ease of calculations triangular areas have been assumed instead. However, by placing the neighbour precisely on the side lot line at the mid-point this should compensate for the additional area which has been included in the total area available to build on.

### **2.5.5 NEIGHBOUR LOCATION B - MIDDLE OF THE ADJOINING 100 ACRE FARM**

For this scenario there are two square 100 acre farms side by side. The measurements are again 632 m x 632 m. The neighbour's dwelling is located exactly in the middle of the adjoining farm back from the road the distance of the front yard requirement. The front yard requirement for the neighbour is assumed to be that distance which would be required for a dwelling located in the agricultural zone and in most cases is different from the front yard requirement for a livestock use. It is also assumed that there are no other buildings between the neighbour's dwelling and the side lot line separating the two farms. Front, side and rear yard requirements for the study farm have been accounted for as areas not able to be built in. Please refer to Diagram 2.

**Diagram 2**



From the neighbour's location **X** the minimum distance requirement for each farm type was drawn toward the study farm and is labeled **MDS**. Many township **MDS** requirements did not extend into the sample farm because this distance was less than the distance to the side lot line. For those townships which did extend into the sample farm, points were noted where the minimum distance value touched the front and side yard lines when an arc was drawn from location **X**. For ease of calculation a line was drawn from the intersection of the arc at these two points. The resulting triangle **T** is the area of the farm which can not be built on due to minimum distance requirements from the neighbour. The total area of the farm which can be built on is **Area A**. The calculations were done as follows:

Study Farm:

Front Yard Area = 632.455 x front yard requirement

Rear Yard Area = 632.455 x rear yard requirement

Side Yard Areas = 2 x (632.455 - front yard requirement - rear yard requirement)

To calculate Triangle **T**:

- 1)  $s(\text{MDS}^2 - (\text{sample farm front yard} - \text{neighbour front yard})^2) = a$
- 2)  $a - \frac{1}{2} (632.455) - \text{sample farm side yard} = b$  (base of triangle)
- 3)  $s(\text{MDS}^2 - (a-b)^2) = c$
- 4)  $c - (\text{sample farm front yard} - \text{neighbour front yard}) = d$  (height of triangle)
- 5)  $\frac{1}{2} (b \times d) = \text{Triangle T}$

Total Area Available to Build On =

$$\frac{\text{Total Area of Farm} - (\text{Front} + \text{Rear} + \text{Side Yards} + \text{Triangle T} + \text{Size of Building})}{\text{Total Area of Farm}} \times 100\% = \text{rating}$$

Total Area of Farm

### 2.5.6 NEIGHBOUR LOCATION C - MIDDLE OF THE TWO ADJACENT 100 ACRE FARMS

This location is the same as for Neighbour Location B except a second neighbour has been placed at the same place on the farm on the other side of the study farm. This is shown in

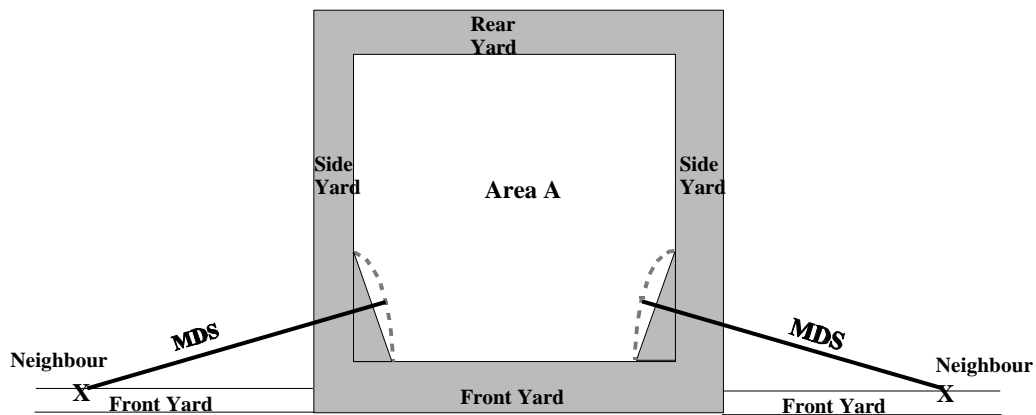


Diagram 3.

#### Diagram 3

All the yard requirements and minimum distance values are identical to the previous scenario. The calculations have been done in the same manner except the value of Triangle T has been added twice to represent the area which can not be built on due to the minimum distance requirements. This has been done because the neighbours are at exactly the same location on both sides of the study farm, therefore impacting the area available to build on by the same amount. The resulting calculation is as follows:

Total Area Available to Build On =

$$\frac{\text{Total Area of Farm} - (\text{Front} + \text{Rear} + \text{Side Yards} + 2(\text{Triangle T}) + \text{Size of Building})}{\text{Total Area of Farm}} \times 100\% = \text{rating}$$

Total Area of Farm

## **2.5.7 RESTRICTIVENESS DEFINITIONS**

The townships were classified as not restrictive, somewhat restrictive or restrictive based on the percent area of the study farm which could accommodate each farm type. A township is rated not restrictive if the calculation resulted in a value greater than 75%. This means that on the 100 acre farm a barn could be built on more than 75% of the farm based solely on the minimum distance from the nearest neighbour and taking into account the front, side and rear yard requirements. This has not taken into account the presence of watercourses, topography or anything else which may affect the siting of a barn. If the calculation fell between 50% and 75% the rating was somewhat restrictive and if it was less than 50% the township was rated restrictive.

The ranges for the restrictiveness rating were chosen arbitrarily and the results would be very different if alternative limits were established. These ranges were chosen because if a farmer could site a barn on greater than 75% of the 100 acre farm then this would provide great flexibility to the producer. If however, less than 50% of the farm could be built on, then this would be much more limiting for the producer and could be seen as restrictive. The minimum distance requirement and restrictiveness rating for each farm type and Neighbour Location are listed in detail in Appendix 4.

## **2.6. ADDITIONAL BUILDING RESTRICTIONS**

The ability to site a barn on the square 100 acre parcel of land used in the study is also affected by other factors such as the presence of streams and other water sources, the topography and proximity to residential, commercial and institutional zones. The results would also vary if a different size or shape of farm was used.

### **2.6.1 WATERCOURSES**

Consideration must be given when building close to watercourses. The information presented in Appendix 3 indicates the minimum distance which must exist between a liquid manure storage facility and a watercourse as defined by an open municipal drain up to 4 ½ m wide. Many townships had specific provisions for siting these facilities in relation to watercourses within the township's Manure Management By-laws (as in Huron County townships) or within the agriculture section of the zoning by-law. Other townships indicated in the general by-law provisions distances which must be maintained between a new structure, not necessarily a livestock structure, and a watercourse such as a stream, municipal drain or river. These distances ranged from 5 m to 100 m. This criteria puts distance between potential sources of water pollution and the waterway to reduce, and hopefully eliminate the chances of contamination should a manure spill occur. Although several townships do not have this requirement stated in the local by-law an individual would need the approval of other authorities (such as the Conservation Authority) before a building permit would be issued.

## 2.6.2 TOPOGRAPHY

Another factor which could affect the ability to site a barn on this land would be topography. Much of the study area except locations in the extreme southwest would consist of areas with hills.

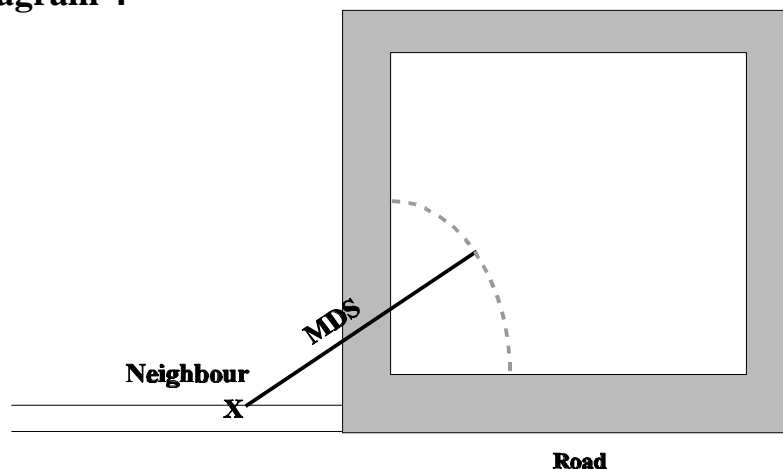
## 2.6.3 ZONING OF ADJACENT LAND

Zoning of adjacent land can also affect the siting of livestock barns. If the study farm was close to a residential, commercial or institutional zone the minimum distance which would need to be maintained between the zone and the proposed barn would be double the distance calculated to the nearest neighbour. This would be the case for those areas which use the Provincial MDS II calculations or calculations which have been derived from the Provincial guidelines. In the case of Farm Type 1 the minimum distance to the nearest neighbour is 404 m. To a residential zone this would become 808 m. The sample farm in this study is 632 m square which would mean that a barn could not be built at all if the residential zone was along one entire side of the farm. Many townships which do not use the MDS II calculations have minimum distances to these zones stated in the by-laws. These distances are outlined in Appendix 3.

## 2.6.4 HOW SHAPE OF THE FARM AFFECTS WHERE BUILDING CAN OCCUR

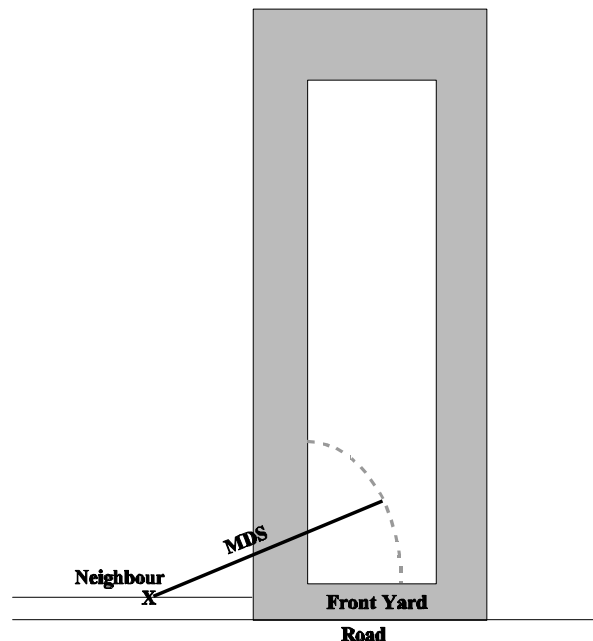
Although this study has focused on a square 100 acre piece of land, the results will change if a different size or shape of farm is used. For example the sample farm is square and 100 acres in size. Diagram 4 shows the resulting area available to build on using the yard and minimum distance requirements for Farm Type 1 and placing a neighbour 100 m from the side lot line. This does not take into account the presence of watercourses, topography, zoning of nearby land and location of other neighbours.

**Diagram 4**



Now, assume the size is still 100 acres but the shape of the farm has changed to be rectangular (ie less frontage on the road). The neighbour's location, yard and minimum distance requirements are the same as for Diagram 4 above. Diagram 5 shows the area of the farm directly impacted by the neighbour. This area is identical to the area in Diagram 4 but the barn would need to be sited further back on the farm. This would result in additional yard and utilities expenses because the barn would be set back further from the road.

**Diagram 5**



### **2.6.5 HOW SIZE OF THE FARM AFFECTS WHERE BUILDING CAN OCCUR**

To demonstrate the effect size has on the ability to site a barn assume a square 75 acre farm. The neighbour's location, yard requirements and minimum distance values are the same as for Diagram 4 above. The amount of the farm which can be built on is smaller as a result of the initially smaller size of the farm. That portion of the farm which is affected by the minimum distance from the neighbour is identical in all of these scenarios because all yard requirements, minimum distance values and neighbour locations are the same but for this example there will be less farm area available to build on because the initial size of the farm is smaller.

### **2.6.6 MANURE STORAGE CAPACITY**

Another factor which can be restrictive is the required amount of manure storage capacity. Some townships require more manure storage which would result in a larger manure storage facility and again additional expenses. For example, most townships in Huron County require 240 days of storage capacity and London township in Middlesex County requires 365 days of storage. These requirements differ significantly from many townships in the study which require six months or 200 days of storage and some do not state a requirement for manure storage capacity. The values for each township are shown in Appendix 3. If a farmer had to build a storage facility for 365 days capacity versus 200

days the cost would be increased substantially because the size of the facility would be much larger. There were no townships in the study which required manure storage facilities to be covered. Many townships did however, stipulate the requirement for either a cover or a safety fence to be erected on top of the walls of the manure tank.

### **2.6.7 NUTRIENT MANAGEMENT PLAN**

The need for nutrient management plans (NMP) is being discussed in several areas. Ashfield township in Huron County now requires one, and other townships are considering the need for, NMPs to be prepared by a professional before a building permit will be issued.

### **2.7 COSTS ASSOCIATED WITH SITING A BARN AT DIFFERENT LOCATIONS**

Although minimum distance requirements impact where a barn can be sited the costs associated with siting a barn at different places on the farm should also be considered. For example, having to maintain more distance from the road would mean increased yard and utilities expenses for a longer laneway. If Farmer A had a laneway which was 328 feet (100 m) long by 20 feet wide and one foot deep the resulting cost would be approximately \$2551. For hydro (200 amp service) this farmer would pay approximately \$1292 plus the cost of trenching assuming that hydro already runs along the road and that there is a transformer at the road. If Farmer B had to be set back 656 feet (200 m) from the road with the laneway again 20 feet wide and 1 foot deep the cost would be \$5101. Hydro expense of \$4610 would include the primary underground cable, a pole and transformer at the barn, expense for terminations on the underground cable but does not account for the secondary cable from the pole to the barn. By comparing yard and utilities expenses, farmer A has incurred \$3859 while farmer B has spent \$9711 - an additional \$5868. The cost rises significantly as the barn is sited further from the road.

## **SECTION THREE LITERATURE REVIEW**

### **3.1 INTRODUCTION**

Environmental regulations are of concern not only in Ontario but also throughout Canada and the world. There are no consistent regulations at the local level let alone at the national and international level. This variation amongst municipalities and regions greatly affects the industry mainly through the issuance of building permits. There have been examples in Ontario where an application for expansion or the building of a new barn have been rejected at the municipal level.

From a Canadian perspective, the lead role for administration and enforcement of provincial environmental protection legislation usually lies with the provincial ministry responsible for environment, frequently in partnership with other resource ministries, such as agriculture. Most provinces also have “right to farm” legislation which are intended to protect producers from unwarranted nuisance lawsuits provided that they operate in accordance within normal farm practices. Odour is high on the list of concerns yet it is the most difficult to measure and regulate. Water quality issues are also very important as this can affect the health and well-being of the general population. There has been some thinking that adherence to production protocols and standards may greatly influence the future marketability of Canadian pork in offshore locations.

The next few pages describe the environmental status present in some of the major hog producing countries and provinces.

### **3.2 UNITED STATES**

The swine industry in the United States is facing strong environmental pressure as farm size has increased. It is expected that the environmental issue is likely to become even more important given that many of the larger operations are sited on land bases which are unable to handle the manure generated from the pigs housed there. The sheer size of these operations is difficult to imagine compared to the relatively smaller scale of Ontario operations, however, despite the size differences the issues are very similar.

The much publicized manure spills and discharge of manure into waterways have brought water quality issues to the top of the environmental agenda. In the New York City watershed a group has formed the Watershed Agricultural Council (WAC). This group looks at non-point sources of water contamination in an effort to improve the water quality. Non-point sources are those which are not defined as a point source and include agriculture, construction sites, and parking lots (Hanchar et al., 1997). The WAC works with farmers and all concerned groups to protect this resource while at the same time attempting to create reasonable solutions for the farm (Hanchar et al., 1997). There is general concern to protect the water and water sources in the U.S. and there is a feeling that federal regulations will be forthcoming to provide a consistent approach across the nation. (Vansickle, 1997)

In order to buy time to assess the impact large “factory farms” are having on the environment, some states, such as North Carolina and Minnesota, have placed temporary moratoriums on hog expansion. One county in Minnesota has actually imposed a permanent moratorium on hog expansion. (Vansickle, 1997). However, counties within many states do not have regulations to effectively manage swine growth.

In Iowa there is much activity by pork producers to fight the requirement for county approval for new buildings or expansions, the regulation of manure application, and the requirement for farmers to have adequate financial back-up to cover any costs of cleanup should a spill occur. These requirements are enforceable because they are not zoning issues and it is feared they will make it next to impossible for farms to start or expand. (Vansickle, 1997)

In Minnesota the counties regulate setbacks and zoning while some activities are determined at the township level. This provides some consistency and also allows for flexibility for certain local needs. However, it is the state that determines environmental regulations in order to provide consistency in all locations. (Vansickle, 1997)

### **3.3 EUROPE**

Europe is viewed as the leader in terms of how the environmental situation may evolve in other parts of the world. Although this study focuses on the ability to site a hog barn on a farm the current environment in the Netherlands deserves some attention with regards to manure application. As Ontario currently looks at nitrogen as a limiting factor regarding application, the Netherlands have moved one step further in defining phosphorous as the most limiting. Beginning in 1998 the Netherlands will have a program which will compare the amounts of nitrogen and phosphorous leaving the farm with the total amount produced by the farm (Dunn, 1997). Limits have been set for what is deemed to be acceptable for each of these and once these limits have been exceeded, fines are imposed for every pound of nitrogen and phosphorous that is over the limit. More stringent limits and fines are in place for phosphorous because a larger land area is needed for manure-based phosphorous (AAFC). This program will initially be in place for farms having more than 1.2 sows/acre but it is expected that all farms will be required to abide after 2000. (Dunn, 1997)

### **3.4 CANADA**

Most regulations that impact agriculture are at the provincial or municipal level. There are few federal regulations that have a direct impact. However, one Federal regulation that does is the Fisheries Act which is concerned with water issues, in particular, the release intentionally or unintentionally of substances into “water frequented by fish as well as water that may eventually enter water frequented by fish.” (Ecologistics, 1997) This would include manure run-off and spills into these waterways.

The Canadian Pork Council has published the Canadian Code of Practice for Environmentally Sound Hog Production. This provides guidelines on hog production which provinces and municipalities can incorporate into regulations. It outlines “best management practices” which, if producers follow, can help protect the farming operation from complaints due to normal farming practices (CPC, 1996).

Agriculture and Agri-Food Canada are working on a Hog Environmental Management Strategy (HEMS). During the next three years programs will be developed which will provide information on constructing buildings that will address environmental issues. The objectives of HEMS are to assist in understanding the environmental issues surrounding the swine industry, provide solutions to the odour issue, and determine which solutions would be economically viable for producers (AAFC, CPC, 1997).

Key regulations for several provinces are outlined below. The information was obtained from AAFC, 1997 and Ecologistics, 1997 except where noted.

#### **3.4.1 BRITISH COLUMBIA**

British Columbia has a Code of Agricultural Practice for Waste Management as part of the Agricultural Waste Control Regulations under the umbrella of the Waste Management Act. This regulates manure handling, storage and disposal. Those individuals who farm within the guidelines of the Code are not required to have a Waste Management Permit however they must abide by the remainder of the Act. B.C. also has “Right to Farm” legislation which protects agriculture from nuisance complaints if acceptable farming practices are used. At the local level municipalities can regulate the siting of hog operations and setbacks from lot lines and waterways. This does result in by-laws which vary from area to area. B.C. has a number of environmental programs individuals can voluntarily participate in. The Nitrogen Behaviour Simulation Computer Model assesses the impact manure application will have on crop production and contamination of the environment. The Best Agricultural Waste Management Plan looks at individual farm concerns regarding manure pollution and the Agricultural Land Development Assistance (ALDA) Program provides low interest loans to those farms who want to correct problem areas identified in the Best Agricultural Waste Management Plan.

#### **3.4.2 ALBERTA**

Alberta has the Environmental Protection and Enhancement Act which has an impact on agriculture in general. This Act prohibits, in general, environmental pollution and

regulates waste handling, storage and disposal. Environmental accidents must be reported and those responsible must pay for the clean-up. At the municipal level new livestock facilities are regulated but the process to obtain a building permit varies. Areas which have intensive operations have more specific regulations and some require a permit indicating that the operation complies with the Code of Practice for the Safe and Economic Handling of Animal Manure. Other areas may use portions of the Code in local by-laws (i.e. minimum separation distances) to help minimize potential future complaints. In addition, Alberta Agriculture, Food and Rural Development has formed the Pork Production and Siting Group which will encourage an adoption rate of 80% for the Code of Practice by 2000.

### **3.4.3 SASKATCHEWAN**

Under The Agricultural Operations Act intensive operations in Saskatchewan must have manure storage and waste management plans approved. This applies throughout the province and in some areas may be the only requirement to follow when building a new barn. The provincial government has established guidelines for municipalities to use which look at the number of animal units proposed and whether to hold a public hearing on the process. If a minimum distance can not be maintained between a proposed building and another non-farm use the farmer could be encouraged to enter into an agreement with the owner of the non-farm use and the municipality regarding development of the facility. (Ecologistics, 1997)

### **3.4.4 MANITOBA**

Manitoba has a Farm Practices Protection Act which protects farmers from nuisance complaints resulting from normal farming practices. The Livestock Waste Regulation was passed in 1994 and regulates the “use, management and storage of livestock waste and mortalities” (AAFC). It stipulates manure should not be applied to crops at amounts greater than what the crop requires. Changes are being considered which would address methods of application, prohibiting application in the winter and adequate storage capacity. Also in 1994, the Farm Practices Guidelines for Hog Producers in Manitoba was released which shows how to calculate the appropriate manure application rate. Municipal by-laws vary and in some areas medium and large size operations can be classified as a “conditional use” and council approval is required for expansion plans. The decision of council is final and cannot be appealed.

### **3.4.5 QUEBEC**

Quebec has very restrictive regulations at both the municipal and provincial level. The Regulations for the Reduction of Pollution of Agricultural Origin which will come into effect in July 1998 aims to lessen the local regulations. With this piece of legislation producers will need a permit to apply manure, they will be restricted from applying after October 1, there will be restrictions on applying manure to high phosphorous soils, and the separation distances between barns and waterways will be established. In addition, a nutrient management plan is required, minimum storage capacity for manure is to be

increased from 200 days to 250 days, and detailed records of manure applications and crops grown must be kept which work with the nutrient management plan. It is the intention that these provincial regulations will be adopted by all municipalities.

### **3.4.6 ONTARIO**

The Farm Practices Protection Act is in the process of being replaced by the Farming and Food Production Protection Act. This Act has not passed second reading but if passed will provide protection against nuisance complaints for farmers who use normal farming practices. Although there is some concern regarding a statement within the Act which indicates that municipal by-laws cannot restrict normal farming practices, this will likely be considered on a case-by-case basis. Several documents are available such as the OMAFRA MDS and land use guidelines and other provincial resource booklets such as Livestock and Poultry Waste Management, Nutrient Management and Water Management to farmers.

The province adopted a new MDS formula in 1995 and each municipality is required to incorporate these into local by-laws within 5 years upon Official Plan review. Until that time regulations pertaining to minimum distances required between farm and non-farm uses vary from area to area depending on existing requirements within the by-law.

There is also a Certificate of Compliance program which several townships require before a building permit is issued. The certificate is essentially a site and building plan taking into account MDS calculations, on-farm pollution potential, drainage, manure storage and dead animal disposal. This is currently being reviewed by OMAFRA and may only apply to large operations in the future (Romahn, 1997).

### **3.5 CURRENT SITUATION - ONTARIO**

There have been instances of manure spills in the United States which have been widely covered by the media. It is possible that these cases bring a sense of urgency to the regulation issue in Ontario. Larger, more intensive operations are being built and this increases the awareness of potential environmental concerns.

Within Ontario, there is much activity occurring in efforts to protect the environment and minimize conflict between farm and non-farm uses while not discouraging growth in the swine industry. Many groups are concentrating their efforts on the issue of manure and manure management. OMAFRA has just launched a nutrient management hotline which individuals can use to receive answers to questions related to manure management and there is also a computer program (NMAN97) which compares the nutrients in manure with what the crop requires in order to address potential nutrient overloading which can occur when excessive amounts of manure are applied (Hilborn, 1997). As well, a report titled Managing Manure for Dairy and Swine (Goss et al., 1996) looks at the various computer programs which are available for manure management and highlights the pros and cons of each.

In Eastern Ontario the South Nation Conservation has a committee studying a Total Phosphorous Management Plan to address the increasing levels of phosphorous due to non-point sources. It is encouraging participation from affected municipalities to share the costs and provide incentives to those sources to reduce phosphorous levels. There is a possibility that this type of movement may come to Western Ontario. (Van Dusen, 1997)

The Ontario Farm Environmental Coalition formed the Ontario Water Quality Working Group in 1994 to address water quality issues. By working with farmers it hopes to identify water quality issues and take steps toward corrective action. The view is that the farming community needs to identify these areas and make necessary changes before others step in and regulate. (Svensson, 1997)

Even at the local level municipalities and farm groups are working together to find workable solutions. In some townships nutrient management plans are already a requirement of the local manure management by-law and it is required for any new buildings or expansions. It requires livestock producers to look at manure management as a whole including storage, handling and disposal before approval is granted. In the county of Perth the Agricultural Review Committee has been established and it is to review complaints within the county and offer workable solutions (Kew, 1997).