MHBC

EDGE PLANNING REPORT

The Region of Peel & The Town of Caledon LEAR Study and MDS Review

Our File No. 0929C

A Review of Implemented Practices to Address Planning on the Rural – Urban Fringe

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1.0 INTRODUCTION

The boundary where the city meets the country is often referred to as the "urban fringe". This fringe area to many is the gateway to open countryside, however it is also an area where conflict arises between differing points of view, contrasting lifestyles, conflicting land uses and in many cases, a misunderstanding of the requirements of the production of food and fibre.

When developing guidelines for development in the fringe areas, there are four main factors which influence the compatibility of urban and rural land uses, these are:

1. Farm Operation – Type and Management
2. Environment – Climate and Topography
3. Urban Development – Type and Location
4. Perceptions

When there is an understanding of the factors, they may then be addressed to facilitate compatibility between uses (British Columbia Ministry of Agriculture and Lands, 2006).

The following provides a review of case study examples and methods which have been recommended and in some instances implemented to mitigate the impacts of potentially conflicting land uses in the fringe areas. Section 4.0 of this report provides recommendations for discussion for the Region of Peel to consider in addressing the mitigation of conflict along the fringe areas of the urban settlement boundary and the prime agricultural areas.

2.0 CASE STUDY REVIEW

2.1 California, United States of America

The state of California is the most populous state within the United States and is also the nation's leading agricultural producer (Handel, 1998). The challenge to balance urban growth with a thriving agricultural industry is pushing land use planners to develop methods and policy to support urban growth while preserving and protecting valuable farmland and the agricultural industry.

The conflict between urban and agricultural land uses is intensified by the frequent expansion of urban edges into farmland. The seemingly unstable urban edges create an impression of impermanence for the farmers in the area. Those who are farming land on the edge of the urban areas may be waiting to sell out and no longer have incentive to invest in new equipment, long term crops or to adopt long-term production management techniques. Without policy or legislation to set firm urban growth limits, the farmers who are not directly adjacent to the urban boundaries today, may find themselves there tomorrow as urban areas expand into the countryside.

Another source of conflict in the fringe areas or on lands zoned for agriculture is the allowance of non-farm uses on lands zoned for agriculture. Examples of these uses include golf courses, churches, and recreational facilities. These uses not only add to the conflict with adjacent farmers but also create new centres of non-agricultural development and thus a greater threat to agriculture.

The differences of perspective of farmers and non-farm residents in these areas heightens the real and perceived land use impacts.

The Urban perspective:

- Urban edge residents complain about agricultural pesticide use.
- Complaints about agricultural noise, e.g. harvesting at night, use of aircraft for pesticide and seed application.
- Complaints about odour (plant decay, livestock operations)
- Complaints about dust generated by field work – decreases the quality of life and threatens health.
- Complaints about slow moving farm equipment blocking the flow of traffic on roadways.

The Farm Perspective:

- Resentment of intrusion of urban residents which creates the need for special management practices which may affect crop yield and increase cost and labour requirements.
- Domestic pets from new subdivisions may harass livestock on pasture.
- Complaints about the increased traffic and the difficulty of trying to move large equipment on a busy roadway.
- Increased trespassing and the corresponding increased liability.
- Increased theft and vandalism on farms.

Differing viewpoints on Value of Farmland:

- City/County decision makers often view farmland as a provider of open space or as a land bank for future urban expansion.
- Urban residents often view farmland as a place for idyllic country living.
- Farmers view their land as a means for making a living.

California has some of the most productive farmland in the world, but when urbanization threatens that farmland, the public is concerned about losing open space rather than productivity (Logan and Molotch, 1987)

Farmland is also viewed by some cities and counties as a convenient way to hold land until the time for urban development.

There is no such thing as farmland without farmers. If non-farmers are to enjoy the amenities of a working rural landscape, then they must either learn to tolerate farming practices or else settle at a distance from farm operations. The friction between farmers and non-farmers involves a clash of 'property rights' that cannot be resolved in the marketplace. Instead, legislative bodies and the courts must act as referees (Lapping et al. 1989)

Within some jurisdictions in California, methods are presently being utilized in an attempt to reduce the impacts in the fringe areas as well as to preserve the valuable farmland. This is not an easy task in the state given that only 2% of California's population is employed in the agricultural industry and do not necessarily have political clout with the state's elected officials and policy makers. The three predominant practices being recommended to policy makers, and in some areas implemented, include:

1. The importance of viewing agriculture as an industry. This would aid local planners and decision makers to advocate land use decisions that will help reduce the urban / agricultural conflict.

2. The establishment of firm urban growth boundaries.

3. The establishment and implementation of outreach programs to educate the urban population. This practice will help the urban population to understand the industrial nature of farmland so that their expectations of country living are realistic.

The establishment of Urban Growth Boundaries (UGB) is becoming more popular in California. The UGBs are implemented by one of three mechanisms, city council action, direct democracy or the action of a governmental entity external to the community. The establishment of a UGB is often one component of an overall urban containment strategy. These strategies would also include policies that promote the production of affordable housing, encourage infill and mixed-use development, preserve open space within the boundary and avoid straining existing infrastructure. It is believed that without this multi-faceted approach and implementation of policies to apply to development. within the UGB that the UGBs may eventually result in increases in housing prices, overcrowding and lower quality of life for residents within the UGB areas.

There is some controversy surrounding the effects of UGBs. Those in support of UGBs argue that the policies are essential to containing suburban sprawl and protecting open space. Opponents however claim that UGBs lead to increases in housing prices and overcrowding.

One example is the City of San Jose, California. By unanimous City Council vote in 1996, an UGB was adopted and incorporated into the San Jose 2020 General Plan. San Jose experienced rapid growth between the 1950's and 1970s which resulted in large costs associated with urban sprawl. The City discovered that the development in the fringe areas, especially residential development, did not generate sufficient revenues to cover the cost of providing urban services and infrastructure to the fringe areas. Commencing in the 1970's, the City started to utilize growth management tools to slow urban sprawl. The latest of the tools to be implemented is the UGB. It is the goal that the establishment of the UGB will manage growth, be a means to assist in balancing the City's budget and to preserve open space.

The City of San Jose has been working with the County of Santa Clara to implement the UGB and has established criteria and a process for a comprehensive review of proposed UGB expansions. This method is very similar to Ontario's of establishing urban growth boundaries and addressing settlement area expansions in the Growth Plan for the Greater Golden Horseshoe.

California's approach is similar to the Ontario approach of establishing urban growth or settlement area boundaries. Their implementation method however appears to be more of a political decision and driven by ballot results which is by nature of the local political system.

2.2 Queensland, Australia

The Queensland Government considers that good quality agricultural land is a finite national and state resource that must be conserved and managed for the longer term. State level legislation was implemented in 1992 as an instrument to protect good quality agricultural land through local government planning. SPP1/92 Principle No 8 states:

Local Authority planning provisions should aim to minimize instances of incompatible uses locating adjacent to agricultural operations in a manner that inhibits normal farming practice. Where such instances do arise, measures to ameliorate potential conflicts should be devised wherever possible.

This principle is not unlike the policies contained within Ontario's Provincial Policy Statement.

From this, Planning Guidelines were developed to provide technical advice and guidance to reduce the potential for conflict between farming activities and residential development. Additionally, these guidelines may be utilized in other land use conflict matters such as situations where conflicts are likely to arise between industrial, tourist, commercial or other urban uses and nearby agricultural uses.

These guidelines do not deal with intensive livestock operations and conflicts arising from those operations. These conflicts are addressed through industry specific codes of practice not unlike Ontario's Minimum Distance Separation Guidelines.

The guidelines are divided into five sections addressing the following areas: Planning Schemes, Conflict Assessment and Buffer Area Design, Ownership and Maintenance of Buffer Areas, Dealing with Existing Conflicts and Roles.

The Queensland planning guidelines are to be applied with the consideration of the following principles:

1. Provided agricultural practices are legally practised according to existing codes of practice, it is unreasonable for new adjacent uses to demand a modification of these practices to an extent which threatens efficient agricultural operations.
2. When preparing planning schemes, local governments should avoid, as far as practicable, locating residential development in proximity to agricultural land. Where this is not possible, mechanisms such as buffer areas should be used to minimize conflicts.
3. Buffer areas should be determined on the basis of the sustainable agricultural land use with the potential to have the most impact on adjacent land uses and which is reasonably likely to be practised, regardless of current use.
4. Buffer areas should be located within the site being developed for residential purposes, and be provided/funded by the proponent of that development. This principle protects the prior rights of agricultural producers to practice agriculture on rural land.
5. Where conflicts already exist between agricultural and residential land uses, mechanisms including mediation, source controls and public education should be encouraged.

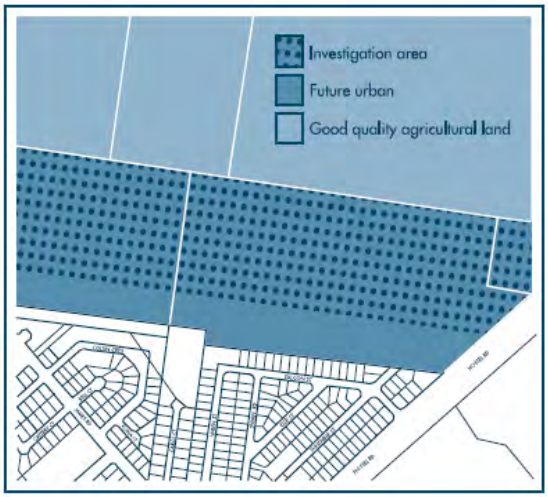
The guidelines provide a set of definitions to eliminate any question of misinterpretation. These definitions include the following:

- Agricultural Land Use
- Buffer Area
- Buffer Element
- Building Envelope
- Drift
- Residential Development
- Sensitive Receptor
- Separation Distance

The Guidelines recommend that, to achieve separation of incompatible uses through planning decisions, the following planning controls should be utilized:

- Isolate good quality agricultural land from uses likely to conflict with nearby farming activities.
- On the edges of urban areas, retain natural features free from development to act as buffer areas between newly developing areas and farmland.
- Ensure that newly developing areas are designed so that features such as public open spaces, road reserves or purpose-designed buffer areas provide the required separation.
- Require individual developments to be designed in ways that incorporate buffer areas.

SUBDIVISION CONDITIONS OF APPROVAL



Strategic Plan Buffer Design Example

The Queensland guidelines suggest the assessment of the conflicting use to determine the most optimal design of the buffer area. This is generally carried out during subdivision approval. They recommend that the following steps be taken in investigating the need for appropriate buffer areas:

- Determine the sustainable agricultural land use with the potential of causing most problems for adjacent residential and which is reasonably likely to occur on the subject land.

- Identify the elements that may cause conflict and the extent of the conflict. The elements should be quantified, where possible, in terms of frequency and duration of activities to determine the element's impacts.

- Explain how the proponent intends to address each element to achieve acceptable outcomes in terms of residential area design, size of lots, separation widths, tree planting, acoustic barriers etc.

- Propose the means by which the proposed measures will be monitored and maintained. This should include responsibility for implementing and maintaining specific features of the buffer areas to ensure continued effectiveness.

The guidelines provide buffer design criteria based upon the element. The elements are agricultural chemical spray drift, odour, noise, dust, smoke and ash, and sediment and stormwater runoff.

Vegetative buffers are successful in separating conflicting land uses and consequently mitigating conflict and impacts. The Queensland guidelines outline that in circumstances of single tenure, private land, that the buffer can be created through planning controls such as building envelopes and conditions tied to development approval, or through vegetation protection orders where existing vegetation is contributing to an effective existing buffer area or by voluntary provision of a buffer area by the rural landholder when initiating an intensification of a rural / agricultural land use.

In situations of joint tenure of private land, the common property areas of land may be utilized as a buffer where the location is appropriate. The land use of the buffer area must be consistent with the reduction of the land use conflict.

When the land to be utilized as a buffer area is public land, it is under the control of the local government or a government department (example: Department of Natural Resources). In this circumstance, the buffer area could be used for parks, public open space, or road and drainage reserves, if appropriate.

EXISTING CONFLICTS

Where there are existing impacts in the fringe areas, the Queensland Guidelines recommend the following strategies:

- Mediation and negotiation
- Source Controls and Agricultural Practices
- Education

An example of an education tool utilized in Queensland is a *Notice to Purchasers of Land in Rural Areas*. This document outlines the agricultural practices which take place in the area. A sample of the document is provided in Appendix 1.
It appears as though Queensland shares many similar challenges as the Region of Peel and Town of Caledon with respect to mitigating the impact of urban land uses adjacent to valuable farmland. The practices noted above could be considered for implementation within Peel.

2.3 British Columbia, Canada

The Province of British Columbia has been forward thinking in farmland protection since the 1970's. At that time, nearly 6000 hectares of prime agricultural land were lost each year to urban and other uses. The Province responded to this by introducing the British Columbia Land Commission Act in 1973. The Agricultural Land Commission (ALC), which was appointed by the Provincial Government, established a special land use zone to protect the province's declining supply of agricultural land. This zone was named the "Agricultural Land Reserve" (The ALR). The ALR was established between 1974 and 1976 It initially comprised 4.7 million hectares of farmland (5% of the Province's land base). It is a provincial zone in which agriculture is recognized as the primary use. In this zone, farming is encouraged and non-agricultural uses are controlled. The ALR takes precedence over, but does not replace other legislation and by-laws that may apply to the land. Governments at the local and regional levels are required to plan in accordance with the provincial policy of preserving agricultural land. There have been boundary changes to the ALR since 1976, however the area of the ALR remains more or less the same. (alc.gov.bc.ca, 2013)

The province has produced publications addressing development in the fringe areas. The two that will be focused on in this report are "Landscaped Buffer Specifications" which was prepared by the ALC in 1993 and "Guide to Edge Planning – Promoting Compatibility Along Urban-Agricultural Edges" which was prepared by the British Columbia Ministry of Agriculture and Lands in 2009. These documents are tools to aid in promoting the compatibility between the urban-rural interface and to improve the relations and practices on "both sides of the fence".

The strategy behind the guidelines is shared responsibility. Both urban and agricultural land users and decision makers must look for opportunities and adopt approaches that will aid in ensuring the compatibility of land uses in the edge areas. The stated strategy outlines that successful urban/agricultural edge planning relies on:

1. Recognition that it is reasonable for landowners along both sides of the urban /ALR boundary to share the benefits and impacts from edge planning implementation;

2. Public education that increases agricultural awareness and promotes neighborhood friendly land use; and

3. The ability of landowners to realize optimum land use which ultimately leads to increased long term certainty and security for urban and agricultural land uses.

In consideration of the above, an edge planning strategy for each community should include:

1. Defining similarly sized edge planning areas on both sides of the ALR boundary for the application of edge planning techniques;

2. Developing communication tools such as edge planning public information brochures, agricultural awareness signage along the ALR boundary, farm notification restrictive covenants on new land titles, and local government websites to enhance public awareness of edge planning objectives; and

3. Amending and adopting bylaws that encourage more intensive land use within a strengthened land management regime along the edge planning area.

The areas considered to be a part of edge planning areas are defined as:

"Urban and agricultural land situated near the ALR boundary that requires special management in the spirit of shared responsibility."

The BC Guide to Edge Planning recommends an edge planning study area of 300 metres on either side of the Agricultural Land Reserve boundary within which to assess the possible application of edge planning techniques to improve land use compatibility and reduce land use conflicts. The Agricultural Land Reserve is intended as a permanent land reserve for agriculture where agriculture is a priority use. In this regard, the guidance developed by the Commission and the Ministry has been developed in the context of providing edge planning approaches to promote compatibility along a permanent urban-rural boundary.

The Guide also discusses types of land uses and their location relative to farming areas. The guide looks at low density residential uses, including contemplation of both urban and estate residential development and medium to high residential uses. The Guide recognizes that different types and intensities of uses warrants different levels of edge planning applications. Accordingly, it is recognized that commercial, industrial and recreational uses along the agricultural edge areas would not require the same level of edge planning or buffer that more sensitive land uses, such a residential uses, would require.

OFFICIAL COMMUNITY PLANS

Official Community Plans (OCP) can be developed by municipal and regional districts within the province of British Columbia and provide a longer term vision for a community. This is similar to an Official Plan that we use in Ontario. The following elements are required to be contained in an OCP:

- The approximate location, amount, type and density of residential development required to meet anticipated housing needs over a period of at least five years;
- The approximate location, amount and type of present and proposed commercial, industrial, institution and, agricultural, recreational and public utility land uses;
- The approximate location and area of sand and gravel deposits that are suitable for future sand and gravel extraction;
- Restrictions on the use of land that is subject to hazardous conditions or that is environmentally sensitive to development;

- The approximate location and phasing of any major road, sewer and water systems;
- The approximate location and type of present and proposed public facilities, including schools, parks and waste treatment and disposal sites;
- Other matters that may, in respect of any plan, be required or authorized by the Minister;
- Housing policies of the local government respecting affordable housing, rental housing and special needs housing; and,
- Targets for the reduction of greenhouse gas emissions in the area covered by the plan, and policies and actions of the local government proposed with respect to achieving those targets.

Local governments may choose to provide policy statements within the OCP that address a variety of issues including policies relating to respecting the maintenance and enhancement of farming on land in a farming area or in an area designated for agricultural use in the community plan and also policies relating to the preservation, protection, restoration and enhancement of the natural environment, its ecosystems and biological diversity.

Development Permit Areas

The establishment of Development Permit Areas (DPA) is a policy tool that may be implemented to achieve the objectives provided by the OCP. DPAs are required to be established for a specific purpose, with clearly stated rationale for their development and guidelines for the undertaking of successful development applications. DPAs are most frequently developed for areas where there are significant natural heritage features, challenging landscape limitations (cliffs and steep slopes), greenhouse gas mitigation, water or energy conservation, and land uses whose alteration requires consent of provincial or federal government agencies (Agricultural Land Reserve Lands or Fisheries and Oceans protected waterways).

Within a DPA, property owners must obtain a development permit before dividing land or constructing, adding to, or altering a building. Local governments may issue a development permit that varies or supplements a subdivision or zoning by-law.

Local governments may create and implement their own development permit guidelines tailored to the needs and vision of the respective community. The justification for the guidelines is required within the OCP. DPAs are limited to those areas for which they were developed and are often required in conjunction with other land use development processes, such as sub-division of lands, zoning bylaw variances or building permit issuance in sensitive land use areas.

DPAs for edge planning triggered by subdivision, zoning or other development applications for properties adjacent to ALR lands would supplement requirements established by the ALC. Setbacks, buffer type, and the mechanism for protection of the buffer would be developed in coordination with the applicant and would be considered as part of the overall application and approval process.

Development Permit Guidelines must contain objectives to highlight their purpose. Examples of these include:

- To protect farmland from impacts, associated with urban development;
- To reduce conflicts between farm operations and urban land uses; and
- To encourage urban development / redevelopment along the urban – ALR interface that supports the viability of agriculture.

City of Abbotsford

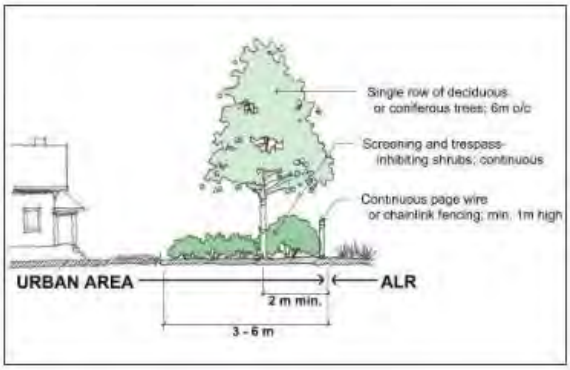
The City of Abbotsford is a community of 138,000 (2014), located in the Fraser Valley of British Columbia. The City itself is surrounded by agricultural lands which make up 71.2% of the 370 km^2 which make up the municipality. Agriculture is the economic anchor of the community, with other employment sectors occupying 6.8% of the land area, 4.8% Industrial and 1.5% Commercial. Residential and institutional development occupy 16% and 3.3% respectively.

Protection of agricultural lands is important to the identity and economic foundation of this community and the City of Abbotsford has developed and implemented Development Permit (DP) requirements which require the inclusion of buffers between agricultural lands and other land uses.

All lands in the municipality which abut Agricultural Land Reserve (ALR) lands are required to follow the DP guidelines, which establish guidelines for minimal, street edge, natural edge, moderate and maximum buffer standards. The application of the appropriate buffer requirements are determined based on the adjacent land use condition and the proposed development alteration to land use abutting ALR lands.

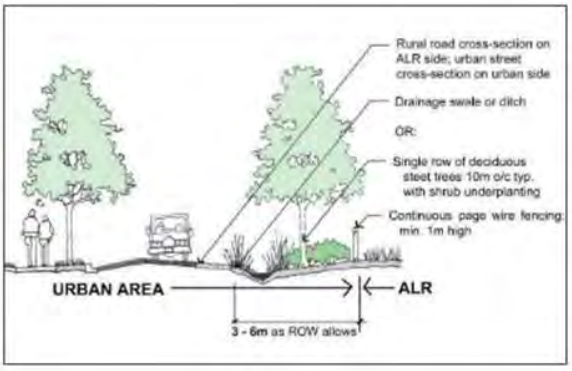
A copy of the City of Abbotsford's development permit guidelines for the protection of agriculture are attached as Appendix 2 to illustrate an example of how a municipality in BC has incorporated edge planning policy and guidelines into an official community plan.

Minimal Buffer



Appropriate where there is minimal risk of conflict between urban and agricultural land uses.

Street Edge Buffer



Appropriate where the urban-ALR interface is defined by a public road.

City of Kelowna

The City of Kelowna is a community of 122,000 (2014), located in the Okanagan Valley of British Columbia. The City itself is surrounded by agricultural lands which make up 11% of the 2,905 km^2 of the Central Okanagan, 22.7% of the 214 km^2 land base of the Kelowna. Agriculture, including viticulture and agri-tourism are central to the economy of Kelowna and the Central Okanagan Region, and balancing the protection of viable agricultural land is central to growth management in the City, and throughout the Okanagan Valley.

Similar to the City of Abbotsford, Kelowna has developed and implemented Development Permit (DP) requirements which require the inclusion of buffers between agricultural lands and other land uses. Unlike Abbotsford, the City of Kelowna extends the applicability of the DP guidelines to all agricultural lands, not limited to Agricultural Land Reserve (ALR) lands. As well, buffer requirements, widths and specifics of the buffers are defined in Section 7 – Landscaping and Screening in the Zoning Bylaw. Chapter 15 of the Official Community Plan, Farm Protection Guidelines sets out and explains the general edge planning guidelines to be implemented through a Development Permit.

The Farm Protection Development Permit Guidelines adopted by the City of Kelowna are included in Appendix 3 as a further example of how edge planning policy guidelines have been developed in British Columbia. Excerpts from the City of Kelowna Zoning Bylaw are also included to illustrate how the City has implemented the policy guidance through zoning provisions (Section 7.6.1 and Diagram 7.6).

Edge Planning Tools for Implementation on the Urban Side

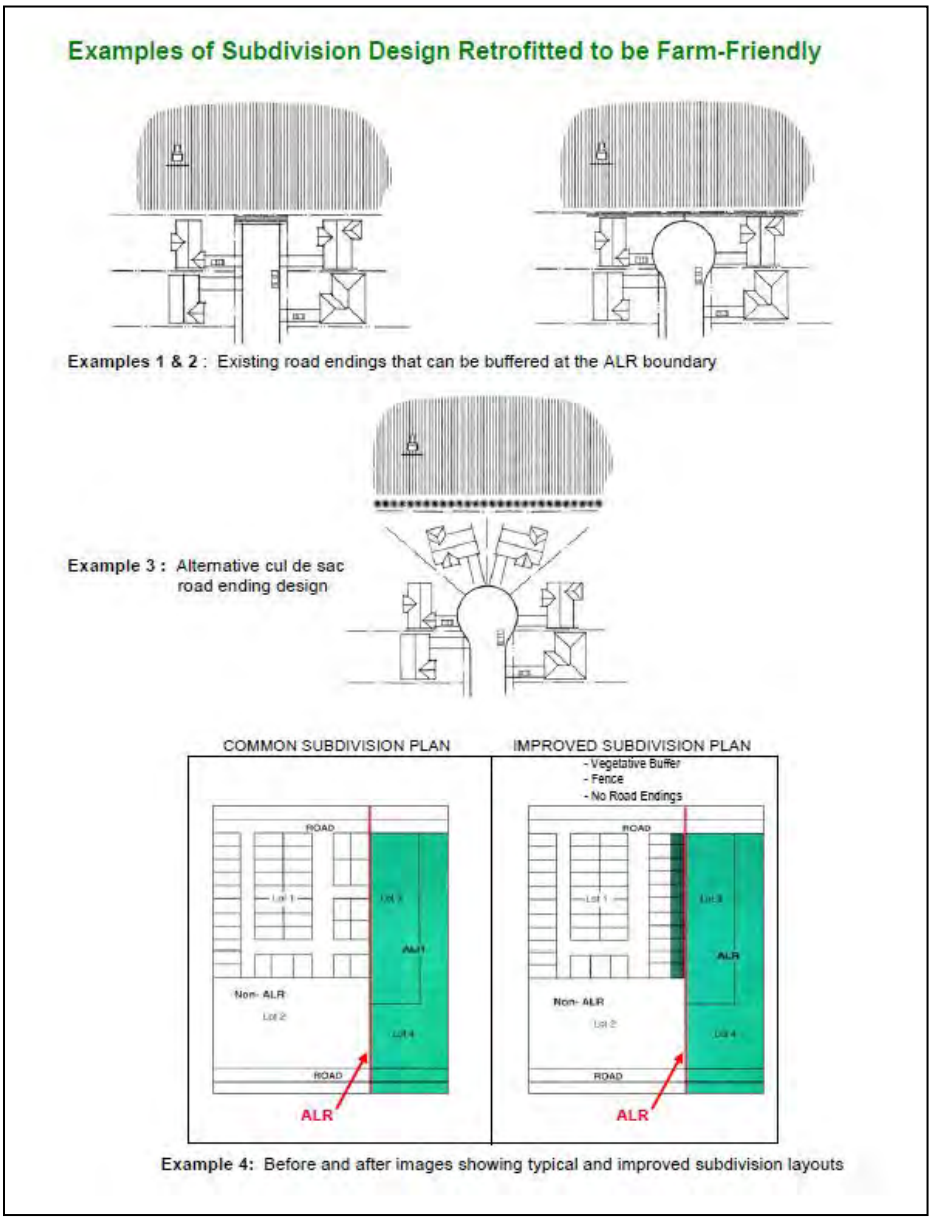
The ALC's "BC Guide to Edge Planning" recommends that a study area of 300m be established for consideration of agricultural buffering requirements. These recommendations include urban development that occurs within 300 metres of the boundary should consider subdivision design, road layout, building design and rainwater management and their effects on neighbouring farmland.

However, the Agricultural Land Reserve is not a solid, linear boundary. Often, due to geographic boundaries of a plan area, and the history of development, ALR lands can often be found in small clusters, or along dis-contiguous edges of a community. Buffer and edge protection of agricultural lands are therefore considered based on the Development Permit Area requirements established by each Official Community Plan and are negotiated on an individual parcel basis as part of development applications. Consistent application and the development of a replicable buffer standard is established through the purposeful development of the DPAs during the Official Community Plan development, including consultation with the ALC and other relevant provincial ministries.

The Guidelines provide the setback and buffer design criteria for urban-side development. Examples of these are provided in section 4.5 below.

Subdivision Design / Road Layout / Building Design

Legislation has been enacted to assist local governments in edge planning area subdivision and building design. For example, an application for subdivision can be refused if it would unreasonably interfere with nearby farming operations due to inadequate buffering or separation or its road patterns would increase access to land in the agricultural land reserve. Farm friendly design requirements such as buffers can also be requested to be incorporated into subdivision design before approval may be granted. Development permit areas with an Official Community Plan are utilized to ensure that the best possible design is achieved. The following excerpt from the Guide to Edge Planning provides examples of subdivision design that has been retrofitted to be farm friendly.



(Source: Guide to Edge Planning, 2009)

Rainwater Control

The loss of permeable surfaces and changes to drainage patterns as a result of development can change land surface characteristics and the hydrological balance which in turn may impact the agricultural land depending upon the elevation of the land. Potential impacts include soil erosion, siltation and sedimentation and flooding.

The guidelines recommend the following techniques to alleviate the impacts:

- Erosion, sediment and rainwater control during and after construction
- Implementation of source controls such as pervious pavers for driveways and patios, connecting roof downspouts into infiltration basins and utilizing deeper topsoil (minimum 300 mm) in landscaped areas
- Design buffer areas to aid in breaking up overland flow

The above methods are implemented through subdivision and servicing bylaws, development bylaws and development permit area regulations.

Effective road and public right of way layout is an effective tool which can be utilized in conjunction with a vegetative buffer. The avoidance of the use of half width roads and ensuring road endings are not pointed at the ALR are simple measures to strengthen the permanency of the ALR boundary.

Disclosure Statements

The Province of British Columbia has introduced disclosure statements, which have been an effective tool in ensuring that purchasers of property in the rural or rural – urban fringe areas are cognisant of agricultural practices in the area. The statement provides the prospective purchaser that the property is in proximity to an agricultural area and that as part of acceptable farm practices, there is the potential for noise, dust, odour and other impacts associated with nearby farms during certain times of the year. It is also an option that if new development occurs within 300 metres of the ALR boundary, a covenant can be placed on land title disclosing the proximity of the agricultural area and the potential implications.

Edge signage and information package

The British Columbia guidelines recommend that municipalities should consider utilizing signage along the urban – rural boundary. This signage is a tool to inform residents and prospective purchasers of the proximity of farm operations within the immediate area and the possible associated activities.
An information package is also an important awareness tool that is recommended for municipalities. It would be intended that this package be distributed to new and existing residents in the fringe area. The package would contain information explaining:

- Benefits of vegetation buffers;
- Overview of Provincial Farm Practices Protection legislation and acceptable farm practices; and
- An explanation of the types of farm operations found in the area.

Urban Side Buffers

The guidelines outline that the establishment of a visual buffer and fencing between non-farm development and agricultural land can significantly reduce the level of complaints by minimizing both the cause and the perception of a nuisance. The recommended buffer design varies depending on the type of agricultural use and the intensity of the adjacent non-agricultural use. For example, residential development that is adjacent to a field crop or an orchard crop area would require a densely vegetated buffer that will mitigate the effects of dust and/ or spray drift. Whereas a lower intensity non-farm development (i.e. industrial use) adjacent to an agricultural operation would not require the same level of vegetated buffer.

Buffers and fencing are also useful tools in trespass prevention which accordingly assists with reducing the associated litter, crop damage and livestock harassment as well as provides potential for recreation and wildlife corridors.

Buffer and fence design is discussed in further detail in Section 4.0 of this report.

Edge Planning Tools For Implementation on the Rural Side

There are also recommended practices to be implemented on the "rural side" of the fringe area. These include:

- Farm Management Practices
  - Minimum thresholds based on crop type
  - Animal limits
  - Manure handling
  - On-farm composting
  - Noise, odour and dust management
  - Light management
  - Safety measures
- Setback distances
- Buffers

Many of the farm management practices and setback distances are addressed in the Ontario context through the Minimum Distance Separation Formulae.

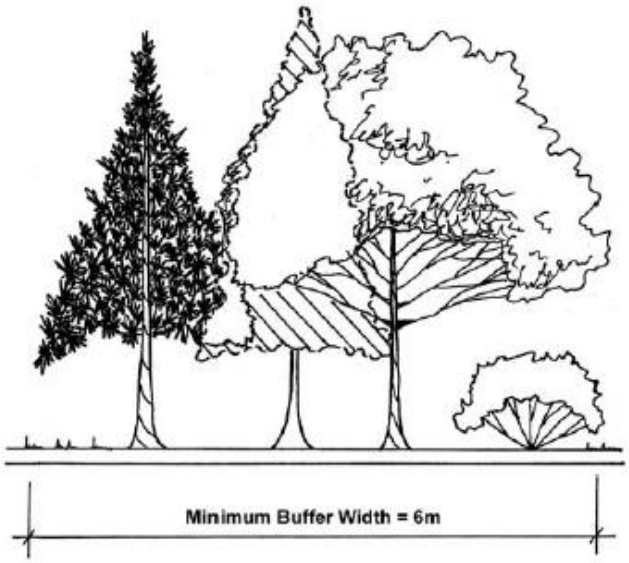
The Guidelines provide the following setback and buffer design criteria for farm-side development.

FARM-SIDE Setback & Buffer Design Criteria for Urban – ALR EDGE PLANNING AREAS			
	Setback Distance and Buffer Size	**Buffer Height**	**Buffer Design Features**
Farm-side Setback and Buffer	**<u>Setback</u>** 60m from the ALR/Urban boundary (except horse paddocks = 7m) **<u>Buffer Width</u>** 6m – buffer is located within the 60m setback **<u>Exception for Greenhouses</u>** Buffer applies to greenhouses located 15-100m from the ALR/Urban boundary	6m (finished height)	- The length of the vegetative buffer should be established within 15m of the farm building or structure and extend a minimum of 5m beyond the length of the wall facing the ALR/Urban boundary. - Plant either a double row of evergreen conifers or mixed planting of deciduous / coniferous tree and hedging /screening shrub species with foliage from base to crown – minimum of 60% evergreen conifers. - A berm with hedging /screening shrubs is also acceptable provided the target farm structures are screened. - Crown density of approximately 50-75% - Design specifications and layout will be as per Farm-side Buffer A or B (shown below)

(Source: Guide to Edge Planning, 2009)

Farm-Side Buffer A (no berm)

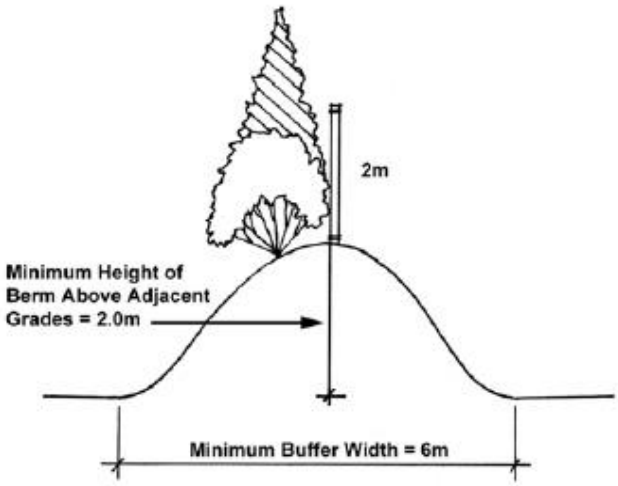
- Double row coniferous or mixed deciduous/coniferous trees
- Single row hedging/screening shrubs



(Source: Guide to Edge Planning, 2009)

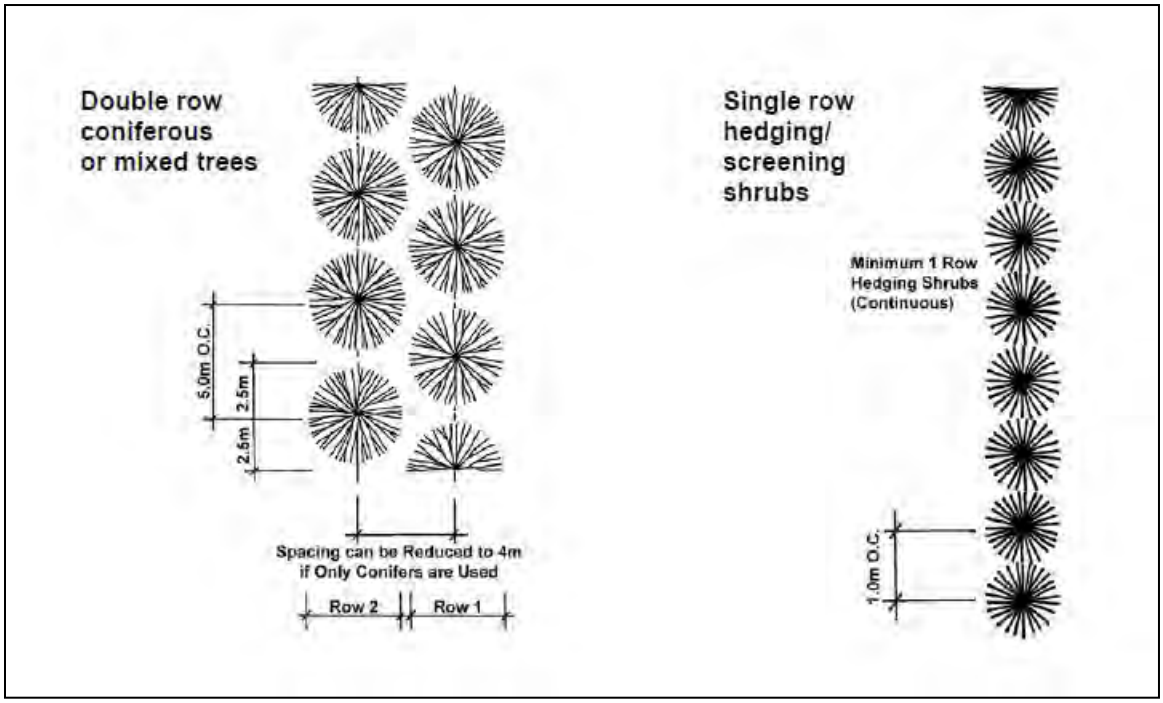
Farm-Side Buffer B (with berm)

- Single row hedging/screening shrubs
- Berm with minimum height 2 metres above adjacent grades
- Fence of 2 m height



(Source: Guide to Edge Planning, 2009)

The recommended spacing for buffer plantings is as illustrated below:



(Source: Guide to Edge Planning, 2009)

The Edge Planning Guidelines have provided useful guidance in the province of British Columbia, not only in preserving farmland but also in reducing conflicting land use impacts in the fringe areas. The establishment of the Agricultural Land Reserve has implemented a solid line or boundary and thus setting a development limit which has given farmers a sense of confidence in the longevity of the operation of their lands and consequently the confidence to make further investment into farm infrastructure and equipment. The intended permanent nature of BC's Agricultural Land Reserve boundary provides a similar strong rationale for the application of edge planning techniques to minimize potential land use conflicts.

2.4 Case Study Summary

The case studies above show that planning for the fringe or rural / urban edge areas is a challenge that is faced by governments in a variety of jurisdictions. The Region of Peel and Town of Caledon can learn from the experiences of these other governments in creating a set of practices which will be specific to the edge planning challenges faced by the Region and Town. It is apparent from the available literature that it is not one practice that will ensure success, but rather a collection of policy, design guideline and education tools which are necessary to mitigate the impacts of urban development adjacent to agricultural areas.

3.0 THE REGION OF PEEL

The Region of Peel faces the challenge of balancing an expanding urban population with preserving its valuable prime agricultural land. The impact of conflicting land uses is not unique to the Region of Peel as has been illustrated by the case studies outlined in Section 2.0 of this report. This is a challenge faced by land use policy makers around the globe.

The Province of Ontario has taken steps to address the conflict between farm and non-farm development in the rural areas through policy implementation. Below is a summary of the Provincial level polices which have been implemented to address protection of agricultural land as well as mitigation of conflicting land uses in the rural area.

3.1 Provincial Policy Statement, 2014

The Provincial Policy Statement (PPS) is a document that provides policy direction on land use planning matters. This document is the basis of the Province's policy-led planning system and provides for appropriate development while protecting resources of provincial interest, public health and safety and the quality of the natural environment. The sections of the PPS which are relevant to agriculture and related uses include Sections 1.1.3 which addresses settlement area expansion, 1.1.4 which addresses rural areas in municipalities, 1.1.5 which addresses rural lands in municipalities and section 2.3 which addresses agriculture.

The PPS provides specific policies to aid in the mitigation of impacts of non-farm development on agricultural operations; these are provided in the following policies:

1.1.3.8 A planning authority may identify a settlement area or allow the expansion of a settlement area boundary only at the time of a comprehensive review and only where it has been demonstrated that:

c) In prime agricultural areas:

1. the lands do not comprise specialty crop areas;

2. alternative locations have been evaluated, and,

i) there are no reasonable alternatives which avoid prime agricultural areas; and

ii) there are no reasonable alternatives on lower priority agricultural lands in prime agricultural areas;

d) the new or expanding settlement area is in compliance with the minimum distance separation formulae; and

e) impacts from new or expanding settlement areas on agricultural operations which are adjacent or close to the settlement area are mitigated to the extent feasible.

1.1.4.1 Healthy, integrated and viable rural areas should be supported by:

i) providing opportunities for economic activities in prime agricultural areas, in accordance with policy 2.3.

1.1.5.6 Opportunities should be retained to locate new or expanding land uses that require separation from other uses.

1.1.5.7 Opportunities to support a diversified rural economy should be promoted by protecting agricultural and other resource-related uses and directing non-related development to areas where it will minimize constraints on these uses.

1.1.5.8 Agricultural uses, Agricultural-related uses, on-farm diversified uses and normal farm practices should be promoted and protected in accordance with provincial standards.

1.1.5.9 New land uses, including the creation of lots, and new or expanding livestock facilities, shall comply with the minimum distance separation formulae.

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

3.2 The Farming and Food Production Protection Act, 1998

The Farming and Food Production Protection Act (FFPPA) was brought into effect in 1998. This document ensures that the rights of all rural Ontario residents are respected. Similar to the PPS, this document provides policy tools to assist in mitigating the impact between conflicting land uses in the rural area or on the fringe between rural and urban areas. The two main themes of the FFPPA are:

- Farmers are protected from nuisance complaints made by neighbours, provided they are following normal farm practices.
- No municipal by-law applies to restrict a normal farm practice carried on as part of an agricultural operation.

This Act also established the Normal Farm Practices Protection Board. The role of the Board is to hear from parties involved in formal complaints that cannot be resolved through mediation efforts.

3.3 The Greenbelt Plan, 2005

The Greenbelt Plan identifies where urbanization should not occur in order to provide permanent protection to the agricultural land base and the ecological features and functions occurring on the landscape. Within this Plan there are Protected Countryside lands and it is intended that the policies contained in the Plan will assist in enhancing the spatial extent of agriculturally and environmentally protected lands in these areas. The Protected Countryside, as identified by the Greenbelt Plan, consists of an agricultural system and a natural system together with a series of settlement areas. The agricultural system is made up of specialty crop areas, prime agricultural land areas and rural areas. The Plan provides permanent agricultural and environmental protection of these lands. The Niagara Escarpment Plan as well as the Oak Ridges Moraine Conservation Plan are part of the over-all Greenbelt Plan and protect agricultural land and improve linkages between natural areas and the surrounding major lake system and watersheds.

While the Greenbelt Plan does not address the mitigation of the impact of non-farm development on agricultural operations, it does set out goals for agricultural protection. These are provided in Section 1.2.2 of the Plan, those which are applicable to the Region of Peel and the Town of Caledon and are as follows:

1. ***Agricultural Protection***

   Protection of the specialty crop area land base while allowing supportive infrastructure and value added uses necessary for sustainable agricultural uses and activities;

   b. *Protection of prime agricultural areas by preventing further fragmentation and loss of the agricultural land base caused by lot creation and the re-designation of prime agricultural areas;*

   c. *Provision of the appropriate flexibility to allow for agriculture , agriculture-related and secondary uses , normal farm practices and an evolving agricultural/rural economy; and*

   d. *Increasing certainty for the agricultural sector to foster long-term investment in, improvement to, and management of the land.*

This Plan is another policy tool available to the Region and Town to protect the rural lands from development and to promote agriculture. However, the policies within the Plan do not address farm practices and mitigation of conflict in the manner that the FFPPA does.

3.4 The Niagara Escarpment Plan

The Niagara Escarpment Plan (NEP) is a policy document which provides direction for the preservation and protection of the Niagara Escarpment and adjacent lands as an uninterrupted natural environment. The NEP also contains policies to provide guidance to development to ensure that it is compatible with the natural environment. The most recent NEP was issued in June 2005.

As not all lands within the Region are situated in the Escarpment area, the NEP may only be applied to those lands which are located within the NEP area.

Policy within the Plan that addresses agricultural land uses are found in section 2.10. The general objective of these polices is to encourage agricultural uses in agricultural areas, to protect these areas and to permit uses that are compatible with farming and to encourage accessory uses that directly support continued agricultural use.

3.5 The Oak Ridges Moraine Conservation Plan

The Oak Ridges Moraine is a geological landform extending 160 km from the Niagara Escarpment to Rice Lake. The Oak Ridges Moraine Conservation Plan (ORMCP) is a provincial plan that is ecologically based and was created to provide land use and resource management direction for the 190,000 hectares of land and water within the Oak Ridges Moraine. Municipal planning decisions are required to conform to the ORMCP.

The Plan consists of four designations, Natural Core Areas, Natural Linkage Areas, Countryside Areas, and Settlement Areas. The Natural Core Areas protect lands that contain the greatest concentrations of key natural features that are critical to maintaining the integrity of the Moraine as a whole. The Natural Linkage Areas protect critical natural and open space linkages between the Natural Core Areas and along rivers and streams. The Countryside Areas provide an agricultural and rural buffer between the Natural Core and Linkage Areas and the Settlement Areas. This designation protects prime agricultural areas as well as natural features.

Similar to the Niagara Escarpment Plan, as not all lands within the Region of Peel are located within the Oak Ridges Moraine area and thus the Plan may only be applied to lands that are identified to be located within the ORMCP area.

Section 13 of the ORMCP provides policy relating to the Countryside Areas. The purpose of this designation is to provide policy direction to encourage agricultural and other rural uses that support the Plan's objectives by protecting prime agricultural areas, providing for the continuation of agriculture and other rural land uses and normal farm practices as well as maintaining the rural character of the Rural Settlements.

3.6 Minimum Distance Separation

Minimum Distance Separation is another tool which has proven useful in reducing and mitigating the conflict between livestock operations and rural non-farm land uses. In 1995 the Guide to Agricultural Land Use; Minimum Distance Separation I (MDS I); and Minimum Distance Separation II (MDS II) were introduced. These documents were revised from time to time, to reflect emerging trends in agriculture and rural land use. In 2005, the MDS I and MDS II documents were replaced by the Minimum Distance Separation (MDS) Formulae Implementation Guidelines - Publication 707. The application of MDS is explored in detail in an associated report by MHBC, dated July 2014.

3.7 Guidelines on Permitted Uses in Ontario's Prime Agricultural Areas

The Guidelines on Permitted Uses in Ontario's Prime Agricultural Areas have been created to assist municipalities, decision-makers, farmers and other to interpret the policies in the PPS regarding uses that are permitted in prime agricultural areas. It is noted that at the time of writing this report, the Guidelines were a draft document. The topics of note which this document provides guidance for include:

- Agricultural, on-farm diversified an agriculture-related uses;
- Removal of land for new and expanding settlement areas and limited non-residential uses in prime agricultural areas; and,
- Mitigation of impacts from new or expanding non-agricultural uses.

Of particular relevance to this report is the content provided in Section 3.1.3 of the draft Guideline document concerning impact mitigation. The PPS includes policy which requires impacts from new or expanding settlement areas to surrounding agricultural operations be reduced as much as possible. The Guideline recommends that the identification of any potential adverse impacts on neighbouring agricultural operations is a positive first step.

Impacts from expanding settlement areas to existing surrounding agricultural operations may be identified through a comprehensive review or through the preparation of an Agricultural Impact Assessment. These studies would identify impacts that may be short or long term and may have impact on agricultural production, operations, infrastructure or farmers' flexibility in carrying out their farming business. The Guidelines provide examples of potential impacts and recommended mitigation measures. Examples are provided in the table below:

POTENTIAL IMPACT	MITIGATION MEASURE
Increased traffic and safety risks for slow-moving equipment, operators and people in passing vehicles	Ensuring signage is used on slow-moving vehicles (as required by the Highway Traffic Act) and along roads frequently used by farm vehicles Designing roads and traffic controls to accommodate wide, slow-moving farm equipment (i.e. wider shoulders, no curbs, controlling access to new or expanding settlement areas, and reduced speed limits). Improving public transit in and to new settlement areas to reduce rural traffic.
Loss of agricultural land	Minimizing the amount of land converted from agriculture by maintaining any surplus lands in agriculture.
Increased growth pressure on remaining agricultural lands	Developing firm urban boundaries that generally follow recognizable features. Having strict control over the extension of municipal services Providing agricultural easements along the rural-urban fringe.
New or increased minimum distance separation requirements that may restrict future development or expansion of livestock facilities	Giving existing livestock facilities space to operate by ensuring that MDS setbacks are established early in the land use planning process. Placing employment areas, storm water management systems or green space at the edge of settlement areas to further separate residential and agricultural areas.
Nuisance complaints by new residents related to normal farm practices	Designing subdivisions to reduce potential conflicts Providing public education on normal farm practices Providing education to farm operators on how to minimize nuisance impacts and develop "good neighbour" relationships Writing warning / notification clauses into non-agricultural property titles regarding location in agricultural areas and the potential for nuisance effects.

POTENTIAL IMPACT	MITIGATION MEASURE
Trespassing, vandalism, pets at large and garbage disposal on farm properties	Providing public education Erecting signage Developing municipal by-laws that require pets to be kept on-leash
Change in water quality or quantity	Maintaining existing water supplies, agricultural drainage and irrigation infrastructure. Ensuring effective stormwater management in new settlement areas. Avoiding water erosion by minimizing impermeable surfaces and maximizing vegetated areas in new settlement areas.
Farmer concern over lighting, noise, dust and other changes in settlement areas that are incompatible with agriculture	Establishment of a municipal agricultural advisory committee that may work with municipal Staff and Councils and provide input to land use planning decision making.

As each municipality is unique, it is important that local factors be considered when assessing impact and mitigation measures specific to the local circumstance be applied. This is best established through an agricultural impact assessment (AIA). Agricultural impact assessments are discussed further in Section 4.0 of this report.

4.0 RECOMMENDED PRACTICES FOR MITIGATING IMPACTS

There are a variety of practices which can be utilized to mitigate the impacts of development in the urban/rural fringe areas. These range from high level policy initiatives which establish urban growth boundaries to more site specific design tools such a vegetated buffer design and fencing. It is also key that education and outreach be considered as a integral tool to educate the population of the impacts that can be experienced on both sides of a growth boundary and different approaches to mitigation.

The following provides recommended practices for mitigating impacts on the urban / rural fringe. Some of these practices are currently being implemented in the Region of Peel and Town of Caledon (i.e. Agricultural Impact Assessments and the use of MDS), whereas others such as vegetative buffers and fence design implemented through development permit areas in the Province of British Columbia could be considered for implementation within the Region and Town.

It is recommended that edge planning for farming be considered early in the planning process at the secondary planning stage when the type and location of land uses are being established. Detailed consideration and/or guidance for edge planning should be addressed as part of the settlement expansion process and addressed within agricultural impact assessments (AIAs) to provide recommendations and direction for secondary plan, subdivision plan and site plan stages. Policies for edge planning would require appropriate phasing in of requirements as AIA studies are prepared to specifically consider where these tools may be suitable for implementation.

4.1 Official Plan Policy

The implementation of Official Plan policy to assist in directing land use in the fringe areas can be a very effective tool. The City of London, Ontario has recently developed policy to be included in their next Official Plan entitled *The London Plan* which will address development in the rural-urban interface areas where designated Rural Neighbourhood Areas abut the Urban Growth Boundary and the City's municipal boundary. The London Plan is currently in draft form and the final version of the Plan is expected to be presented to the Committee and Public in the Fall of 2015.

The draft London Plan provides the following:

The City Structure Plan shows the long-term Rural-Urban Interface on lands where a Neighbourhood Place Type abuts both the City's Urban Growth Boundary and the City's municipal boundary. It is important to manage this interface to avoid and mitigate land use conflicts. Planning and development proposals within 300 m of the Rural-Urban Interface shall be reviewed within the context of the following policies to mitigate the potential such conflicts:

1. Development proposals at the Rural-Urban Interface shall utilize design measures to mitigate conflicts between urban and rural uses. These measures may include such things as subdivision layout, site layout, and the incorporation of buffers such as treed landscape strips or public pathways.

2. Development agreements to be registered on lands at the Rural- Urban Interface shall clearly identify that agricultural operations are ongoing in the area, beyond the City's municipal boundary, and that these agricultural practices may result in noise, odours, dust and other potential nuisances resulting from normal farm practices.

This type of policy could be considered for the next Official Plan Review for the Region of Peel and Town of Caledon. In addition, the policies should make it clear that the measures to mitigate impact should be established within the urban areas and not be something that the farming community should have to implement. Finally, there should be consideration for transition when urban boundaries are again expanded to accommodate 2041 growth.

4.2 Agriculture Impact Assessment

Agricultural impact assessments (AIA) are carried out to determine if a development proposal will have a negative affect on existing and future agricultural activities on-site and in the surrounding area. They are often recommended for settlement area expansions and applications for rural non-farm development that has the potential to conflict with surrounding agricultural uses. An AIA should contain the following:

- Description of the proposed development;
- The on-site and surrounding land uses;
- The physical and socio-economic components of the agricultural resource base;
- Identification of the direct and indirect impacts of the proposed development on existing agricultural operations and on the ability of the area to support different types of agriculture; and,
- Identified methods of impact reduction and recommendation of further methods to reduce impact

An AIA can be an effective tool to assist planning staff and Councils / Committees in decision making with respect to land uses that may conflict with agricultural uses. AIA's generally provide guidance to avoid and minimize the loss of prime agricultural land and consideration to direct development to lower priority agricultural lands when prime agricultural lands cannot be avoided. The requirements for the depth of the AIA are dependent upon the type and intensity of the proposed development and may be scoped during the pre-consultation process.

The Town of Caledon prepared Draft Agricultural Impact Assessment Guidelines in 2003. This document provides applicants with terms of reference to follow when preparing an AIA. Section 6.2.1.6.2 i) of the Town's Official Plan provides that an AIA may be required as a technical study in support of Official Plan Amendments, Zoning By-law amendments, plans of subdivision, condominium plans or other development proposals to ensure that the development conforms to the Official Plan. The Town of Caledon's draft guidelines outline that the following information is required to be included in an AIA:

- Description of proposal
- Site Physical Resource Inventory
- Site Land Use Features
- Off-Site Land Use Features
- Economic Viability
- Assessment of the Impacts on Agriculture
- Mitigative measures
- Conclusions
- Background information that will include:
  - Literature cited
  - All background data sources
  - A list of people contacted during the study
  - A description of the methodologies and survey techniques employed in the study, including a description of soil sampling techniques and method of viability assessment
- Curriculum Vitae of study team members

4.3 Minimum Distance Separation

The Province of Ontario created Minimum Distance Separation (MDS) Formulae Implementation Guidelines. The objective of the MDS formulae is to minimize nuisance complaints due to odour and thereby reduce potential land use conflicts. MDS does not account for other nuisance issues such as noise and dust. (Note: the MDS Guidelines are currently under review).

MDS applies in rural areas and in prime agricultural areas of municipalities. The separation distances calculated by MDS vary according to variables including the type of livestock, the size of the farm operation, the type of manure system and the form or development that is present or proposed.

The PPS provides a requirement to comply with MDS setbacks in Sections 2.3.3.3, "*New land uses, including the creation of lots, and new or expanding livestock facilities shall comply with the minimum distance separation formulae.*", and 2.3.6.1 b), "*limited non-residential uses, provided that all of the following are demonstrated: 2. The proposed use complies with the minimum distance separation formulae*."

MDS provides two formulae, MDS I and MDS II. MDS I is applied at the time of planning and /or development review for proposed new development (i.e. lot creation), building permits for development on a lot in accordance with the Guidelines, re-zoning or re-designation of agricultural land to permit development, or for proposed development in proximity to existing livestock facilities on an existing or proposed separate parcel of land. This formula is applied to all livestock facilities that are reasonably expected to be impacted by the proposed development, lot creation, rezoning or re-designation. A study radius area of 1000 metres is required for Type A land uses (lower density uses) and a 2000 metre radius study area for Type B land uses (higher density uses. As an example, when considering the expansion of a settlement area boundary, a 2000 metre radius study area would be used as the settlement area would contain areas of high density human occupation.

MDS II is applied at the time of building permit application to construct a first or expanded livestock facility and is applied to all development reasonably expected to be impacted by the proposed first or expanded livestock facility.

MDS has proven to be an effective tool to minimize odour complaints and to address issues pertaining to rural non-farm uses and their compatibility with livestock and is a tool that is presently being used in the Region and Town.

4.4 Secondary Planning and Subdivision Design

A secondary plan is a tool which aids in providing understanding to opportunities and addresses issues related to land use in defined geographic areas. A secondary plan establishes local development policies to guide growth and development for the prescribed areas where more detailed direction is required for matters beyond the general framework provided by an Official Plan. Secondary plans may include policies and maps that provide direction on topics including land use, infrastructure, transportation, design and the natural environment. These more detailed policies allow for direction to locate and group compatible land uses wherever possible to minimize land use conflict. Additionally, secondary plans may be utilized as a means to implement the recommendations that have been provided in an AIA.

Subdivision Plan design is another tool which can be utilized to minimize conflict in the urban / rural fringe areas. These plans may be phased to facilitate orderly expansion of urban development which will reduce the possibility of impacts on agricultural lands. Design elements which could be incorporated into subdivisions in the fringe areas should include:

- Road design to direct traffic away from farming areas;
- Increased lot depths/sizes along the boundary to allow for greater separation between uses;
- Implementation of vegetation buffers and fencing buffers to protect residential areas from possible spray drift, dust and noise;
- Recognition that a road right of way may be an adequate buffer, implementation of augmenting vegetation to improve the existing roadway buffer;
- Implementation of increased building setback provisions in the zoning by-law to increase the separation between uses;

Illustrations of design examples are provided as Appendix 5.

4.5 Vegetative Buffers and Fencing

Similar to British Columbia's ALR boundary, Ontario has a number of policy documents which delineate boundaries and provide policies directing where growth may occur. The Region and Town Official Plans provide an urban growth boundary and settlement area boundaries which may be expanded following a comprehensive review. While this is not as permanent as the ALR in British Columbia, it does provide the region with a "line" to work with to establish design criteria which will aid in alleviating the conflict between rural farm land use and urban land use on the fringe.

British Columbia utilizes zoning by-laws and community plans (similar to Ontario's Zoning By-laws and Official Plans) to promote compatibility between land uses. The establishment of development permit areas, as discussed above, provided a tool to protect farm operations and to develop farm bylaws to manage certain farm practices and operations. Taking it one step further, British Columbia has been proactive in developing specifications for landscaped buffer areas to mitigate conflict between agricultural and non-farm uses and providing publications to provide guidance and direction. Two notable documents as mentioned above are "Landscaped Buffer Specifications" (Agricultural Land Commission, 1993) and "Guide to Edge Planning, Promoting Compatibility Along Urban-Agricultural Edges" (British Columbia Ministry of Agriculture and Lands, 2009). These documents provide a variety of tools that can be utilized together with policy initiatives and applied to the rural / urban fringe areas.

It is important for edge planning requirements to be tailored to the local and regional contact. Recommendations and findings from AIA studies would be a tool to aid in determining the need for edge planning treatments and for the development of primary criteria.

The determination of edge planning treatments would need to assess where there may be potential for long term compatibility issues. Recommended criteria for consideration could include the type and intensity of existing farm operations; the type, compatibility and proximity of urban land uses; and importantly, the permanency of the urban edge. Industry knowledge and complaint histories should inform the evaluation of compatibility and selection of mitigation measures in relation to the different type of agricultural operations that might warrant edge planning protection. This evaluation is needed as intensity of potential nuisances will vary depending on the type, size and orientation of the agricultural land use. For example, field crop vs. fruit orchard vs. livestock operation.

The need for edge planning and buffering would be greatest along a permanent agricultural boundary such as along the Greenbelt Protected Countryside, Oak Ridges Moraine Plan and Niagara Escarpment Plan boundaries. Additional locations may be investigated through AIAs where the urban boundary is planned to function as a permanent rural-urban edge or where the nature and longevity of an existing agricultural operation may warrant unique consideration such as through development phasing and establishment of interim buffers.

The challenge of edge planning in areas where future settlement expansions are contemplated should be recognized. These situations would likely require a wider range of alternative mitigation and edge planning approaches to be considered and not necessarily require the implementation of dedicated buffers that would impose design solutions that would no longer function as intended when boundaries are expanded in the future.

To implement vegetative buffer and fencing design criteria it will be necessary for the Region and Town to establish a boundary area and associated implementing policy. To utilize the BC example, a 600 metre periphery is established at the 2031 settlement boundary. This would mean that any development which takes place within 300 metres of the settlement boundary within the settlement boundary would be subject to design criteria for fringe area development. And consequently, any development or activities which would take place within 300 metres of the boundary on the rural side, or outside of the settlement boundary would be subject to design criteria and procedures as established by the Region or Town of Caledon. It would be necessary for the Region and Town to determine an appropriate distance of the rural – urban edge that would reflect local circumstances. The distance of 300 metres is recommended in the BC example guidance material, but edge planning should reflect local circumstances and as such criteria would need to be developed in the local context.

Fencing and landscaped screening are effective tools to mitigate conflict in the fringe areas. In some cases, the impact is more perceived than actual and as such the visual separation of the uses may be quite effective in reducing the perceived conflict. British Columbia's guidelines provide rationale for recommended buffers. The following summarizes the BC ALC recommendations from the guidelines.

1. Minimum vegetated buffers of 3 m to 15 m with or without additional separation distances between a residential development abutting an agricultural boundary may be considered to mitigate the impacts of urban and farming activities.. A total minimum separation distance of 30 metres (15 metres of which is a vegetative buffer) between a housing unit and ALR boundary is required in order to most effectively mitigate the impacts of urban and farming activities.

2. The vegetative buffer must reach a finished height of at least 6 metres to effectively screen the farm operation from its urban neighbours – studies indicate people are less likely to complain about farming activities if they cann*ot* see them.

3. A mixed deciduous / coniferous planting with foliage from base to crown is required in order to ensure dust/spray drift is captured to the fullest extent possible.

4. The crown density must be 50-75% (i.e. densely packed hedges are not desirable due to poor air circulation which can lead to ineffective buffering of dust/spray drift and odour).

5. A 2 meter separation distance between the vegetative buffer and ALR boundary is desirable as it provides space for improved functioning on the ALR side – less shading, more air circulation and greater manoeuvrability for farm equipment.

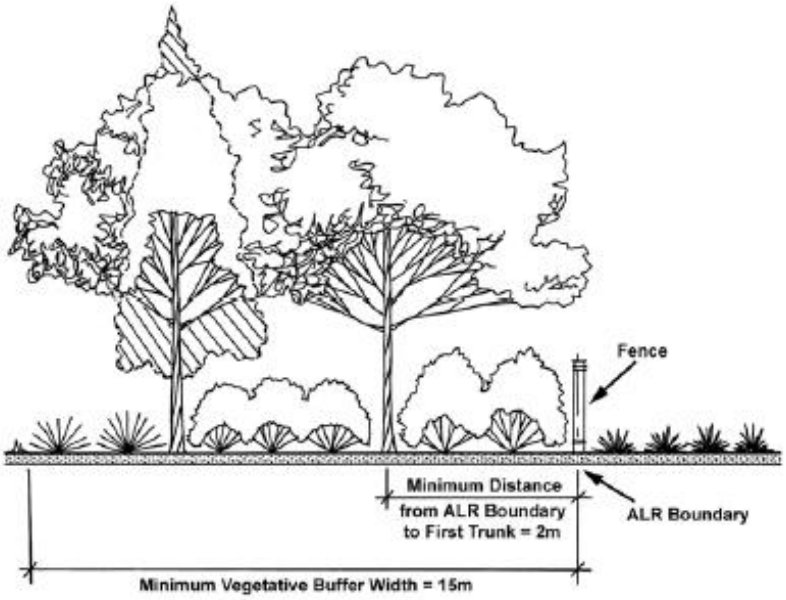
6. By including a barrier (fence), trespass and littering can be prevented.

The guidelines note that the buffer areas are to be established on the non-farm properties so as to preserve the productive farmland and include the use of plantings and fencing to form a buffer area. The provincial guidelines provide urban-side and farm-side setback and buffer design criteria for the ALR boundary areas. The farm-side setback and buffer has been discussed in Section 2.3 above. The following table provides the urban-side setbacks and buffers, outlined in the Edge Planning Guidelines, which are to be applied to principal buildings along the ALR boundary. It is noted that similar edge planning considerations may be warranted to buffer and separate some types of rural non-farm development from agricultural operations where there are opportunities to address land use compatibility.

The guidelines provide the following 4 Urban-side buffer examples which provide visual screening, protection of farmland from trespass and vandalism and to protect non-farm areas from dust and spray drift.

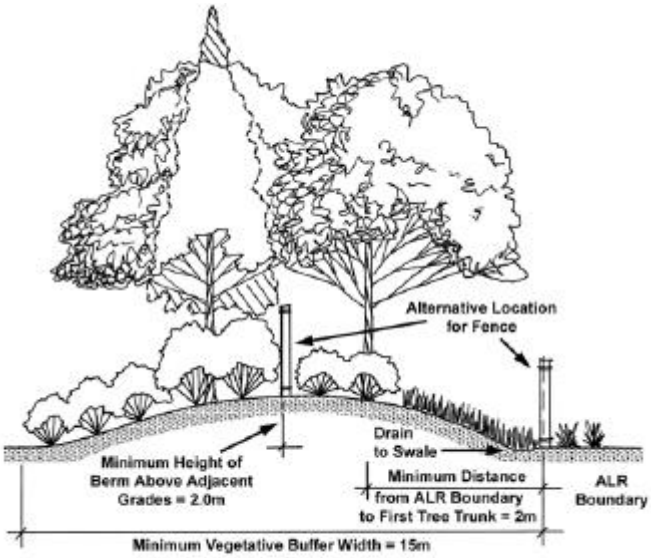
Urban Side Buffer A (no berm)

- Double row deciduous/coniferous trees
- Triple row trespass inhibiting shrubs
- Double row screening shrubs
- Solid wood fence or chain link fence with a height of 6 feet



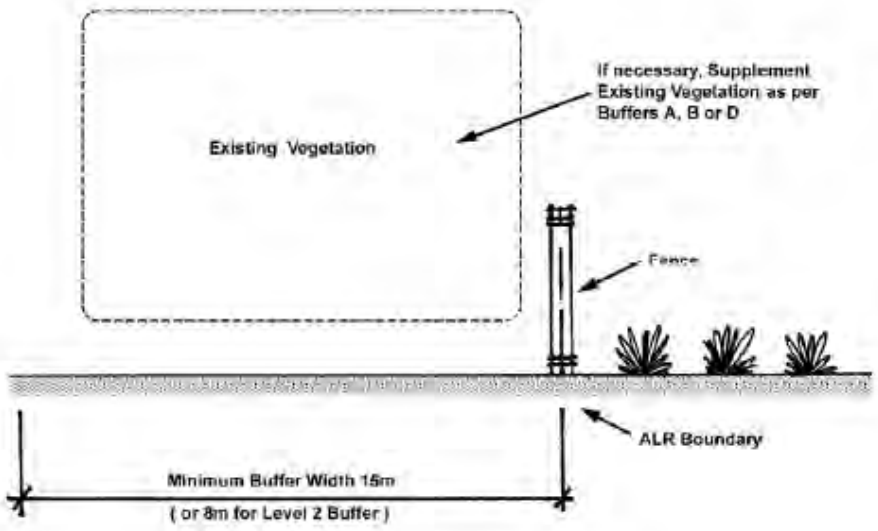
Urban Side Buffer B (with berm)

- This includes all elements of buffer A as well as a berm with minimum height of 2 m above adjacent grades



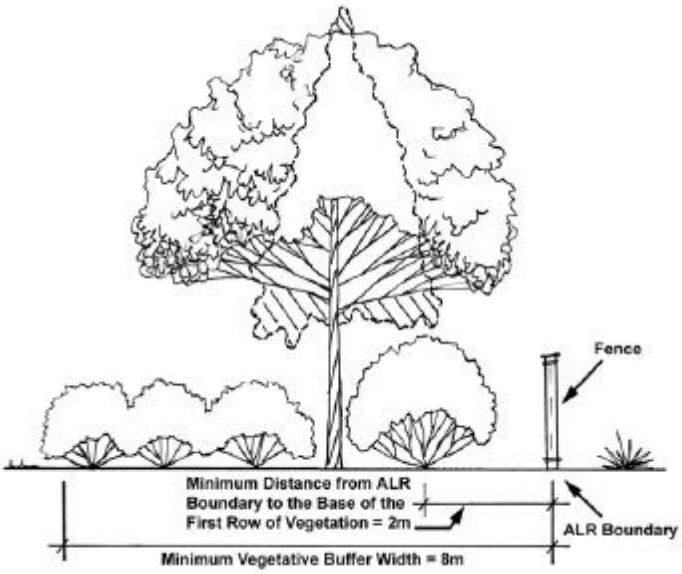
Urban Side Buffer C (Existing Vegetation)

- This should retain existing vegetation and install either a solid wood fence or chain link fence with a height of 6 feet.



Urban Side Buffer D

- Single row deciduous / coniferous or just coniferous trees
- Triple row trespass inhibiting shrubs
- Single row screening shrubs
- Solid wood fence or chain link fence with a height of 6 feet



The examples provided above are simplified versions of the 6 buffer types that are outlined in the BC Landscape Buffer Specifications. Additionally, the specifications document provides detailed guidance on fence construction. A copy of the document is provided as Appendix 6 for reference.

The following mitigation techniques are recommended for the Rural Area:

- Buffer planting
- Restricted livestock use within periphery

Vegetative buffers add to the aesthetic quality of the area and with relatively low maintenance, the buffer will improve over time as the vegetation matures. They are also an effective tool to address odours by:

1. Diluting gas and spray concentrations;
2. Encouraging dust and other aerosol dispersion by reducing wind speeds;
3. Physically intercepting dust and other aerosols ; and,
4. Acting as a sink for the chemical constituents of odour (Tyndall and Collettii, 2000).

It is recommended that design standards contain general guidelines as provided by the British Columbia example provided in Section 2.3 and diagrams above and should also recognize that different agricultural operations would require varying levels of buffering and fencing. As well, non-rural land uses have varying sensitivity levels and would require differing levels of buffering as well. Given that the Region of Peel and Town of Caledon are home to a variety of agricultural operations ranging from intensive livestock operations to smaller scale hobby farm operations, guidelines addressing this variety would need to be developed to ensure that the proper distances and intensity of buffering are being applied to each situation.

4.6 Education and Outreach

The differing opinion of the value of farmland is not unique to the Region of Peel or the Town of Caledon. To many, especially those who live in urban areas, rural lands are valued for their aesthetic appearance and recreational value of open countryside. However, it is not to be forgotten that agriculture is an important industry in Canada providing employment for 2.1 million Canadians and accounting for 8.0% of the total GDP (Government of Canada, 2013). For this reason, agricultural land should be valued for its productive, arguably industrial, use.

The scenic hills of the Town of Caledon attract many who wish to live on a small acreage country property with a short commute to the urban areas of Brampton, Mississauga and Toronto. Conflicts can arise when their quiet country living is interrupted by the sounds of loud farm machinery, the dust from the farmland being worked and crops being harvested, the spray drift from crops being treated, the odour and associated insects from livestock operations and the inconvenience of being delayed behind a combine on a narrow municipal road.

The conflict is not one sided, from the rural farm perspective. The increase in non-farm residents creates larger traffic volumes on the roads which make it increasingly difficult and dangerous to transport equipment between farm properties. Other issues of concern include:

- increased trespassing which may lead to crop damage;
- vandalism to buildings and equipment;
- livestock harassment by neighbourhood dogs; and
- nuisance complaints about normal farm practices.

To ease the impact of conflicting land uses between farm and non-farm rural uses it is important to educate non-farm rural residents about the agricultural industry. This can be done through publications provided by the Municipality or possibly in conjunction with the Province, local farm associations, developers and real estate agents in the area. Local farm operations can assist in educating the public by hosting on-farm education days, wherein open houses are hosted and educational talks are presented to area non-farm neighbours to explain how a farm operates and what is required for the farm to be a successful business (i.e. herbicide application, animal management practices etc.).

Examples of topics which may be addressed in information packages include:

- Normal farm practices
- Dust
- Odour
- Movement of Farm Vehicles
- Livestock
- Fencing
- Lighting
- Pesticides and Herbicides
- Noise pollution

Notification clauses / disclosure statements on land title are utilized for other potentially conflicting land uses (i.e. for properties adjacent to aggregate operations). This would notify a potential purchaser of a property that they are buying land that is adjacent to a farm operation

and may experience periods of dust, noise or odour as a result of the neighbouring farm operation. This is discussed in detail in Section 2.3 of this report.

5.0 SUMMARY

The conflict along the Rural-Urban boundary is not unique to Peel, Ontario, or even Canada. The successful best practices to address the conflict in the fringe areas are consistent from North America to Australia. The establishment of urban growth boundaries provides a sense of stability of the land use in the fringe areas and provides the ability to implement policy and guidelines for development design to mitigate the impact of conflicting land uses.

A combination of policy, education and landscape design is the most successful way to reduce the impact of conflicting land uses in the fringe areas and also to preserve and protect valuable agricultural land. The practices recommended in section 4.0 of this report and associated provided illustrations have been derived from a study of case examples in North America and Australia.

It is recommended that the Region and Town update their Official Plan policies to ensure consistency with the Provincial Policy Statement (2014) with respect to policies addressing impact mitigation and agriculture. The development of Official Plan policy that would provide direction for development proposals in the urban / rural fringe areas to consider edge planning measures to minimize potential land use conflict would be a useful tool. While lower tier municipalities have largely completed the secondary planning processes for the urban expansion areas to accommodate the 2031 population targets, it is prudent to establish policies that will require edge planning considerations prior to the next round of urban expansion to provide the best opportunity to mitigate impacts.

The Town of Caledon's Agriculture Impact Assessment Terms of Reference were developed in 2003. It is recommended that these be reviewed and updated include direction for the consideration of additional edge planning tools as outlined in Section 4.0.

The Province of British Columbia has taken a proactive approach to developing mitigation measures to address conflicting land uses at the rural / urban boundary. It would be helpful if the Ontario Ministry of Agriculture Food and Rural Affairs took a similar approach. It is recommended that the Ministry of Agriculture Food and Rural Affairs be requested to develop detailed impact mitigation guidelines when planning development adjacent to agricultural areas. These guidelines should provide guidance and criteria on when edge planning and buffering may be appropriate and required.

6.0 REFERENCES

British Columbia Agricultural Land Commission (1993) *Landscaped Buffer Specifications.* Retrieved June, 2015 from: http://www2.gov.bc.ca/assets/gov/business/natural-resource-industries/agriculture/agriculture-documents/resource-management/factsheets-and-publications/800-series/823510-1_alc_landscaped_buffer_specifications.pdf

British Columbia Ministry of Agriculture, Fisheries and Food (1997) *Planning Subdivision s Near Agriculture*. Burnaby: Provincial Agricultural Land Commission.

British Columbia Ministry of Agriculture and Lands (2006) *Guide to Edge Planning: Promoting Compatibility Along Urban-Agricultural Edges – Working Copy.* Resource Management Branch. Abbotsford, British Columbia.

Centre for Local, State and Urban Policy, The University of Michigan (April 2004) *Growth Management Policy in California Communities.* Retrieved July, 2015 from: http://closup.umich.edu/files/pr-2-growthmgmt.pdf

Department of Natural Resources, Queensland. (1997). *Planning Guidelines: Separating Agricultural and Residential Land Uses.* Department of Local Government and Planning. Queensland, Australia.

Handel, Mary E. (1998) *Conflicts Arise on the Urban Fringe.* California Agriculture 52(3) 11-16.

McGinnis, Gillian (2009) *Urban-Rural Edge Area Nuisance Mitigation Strategies In Kings County, Nova Scotia.* Retrieved May 14, 2013 from: http://architectureandplanning.dal.ca/planning/research/moptheses/downloads/PLAN6000-2009/GM-Independent_Project.pdf

Ontario Ministry of Agriculture, Food and Rural Affairs - OMAFRA (2006a*). MDS Minimum Distance Separation Formulae Implementation Guidelines - Publication 707*. Toronto, Ontario.

The City of Abbotsford (November 2014) *Development Permit Guidelines for the Development Permit Application Process in the City of Abbotsform.* Retrieved July 2015 from: https://www.abbotsford.ca/Assets/2014+Abbotsford/Planning+and+Development/Planning/FAQs+$!26+Guides/Development+Permit+Guide.pdf

The City of Kelowna (May 2011) *Kelowna 2030 Official Community Plan: Greening our Future.* Retrieved July 2015 from: http://www.kelowna.ca/CM/Page357.aspx

The City of London (June, 2015) *The London Plan – Second Draft*. Retrieved June 2015 from: http://thelondonplan.ca/

The City of San Jose (Date Unknown) *Urban Growth Boundary – The Greenline Initiative*. Retrieved June 2015 from: http://www.sanjoseca.gov/DocumentCenter/View/716

Tyndell, John and Joe Colletti. (March 2000). *Air quality and Shelterbelts: Odour Mitigation and Livestock Production: A Literature Review. Final Report.* Forestry Department, Iowa State University. Ames, Iowa, US.

Appendix 1:

Example Document: Notice to Purchasers of Rural Land

Queensland, Australia

(EXAMPLE ONLY)

NOTICE

TO PURCHASERS OF LAND IN RURAL AREAS IN (....) SHIRE

(....) Shire Council supports the right of persons in rural areas to carry out agricultural production using reasonable and practicable measures to avoid environmental harm. An Environmental Code of Practice for Agriculture has been prepared under the *Environmental Protection Act 1995* and provides guidance on reasonable and practicable measures.

Intending purchasers are advised that agricultural production practised in accordance with the Code of Practice may include some of the following activities and some activities may have implications for occupiers of adjacent land :

- Logging and milling of timber
- Dairies
- Intensive livestock production (feedlots, piggeries and poultry farms)
- Vegetation clearing
- Cultivation and harvesting
- Bushfire hazard reduction burning
- Construction of firebreaks
- Construction of dams, drains and contour banks
- Fencing
- Use of agricultural machinery (tractors, chainsaws, motor bikes etc.)
- Pumping and irrigation
- Pesticide spraying
- Aerial spraying
- Animal husbandry practices
- Droving livestock on roads
- Silage production
- Construction of access roads and tracks
- Slashing and mowing vegetation
- Planting of wood lots

Intending purchasers of land in rural areas may have difficulty with some of these activities or the impact of these activities when they are being carried out on land near their proposed purchase. If so, they should seek independent advice and consider their position.

This notice is not intended to affect the rights of individuals to take action under the common law or legislation (including the *Health Act 1937, Environmental Protection Act 1994, Agricultural Chemical Distribution Control Act 1966* or the *Work Place Health and Safety Act 1995)*. This

notice is provided for information purposes only.

Appendix 2:

The City of Abbotsford B-5
Protection of Agriculture
Development Permit
Guidelines

B-5 PROTECTION OF AGRICULTURE DEVELOPMENT PERMIT GUIDELINES

All lands wholly or partly within the Urban Development Boundary (UDB) on Map 1, which abut lands in the Agricultural Land Reserve (ALR), are designated as a Protection of Agriculture Development Permit Area. The justification for these guidelines is located in Section 4.4 of the Official Community Plan.

The objectives of this Development Permit Area designation are to:

- Protect farmland from impacts associated with urban development.
- Reduce conflicts between farm operations and urban land uses.
- Define a stable and clearly-understood boundary between urban areas and the ALR.
- Encourage urban development/redevelopment along the urban - ALR interface that supports the viability of agriculture.

Development permits issued in this area shall comply with the following guidelines:

General Site Design

1. Buildings, structures, streets, vehicle accessways and outdoor amenity areas shall be oriented in a manner that directs high intensity uses, characterized by high levels of vehicle and pedestrian traffic and noise generators, away from adjacent agricultural lands.

2. Low intensity uses, such as low activity service areas, residential rear yards and passive open space, shall be oriented in a manner that forms a buffer between higher intensity uses and adjacent agricultural lands.

3. Streets and vehicle accessways that “dead-end” adjacent to the ALR are strongly discouraged, except as may be necessary for access by farm vehicles into ALR properties.

4. Development sites, buildings and signage shall be designed in a manner that minimizes lighting impacts on residential dwellings located on adjacent agricultural lands.

5. Development sites shall be designed to manage rain water run-off on-site, as required by the Development Bylaw and the Natural Environment and Hazardous Conditions Development Permit Guidelines.

6. Landscaped areas with the capacity to infiltrate or detain rain water, such as rain gardens, planting beds, grassed areas and water features, are strongly encouraged along or near property lines adjacent to agricultural lands. Wherever possible, these features should be incorporated into the design of landscape buffers.

7. Wherever possible, preserve mature trees in areas along or near property lines adjacent to agricultural lands and incorporate them into landscape buffers.

8. Wherever possible, utilize existing fencing (located along property lines between urban and ALR lands) and incorporate into landscape buffers, provided it is in good condition and meets landscape buffer fencing requirements.

Landscape Buffers

1. Development sites shall include landscape buffers along urban - ALR interfaces. The location, type and design of these buffers shall meet the requirements of the City of Abbotsford's *"Landscape Buffering Strategy for the Agricultural- Urban Interface"*.

   a. Landscape buffers shall be located entirely on the urban side of the UDB.

   b. Landscape buffers shall be designed to include setbacks, fencing and landscaping features that aim to minimize conflicts between urban and agricultural uses.

   c. Buildings, structures, streets, vehicle accessways, parking areas and paved areas are prohibited within landscape buffer areas.

   d. Vegetation within landscape buffer areas should be designed for a mature height of 6 metres, minimum crown density of 60 percent and minimum 60 percent conifers, with the exception of street trees within Street Edge buffers, which should reflect City street-tree standards. Whenever possible, trees and shrubs should be native to the region.

   e. Walking and/or bike trails and associated passive open spaces may be incorporated into landscape buffers, provided they do not reduce buffer effectiveness, do not compromise pedestrian/cyclist safety and are located at the urban edge of the landscape buffer. Trails are strongly discouraged within environmental setback areas, and trail width is limited to a maximum of 1/3 of total landscape buffer width.

   f. A restrictive covenant to maintain the buffer, according to the approved landscape plan, must be registered on title.

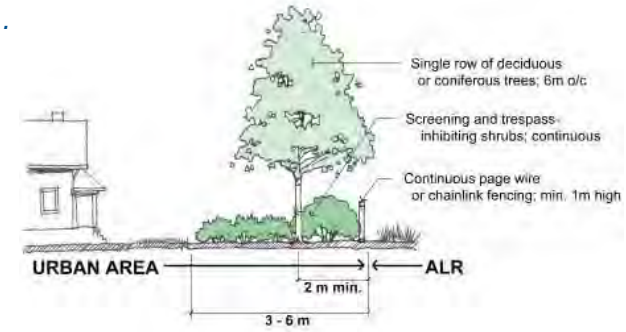
   g. Required landscape buffer widths do not supersede setbacks prescribed by environmental legislation.

2. Landscape buffer designs shall be tailored to specific urban - ALR interface conditions, as detailed in the City of Abbotsford's *"Landscape Buffering Strategy for the Agricultural-Urban Interface"*.

   a. Five buffer types have been developed to reflect specific interface conditions. Buffer designs shall conform to the following buffer type(s), according to interface conditions found on development sites:

1. Minimal Buffer

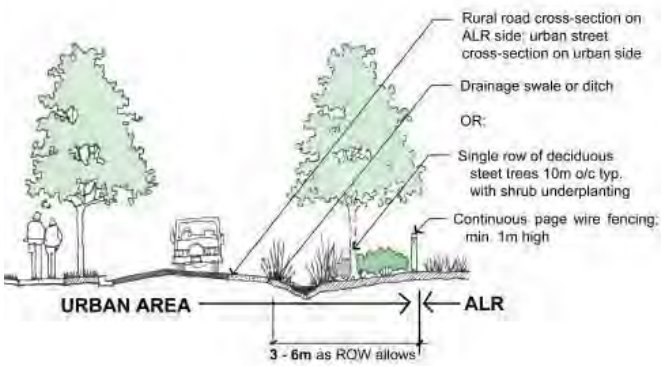
Appropriate where there is minimal risk of conflict between urban and agricultural land uses.



- 3 to 6 metre wide buffer as space permits
- single row of trees (deciduous or coniferous)
- trespass-inhibiting shrubs
- page wire or chainlink fencing, minimum 1 metre high, along property line.

2. Street Edge Buffer

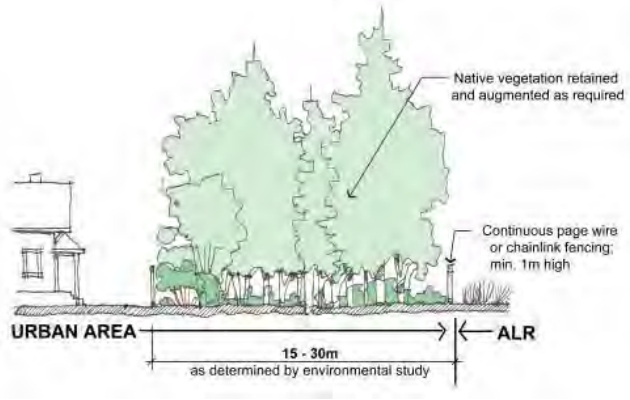
Appropriate where the urban-ALR interface is defined by a public road.



- 3 to 6 metre wide buffer as space in right-of-way permits
- single row of street trees, with trespass-inhibiting shrubs, OR ditch, drainage swale (including rain gardens)
- page wire fencing, minimum 1 metre high, along property line

3. Natural Edge Buffer

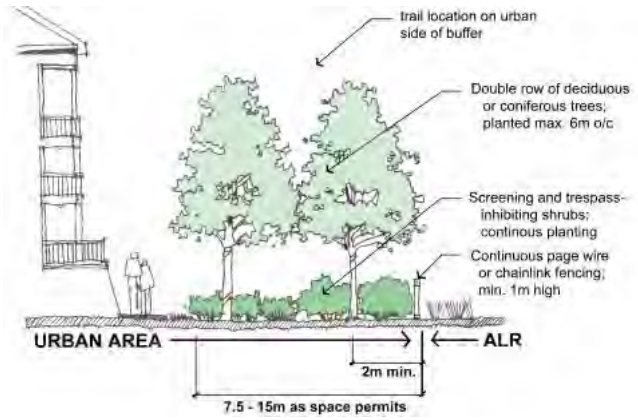
Appropriate when there is an existing or proposed natural edge (stream, topographical break) between urban and agricultural land uses.



- 15 to 30 metre wide buffer, as required by environmental setbacks
  - trails may be developed at urban edge of buffer; trails are strongly discouraged within environmental setback areas
- native vegetation retained and/or augmented as required and appropriate
- page wire or chainlink fencing, minimum 1 metre high, along property line.

4. Moderate Buffer

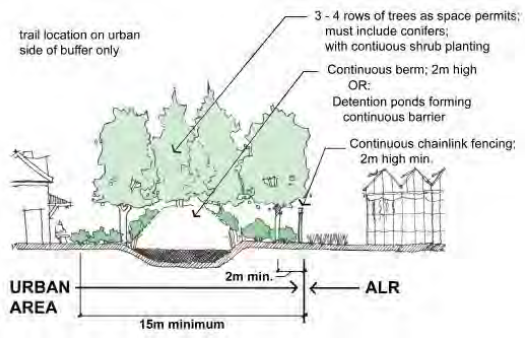
Appropriate where there is moderate risk of conflict, typically where industrial, commercial and residential land uses abut the ALR.



7.5 to 15 metre wide buffer, as space permits
- trails may be developed at urban edge of buffer
- double row of trees (deciduous or coniferous)
- trespass-inhibiting shrubs
- page wire or chainlink fencing, minimum 1 metre high, along property line

5. Maximum Buffer

Appropriate where there is a high risk of conflict between urban and agricultural land uses. This includes interfaces where there is a high risk of trespass from urban sites into agricultural areas, and a high risk of exposing urban land uses to impacts associated with intensive agricultural operations.



- minimum 15 metre wide buffer
- trails may be developed at urban edge of buffer
- use berms OR detention ponds to create continuous barrier
- minimum three rows of trees (deciduous and coniferous required)
- trespass-inhibiting shrubs
- solid or chainlink fencing, minimum 2 metres high, along property line

Application Requirements

Every Protection of Agriculture Development Permit application, to allow site work or building construction, shall include:

Plans

- An existing and proposed grade and tree survey plan, including all trees with a minimum 20 cm diameter, at a point above 90 cm above the ground and located outside the Streamside Protection and Enhancement Area (SPEA), and if applicable, toe of the slope, top of bank, or top of ravine bank. The top of bank or top of ravine bank shall be physically located on the ground by a British Columbia Land Surveyor (BCLS), and the determination of the SPEA shall be provided by an appropriately qualified professional.
- A site plan superimposed on the tree survey plan and the slope analysis plan, showing, where applicable, proposed lot layouts, buildings and structures, unenclosed storage areas, garbage areas, access points, parking and loading areas and circulation elements (including streets, vehicle accessways, pedestrian and bicycle trails).
- Landscape plans for the required buffer, prepared by a registered professional landscape architect, showing the location, size, condition and species of all plant material proposed, as well as details of existing vegetation to be retained and proposed fencing. Landscape architects are required to consider the compatibility of species, proposed for the landscape buffer, with adjacent agriculture (the *Guide to Edge*

Planning, developed by the Ministry of Agriculture and Lands, can be used as reference for species compatibility). An arborist report detailing existing tree inventory and health, and proposed retention scheme, is also required.

- Planting details and specifications shall be in conformance with the British Columbia Landscape Standard and the City of Abbotsford's Development Bylaw, as amended from time to time.
- Berms, detention ponds, ditches, swales, rain gardens and other similar elements must be designed and approved by an appropriately qualified professional, to ensure proper function and prevent negative impacts on adjacent lands, such as groundwater seepage.
- A contextual plan, showing the proposed development and the surrounding area, to a distance of 100 metres from the exterior and interior lot lines of the development site.

Drawings

- Drawings, including building elevations, illustrating sides of proposed buildings and structures facing and / or adjacent to the ALR.
- Cross-sections detailing existing and proposed grades on the development site, and the grade on abutting streets and lots to a distance of 3 metres.

Exemptions

Protection of Agriculture Development Permits are not required for the following instances:

- For urban developments that abut the ALR and require a Multi-family, Commercial, Industrial or Natural Environment and Hazardous Conditions Development Permit, provided the above Protection of Agriculture Development Permit requirements are illustrated and fulfilled in the Development Permit submission, to the satisfaction of the Director of Planning.
- Minor additions or alterations to property.
- Patio and outdoor improvements that do not require retaining structures.
- Emergency works, including tree cutting to remove immediate danger.
- Minor site clearing for topographic or other surveys for site and servicing work.
- Buildings that have been destroyed by fire and natural disaster. Building massing, siting and general appearance shall be as prior to destruction, and use conforms to the Zoning Bylaw.

Appendix 3:

City of Kelowna

Zoning Bylaw Landscaping and Screening, Section 7.8

Official Community Plan, 2013 Development Permit Guidelines, Chapter 15

7.6 Minimum Landscape Buffers

7.6.1 Landscape buffers, of a design as shown on the **Minimum Landscape Buffer Treatment Drawings (Levels 2 through 5)**, the **front yard**, **side yards**, and **rear yard** depending upon the **zone** as indicated by **Table 7.1 - Minimum Landscape Buffer Treatment Level Schedule**, are as follows:

(a) **Level 1**: no specific guidelines for the design of the landscape buffer;

(b) **Level 2:** a minimum 3.0m landscape buffer is required to separate **uses** from **adjacent** properties and will consist of a vegetative buffer where no continuous opaque barrier is required.

(c) **Level 3**: a minimum 3.0 m landscape buffer is required to separate **uses** from **adjacent** properties and will consist of a vegetative buffer or a continuous opaque barrier;

(d) **Level 4**: a minimum 3.0 m landscape buffer is required to separate **uses** from **adjacent** properties and will consist of coniferous tree species or native vegetation to provide a continuous opaque screen for parking areas; and

(e) **Level 5**: a landscape buffer is required for all land **abutting ALR** land where non-farm **uses** exist. The minimum buffer shall be 3.0m wide and include an opaque barrier immediately adjacent to the boundary(s) abutting the **ALR** on the urban side of the property. This standard may be replaced or modified as a result of conditions of a decision by the **Land Reserve Commission**. The buffer area shall not be included in the required setback for **Rural** and **Urban Residential zones.**

7.6.2 Trees shall be spaced, on average, to the dimensions specified in the approved drawings. Deciduous trees shall have a minimum **caliper** of 60 mm with a minimum clearstem **height** of 1.5 m. Conifers shall be a minimum of 2.5 m high. Irrigated No. 2 pot shrubs are to be placed at a maximum spacing of 1.0 m on centre with 10 cm ground cover at a maximum spacing of 450 mm.

7.6.3 Trees or shrubs higher than 600 mm shall not be located in the visual triangle indicated on the drawings.

7.6.4 Where a visual screen is required it may consist of either vegetation or decorative **fence** or wall. The minimum **height** of the screen is 1.2 m for Level 3 (at maturity for vegetation, planted at a minimum of 1.0 m high on an maximum spacing of 900 mm), 1.5 m for Level 4, and 1.8 m for Level 5.

7.6.5 Notwithstanding paragraph **7.6.1**, buffer widths between a building or structure and the property line may be reduced to the width of the required yard if the required yard is narrower than the buffer specified in that section, with the exception of level 5 buffereing.

7.6.6 Where a **side yard** Landscape Buffer Treatment is required and an opaque barrier is included in the Landscape Buffer Treatment Design, the opaque barrier may be located at the **property line**.

7.6.7 Landscape Buffer Treatments for school sites may be amended from the standards indicated in **Table 7.1 – Minimum Landscape Buffer Treatment Levels Schedule**. Where changes to the standards are proposed, supporting documentation from a registered landscape architect must be provided that confirms that the following objectives have been met:

(i) That sufficient screening to **adjacent** residential properties has been achieved;
(ii) That adequate **landscaping** has been provided to provide shade for **buildings** and play areas;
(iii) Driveway entrances and parking areas have been appropriately landscaped for optimization of screening and vehicular site lines; and,
(iv) **Landscaping** around active play areas ensures safety to children on the school grounds.

Where perimeter **landscaping** cannot be provided due to any of the above noted objectives, the School District will be required to provide or upgrade boulevard trees on all **abutting** roads.

7.6.8 Notwithstanding any other provisions in this Bylaw, where **Riparian Management Area** are required along stream corridors in accordance with the **Official Community Plan**, the land and vegetation shall remain undisturbed. In the case of **Riparian Management Area** along Okanagan Lake, land is to remain in its natural condition or be landscaped in a manner that either enhances conditions for **fish** and wildlife or maintains conditions equivalent to those that would have existed had no **development** occurred. Retaining walls along the Okanagan Lake waterfront are permitted under the terms of a **development** permit where required to protect lakefront property.

7.6.9 In addition to the minimum landscape buffer treatment levels above:

(a) all lands **adjacent** to Highways 33 and 97, except those in **agricultural zones** and within Urban Centres, are required to have Level 4 landscape buffer treatment unless superceded by **development** permit guidelines;

(b) all internal **lot lines** on a **site** being comprehensively developed are exempt from **side yard** buffer **zones**;

(c) all industrial **zone** properties shall have a Level 3 buffer **zone** when **adjacent** to non-industrial **zone** properties;

(d) CD **zones** shall specify the buffer treatment levels for the CD **site**;

(e) all non-accessory surface parking lots in an urban centre shall have a level 2 buffer zone;

(f) required landscape islands in parking areas shall have the same level of **landscaping** as a Level 2 buffer **zone**; and

(g) **recreational vehicle** parking compounds in **residential zones** shall have a Level 5 buffer **zone**.

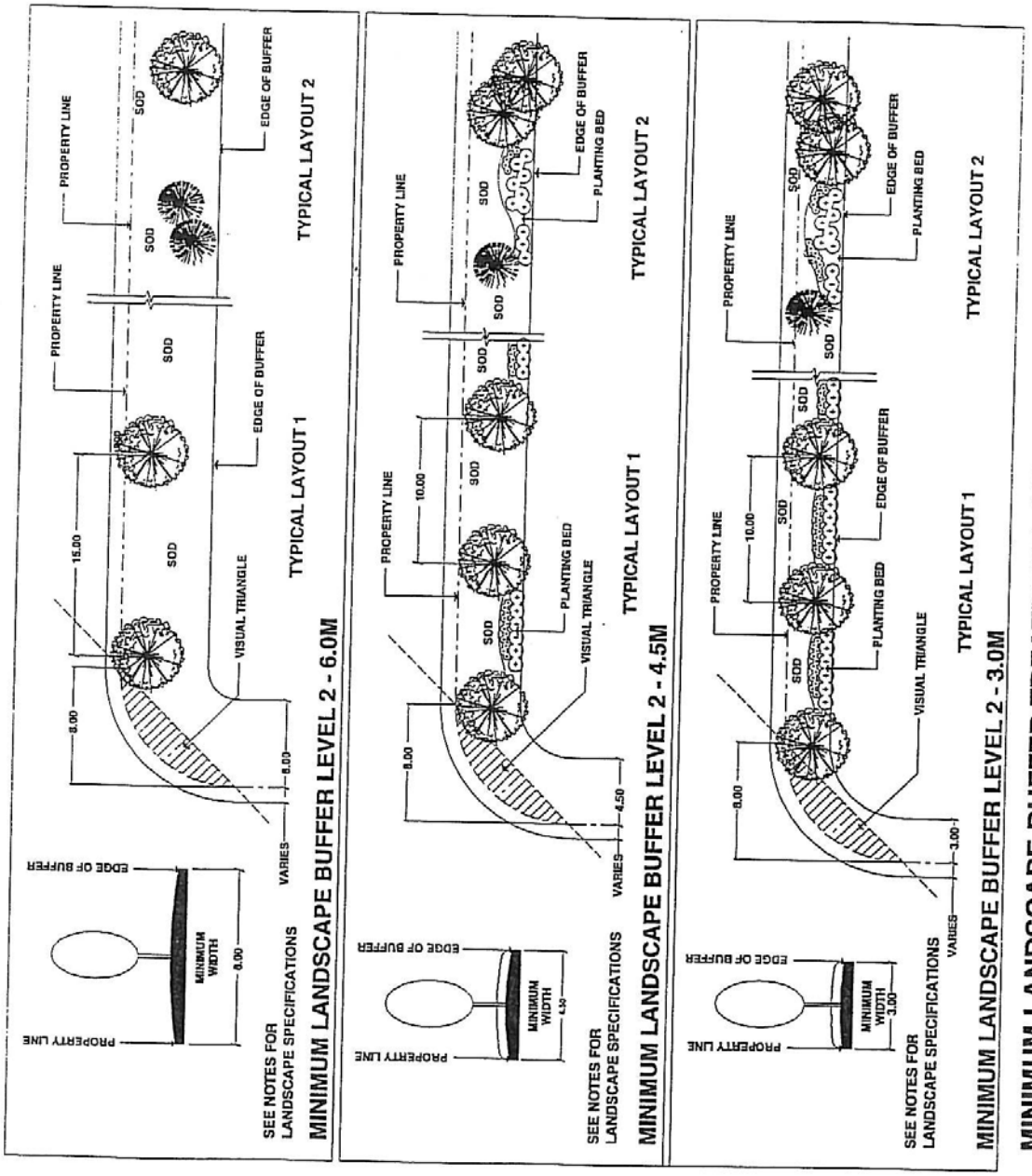
(h) on corner lots, front yard landscape buffers shall apply to all street frontages;

(i) for development in industrial zones with parking located in front of the building, level 4 buffers shall apply for the front yard, and in the case of a corner lot, for the front yard and the flanking side yard; and

(j) all properties abutting Highways 97 and 33 require a level 4 buffere along the highway frontage.

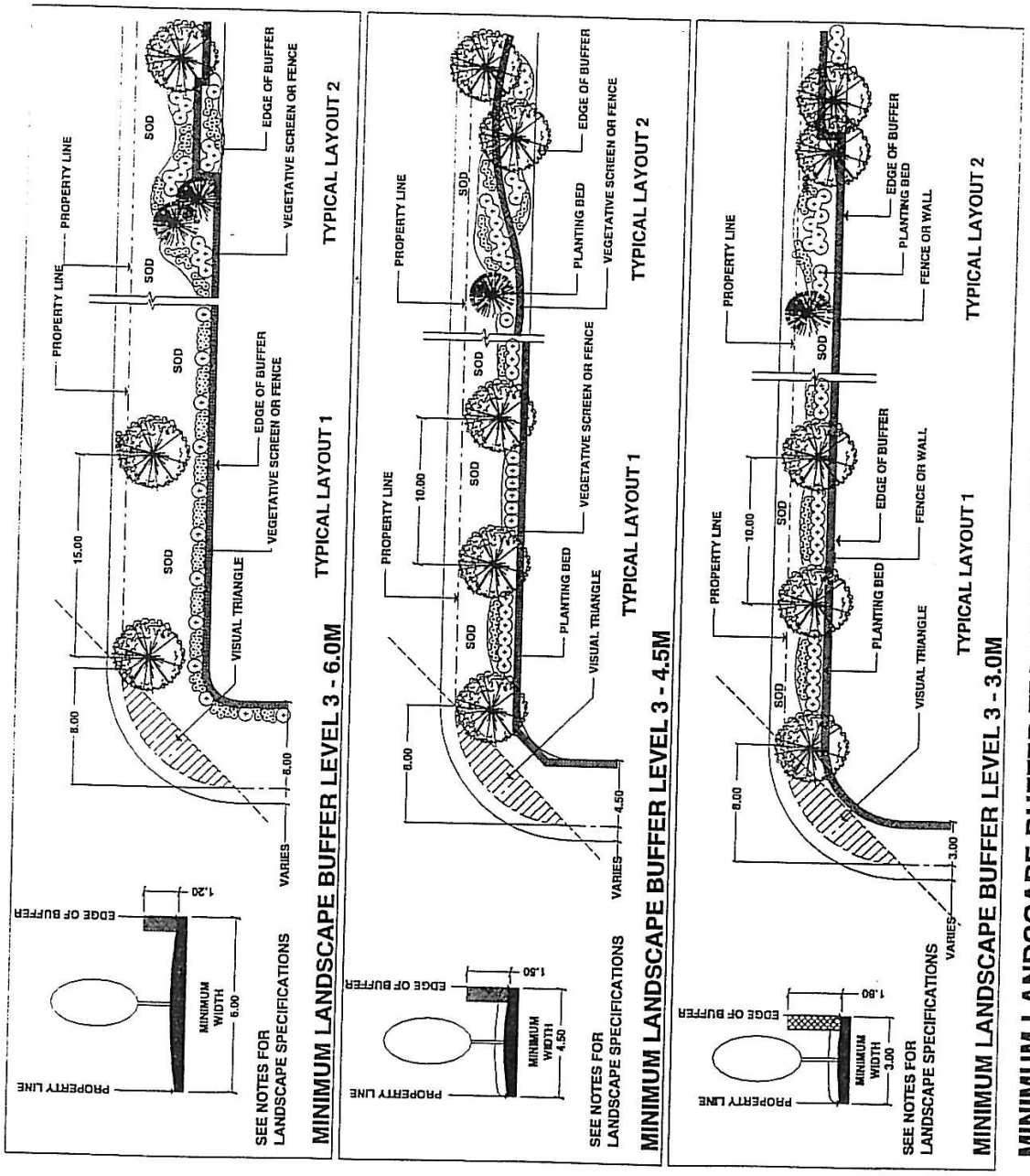
7.6.10 Notwithstanding Section 7.6.1, all landscape areas should reflect the character and intent of the **Official Community Plan**.

Table 7.1 – Minimum Landscape Buffer Treatment Levels Schedule				
Location	**Front**	**Rear Yard**	**Side Yard**	**Urban Plaza Permitted (see 7.4)**
All properties abutting Agricultural Land Reserve	5			
Agricultural Zones				
A1, A1s	1	1	1	No



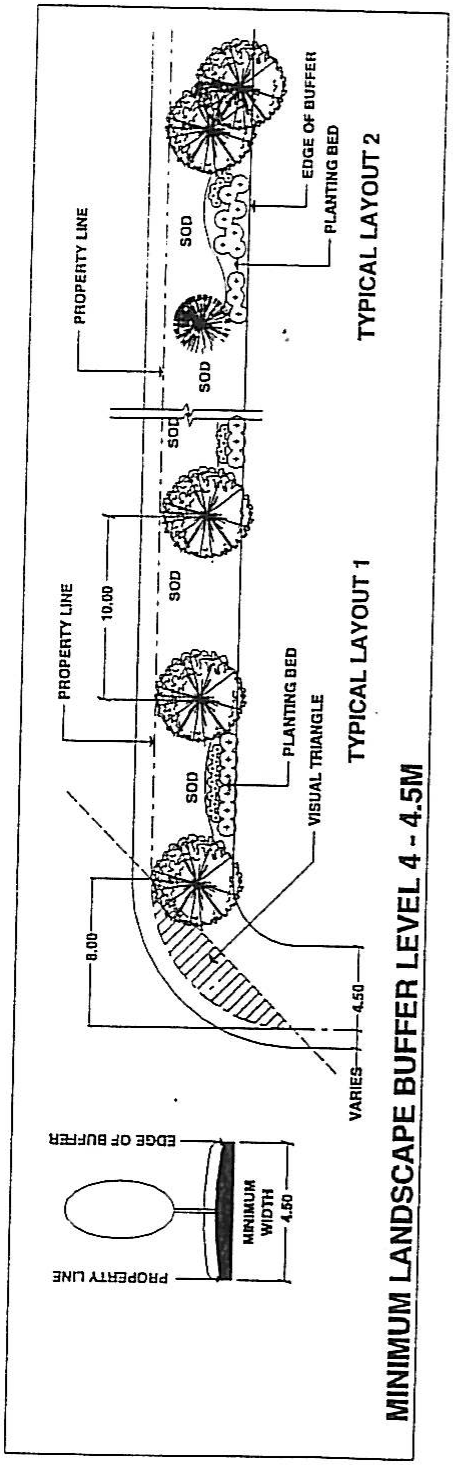
MINIMUM LANDSCAPE BUFFER TREATMENT - LEVEL 2

Diagram 7.3

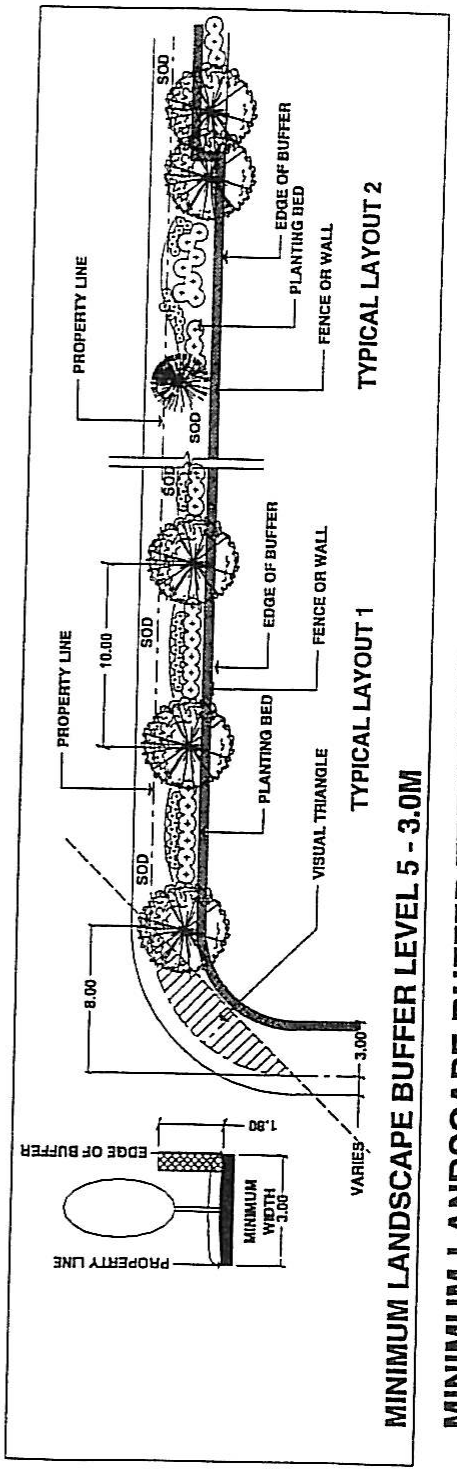


MINIMUM LANDSCAPE BUFFER TREATMENT - LEVEL 3

Diagram 7.4



MINIMUM LANDSCAPE BUFFER TREATMENT
HIGHWAY 97 & 33 - LEVEL 4
Diagram 7.5



MINIMUM LANDSCAPE BUFFER TREATMENT ALR - LEVEL 5
Diagram 7.6

City of Kelowna
Official Community Plan, 2013
Development Permit Guidelines
Chapter 15

Chapter 15:
Farm Protection DP Guidelines

Category
Properties Affected
Justification
Objectives
Exemptions
Guidelines

CATEGORY

Sec. 919.1(c) of the *Local Government Act* for the protection of farming.

PROPERTIES AFFECTED

Unless exempted (See Exemptions section below) a development permit addressing protection of farming guidelines (See Guidelines section below) must be approved for all properties:

1) Any development located on Agricultural Lands before:

a. Subdivision of land;

b. A Building Permit, Soil Permit, or alteration of land associated with the following uses:

i. agri-tourism;

ii. agri-tourist accommodation;

iii. agricultural dwellings, additional;

iv. secondary suite (within an accessory building or structure);

v. utility services, minor impact;

vi. wineries and cideries;

vii. greenhouses and plant nurseries;

viii. agricultural and garden stands;

ix. temporary farm worker housing.

> **"Unless exempted... a development permit addressing protection of farming guidelines... must be approved for all properties..."**

2) Any development located adjacent Agricultural Lands before:

a. A Building Permit adjacent to an urban/rural interface;

b. Subdivision of land adjacent to an urban/rural interface.

JUSTIFICATION

Agriculture is a prominent land use in Kelowna and a vital component of the local economy. As growth continues in the City, the potential for land use conflicts within and adjacent to agricultural areas increases, necessitating the application of guidelines with respect to subdivision design, site layout, landscaping, and buffering.

> **Agriculture is a prominent land use in Kelowna and a vital component of the local economy.**

OBJECTIVES

- Protect farm land and farm operations;
- Minimize the impact of urban encroachment and land use conflicts on agricultural land;
- Minimize conflicts created by activities designated as farm use by ALC regulation and non-farm uses within agricultural areas.

EXEMPTIONS

An Agricultural Development Permit will not be required for:

- Greenhouses and plant nurseries where all of the farm products offered for sale are produced on the farm on which the retail sales are taking place; or
- Agricultural and garden stands where all of the farm products offered for sale are produced on the farm on which the retail sales are taking place; or
- Wineries and cideries that do not provide ancillary uses or access to the public, such as retail sales, tours, food and beverage services, and/or other uses which have the potential to impact surrounding agriculture; or
- The subdivision of land that already provides the prescribed agricultural buffer (see Guidelines) for all impacted property lines; or
- Replacement, alteration or addition to a building such as new siding, roofing, doors, building trim, awnings, and/or windows where it does not adversely impact agriculture or potential agricultural use of land; or
- Replacement of a building that has been destroyed by natural causes, in cases where the replacement building is identical to the original in location, floor area and height; or
- Interior / exterior building alterations that do not expand the existing building foundation; or
- Construction, addition or alteration not exceeding 30 m^2 (323 ft^2) where no variance(s) of the Zoning Bylaw is (are) required; or
- Farm activities considered normal farm practice.

GUIDELINES

1.1 On properties located adjacent to agricultural lands, design buildings to reduce impact from activities associated with farm operations. Design considerations include, but are not limited to maximizing the setback between agricultural land and buildings and structures, and reducing the number of doors, windows, and outdoor patios facing agricultural land;

1.2 On agricultural lands, where appropriate, locate all buildings and structures, including farm help housing and farm retail sales, within a contiguous area (i.e. homeplate). Exceptions may be permitted where the buildings or structures are for farm use only;

1.3 On agricultural and non-agricultural lands, establish and maintain a landscape buffer along the agricultural and/or property boundary, except where development is for a permitted farm use that will not encourage public attendance and does not concern additional residences (including secondary suites), in accordance with the following criteria:

1.3.1 Consistent with guidelines provided by Ministry of Agriculture "Guide to Edge Planning" and the ALC report "Landscape Buffer Specifications" or its replacement;

1.3.2 Incorporate landscaping that reinforces the character of agricultural lands. A majority of plant material selected should include low maintenance, indigenous vegetation;

1.3.3 Preserve all healthy existing mature trees located within the buffer area;

1.3.4 Integrate double rows of trees, including coniferous trees, and dense vegetation into the buffer;

"Locate and design buildings to reduce impact from the activities associated with a farm operation..."

1.3.5 Install and maintain a continuous fence along the edge of agricultural land. A permeable fence which allows for the movement of wildlife (i.e. split rail) in combination with dense and continuous evergreen hedge is preferred. Impermeable fencing will not be permitted;

1.3.6 Utilize where appropriate, roads, topographic features, watercourses, ditching, no-build areas, vegetated and fenced barriers as buffers to preserve larger farm units and areas from the gradual encroachment of non-agricultural uses. Where appropriate use statutory covenants to ensure that buffers are established and maintained.

1.4 On non-agricultural lands, design developments to protect the required landscape buffer from potential negative impacts related to on-site activities (i.e. drainage, recreational pathways, driveways);

1.5 Design any subdivision or urban development of land to reduce densities and the intensity of uses gradually towards the boundary of agricultural lands;

1.6 Incorporate subdivision design that minimizes potential negative impacts that may occur between farm and non-farm users (i.e., avoid road endings or road frontage next to agricultural land);

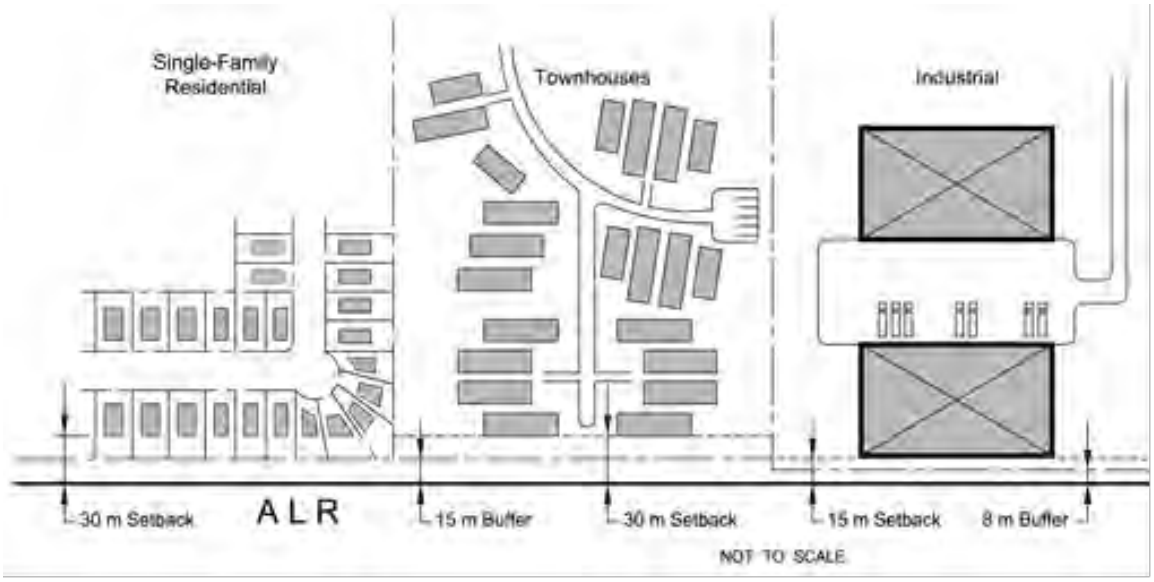
1.7 Require statutory covenants on non-agricultural land at subdivision to notify landowners that "normal farm practices" occur in close proximity.

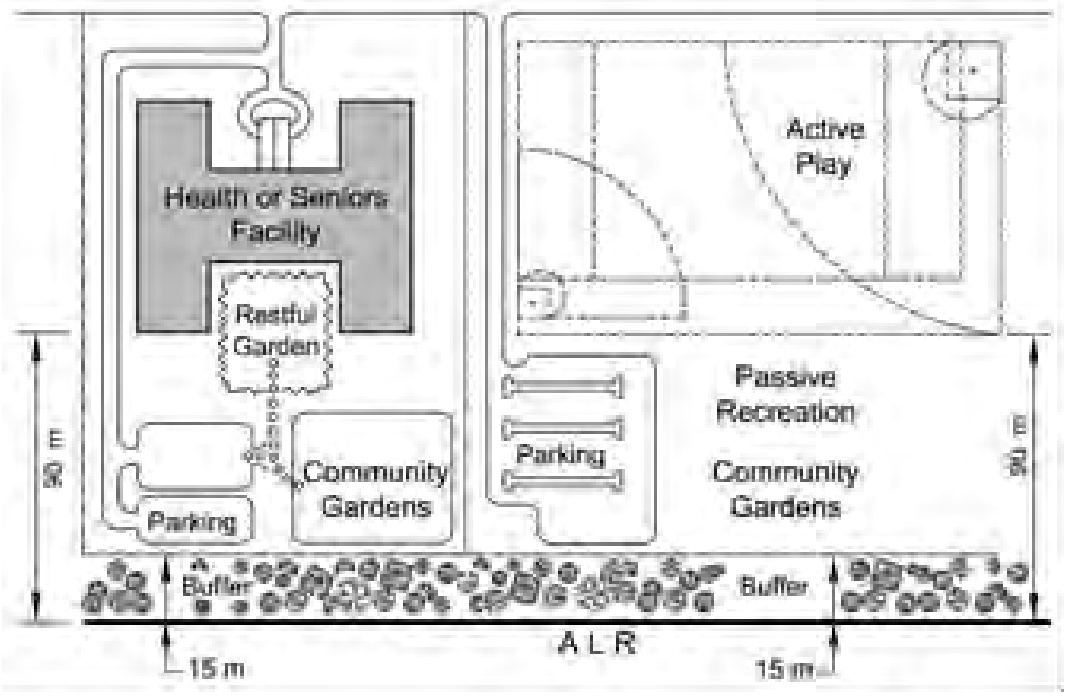
"Install and maintain a continuous fence along the edge of agricultural land..."

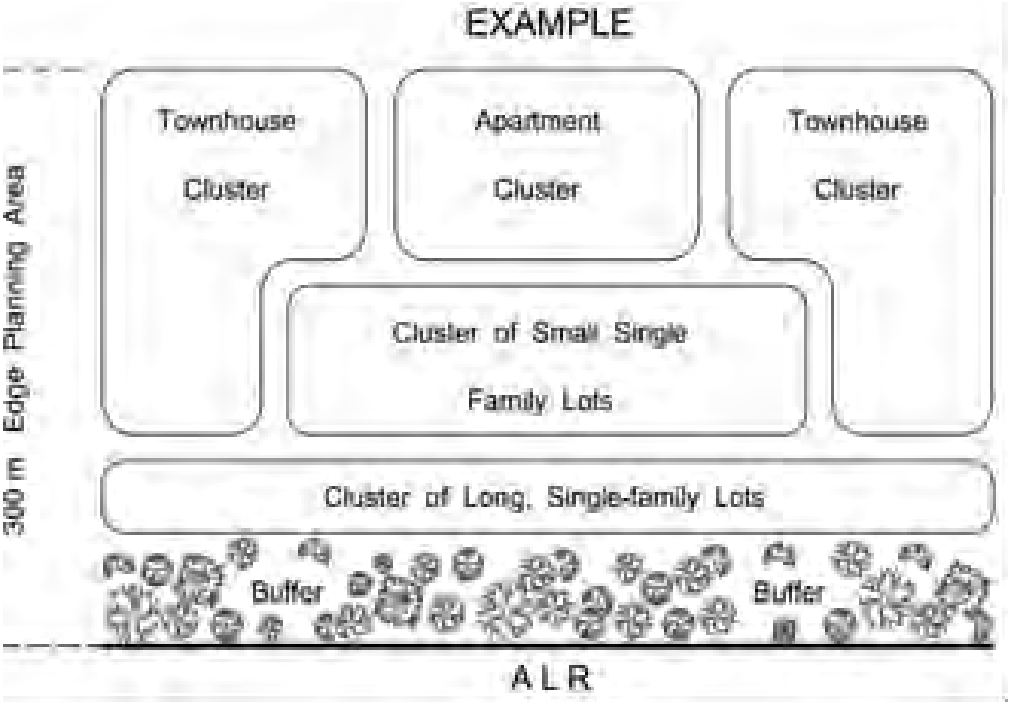
Appendix 4:

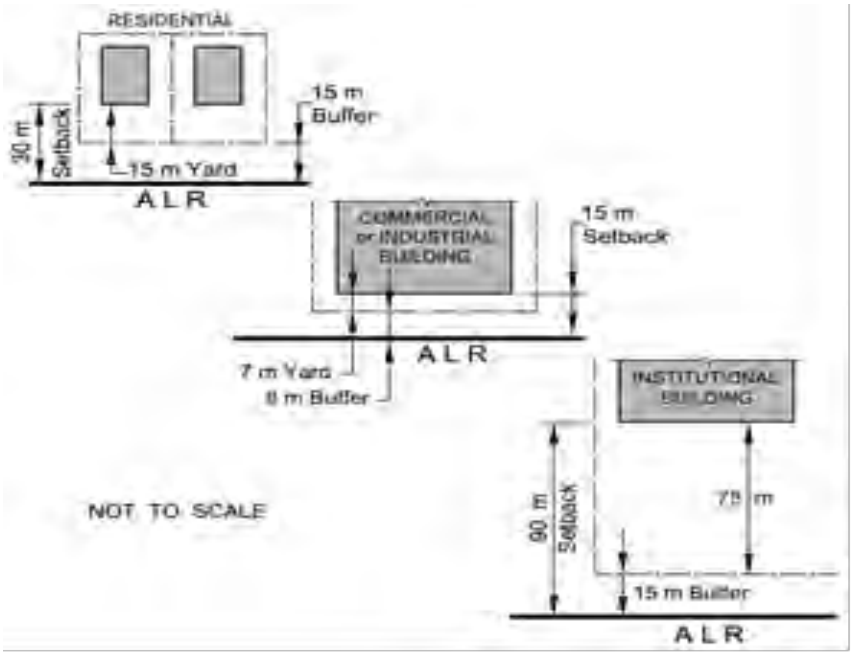
Subdivision Design Examples

Examples of Secondary Plan Design Opportunities

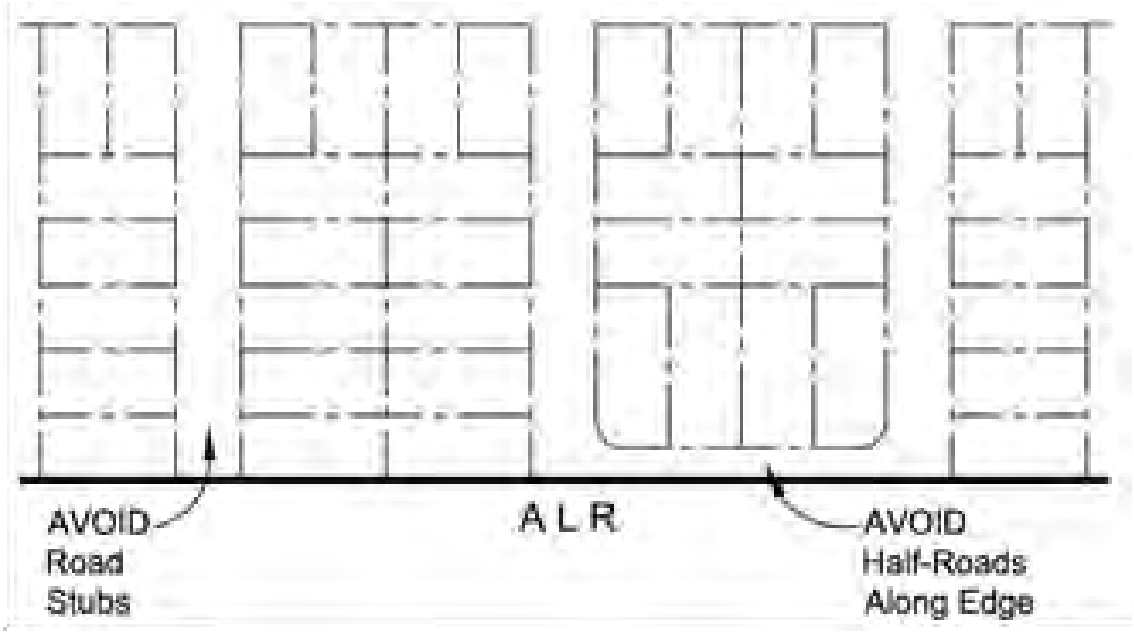




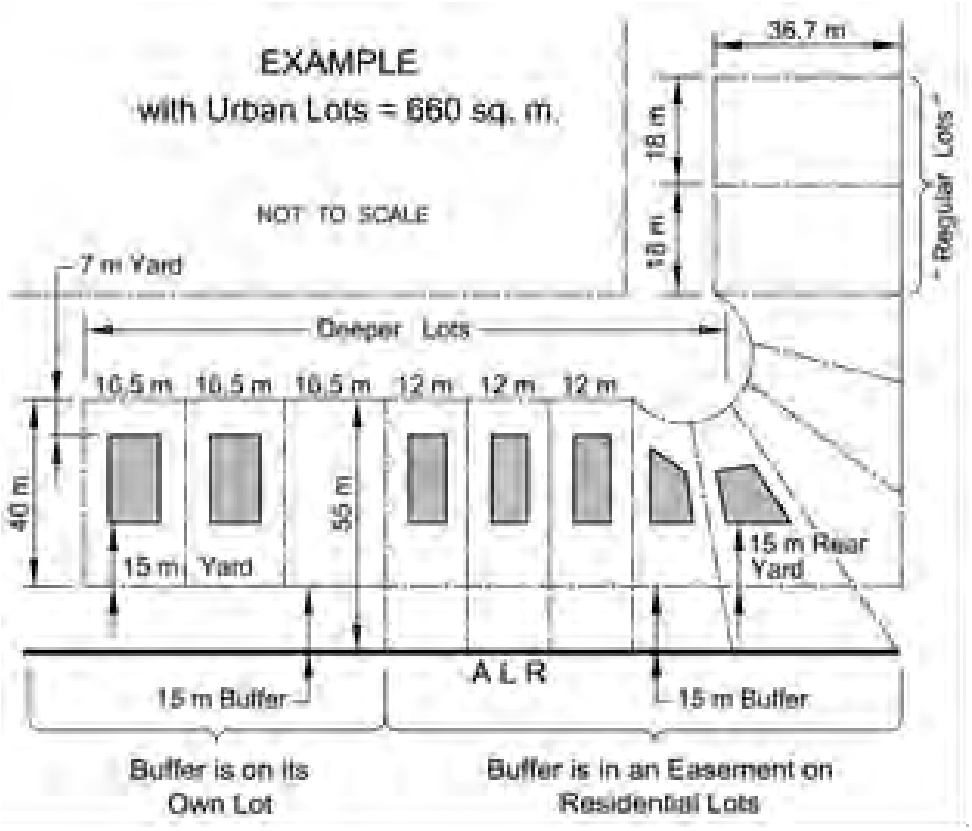

EXAMPLE
300 m Edge Planning Area
Townhouse Cluster
Apartment Cluster
Townhouse Cluster
Cluster of Small Single Family Lots
Cluster of Long, Single-family Lots
Buffer
Buffer
ALR


RESIDENTIAL
30 m Setback
15 m Buffer
15 m Yard
ALR
COMMERCIAL or INDUSTRIAL BUILDING
15 m Setback
ALR
7 m Yard
6 m Buffer
INSTITUTIONAL BUILDING
NOT TO SCALE
90 m Setback
75 m
15 m Buffer
ALR

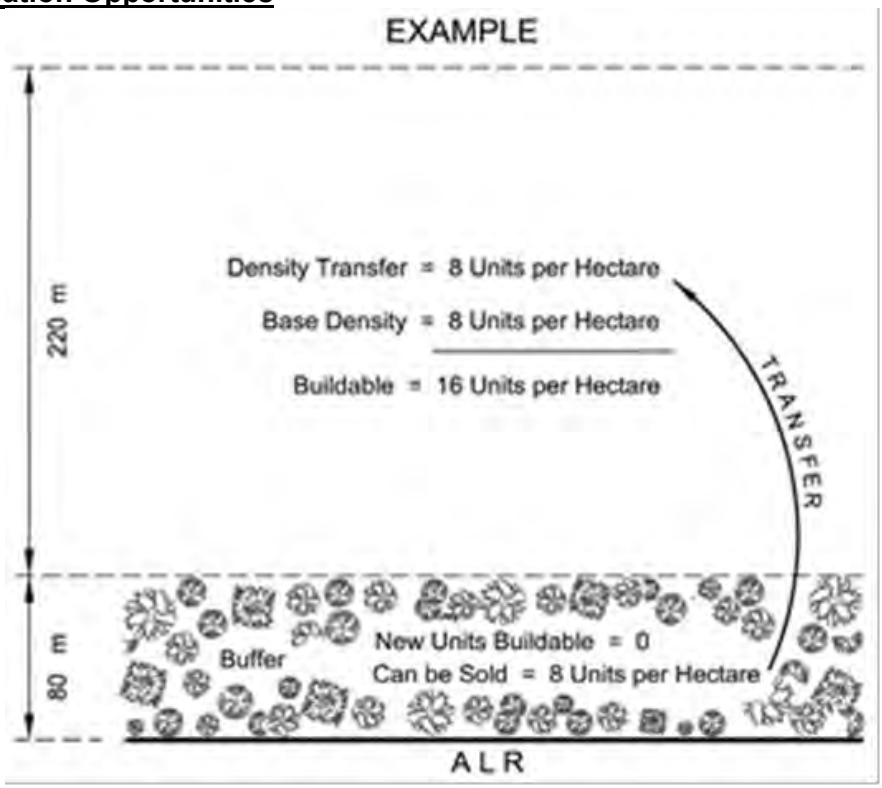
Interface Considerations: Roads and Connectivity

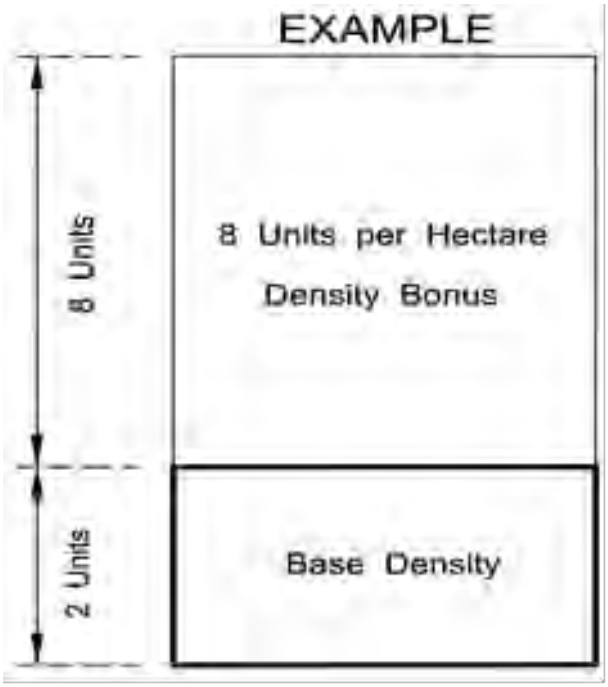


Interface Considerations: Location and Orientation of Buffers



Density Allocation Opportunities





Appendix 5:

Edge Planning Guideline Excerpts from British Columbia

Landscaped Buffer Specifications Document (Agricultural Land Commission, March, 1993)

BC Guide to Edge Planning, (2015)

Landscaped Buffer Specifications

Agricultural Land Commission

March 1993

Reprint: September 1998

TABLE OF CONTENTS

LANDSCAPED BUfFER SPECIFICATIONS

PART 1: INTRODUCTION

Today's increasingly complex land use patterns demand that special attention be paid to the relationship between agricultural and non-farm uses. In the past, a very simple fence and a good neighbour policy may have sufficed; however, present day realities suggest that the combination of agricultural operations and non-farm uses, most often residential uses, require special efforts be made to avoid the conflicts that many agricultural producers are concerned with. Trespass and vandalism to farm crops and equipment, complaints about early morning farm vehicle noise, the drifting of dust and sprays from field operations and smells from the application of manures and composts, are only some of the more commonly expressed concerns.

With the increasing demands being placed on a very limited land base, there will continue to be situations where there will be a hard and distinctive edge between agricultural and other uses.

In an effort to make that edge work to the advantage of the farmer and non-farming public, the Commission has developed "Landscaped Buffer Specifications" which set out a variety of buffering schedules for use in different circumstances. It is important to note that these buffer areas are intended to be established on the non-farm property rather than coming off of the farm properties.

The Commission will use the specifications, where appropriate, as a condition when considering the approval of applications under the Agricultural Land Commission Act. In addition, these specifications provide a practical guide for councils, regional boards and other agencies where the opportunity exists to create or improve the buffer between agriculture and non-agricultural lands.

This report sets out a gradation of buffers types. These range from a fairly simple minimum vegetative screen, that might apply to low impact situations, to a very comprehensive buffer that incorporates berming, fencing and planting for the screening of noise, views, dust and sprays. There is also a buffer type that allows for the combination of water features and fences for trespass prevention.

In addition, the report specifies separate schedules for plant layout and spacing, acceptable plant materials and fencing. It is anticipated that various combinations of the schedules will allow the greatest flexibility in selecting an appropriate buffer to suit the specific situation at hand.

• • • • • • • • •

LANDSCAPED BUFFER SPECIFICATIONS

PART 2: GENERAL REQUIREMENTS

1. At the discretion of the Commission, where landscaped buffer requirements are minimal, Sections 1.2 - 1.4, below, shall not be required. Instead the applicant shall submit the following information:

   a) a plan of the proposed landscaped buffer describing the existing conditions, the type and location of fencing and the location, species, sizes and quantities of new plant material.

2. At the discretion of the Commission, where landscaped buffer requirements are of a complex and extensive nature, professional consultants having expertise appropriate to the needs of each buffer shall be engaged in the planning and design of the landscape work.

3. All planning, design and construction of each landscaped buffer shall be such that all provisions of the B.C. Society of Landscape Architects (B.C.S.LA.)/ B.C. Nursery Trades Association (B.C.N.TA.) Landscape Standard are met.

4. A set of working documents accurately describing existing conditions and the proposed buffer design shall be provided to and approved by the B.C. Agricultural Land Commission before the commencement of construction. Working drawings shall show:

   a) existing grades;

   b) proposed grades;

   c) locations of existing plants or vegetation to be retained;

   d) locations of existing plants or vegetation to be removed;

   e) locations of existing and proposed features (i.e. buildings, fencing etc.) and utilities;

   f) depths of growing medium;

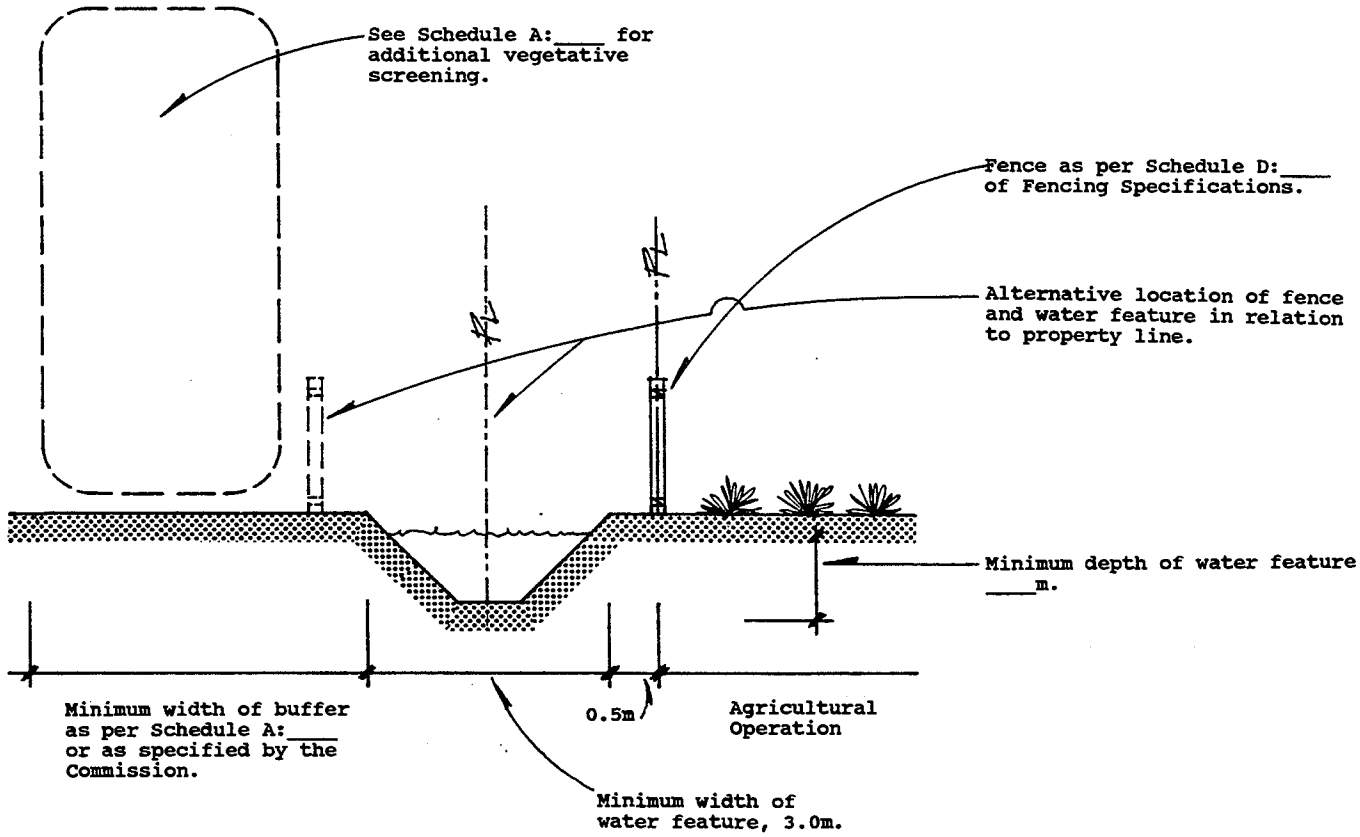
   g) locations, species, sizes and quantities of new plant material;

   h) landscape specifications.

SCHEDULE A: BUFFER TYPES

A.5: Trespass Prevention (Water Feature and Fence)

For use in those situations where a water body (i.e. slough, creek, river, lake, pond or drainage ditch) exists or is planned. Trespass prevention is enhanced with incorporation of vegetative buffering as per the following diagram.

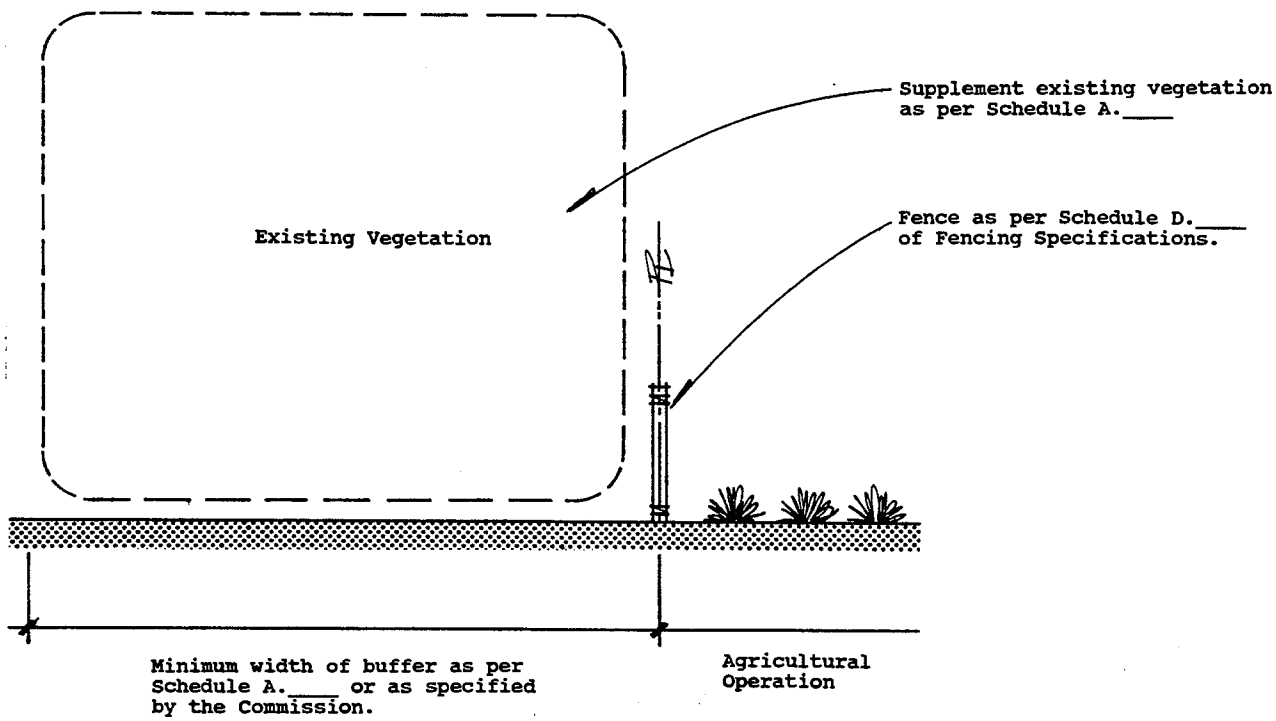


Not to Scale

SCHEDULE A: BUFFER TYPES

A.6: Existing Vegetation Retention * (with Vegetation Supplement Option)

For use in those situations where existing vegetation is of a density and structure which will meet Commission buffering requirements. The vegetation will be protected and maintained by restrictive covenant and supplemented if required as per the following diagram.



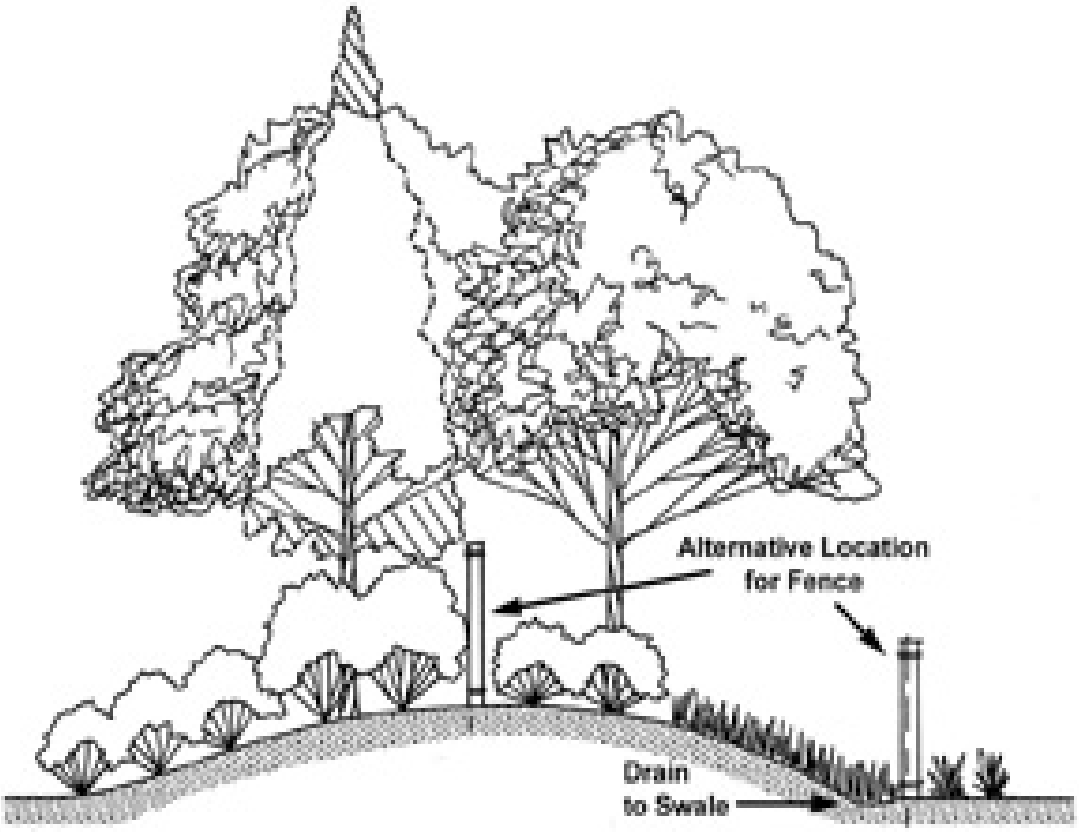
*Note: This Specification will be accompanied by a Restrictive Covenant detailing conditions for:

a) thinning and clearing of existing vegetation
b) the width of buffer
c) locating structures, services and additional uses within the retention zone

Not to Scale

BC Guide to Edge Planning (2015)

Guide to Edge Planning



Promoting Compatability Along Agricultural - Urban Edges

BRITISH COLUMBIA
Ministry of Agriculture

Guide to Edge Planning

Promoting Compatibility Along Agricultural – Urban Edges

Published by

Strengthening Farming Program

British Columbia Ministry of Agriculture

1767 Angus Campbell Road

Abbotsford, British Columbia, Canada

V3G 2M3

Telephone: 604-556-3001; Toll-free: 1-888-221-7141

Strengthening Farming Program website: http://www2.gov.bc.ca/gov/topic.page?id=0F162AFAFAEC454C9CC89D0D6E39599A

Contents

Acronyms

AAC	Agricultural Advisory Committee
AAP	Agricultural Area Plan
ALC	Agricultural Land Commission
ALR	Agricultural Land Reserve
AGRI	British Columbia Ministry of Agriculture (present name in 2015)
B.C.	British Columbia
BCMAF	British Columbia Ministry of Agriculture and Food (former name)
BCMAFF	British Columbia Ministry of Agriculture, Food and Fisheries (former name)
BCMAL	British Columbia Ministry of Agriculture and Lands (former name)
BCMA	British Columbia Ministry of Agriculture (present name in 2015)
DPA	Development Permit Area
EPA	Edge Planning Area
FPPA	Farm Practices Protection (Right to Farm) Act
GIS	Geographic Information System
OCP	Official Community Plan

Additional AGRI and ALC Resources

The following publications offer further information on edge planning; they are on the Ministry of Agriculture's *Strengthening Farming* website: *http://www2.gov.bc.ca/gov/topic.page?id=0F162AFAFAEC454C9CC89D0D6E39599A* . If the reader is viewing this guide electronically, the following blue titles have hyperlinks to the publications.

- *AgFocus: A Guide to Agricultural Land Use Inventory* (2004)

  This 30-page guide outlines practical details on how to undertake a land use inventory in agricultural areas. It includes a ready-to-use coding system for agricultural activities and land covers. As of January 2012, it is being revised to reflect current agricultural land use inventory procedures.

- *Agricultural Drainage Criteria*

  This 7-page factsheet contains criteria to provide good drainage for lowland crops to survive and thrive.

- *The Countryside and You - Understanding Farming* (1998)

  This 24-page booklet explains to the non-farmer living in or near an agricultural area what to expect from agricultural operations as farmers and ranchers go about their day-to-day activities.

- *Planning for Agriculture* (1998)

  This 66-page document summarizes the key issues in the **Planning for Agriculture - Resource Materials** (400 pages). The reports were prepared by the Agricultural Land Commission to encourage greater focus on agricultural issues and opportunities during planning processes.

  Chapter 8 - Planning Along Agriculture's Edges

Appendix 20 - A Check List of Common Urban / Agricultural Conflicts

- *Planning Subdivisions Near Agriculture* (1997)

  This 12-page brochure summarizes the report **Subdivision Near Agriculture... A Guide for Approving Officers**. The brochure is designed for the general public, particularly those individuals who may be planning to subdivide next to the Agricultural Land Reserve.

- *Subdivision Near Agriculture...A Guide for Approving Officers* (1996)

  This 21-page guide, was developed to assist subdivision approving officers when considering proposals for subdivision near farmland. It includes examples of ways to improve subdivision design, provide buffering, and manage road patterns to improve land use compatibility along agriculture's edge. Sample draft covenants associated with the provision of buffering are also included.

- *Vegetative Buffers in BC. An Investigation of existing buffers and their effectiveness in mitigating conflict* (2003)

  This 93-page report documents the results of an investigation that was undertaken in 2003 to determine the effectiveness of vegetative buffers in mitigating conflict. By conducting physical assessments and interviews with farmers and residents who lived next door to buffers, a number of conclusions and recommendations aid in the establishment of buffer guidelines to promote urban-rural compatibility.

- *Farm Practices in BC Reference Guide* (2014)

  The Guide includes over 60 separate factsheets grouped under the headings 'Commodity Specific', 'Farm Activity', and 'Farm Nuisance'. The documents describe many of British Columbia's diverse farm practices in general terms and refers to existing government legislation, industry guidelines and other sources of information related to farm practices.

- *Siting and Management of Dairy Barns and Operations* (2010)

  This 11-page factsheet recommends proper dairy facility siting and management to help establish good neighbour relations.

- *Siting and Management of Poultry Barns* (2008)

  This 8-page factsheet recommends proper poultry facility siting and management to help establish good neighbour relations.

Part 1 – Planning British Columbia's Agricultural Urban Edge

1.1 The Agriculture-Urban Edge

The hallmark of agriculture in British Columbia is its outstanding diversity – from the niche market vegetable farms in the Lower Mainland to the expansive grain farms in the Peace River to the internationally recognized vineyards and wineries in the Okanagan. With nearly 20,000 farms and ranches in B.C., almost every part of the province makes a contribution to our agri-food sector. In 2006, farm gate receipts were approximately $2.7 billion. Many of the over 200 different commodities produced in B.C. are exported around the world. Export sales of agricultural products across Canada and to over 100 countries are valued at $2.4 billion.

Agriculture in British Columbia takes place on some of the highest quality land in Canada. However, the province's physiography makes most of B.C. unsuitable for farming – only 5% of the province is within the Agricultural Land Reserve (ALR). This combination of scarcity and high quality, coupled with a growing population and an expected increase in the limitations to long distance transport make B.C. farmland an extremely valuable resource, from social, environmental, health, and economic perspectives.

Most cities and towns of B.C. grew up where agriculture occurred. As the settlements expand, they are pressing up against the valuable ALR. The interface between agricultural and urban land uses is an area that is often vulnerable to conflict. Traditionally, it has not been the subject of focussed planning efforts, largely due to the historic fluidity of the agriculture-urban edge. In the past, as urban areas expanded, the "edge" moved further into former farming areas.

However, in British Columbia, compared with many other jurisdictions, the Agricultural Land Reserve (ALR) provides an opportunity to reverse the long-standing assumption that it is natural and inevitable to compromise food lands for the sake of urbanization.

The information in this document is intended to apply only to those areas defined as edge planning areas.

1.2 Edge Planning Areas or Special Management Areas

The ALR boundary provides a geographic location where local government policy makers can confidently apply land management techniques and guidelines that will ensure greater long term compatibility between agricultural and urban land uses. Such planning will also ensure greater long term security for farming along the agriculture-urban edge.

Edge Planning Areas (EPAs) are:

agricultural and urban lands near the ALR boundary where the design and management tools in this guide are studied to create compatibility between land uses.

Determining where to undertake edge planning and ultimately establish edge planning areas depends on a number of factors. The ALR boundary should be the initial focus but there may be areas outside of the ALR that are also worthy of attention. Locating the most eligible areas will involve undertaking an overview inventory to identify broadly where the critical and non-critical edges are. Such an overview will ensure that effort is not wasted on areas where there is little possibility of future conflict.

Edge areas that require particular attention are generally undergoing urban growth, with development pres-

sures for new neighbourhoods, commercial, industrial and institutional land use changes. Those future growth areas are usually spelled out in Official Community Plans (OCPs).

Edges that do not require 'special management' may be isolated or have a physical characteristic or long term land use that has little existing or potential for conflict. Examples of these non-critical edges include agricultural land that abuts:

a mountainside, large water body, steep embankment, ravine; or existing low-intensity land uses such as a passive recreational park, Crown range land, airport, gravel pit, cemetery, landfill, established industrial and business parks, railway, BC Hydro right-of-way, or a freeway.

It is important to know whether the surrounding non-farm land use will be subject to change to a more urban intensive use in the future. If changes are expected, it would be prudent to have the edge planning area (EPA) in place ahead of time.

The size of the EPA may vary not only in length but also in width. Ideally, the planning area should be a minimum of 600 metres wide, spanning both sides of the ALR boundary - no less than 300 metres on each side. The edge planning area is not a 'no-go zone' where agricultural or urban uses are prohibited. Rather, the EPA is a study area, or special management area, for the possible application of edge planning techniques to improve land use compatibility.

Figure 1 Edge Planning Distance on Both Sides of the ALR Boundary

Various studies indicate that non-farm residents who live within 300 metres of an urban-agricultural edge can be significantly impacted by certain farming activities. However, if measures in this guide are undertaken within 300 metres on either side of the interface, conflicts can be minimized. Depending upon the specific circumstances facing different communities, this 600-metre-wide area may be adjusted. Each local government will need to undertake an edge inventory to determine the most appropriate size of its EPA.

There may be situations where an EPA lies across two communities. If possible, both local governments should work together to mitigate any impacts generated from the urban development or agricultural activity.

Once the location and size of the edge planning area have been determined within a community, a map or schedule should be established for reference. This map can be incorporated into the OCP and/or zoning bylaw.

People's contrasting perspectives on the function of rural areas have a significant effect on the perception of a nuisance and the ability to achieve compatibility.

While most farmers consider the rural area to be a place of business, many non-farm residents believe the rural area is a place that offers a lifestyle of open space, peace and quiet.

1.3 Rationale for Edge Planning

Measures to promote compatibility along B.C. agriculture-urban interfaces have been limited. As a result, a variety of complaints can arise from both farmers and their neighbours.

Farmers often experience trespass, property and equipment vandalism, crop damage and theft, livestock harassment, and litter. Flooding of farm land by rainwater runoff from upland urban development is another impact many farmers have experienced. All of these problems result in significant financial losses for farmers.

On the urban side of the 'fence', complaints can be related to odour, pesticide spraying, dust, aesthetics, and noise from different farm activities. Urban neighbours might complain about unfamiliar (to them) but normal and accepted farm practices, even if they are carried out in compliance with established regulations and standards.

Many local government jurisdictions have attempted to minimize the potential for conflict and complaints by using zoning bylaws to restrict the types of agriculture that take place next to urban edges, even within the ALR. Restrictions often require agricultural buildings to be set back such large distances from property lines that it makes it impossible to establish the operation. Alternatively, minimum lot size requirements or animal density controls may have been set, restricting the level of intensity. Another method used in the past was to completely prohibit certain types of agricultural commodities within specific areas. These methods unnecessarily restrict agricultural development opportunities.

Since 1996, the *Local Government Act* has limited the ability of local governments to restrict agriculture. Also, it allows intensive agriculture as a permitted use in the ALR. But, the Act also has tools for better planning for agriculture. It provides for development permit areas for the protection of farming. It also allows local governments to use farm bylaws to regulate farm operating methods, with the approval of the Minister of Agriculture. Farm bylaw powers complement zoning powers by allowing local governments to regulate certain aspects of farm operations that would not be possible with zoning alone. The *Land Title Act* allows approving officers to refuse subdivisions that would unreasonably interfere with farming operations on adjoining or reasonably adjacent properties, or that would increase access to land in the ALR, or that would have inadequate buffering or separation of the development from the farm.

These legislative tools provide an opportunity for local governments, the agriculture industry, and the Province jointly to develop urban and farm-side techniques to enable a wide range of farm operations to co-exist with neighbouring urban land uses.

1.4 Summary

Changing people's point of view on what the 'countryside' represents may be a nearly impossible task. However, employing measures that 'soften' the hard ALR edge, such as buffering, sensitive subdivision design, and management of certain farm practices to minimise nuisance, combined with an effective awareness strategy, will go a long way to lessening clashing perspectives and promoting compatibility.

Part 2 – Where the Edge Planning Process Fits

2.1 Purpose of Edge Planning

Edge planning is a process that will develop a package of policies and recommended criteria that can be adopted by a local government and implemented through regional growth strategies, official community plans, sub-area plans, bylaws, signage, and other statutory means. The edge planning process will also guide more detailed land use decisions associated with OCP designations along the non-farm side of the edge, rezoning, development permits, subdivision layouts, densities, road patterns, and the provision of other services. Urban-side land use planning can be conducted according to compatibility standards using a suite of tools. The agriculture-urban edge can be managed effectively through clear policies and the application of the tools in this Guide.

2.2 Role of Local Government in Edge Planning

Local governments are the most appropriate bodies to design and manage the edge planning process. Included here are a number of tools that local governments can use to manage or prevent potential edge conflicts before issues around compatibility arise. The following planning mechanisms are available for local government edge planning:

- Regional Growth Strategies
  - Regional Context Statements
  - Regional Collaboration and Consensus
- Official Community Plans
  - Integrated Community Sustainability Plans (ICSP)
  - High level policy
  - Land use policy
  - Development Permit Area Guidelines
  - Design Guidelines
- Neighbourhood Plans
- Agricultural area plans
- Zoning Bylaws

Several principles provide context for planning along agriculture's interface:

1. The ALR boundary is fixed and should form the focal point of edge planning
2. Both sides of the interface must be considered simultaneously.
3. Edge planning should be considered in wider context of Regional Growth Strategies, Official Community Plans, and Neighbourhood Plans.
4. An edge plan must anticipate land use change.
5. Edge planning techniques must be tailored to meet local situations.

Local governments not only have the planning tools, but it is important they become very familiar with their community's agricultural edges to ensure that sound land management policies and decision-making emerge. A commitment to the policies should result from the edge planning process.

Resources that can be drawn upon to participate in the edge planning exercise include:

- agricultural advisory committees (AAC) - a steering committee that includes farmers can be appointed to provide the agricultural perspective to strategic and long-range planning;
- individual farmers whose land is along the edge;
- Provincial planning resources such as the Smart Planning facilitators who can provide resources on emerging and cutting edge legislative tools;
- AGRI and ALC staff can provide technical assistance as requested.

Will this hillside remain in forest or will it be urbanized? This type of question should be asked to determine if this is an area for more detailed land use inventory work and the potential application of an EPA.

2.3 Legislative Mechanisms to Promote Edge Compatibility

Although zoning bylaws and official community plans can promote compatibility to some degree, their broad-based nature does not give local governments a lot of flexibility to deal with potentially incompatible land uses. The *Land Title Act* and *Local Government Act* provide local governments with mechanisms to promote compatibility between urban development and farm operations. These mechanisms include revised decision making abilities for approving officers, development permit areas to protect farming, and farm bylaws to manage certain farm practices and operations.

The *Farm Practices Protection (Right to Farm) Act* (FPPA) protects farmers from liability in lawsuits alleging nuisance and court injunctions provided they use "normal farm practices" and do not contravene other legislation listed under the FPPA such as the *Environmental Management Act,* the *Public Health Act,* and the *Integrated Pest Management Act*, and any land use regulation (as defined under the FPPA). However, AGRI and the ALC recognize that certain areas within the ALR may require special management so that different interests are taken into account.

2.4 Climate Change Mitigation

By the end of May 2010, municipalities and regional districts in B.C. were to have amended or adopted OCPs to include measures for climate change mitigation. Specifically, Official Community Plans must include:

- hard, measurable targets for greenhouse gas (GHG) emission reductions;
- policies that support the reduction of municipal GHGs sources; and
- actions that will lead to GHG emission reductions.

Provincial Bill 27, 2008 provided tools for direct and indirect GHG reductions. Specifically, there are three Development Permit Areas (DPAs) related to GHGs that local governments can employ as part of their reduction strategies. The purposes of these three DPAs are:

- GHG reduction
- Energy efficiency
- Water efficiency

In strategizing around GHG reduction targets, a local government may choose to include a minimum forest cover objective over and above an existing baseline. This forest would also link to the Provincial aforestation policy. The GHG reduction benefits from such a policy include carbon capture from planting or growing trees, and energy efficiency with placement of vegetation around buildings. There could also be conservation of water by reducing lawn areas. This approach would be an opportunity to support the planting and maintenance of trees in the buffer areas in the agriculture-urban edge.

2.5 Edge Strategy – Shared Responsibility

The success of edge planning relies on shared responsibility. This philosophy requires that both agricultural and urban land users and decision makers seek opportunities and adopt approaches to ensure compatibility. More specifically, successful agricultural - urban edge planning relies on:

- recognition that it is reasonable for landowners along both sides of the agriculture-urban boundary to share the benefits and impacts from edge planning implementation;
- public education that increases agricultural awareness and promotes neighbourhood-friendly land use; and
- ability of landowners to realize optimum land use which increases long term certainty and security for agricultural and urban land uses.

An edge planning strategy for each community should include:

- defining similarly-sized edge planning areas on both sides of the agriculture-urban boundary for the application of edge planning techniques;
- developing communication tools to enhance public awareness of edge planning objectives; and
- adopting bylaws that encourage more intensive land use with a strengthened land management regime along the edge planning area.

2.6 Edge Planning Process

Edge planning is an investigative process to enhance our understanding or awareness of the relationships between agricultural and other land uses and resources. This knowledge can then be applied to improving compatibility between the different land uses where they meet at the 'edge'.

2.6.a Edge planning's place within planning processes

Edge planning can be initiated as a stand-alone process or arise from a policy directive through a regional growth strategy or an Official Community Plan (OCP). Communities that have a limited amount of farm land may find the OCP to be an appropriate vehicle to provide policy direction on edge planning. In other cases, the OCP may direct that a more detailed (sub-area) Agricultural Area Plan (AAP) be undertaken and, in turn, the AAP could direct that edge planning work be undertaken. An AAP is a policy vehicle to examine in detail an area largely in agricultural use or with agricultural potential.

The edge planning process could influence plans and bylaws in a number of ways. It could provide the basis for the inclusion of Development Permit Areas (DPA) for the protection of farming within an OCP. The DPA, in turn, can provide direction in the design of subdivisions next to the agricultural land that can be dealt with under the *Land Title Act* section 86(1) (c) (x) & (xi). Edge planning will also influence zoning and farm bylaws by affecting setback distances, landscape requirements, and farm management requirements. In addition, the process can influence other initiatives such as park and recreation planning that may happen at the agricultural edge, water issues involving drainage, and the provision of disclosure statements on title.

2.6.b Steps to undertaking edge planning and establishing Edge Planning Areas

Official community or agricultural area planning processes provide the opportunity to give policy direction for more focused edge planning. In order to identify which actual details should be used for addressing the edge (e.g. buffer and farm management specifications) within the plans and bylaws, a land use inventory should be undertaken. Displaying this information with a geographic information system (GIS) will provide a practical means to understand clearly the land use dynamics on both sides of the edge.

Suggested steps to undertaking edge planning

1. Conduct an overview inventory to identify broadly where the critical and non-critical edges are.
2. Undertake a detailed land use inventory (via a drive-by survey) along both sides of the critical edges. Key features that should be noted include:
   - existing land uses and types of farming;
   - roads and freeways;
   - hydro and other utility rights-of-way;
   - railways;
   - watercourses and water bodies;
   - existing vegetative cover (that may be retained as a buffer); and
   - major topographic features.
3. Identify current zoning and OCP land use designations – determine whether land use is expected to change in the next 10-20 years and identify where the opportunity lies for Development Permit Areas for the protection of farming, including buffering. Buffering features that are planned well in advance will be far easier to achieve than attempting to retrofit a situation after a conflict has occurred.
4. Determine parcel ownership – private versus government-owned land, and possibly flag parcels being held for future development.
5. Incorporate land use and farming information into GIS so that maps can be generated, land use dynamics can be understood, and the potential effects of implementing the compatibility tools, particularly the EPA buffer and farm management guidelines, can be examined. Maps will also help to provide a picture of the edge planning areas and a greater appreciation may be gained by seeing the properties and land uses affected.
6. Identify existing or potential conflict areas.
7. Consult with farmers and urban-side land users to determine appropriate 'compatibility tools' to be used in each portion of the EPA. PARTS 3 and 4 of this Guide offer a variety of 'compatibility tools' that can be applied within the edge planning area.
8. Consideration can then be given to applying appropriate land management policies and effective mitigation measures through plans and bylaws.
9. Finalize the definition of the Edge Planning Area, and depending on the 'compatibility tools' that are used, incorporate the final map as a schedule in the OCP and/or Zoning Bylaw.

Part 3 – Urban-Side Edge Planning Tools

This Part contains the urban-side edge planning design objectives, strategies, and implementation tools that can be used to promote rural-urban compatibility. The design objectives and strategies provide a starting point and body of knowledge for local governments to work towards minimizing conflict, protecting farmland from urban encroachment, and promoting a more sustainable urban design. The performance objectives can be achieved through different urban-side design options that draw on tools provided by the *Local Government Act* and *Land Title Act*. Case study examples from the City of Surrey, the Regional District of Nanaimo, and the Capital Regional District highlight the rationale for, and lessons learned from, the implementation of various edge planning strategies and tools.

Implementation using a development permit area is given here as an example. However, Ministry of Agriculture staff have found through experience that inserting the urban-side criteria in the zoning bylaw provides more certainty to applicants and more efficient local government administration.

Design performance objectives and strategies are best utilized in edge areas that are currently not developed but undergoing urban growth, or where there are change-in-use pressures for residential, commercial, industrial, or institutional uses. For existing, built areas, the edge planning tools are used when the area is re-developed.

3.1 Performance Goal and Objectives

The overall design performance goal on the urban side of the Agricultural Land Reserve (ALR) boundary is:

- Within 300 metres of the ALR boundary, create farm-friendly urban development which promotes compatibility with agriculture and stabilizes the ALR boundary.

Within that goal, design performance objectives include:

- Use subdivision layouts which limit potential, future urban encroachment into the ALR or other farming areas;
- Limit the effects of urban development on farming by managing water, pedestrians, and traffic;
- Minimize the effects of farm activities on urban development through visual and spatial separation, reduction of risks, and public awareness of normal farm practices;
- Ensure the edge location is stable over time.

Urban-side planning, design, and management tools to implement these objectives are grouped in the following sections under:

3.3 Subdivision design: density, road, and lot patterns

3.4 Building design and layout

3.5 Open space and landscape design

3.6 Storm and ground water management

3.7 Urban-side buffer design

3.2 Type and Location of Urban Development

The type of urban development (residential, recreational, industrial, etc.) plays a role in compatibility. In most situations, the greater number of people located near an edge, and the closer buildings are situated to farm land, the higher the potential for complaints by both farmers and non-farmers. However, the exception to this appears to be that rural estate owners often have less tolerance for disturbances than those living in higher density types of housing. The following table outlines different types of urban development, their associated activities and impacts, and a compatibility rating. The low and moderate compatibility areas are ones where the edge conditions should be addressed to improve compatibility of uses.

Activities Of Urban Edge Development That Can Affect Compatibility

Urban Development Type	Activities	Impacts and Compatibility with Agriculture
Residential – medium to high (e.g., townhouses, apartments)	High numbers of residents; frequent vehicle access; limited green space; often rely on farm land for 'green space'; limited time recreating immediately outdoors (i.e., on resident's property)	Trespass, dogs at large, damage to crops and equipment, litter, theft, livestock harassment, flooding, traffic conflict **Low to moderate compatibility**
Residential – lower density **(e.g., urban single-family)**	Medium numbers of residents; fairly frequent vehicle access; some green space in yards, but also some reliance on farm land for open space; immediate outdoor recreating high	Trespass, dogs at large, damage to crops and equipment, litter, theft, livestock harassment, flooding, traffic conflict **Low to moderate compatibility**
Residential – low density **(e.g., country residential, 0.20 to 0.40 ha lots)**	Low number of residents; some vehicle access; large properties with own green space; less reliance on farm land for green space; immediate outdoor recreating high; high expectations for peaceful setting	Trespass, dogs at large, damage to crops and equipment, litter, theft, livestock harassment **Low to moderate compatibility**
Institutional **(e.g., schools, churches)**	High numbers of people over short time frame; frequent vehicle access; may have significant green space if associated with a school; may have high immediate outdoor recreating if a school	Trespass, damage to crops and equipment, litter, theft, livestock harassment, flooding, traffic conflict **Moderate compatibility**
Recreational **(e.g., playing fields, nature trails, golf courses)**	Low to high numbers of people over short time frame depending on type of recreation; low to medium vehicle access (may be high for specific events); high levels of green space; high immediate outdoor recreating	Trespass, dogs at large, damage to crops and equipment, litter, theft, livestock harassment, fire, spread of weeds, liability **Moderate to high compatibility**
Commercial	High numbers of people usually over short periods; frequent vehicle access; no green space; no reliance on farm land for green space; no outdoor recreating	Trespass, litter, theft, flooding, traffic conflict **Moderate to high compatibility**
Industrial	High numbers of people over short periods; frequent vehicle access; limited green space; no significant reliance on farm land for green space; limited outdoor recreating	Trespass, litter, theft, flooding, traffic conflict **Moderate to high compatibility**

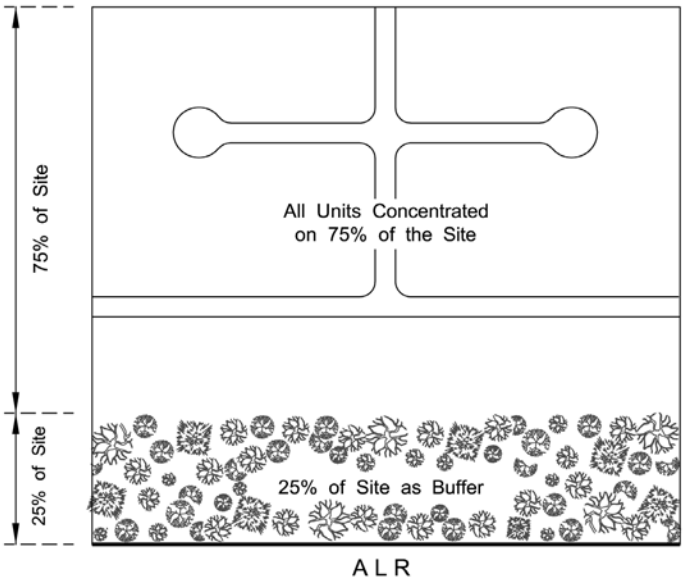
3.3 Subdivision Design: Density, Road, and Lot Patterns

Lay out the development to create separation and a vegetated buffer between the farming, with its noises, dust, odours, and use of chemicals, and the residential, institutional, commercial, industrial uses

3.3.a Gross Density

Use gross density or density bonus, or both, to encourage the creation of open space on the urban side next to the farming area. Gross density is the permitted number of units per hectare, before an area is subdivided and roads, parks, etc. are subtracted from the overall area.

E.g., if a 4 hectare parcel is designated in an OCP for a gross density of 15 units per hectare, the maximum number of units would be 60. If 25% of the land (1 ha) is used for a buffer or open space separation to the farms, all of the unit "entitlement" could go on the remaining 3 ha – or 60 units on 3 ha for a density of 20 units per ha (i.e., medium-sized single-family residential lots).

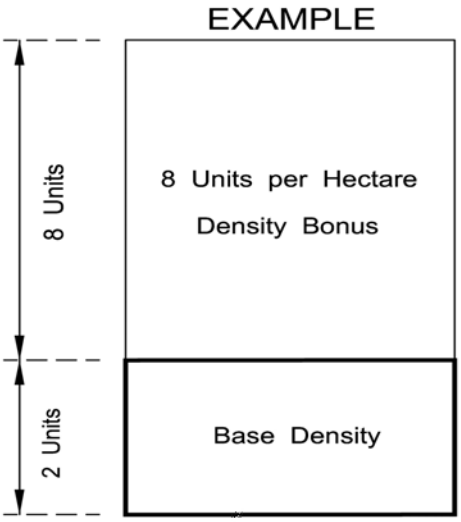


- This tool could be implemented in the OCP by mapping the Edge Planning Area where gross density should be used.
- The zoning and/or the subdivision procedure and servicing bylaws could contain zone(s) which spell out the criteria for this concept.

3.3.b Density Bonus

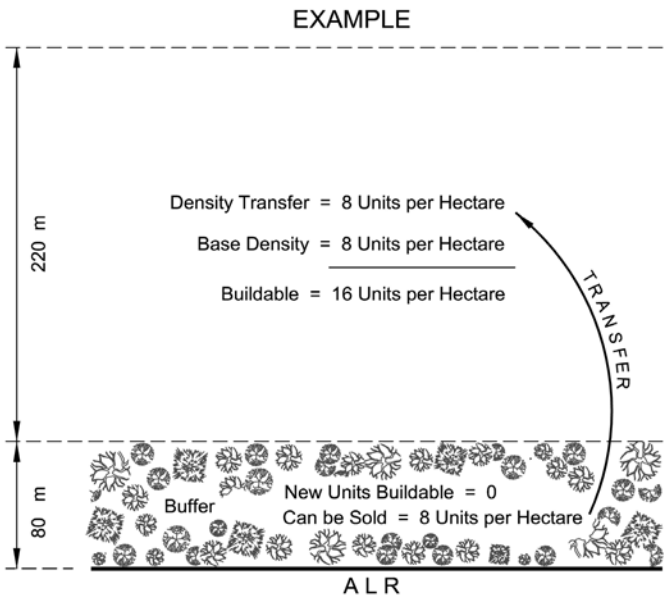
The Edge Planning Area could be zoned to allow an extra "bonus" in density, if open space or buffer were created along the urban side of the farming area boundary.

E.g.,the 'base' density might be 2 units per hectare, but if open space is set aside along the agriculture-urban edge, the 'bonus' could be another 8 units per ha, for a total of 10 units per ha – which could be an attractive total for a developer.



- The OCP could designate where bonuses could apply.
- The zoning bylaw could contain zones that have 'base' and 'bonus' densities.

3.3.c Density Transfer



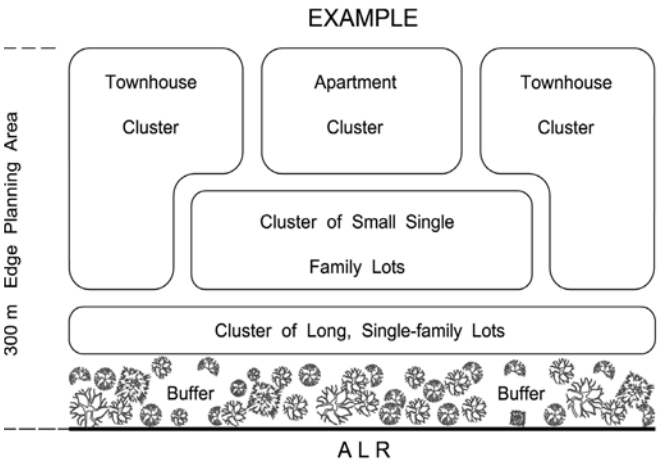
The 300-metre-wide Edge Planning Area (EPA) could have an average allowed density but those areas adjacent to the agriculture-urban edge, on the urban side, could build no more units but could sell all of their 'potential' unit allowance to areas on the outer portion of the EPA.

For example, say the EPA average allowed density is 8 units per hectare, but only 1 unit per ha could be built unless a density transfer occurs. If, within 80 metres along the urban side of the agriculture-urban boundary, no more units could be built, but the full 8 units/ha allowance could be transferred (sold) from this area. Then, within the 220 metres along the outer portion of the EPA, the 'base' density could be expanded from 8 units/ha, to 16 units per ha (8 avg + 8 from adjacent areas = 16) which could all be built, ONLY IF the extra 8 units/ha are purchased (received via transfer) from the landowners along the agriculture-urban edge. [Exact formulae would vary from community to community.]

So, all areas within the EPA would start with the same allowance but units would be transferred from the agriculture-urban edge to the outer edge, away from potential disturbance by farming.

- The OCP should have maps of areas which 'send' density into a transfer and areas which 'receive' the transferred density.
- The OCP or zoning could have text for the 'sending' and 'receiving' areas and zones.

3.3.d Housing Clusters

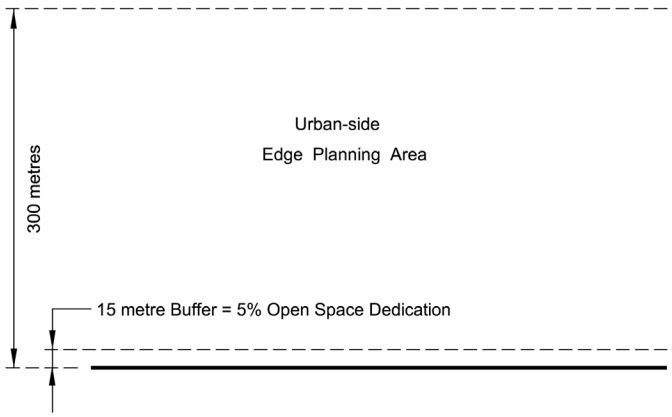


Housing units could be clustered together, away from the agriculture-urban edge, leaving wider open space along the boundary. Clustering could be either a stand-alone concept, or it could be combined with one of the density concepts above. It may mean that not all of the housing is the same type, but there may be a mix – some single-family, some townhouses, and maybe some apartments – and/or some single-family lots might be smaller.

- The OCP could stipulate that the EPA must have clustering in order to create a wider buffer, or separation along the farming edge.
- The zoning could be tailored to each site to match the cluster locations, densities, and housing types.

3.3.e 5% Park Dedication Abutting the Edge

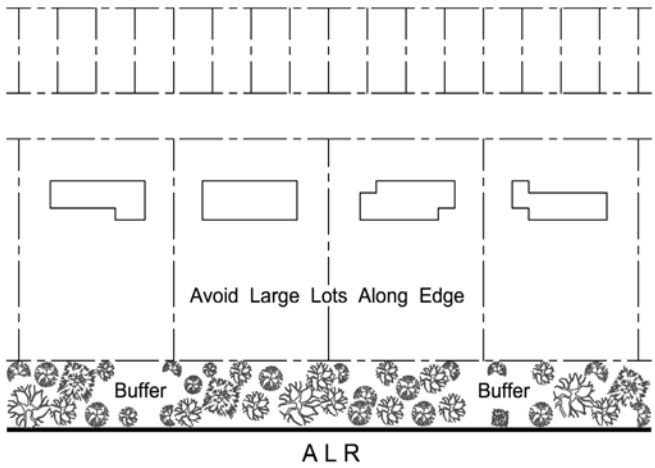
Each subdivision can be required to dedicate 5% of the gross site area for park and open space. For urban sites abutting the farming edge, the 5% should be provided adjacent to the boundary of the ALR or other farming area, to create space for a vegetated buffer. Sites elsewhere within the 300-metre-wide Edge Planning Area could contribute the cash in lieu of the 5% land dedication and the funds could be used to acquire land for the edge buffer in locations where the buffer is missing.



- The parks plans, and zoning and subdivision procedure bylaws could specify these uses of the 5% or cash-in-lieu along the urban side of the agriculture-urban edge.

3.3.f Avoid larger suburban lots along the edge

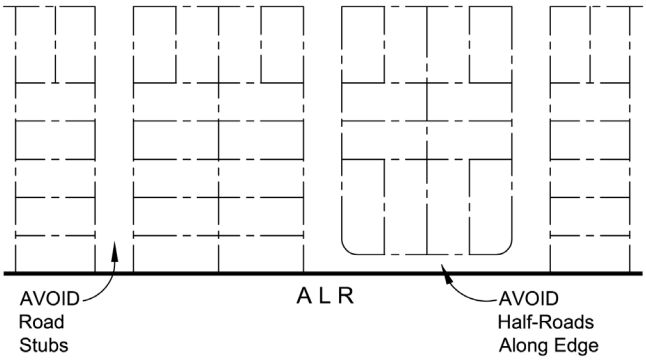
Some local governments have OCP designations and zoning which create larger (say 1 acre or 0.4 ha) lots along the urban side of the ALR edge. While such lower density has the advantage of locating fewer non-farm residents close to the farming, such an approach may backfire. There has been some evidence in Ministry studies of the edge, that more-affluent residents on larger suburban lots adjacent to farms have higher expectations of peace and quiet and are more likely to complain about farm practices.



- Instead of lower density suburban lots along the edge, an OCP should specify the use of other tools in this guide

3.3.g Avoid road stubs and half-roads

Urban-side roads which lead to the agriculture-urban edge and stop create the impression that further urban development of farm land is anticipated. Allowing an urban subdivision to create a half-width road along the farming edge also gives the impression that future subdivision is expected. Both road pattern designs will fuel speculation and drive up farm land prices. Avoid both.



Existing road stubs could be converted to cul-de-sacs or T-ended roads or to mini-parks. Existing half-roads could have dense vegetation planted along the agriculture-urban edge to emphasize "the other half will not be built".

The *Land Title Act* states an approving officer may refuse a subdivision if "the extent or location of highways and highway allowances shown on the plan is such that it would unreasonably or unnecessarily increase access to land in an agricultural land reserve".

Sometimes an approving officer thinks he/she must allow access from the subject lot to land adjacent or beyond within the ALR, but that is not necessary because the ALR should be considered as long-term farm land

not needing any more access.

- Zoning and subdivision procedure bylaws can specify that road stubs and half-roads must be avoided adjacent to farming areas.
- Approving officers should be encouraged to refuse such urban road designs.

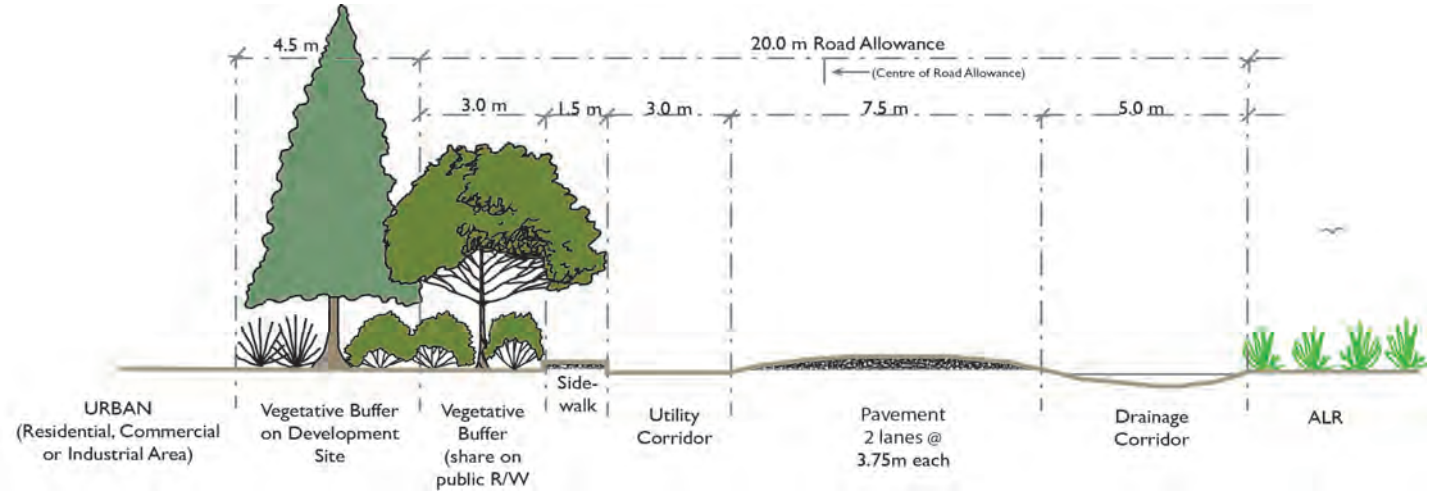
3.3.h Offset Road Along Agriculture-Urban Boundary

Offset pavement toward the agriculture-urban edge, to provide about 1/3 to 1/2 of the buffer on the road allowance.

Avoid new driveways from this road to the urban area, to reduce the openings in the buffer.

Residences should still be sited 30 metres from the boundary – in this case, the setback from the buffer would be 30 – (20+4.5) = 5.5 metres.

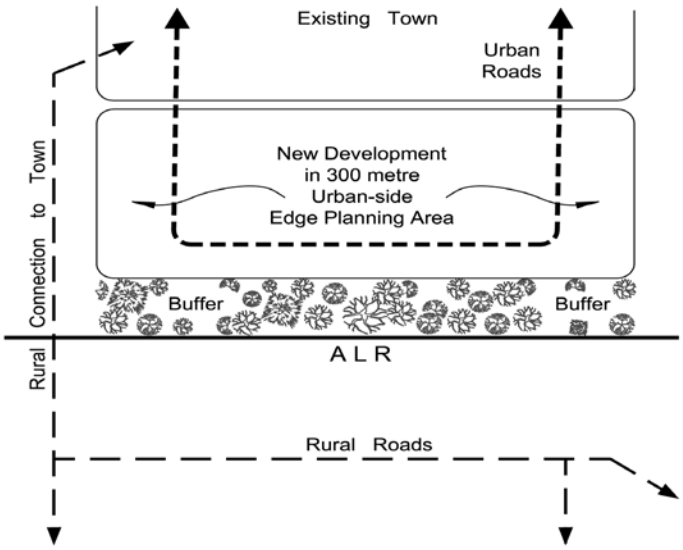
Reduce buffer width to 7.5 metres (from 15 m) to allow for width of road allowance.



3.3.i Direct urban traffic away from farms

Non-farm roads and trails should be linked to collector roads which do not lead the non-farm traffic along routes the farmers use to move their slow, large equipment. By limiting urban access to farm roads, future conflicts between farmers and urbanites can be reduced.

- Transportation and pathway plans in the OCP can allow for such separation of traffic types.



3.3.j Avoid utility extensions into ALR

Like the road patterns, the extension of utilities such as water and sanitary sewer, can fuel speculation of future urban expansion. Either the utility presence creates demand by farm land owners to use the utilities for urban development, or it creates an expectation of urban uses along the lines to pay for them, or both.

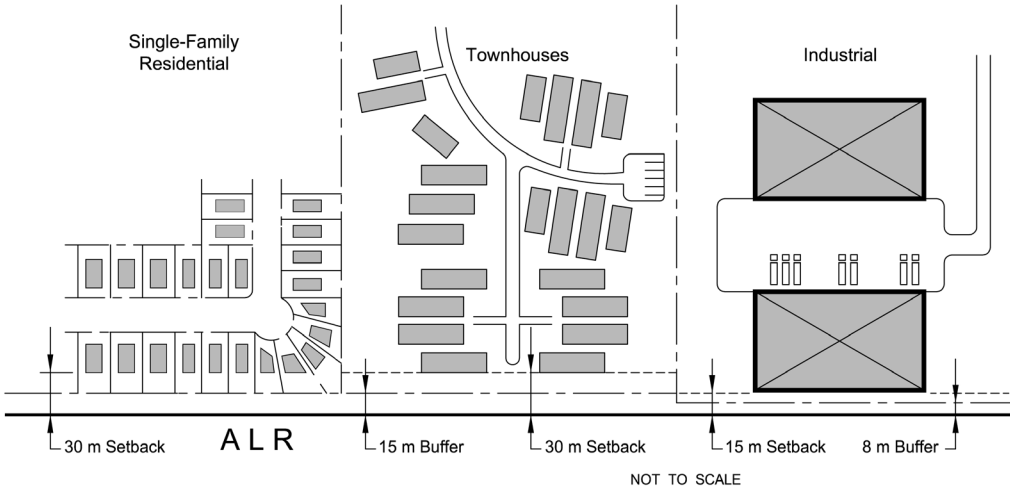
3.4 Site and Building Design and Layout

The setbacks to buildings from the agriculture-urban edge and the design of the buildings themselves can help create the separation between agriculture and urban or industrial uses. They can also decrease the impact of farming activities on the building occupants.

3.4.a Setbacks of buildings from ALR edge

The urban-side setback from the ALR, or other farming area, edge to housing or other buildings should provide some distance separation to the farms, and it should provide space for a wide, vegetated buffer.

In most cases, it will be the rear lot line which abuts the agricultural area, but for some townhouses, apartments, commercial, industrial, or institutional buildings, it may be a side lot line which abuts the agricultural area.



Recommended setbacks of buildings adjacent to the ALR are:

Residential: 30 metres

Commercial or industrial: 15 metres

Institutional: (to occupied buildings) 90 m.

- These setbacks could be included in zoning bylaws and/or development permit area criteria.

3.4.b Vegetated Buffer Height and Width

A continuous buffer along the urban side of the agriculture-urban edge will serve several functions. It will provide a visual screen of farm buildings and activities, provide a deterrent to trespass onto farms, capture some dust and spray drift, and filter farm odours somewhat.

Recommended height at plant maturity: 6 m.

Recommended MINIMUM buffer width:

Residential: 15 metres

Commercial or industrial: 8 metres

Institutional: 15 metres

On existing lots where available space may be limited: 3 metres

Where a stream abuts the farm interface, the vegetated buffer width can be reduced to (in addition to the stream width):

Residential: 8 metres

Commercial and industrial: 6 m

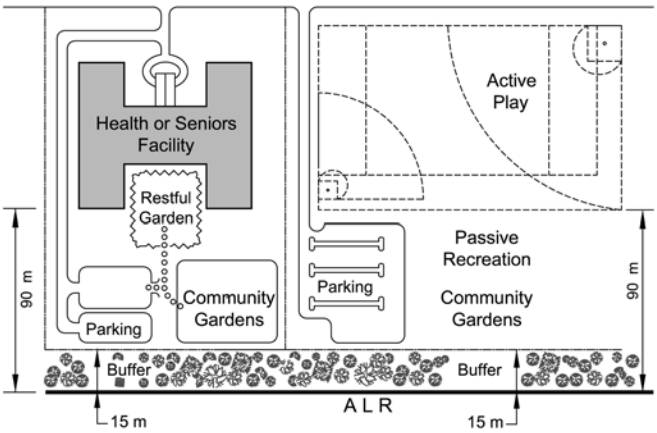
- These buffer widths could be included in a landscape bylaw, in the landscape section of the zoning bylaw, and/or as development permit area criteria.

3.4.c Institutional Site Layouts

Locate large institutional groups of people – playgrounds, schools, churches, health care facilities, seniors' centres, etc. - far from agriculture ("Planning for Agriculture" recommends 90 metres).

Parks situated adjacent to agricultural areas should have active recreation facilities, with larger groups of participants and audience, located farther from farms. Passive recreation facilities and parking areas could be near the agricultural edge.

The buffer design should include extra measures, like a fence or prickly shrubs, to prevent trespass onto farms because adventurous youth at the school or park may seek to explore the farms.



- These design criteria could be in the institutional zones and/or development permit area criteria. They should be shared with architects and other facility planners.

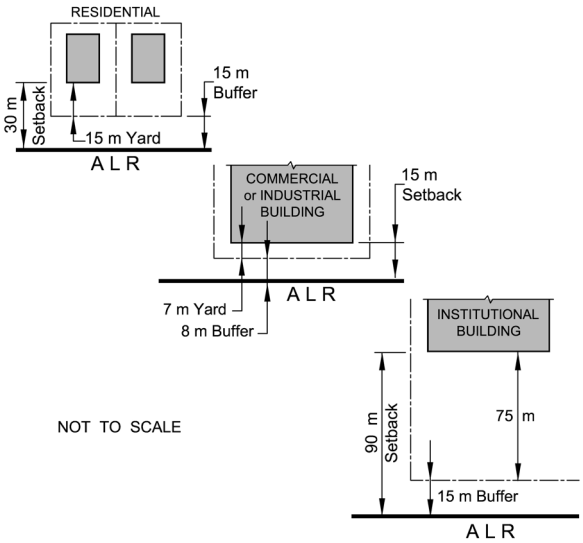
3.4.d Yard Widths Next to ALR or Buffer

In many lot layouts, the vegetated buffer may be included within the setback area. But as recommended below, it would be better for long-term plant maintenance if the buffer area is separate land parcel instead of just an easement. The resulting rear or side yard width abutting the agriculture-urban boundary is recommended to be:

Residential: 15 metres

Commercial or industrial: 7 metres

- These yard widths could be included in the zoning bylaw.

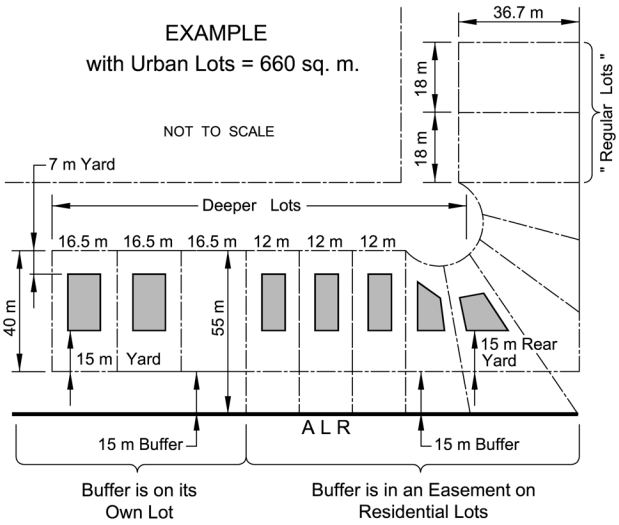


3.4.e Longer or Deeper Lots

To accommodate the longer or deeper yards (in 3.3.d above), the parcels abutting the agriculture-urban boundary should be longer or deeper. They may also have narrower width, if the lots are to have similar areas.

- These criteria could be included in the zoning and/or subdivision procedure bylaw.

NOTE: the lots on the left side of the sketch have standard yards and the buffer is on its own lot.

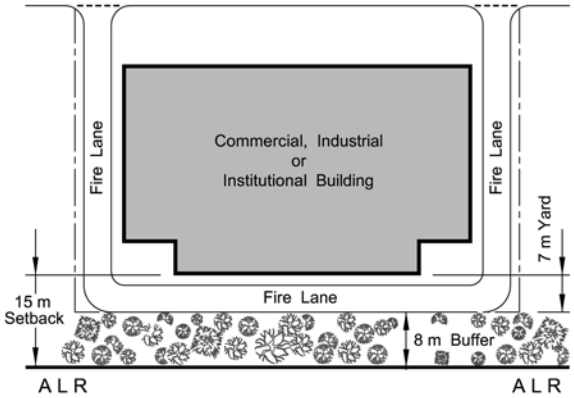


3.4.f Fire Lanes, Other Items in Yards next to Agricultural Areas

Fire department vehicles must be able to have access to all sides of commercial, industrial, and institutional buildings. Along the agricultural edge, such fire lanes could be constructed in the yard area between the vegetated buffer and the building.

Other items which could be included in yards are: parking, stormwater management, and community gardens.

- The zoning and building bylaws and perhaps a development permit area could include these criteria.

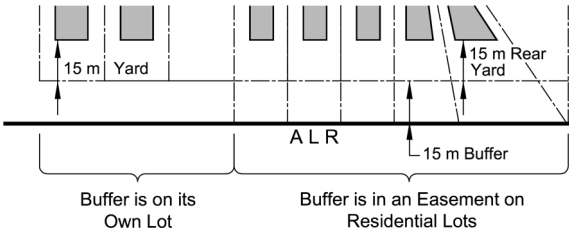


3.5 Open Space and Landscape Design

There are some broad planning and design concepts to be considered in the design of open space and landscape buffers.

3.5.a Buffer in a Separate Dedicated Parcel

Commonly, vegetated buffers have been planted in an easement or covenant area at the end of the (usually rear) yard. Even if the lot owner knows or remembers the easement exists, in the future, he/she may choose to clear or modify the vegetation for his/her own purposes.



A slightly more stable version is within strata titled projects, the buffer area could be made common property. Still, the buffer's continued existence and health depend on the strata members maintaining it.

A much more stable approach that is recommended is to have the vegetated buffer area surveyed into a separate parcel which is turned over to the local government for long-term maintenance.

The measurement of the rear or side yard, and/or setback would be made from this new lot's boundaries.

- This separate-lot approach could be included in development permit area criteria and in the zoning and subdivision procedure bylaws

3.5.b Features of the Buffer Vegetation

- While ensuring farm operations are not affected, maintain and enhance views and natural landscape features – riparian areas, nests, environmentally sensitive areas.
- Retain pertinent existing tree cover in buffer in natural state.
- Locate and choose species in the buffer which will not shade the farm crops.
- Do not plant invasive species.
- Use low-maintenance, drought-tolerant plants.
- Select tree and shrub species which will not harbour insects or diseases harmful to nearby farm crops.
- Select tree and shrub species that will filter dust and spray drift from the agricultural area – see Appendix.

3.6 Storm and Ground Water Management

Urban developments can affect nearby farms by changing the storm water flows and the ground water levels. When development occurs, it usually is converting "soft", natural landscape to "hard", paved areas or roofs. Rainwater that used to soak into the ground often runs off more quickly, either to neighbouring lots or to the municipal storm drainage system of pipes, ditches, and streams.

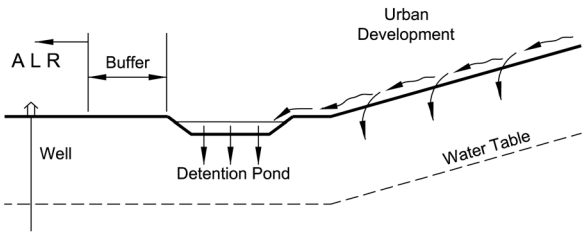
Farms have been affected by the faster runoff flowing on to farm fields making it too soft for farm machines to work, or flooding crops causing loss of value. Developers and local government engineers and planners are considering newer, "green" water management techniques. New drainage management techniques are creating mote infiltration and delaying runoff through retention and detention facilities (over-sized pipes, French drains, ponds). If the pre-development rates of infiltration are decreased considerably, the water table may fall, affecting nearby springs, wells, or ditches that farmers have been using to irrigate their crops.

Some features of storm and ground water management pertinent to edge planning follow.

3.6.a Avoid Changes to Water Cycles Nearby

Post-development surface water flows and stream and ditch runoff rates and volumes should match the pre-development ones. Do not allow flooding of nearby farms. Ground water levels in nearby wells after development should be the same as before development.

On-site storm water detention or retention ponds could be designed next to the buffer area to add to the amount of separation distance between urban uses and farms.



- These concepts could be included in development permit area criteria.
- They could form part of the engineering standards and subdivision procedure bylaw.

3.6.b Possible Water Benefits to Farmers

It may be that nearby farmers could use the extra water at some times of the year. The detention pond could be a holding pond for future farm irrigation. Or, the farmers may be having problems caused by ground wa-

ter levels and would want the water table to be lowered.

The buffer design could break up overland flow and divert water. A ditch along the agriculture-urban interface may catch runoff from uphill but it might also effectively block trespass into farm fields and direct runoff to irrigation systems.

The engineers designing the urban development water systems should consult nearby farmers to see whether the project's water management could also benefit the farmers.

- Co-ordinated design between urban projects and nearby farms could be a requirement in the local government's engineering standards for development.
- It could also be a DPA criterion where the DPA is for the purpose of water conservation.

3.7 Urban-side Buffer Design

Buffers provide a number of benefits for both residents and farmers. Extensive research on buffering has found that complaints about farming practices are often based as much on perception as reality. Seeing the source of the nuisance may heighten the perception of that nuisance (DNR, 1997; BCMAFF, 2000). Thus, establishing a visual barrier between the development and agricultural land can significantly reduce the level of complaints by minimizing both the cause and the perception of a nuisance.

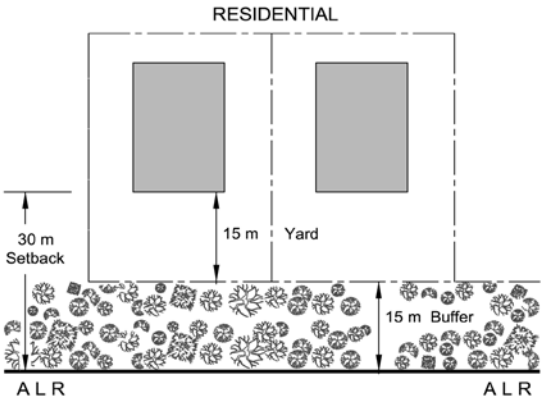
When designed and installed properly, buffers are extremely effective at reducing livestock harassment from dogs, preventing trespass and the associated problems of litter and crop damage. In addition, buffers can mitigate the effects of noise, light, and dust or spray drift.

They can also provide passive, low-intensity recreational and wildlife benefits without negatively impacting adjacent farm operations. A vegetated buffer can:

- protect soils, crops, pastures, and livestock from the effects of damaging winds.
- help reduce soil temperatures and retain moisture
- provide critical food and shelter for a variety of songbirds and small mammals
- provide linear habitat that forms corridors for species to move through
- add an opportunity for agro-forestry sample planting. [Agroforestry is a land management approach that purposefully integrates the growing of trees with crops or livestock.][1]

3.7.a Buffer Design Elements

Research undertaken by the B.C. Ministry of Agriculture indicates that the most effective buffer combines separation of uses, dense vegetation, and fencing. Basic buffer design concepts include:



- **A total minimum separation distance of 30 m** (15 m of which is a vegetative buffer) between a housing unit and agriculture-urban boundary is required to mitigate most effectively the impacts of urban and farming activities.
- A greater separation distance of 50 metres would be optimal based on previous Ministry studies, but limited land availability and current development patterns have lead to a compromise in the spatial setback.

1 http://www.agf.gov.bc.ca/resmgmt/agroforestry/index.html

- By including a barrier (fence), trespass can be prevented.
- **Finished height**: The vegetative buffer must reach a finished height of at least 6 metres to screen effectively the farm operation from its urban neighbours. This height will also capture more dust and spray drift.
- Mixed planting: A mixed deciduous and coniferous planting with foliage from base to crown is required in order to ensure dust and spray drift is captured to the fullest extent possible.
- The **crown density** must be 50-75% - i.e. densely packed hedges are not desirable due to poor air circulation which can lead to ineffective buffering of dust and spray drift and odour.
- A **2-metre separation distance** between the vegetative buffer and agriculture-urban boundary is desirable as it provides space for improved functioning on the agricultural side – less shading, more air circulation and greater manoeuvrability for farm equipment. This two-metre-wide strip could have low-growing vegetation.
- Any pathway or passive recreation along the buffer should be set far away from the farms, with two-thirds of the buffer width, or at least 7 metres of planting between the path and the farm land.

At first glance, it may appear that nothing can be done to enhance this 'built out' urban area adjacent to the ALR for greater compatibility.

But . . . . two actions are possible:

1. **Disclosure statements could be placed on the land titles to indicate to future owners of these homes that they are living near a farming area.**
2. **A buffer could be installed along the road ending that abuts the farm edge.**

3.7.b Buffer Design Plan

- Each application for new development should submit a **buffer design plan** showing:
  - existing and proposed grades
  - extent of the buffer
  - constructed barriers
  - location, spacing, size, and quantity of proposed and existing trees and shrubs
  - list of the tree and shrub species to be planted.
- Another plan should note the subdivision and building design elements that will promote compatibility along the edge (e.g., road layout, location of patios, sound-proofing measures, separation distances, and rainwater management).
- The requirements for these plans could be included in guidelines for a development permit area on the urban side for the protection of farming. See sample wording in Appendix A. The buffer requirements could also be included in the zoning bylaw or servicing standards, or in development procedures bylaws. The approved plans could be included in a restrictive covenant on the land titles.
- Establishing buffer criteria or guidelines should be considered a long-term policy initiative. Where urban uses are already built to the farm land edge, the buffers would be obtained gradually over time as re-development occurs.

3.7.c Buffer Installation and Maintenance

- Ensure the buffer is installed prior to building construction.
- Ensure the buffer is maintained:
- Require a letter of credit for the installation cost, of which a portion would be returned to the landowner or developer after substantial completion of the landscaping construction.
- The remaining portion of the monies should be held for two to three years and returned if the buffer vegetation is deemed to be healthy.
- Irrigation and weeding should be undertaken to ensure survival of the plants.
- If the buffer does not pass inspection, the security can be renewed until the buffer is approved, or the security deposit can be used to undertake the necessary work to complete the landscaping.
- Establish a restrictive covenant on the land title requiring preservation of the buffer and prohibiting the construction of, or addition to, any buildings or structures within the buffer area or a yard adjacent to the buffer.
- It would be best if the buffer was dedicated to the local government, and then public maintenance would be required. OR
- If the buffer is to be maintained by the developer or subsequent owner, a maintenance plan should be prepared and signed off by a registered landscape architect or professional biologist.

Periodic inspections should be conducted to ensure maintenance is being undertaken.

- The requirements for buffer installation and maintenance could be included in development procedures bylaws.

SAMPLE COVENANT WORDING

"The property owner acknowledges that:

1. **the lot is subject to the following restrictions:**
   a. **the vegetated buffer will be maintained;**
   b. **no habitable structures will be built in the rear or side yard abutting the ALR;**
   c. **the walls and windows facing, or at an angle to the ALR, will be constructed with extra sound-proofing and no patios will be built on those sides.**
2. **Because the lot is close to the Agricultural Land Reserve, some or all of the following impacts arising from agricultural practices may occur:**
   a. **noise from farm operations at various times of the day, including propane cannons and other devices used to deter wildlife;**
   b. **farm odours and chemical spray;**
   c. **aesthetic appearance of fields (unkempt fields, storage of materials, etc.);**
   d. **light from greenhouses."**

3.8 Urban-side buffer design specifications

Below are the setback distances for principal buildings and design criteria for installing an urban-side buffer along the agriculture-urban boundary. Four examples of design specifications and layouts follow.

Urban-Side Setback & Buffer Design Criteria for Urban-Agriculture EPAs			
	Setback Distance and Buffer Size	Buffer Height	Buffer Design Features
Level 1 Urban-side Residential Setback & Buffer*	**Setback** **30 m** from agricultural area boundary **Buffer Width** **15 m** – buffer is located within the 30 m setback	6 m ** (finished height)	• Mixed planting of fast growing tree and shrub species with foliage from base to crown – long thin foliage desirable. Include at least 60% evergreen conifers to collect dust & spray drift. • No gaps in buffer and no tightly packed hedges; crown density of 50-75%. Design as wedge shaped if odour dilution desired. • Design specifications and layout will be as per urban-side Buffer A or B (p.24); or existing vegetation may be retained as part of buffer (Buffer C, p.26). • Leave 2 m of low growing or no vegetation from agricultural areaboundary. • If paths and passive recreational uses (e.g. picnic areas) are part of the landscaped buffer, the recreational features will not take up more than 1/3 the width of the buffer and they will be located away from the agricultural area boundary. • If community forest/gardens are an included use of the buffer then the uses should be located away from the agricultural area boundary and protected with vegetation.
Level 2 Urban-side Non-Residential Setback & Buffer (e.g. passive recreation, industrial, or commercial)	**Setback** **15 m** from agricultural area boundary **Buffer Width** **8 m** – buffer is located within the 15 m setback	6 m** (finished height) **See Note 2 below	• Either a double row of mixed deciduous/coniferous (with at least 60% evergreen conifers) or just coniferous, and hedging/screening shrub species with foliage from base to crown. • Design specifications and layout will be as per urban-side Buffer D (p.27); or retain existing vegetation (Buffer C, p.26). • Leave 2 m of low growing or no vegetation from ALR boundary.

* Exception to Level 1 Residential Urban-side Buffer requirements:

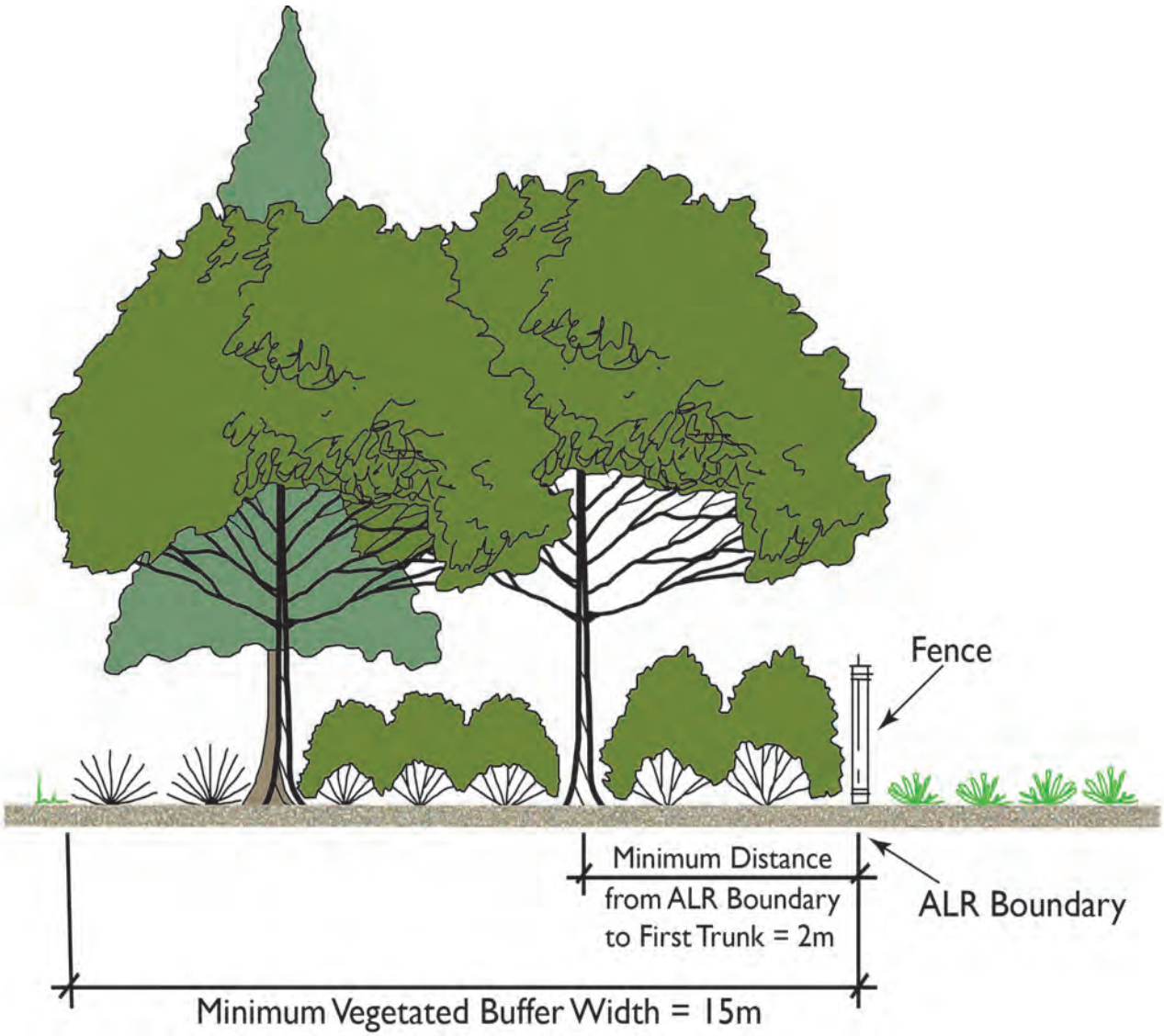
Residential parcels that are separated from the agricultural area by a road allowance can reduce the size of the Level 1 buffer, provided new driveway accesses from these parcels onto the subject road allowance are avoided. The siting of the residence should still be 30 m but the vegetative buffer can be reduced to 7.5 metre width and located as near and parallel to the agricultural area boundary as possible.

** If spray drift is a concern, tree height should be 1.5 times the spray release height or target height, whichever is higher.

3.8.a Urban-Side Buffer A (no berm) – Design Specifications & Layout

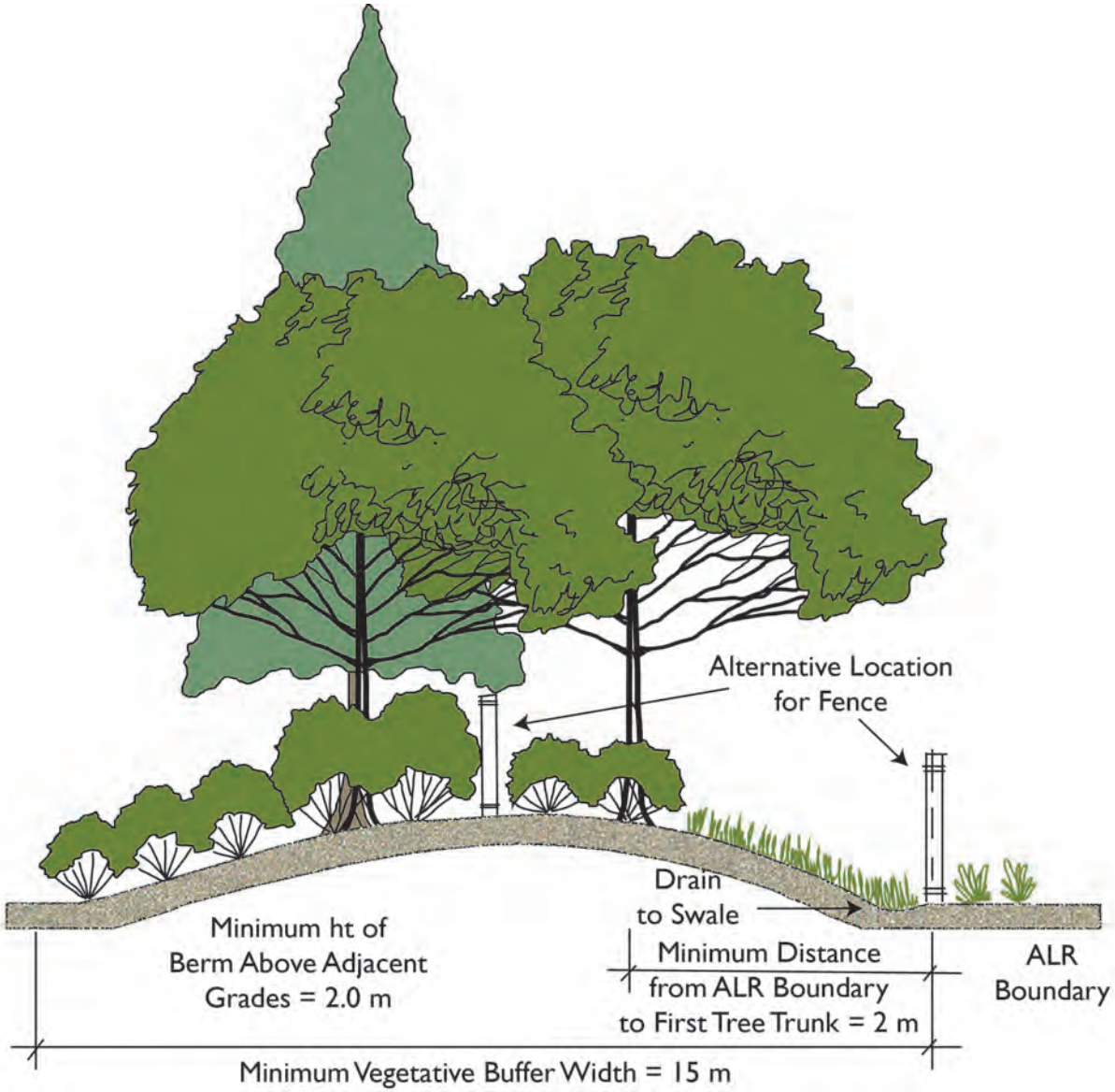
The Urban-side **Buffer A** includes:

- double row deciduous/coniferous trees (see Appendix B for plant list)
- triple row trespass inhibiting shrubs (see Appendix B for plant list)
- double row screening shrubs (see Appendix B for plant list)
- solid wood fence or chain link fence with a height of 6 feet (1.8 metres) and built as per Appendix C or as per the local government's fencing specifications.



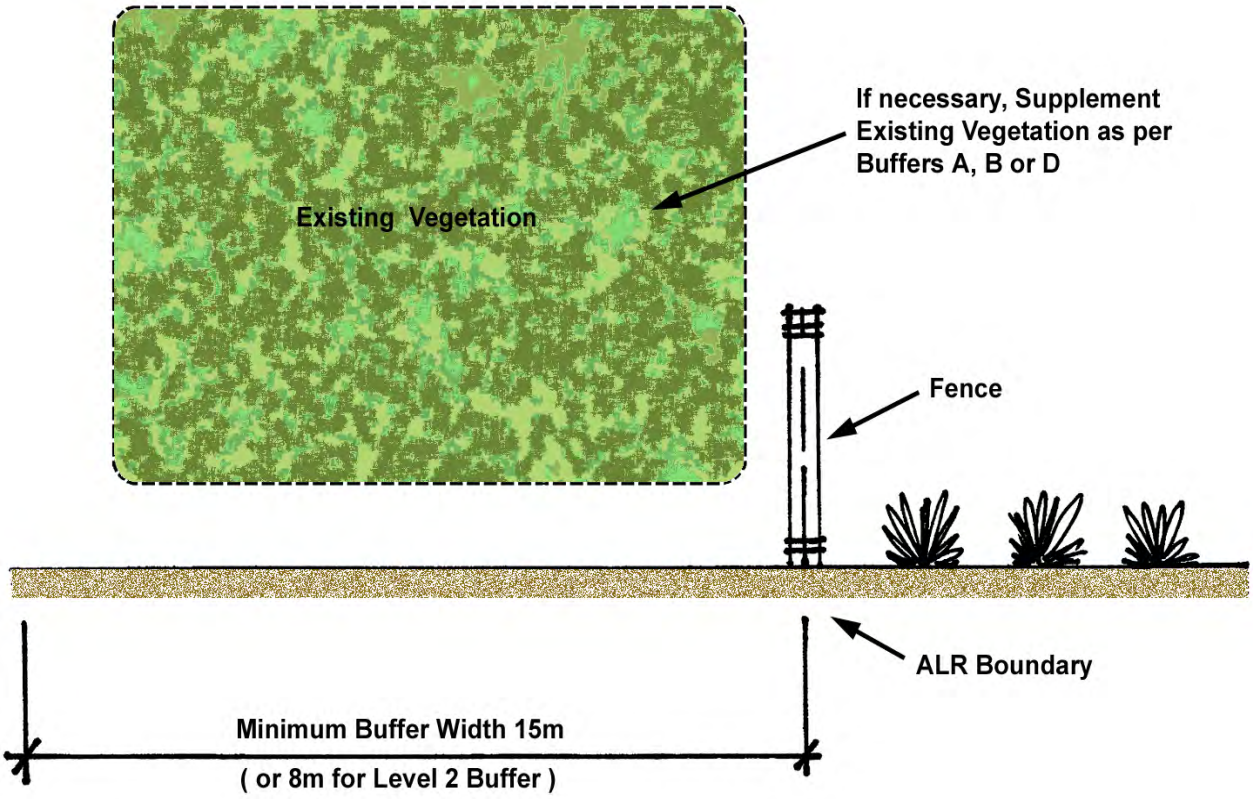
3.8.b Urban-Side Buffer B (with berm) – Design Specifications & Layout

Urban-side **Buffer B** includes all elements of **Buffer A**, as well as a berm with a minimum height of 2 metres above the adjacent grades. There are two alternatives for locating a fence, either at the lowest or highest points of the berm. This choice should be made according to design and use of adjacent properties. The main intent of the berm in this example is to provide increased storm water retention capabilities of the buffer, although a berm may provide more effective noise reduction and visual screening as well.



3.8.c Urban-Side Buffer C (Existing Vegetation) - Design Specifications & Layout

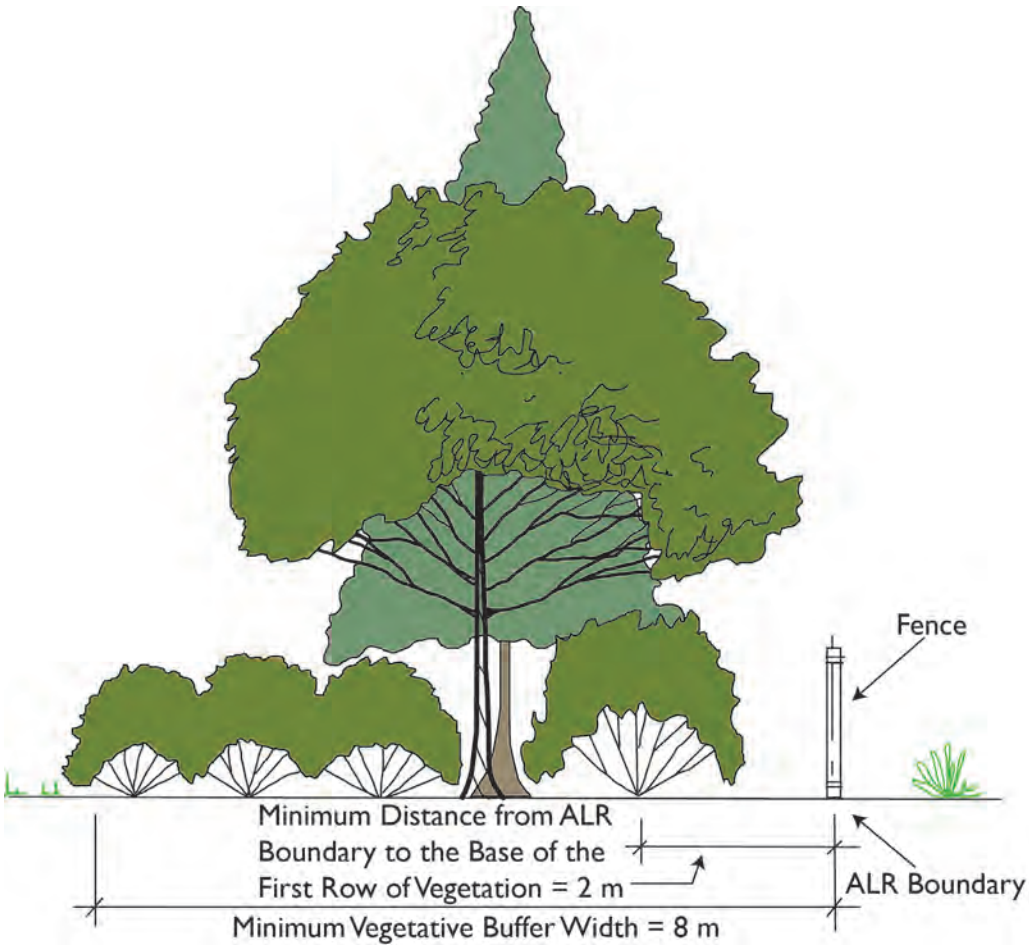
Urban-side **Buffer C** should retain existing vegetation and use either a solid wood or chain-link fence with a height of 6 feet (1.8 metres), built as per Appendix C or as per the local government's fencing specifications.



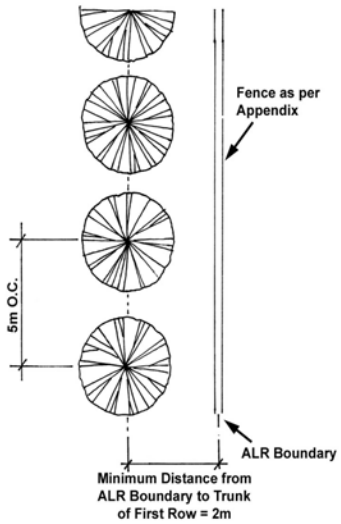
3.8.d Urban-Side Buffer D - Design specifications, layout & spacing

Urban-side **Buffer D** includes:

- single row deciduous or coniferous or just coniferous trees (see Appendix B for plant list)
- triple row trespass inhibiting shrubs (see Appendix B for plant list)
- single row screening shrubs (see Appendix B for plant list)
- solid wood fence or chain link fence with a height of 6 feet (1.8 metres) and built as per Appendix C or as per the local government's fencing specifications.

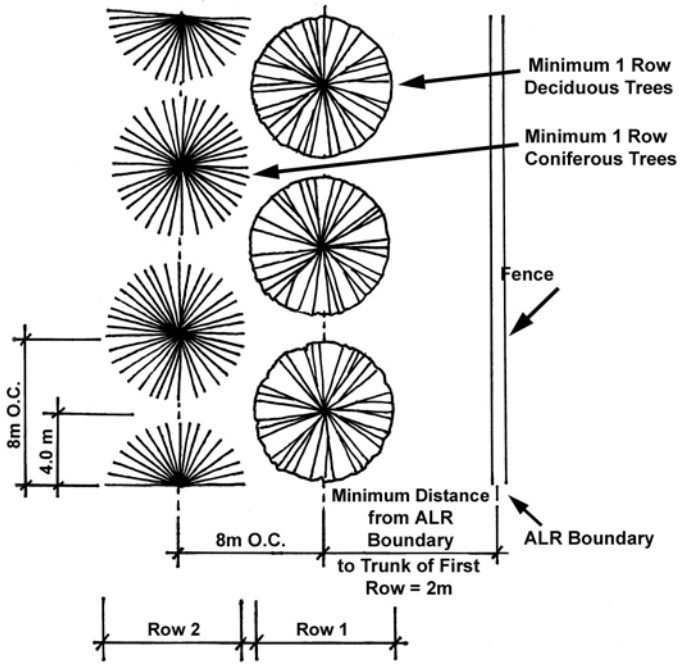


Single row screening shrubs

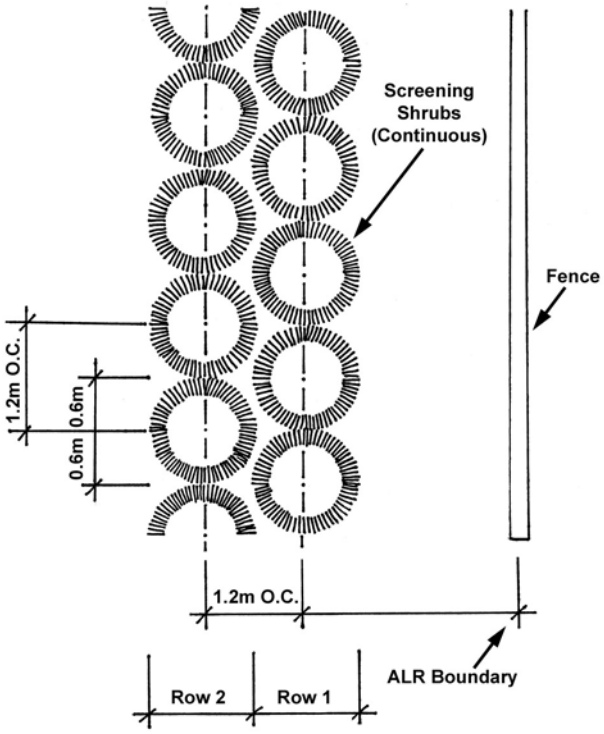


Single Row Deciduous/Coniferous Trees

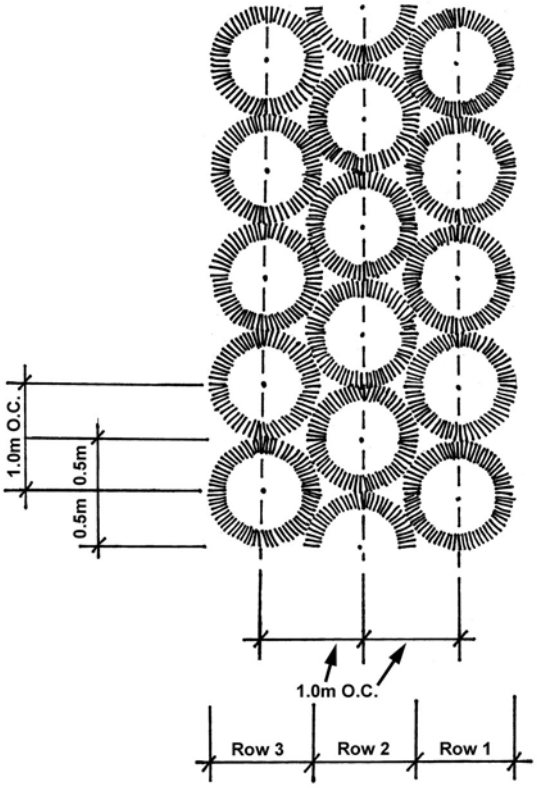
3.8.e Urban-Side Buffer Spacing (Buffers A, B or D)



Double row deciduous/coniferous trees



Double row screening shrubs



Triple row trespass inhibiting shrubs

3.9 Enhancing Agricultural Awareness

Communication tools can be used to enhance compatibility between farming and non-farm uses. Whenever possible, they should be used in conjunction with the other compatibility mechanisms listed in this Guide. These tools can increase the awareness of urban residents living near the farm edge about impacts from normal farm practices that they may experience. The awareness tools can be used even where existing urban development makes it impractical to address subdivision and housing design, or buffering.

Please refer to Appendix A for an example of how the agriculture awareness tools in this section can be applied within Development Permit Area guidelines.

3.9.a Disclosure statements

A disclosure statement, in the form of a restrictive covenant under section 219 of the *Land Title Act* can be a very effective tool. It can inform the prospective land buyer that the property is close to an agricultural area where acceptable farm practices may result in noise, dust, odour &/or other impacts during certain times of the year.

To be accepted by the Registrar of Land Titles, the covenant must have a "restrictive" aspect. Such "restriction" could include other urban-side tools discussed above – e.g., no building in the yards adjacent to the ALR; houses or other habitable buildings must have extra sound-proofing.

If new development occurs in the Edge Planning Area, within 300 metres of the ALR boundary, a covenant could be placed on land titles disclosing the proximity of the agricultural area and the potential implications.

3.9.b Signage

Local governments should consider using signs along the agriculture-urban boundary that inform residents and prospective purchasers of the proximity of farm operations within the immediate area and the possible activities associated with farm operations. Here are two sample buffer signs.

Farmers in this area sometimes:

- Make noises to keep wildlife away from crops
- Plough fields on dry, dusty days
- Spread manure to fertilize fields
- Spray crops to eliminate weeds or plant disease
- Drive big, slow machines between fields
- Harvest crops day or night when ripe

3.9.c Information Package

One final 'awareness tool' that local governments may wish to develop is an information package for new and/or existing residents located within the Edge Planning Area, 300 metres of the agricultural area boundary. This package could include:

- information on and the benefits of the vegetative buffer (assuming one is installed);
- a brief overview of the Provincial Farm Practices Protection legislation and acceptable farm practices;
- the Ministry of Agriculture booklet *The Countryside and You;*
- contact numbers for the Ministry and the Farm Industry Review Board (which reviews complaints about farm practices).

The information package should ensure local relevance by describing the types of farm operations commonly found in the area and use local references. The Ministry could help local government staff and the local agriculture organization or Agricultural Advisory Committee in preparing the package, if requested. This package will help to establish effective communication between farmers and their non-farm neighbours and ultimately assist in reducing potential conflict.

3.10 Case Studies

3.10.a City of Surrey

Context

The City of Surrey is the second largest municipality in BC, with a population exceeding 400,000. Rapid urbanization in Surrey has occurred alongside a significant farming industry. Approximately one-third of the land base in Surrey (nearly 10,000 hectares) is farmland. As a result, the City has longstanding experience in mitigating conflicts between urban and farming land uses.

Policy

For more than two decades, Surrey has employed a policy requiring buffers between urban and farmland uses. A buffer of 15 metres is required on the urban side, with a fence along the property line, vegetation and a restrictive covenant that requires the property owner to maintain the buffer. Neighbourhood Concept Plans and rezoning trigger the buffering requirements.

In addition to the buffer, maximum densities are established within ¼ mile of farmland. Directly adjacent to the farmland, no more than 2 units per acre are permitted. Farther from the edge, densities can increase to urban levels. Recent changes to the policy require that the buffer landscaping must be installed prior to the issuance of a building permit.

Lessons Learned

In general the City has found that the buffers, when installed and maintained properly, seem to be effective. Problems tend to arise with respect to enforcement and when developers negotiate relaxation of buffer requirements. When a property owner removes the landscape plantings within the buffer, the City has no recourse other than to take the owner to court to enforce the restrictive covenant. The City is currently exploring the introduction of bylaws and fines to increase enforcement abilities.

The City has also discussed the possibility of reversing the density policy, thereby allowing higher density strata projects adjacent to farmland. A strata council would perhaps be more reliable in maintaining the buffer, while residents of multi-family units could be more tolerant of the noise and other aspects of farming as compared to their estate lot counterparts.

Links

http://www.surrey.ca/business-economic-development/1428.aspx

3.10.b Regional District of Nanaimo

Context

The Regional District of Nanaimo has a population of about 140,000, approximately one quarter of whom live in unincorporated areas. Nearly 9% of the region's land base is designated in the Agricultural Land Reserve and rapid growth in some areas of the district has increased the size of the interface between urban and farmland uses.

Policy

The Regional Growth Strategy emphasizes the protection of rural areas and agriculture. As a result, the Official Community Plans for Arrowsmith/Benson, Nanoose Bay and Area G include Development Permit Area (DPA) requirements for farmland protection. In these communities, the concept of buffers to farmland was introduced during the OCP process and supported by the community.

The three farmland protection DPAs are largely similar. A DPA is required for developments within 15 metres or across a road from ALR land. A vegetated buffer is required and fencing can be provided if designed with reference to the ALC publications. A restrictive covenant must be registered on title.

There are a number of exceptions from the DPA requirements. If no building is proposed within the 15 metre buffer area, following DPA guidelines is not required. Most commonly, subdivisions in which the lot depth is 50 metres or more are not required to follow the guidelines in the DPA. As a result, only 7 permits have been issued in over a decade, despite ongoing development in the region.

As well, due to developer criticism, in the most recent set of regulations (Area G), DPA guidelines are not required for subdivisions separated from ALR land by a road.

Lessons Learned

The many exceptions dilute the effectiveness of the requirements, since very few development applications actually trigger a DPA. In addition, the latest DPA guidelines are further diluted, since a roadway is considered to be an adequate buffer. Fortunately, a lack of complaints from farmers and residents indicate that there have not been significant problems to date.

Links

RGS: http://www.rdn.bc.ca/cms/wpattachments/wpID436atID413.pdf

Arrowsmith-Benson OCP: http://www.rdn.bc.ca/cms.asp?wpID=403

Area G OCP: http://www.rdn.bc.ca/cms.asp?wpID=1722

Nanoose Bay OCP: http://www.rdn.bc.ca/cms.asp?wpID=1125

Part 4 – Farm-Side Edge Planning Tools

Application of the tools in Part 4 will require the use of a Farm Bylaw. Therefore, local governments will need to engage the Ministry of Agriculture, as well as their local farmers, early in the process in order to develop and implement the most effective farm-side edge planning tools for their community. Farm Bylaws require the approval ov the Minister of Agriculture, which in the case of edge planning would be expected only when urban-side restrictions are jointly applied.

4.1 Overview of Farm Side Guidelines

This Part contains the farm-side edge planning tools and implementation methods to promote compatibility. When they are applied within the ALR, they are only available to local governments regulated under section 918 of the *Local Government Act*. The farm side tools include the use of BOTH the siting of certain farm structures AND some farm management techniques in the Edge Planning Area (EPA). This combined approach enables agricultural lands at the urban edge to be utilized for farm purposes and not be subject to prohibition of uses.

These tools address four aspects of the farm operation:

1. Scale of farm to which the edge planning criteria will apply
2. Management practices that reduce the potential for nuisance concerns
3. Building setbacks that reduce the potential for nuisance concerns; and
4. Landscaped buffering that relaxes the setback requirements for select buildings.

These tools provide a starting point for local governments to explore their appropriate application. Each community will need to craft a package of tools that best suits their needs while maintaining agricultural options within the EPA.

The farm-side management techniques within the Guide are based on practices used by existing operations that are effective in mitigating land use conflict. These techniques will be subject to review and alteration as needed to account for changes in technology and management techniques. In order to ensure the most appropriate farm management and siting techniques are applied, AGRI staff will work with local governments and their farm community to tailor the requirements for their EPA.

4.2 Application of management and siting guidelines

The application of the farm-side edge planning techniques will vary within the EPA. Using the diagram on the next page as an example:

- Within the first 60 metres of the agricultural area boundary some agricultural structures, like manure storage, would be prohibited.
- Within the first 100 metres from the agricultural area boundary, there would be restrictions on the siting of some structures **combined with** special management requirements directly related to lessening conflict (e.g. fan orientation).
- Beyond 100 metres from the edge, structure standards would be the same as elsewhere in the agricultural area. In addition to the setback requirements from the edge, setbacks from lot lines not facing the agricultural area boundary will apply as per local government regulations. Throughout the entire 300-metre-wide EPA, there would be special management requirements for certain activities (e.g. manure application).

The setback distances and management guidelines in this Part are designed to achieve compatibility with an urban residential land user. If other urban uses exist next to the agricultural area boundary such as industrial, commercial, institutional, or passive recreational, and an EPA is deemed necessary, the setback distances and the level of farm management should be reduced to account for these differing or less-intensive urban land uses. For example, the 60 metre setback distance could be used along with the base set of management requirements (i.e. the management requirements currently associated with the 100 metre setback).

The diagram below shows where some of the tools can apply within the farm-side EPA.

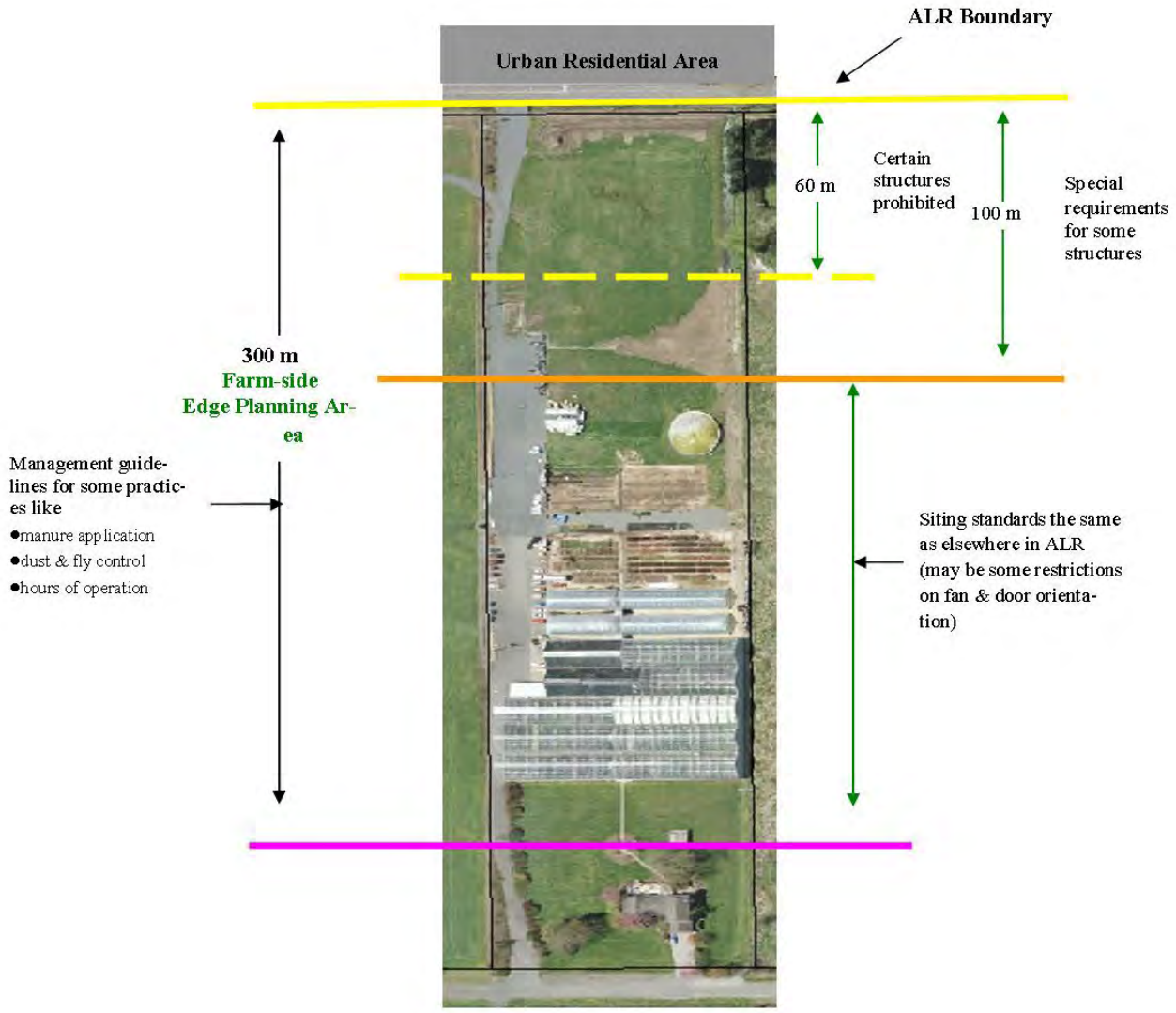


Figure 4: Farm-side Edge Planning Area Example

4.3 Role of the zoning and Farm Bylaws

Because the farm-side guidelines address both the siting of buildings and the management of farming activities, a combination of zoning and farm bylaw powers is required to implement these guidelines within the ALR.

A zoning bylaw regulates the land use and its arrangement on a site. To regulate farm activity, i.e., how a farm is operated, a Farm Bylaw will be needed. Section 917 of the *Local Government Act* establishes Farm Bylaws to address things like conduct of farm operations, types of buildings, machinery and equipment that are a pre-requisite to conducting a farm operation, and the siting of stored materials, waste facilities, and stationary equipment. Before a local government can adopt a Farm Bylaw, it requires approval by the Minister of Agriculture.

It is suggested here that all new farm operations that locate within the EPA should comply with both the siting and management requirements outlined in a 'hybrid' zoning-plus-Farm Bylaw.

Existing farms will need to be treated differently. With regard to setback requirements for farm structures, local governments could consider exempting existing farm structures, for example, those that existed prior to the date of the new bylaw would follow one set of setbacks, so as to not create non-conforming structures. Management requirements could be handled in a similar fashion. The local government may choose to exempt existing farms, in operation before the bylaw date, from complying with all or some of the requirements. A 'phase-in' approach could be taken whereby existing farms would have a certain number of years to come into compliance. Local governments will need to work with their farm communities to develop the most effective approach for their area.

Farms that are exempted could be provided with a generic edge planning brochure that offers ideas and suggestions for enhancing urban-rural compatibility. The farmer can decide whether or not to incorporate these 'good neighbour ideas'. A mechanism could also be put in place that provides farmers with exempted farms the opportunity to discuss with local government or Ministry staff options for mitigating conflict.

4.4 Edge Guidelines Matched to Farm Scale

Whether, and how, to apply edge planning guidelines within the Edge Planning Area (EPA) will depend on the "scale" of the farm operations along the edge. For small farms, it does not make sense to encourage or require them to follow any of these edge farm management and siting guidelines. They could simply follow the setback and coverage standards in the *Guide for Bylaw Development in Farming Areas* (Bylaw Guide).

How is a "small farm" defined? For edge planning purposes, it includes any farm operation which is below the following "minimum thresholds" for each commodity outlined and that various animal commodities total less than 10 agricultural units [2].

4.4.1 Minimum Thresholds

At or above the minimum thresholds listed below, farm operations would follow the EPA guidelines. Below these thresholds, the small farms would simply follow the Bylaw Guide. Included are:

- Greenhouses: 1,000+ square metres of enclosed structure
- All soil-based cropping farm operations
- Animal operations according to the table below[3][4]

2 An "agricultural unit" is defined as the live weight of 455 kg of livestock, poultry, farmed game or fur-bearing animals or any combination of them equalling 455 kg. See Appendix E for more information.

3 Except for free-range hogs - see section 4.6b

4 Except for ostriches, emus and mink - see section 4.8

4.4.2 Scale of Operation Within Various Distances of Agriculture-Urban Boundary

Farm operations within the distance groupings in the table not only would be limited by the maximum number of animals, but must also follow the special farm management requirements everywhere in the Edge Planning Area.

Type of Operation	Minimum Threshold - above which Application of Edge Planning Area Guidelines are applied	Maximum Number of Animals on a Lot at Any One Time; Distances to Agriculture-Urban Boundary	
		Structures Within 60-99 metres	Structures Within 100-300 metres
Special Management requirements	Farm management guidelines in section 4.5	Farm management guidelines in section 4.5 Also, farms in this area must follow other guidelines in sub-section 4.5x	Farm management guidelines in section 4.5
For types of animals not listed below	2 agricultural units	30 agricultural units	50 agricultural units
Beef and Small Ruminants	8+ feeders or 7+ cows (10+ agricultural units)	45 feeders or 43 cows (60 agricultural units) for uncovered confined livestock areas; and 87 feeders or 82 cows (115 agricultural units) for covered confined livestock areas.	120 feeders or 114 cows (160 agricultural units) for uncovered confined livestock areas; and 175 feeders or 160 cows (230 agricultural unis) for covered confined livestock areas
Dairy	lactating animals, 7+ cows (10+ agricultural units)	57 cows (80 agricultural units) for uncovered confined livestock areas; and 175 cows (245 agricultural units) for covered confined livestock areas	114 cows (160 agricultural units) for uncovered confined livestock areas; and 250 cows (350 agricultural units) for covered confined livestock areas.
Fur	50+ animals	250 animals	500 animals
Hog	36+ grower/finishers; 10+ sows (farrow to wean); 4+ sows (farrow to finish)	55 grower/finishers; 22 sows (farrow to wean operation); or 6 sows (farrow to finish operation); or Any combination totalling 12.5 agricultural units.	220 grower/finishers; 90 sows (with piglets in a farrow to wean operation); or 25 sows (with piglets in a farrow to finish operation); or Any combination totalling 50 agricultural units.
Horses	9+ horses (10+ agricultural units)	25 horses (30 agricultural units)	50 horses (60 agricultural units) for uncovered confined livestock areas.

Type of Operation	Minimum Threshold - above which Application of Edge Planning Area Guidelines are applied	Maximum Number of Animals on a Lot at Any One Time; Distances to Agriculture-Urban Boundary	
		Structures Within 60-99 metres	Structures Within 100-300 metres
Poultry (unless otherwise indicated, numbers pertain to animals contained indoors)	250+ broilers, meat chickens, layers or layer breeders (1+ agricultural unit) 200+ broiler breeders (1+ agricultural units) 100+ ducks (0.8+ agricultural units) 300+ free range birds (1.26+ agricultural units of layers or meat chickens; 6+ agricultural units of turkeys) 150+ pheasants (1+ agricultural units) 200+ pigeons (0.5+ agricultural units) 350+ quail (0.25+ agricultural units) 200+ silkie chickens (0.5+ agricultural units) 200+ turkeys (4+ agricultural units) 100+ turkey breeders (4+ agricultural units)	Chickens (Meat): 30,000 broiler equivalents (130 agricultural units); Chickens (Broiler Breeders): 15,000 birds (61 agricultural units/50 agricultural units); Ducks: 2500 birds (19 agricultural units) Emus contained outdoors: 100 birds (10 agricultural units) Ostriches contained outdoors: 50 birds (17 agricultural units); Pheasant: 9250 birds (28 agricultural units); Pigeons: 1800 birds (4 agricultural units) Quail: 46000 birds (30 agricultural units) Silkie chickens: 15,000 birds (35 agricultural units) Turkeys: 25000 birds (500 agricultural units); Turkey breeders: 10000 birds (220 agricultural units) Free range bird density must not be higher than 1 agricultural unit per 100m^2	Chickens (Broiler Breeders): 60,000 birds (400 agricultural units) Chickens (Layers): 118,000 birds (490 agricultural units) Chickens (Layer Breeders): 30000 birds (140 agricultural units) Chickens (Meat): 225000 broiler equivalents (950 agricultural units) Ducks: 5000 ducks (38 agricultural units) and the density for ducks should not exceed: Meat Ducks - 2.5 square feet (0.23m^2) per bird Developing Duck Breeders - 2.7 square feet (.25m^2) per bird Layers/Breeders - 3 square feet (0.24 m^2) per bird Emus contained outdoors: 200 birds (20 agricultural units) Ostriches contained outdoors: 100 birds (35 agricultural units) Pheasant: 65000 birds (200 agricultural units) Pigeons: 8000 birds (18 agricultural units) Quail: 350000 birds (230 agricultural units) Silkie chickens: 130000 birds (270 agricultural units) Turkeys: 50000 birds (1000 agricultural units); Turkey Breeders: 20000 birds (670 agricultural units) Free Range bird density must not be greater than 1 agricultural unit per 100m^2

4.5 Manure Handling

Special management guidelines that apply throughout the designated EPA have been established for manure storage and application. The guidelines for manure storage were developed with the assistance of the BC Ministry of Agriculture resource management specialists. By addressing the type of manure, how it is stored, and how it is applied to land, the impacts of odour will be mitigated effectively.

4.5.1 Manure Storage

- Only *solid manure* storage is permitted for all commodities, except lactating dairy which can have either *solid manure* storage or *enclosed liquid manure storage*.
- Cover manure in areas with more than 600 mm precipitation during the months of October and April as per Section 9 of the Code of Agricultural Practice for Waste Management.
- Beef - clean feedlot loafing areas at least once every 9 months and dispose of manure.
- Horse - remove manure from paddocks/turn out pens at least once a week and clean out the manure storage area at least once every 6 months and dispose of manure.
- Fur, Hog & Poultry - maintain moisture content of manure in barns at 35% or less.
- Fur – remove manure from pens at least once a week (this requirement can be relaxed during whelping season from April 20th to July 1st).

4.5.2 Solid Manure Application

- Beef, Hog & Poultry - for bare soil application of *solid manure*, incorporate manure within 48 hours of applying to the soil.
- Fur - for bare soil application of *solid manure*, incorporate manure within 4 hours of applying to the soil.

4.5.3 Liquid Manure Application

- No aerial application of *liquid manure*
- No liquid chicken or hog manure application
- Application on bare soil:
  - injection method or
  - surface application method if incorporated within 4 hours of application
- Application on crops (this includes pasture/grassland):
  - *sub-canopy manure deposition method* with a 5-10 year phase in period for existing farms

4.6 On-farm Composting

Special management guidelines that apply throughout the designated EPA have been established for on-farm composting. These guidelines are separated into two categories - mushroom operations and all other farm operations. By addressing how the compost is handled, the types of waste composted, and the volume of production, the impacts of odour will be mitigated effectively.

4.6.1 On-farm Composting for Mushroom Operations

- Use impermeable surfaces for all composting activities and compost storage.

- Cover composting materials (except straw) and compost between October 1 and April 1 in areas with more than 600 mm average precipitation during those months.
- Blending, grinding and mixing of raw materials can occur in an uncovered area but should be transferred to an enclosed composting facility in the same calendar day.
- House the *on-farm composting* process in an enclosed building.
- Maintain *aerobic decomposition* through design, mechanical turning or porous ventilation.
- Collect and treat the exhaust generated through the composting process with a wet scrubber and bio-filter designed by a professional, BC licensed engineer; the wet scrubber and bio-filter should remove a minimum of 90% of the odours.
- Provide an air quality monitoring program developed by a BC licensed professional engineer. This program should provide easy verification that the system, including the bio-filter, is operating as designed; monitor and submit reports annually and include a description of the composting facility and the treatment works, a statement as to whether the composting facility is operating as designed, and the annual compost production in cubic metres at the actual moisture content.
- No *liquid manure* may be composted.
- Manage *solid manure* used for composting according to the commodity-specific EPA guidelines.
- Waste to be composted that is not generated on the farm unit is limited to *solid agricultural waste*.
- The volume of compost produced, including unfinished and finished, is limited to 300 m^3 per week.
- Manage storm water and waste water per the Bylaw Guide.

4.6.2 On-farm Composting for all Farm Operations, except Mushroom

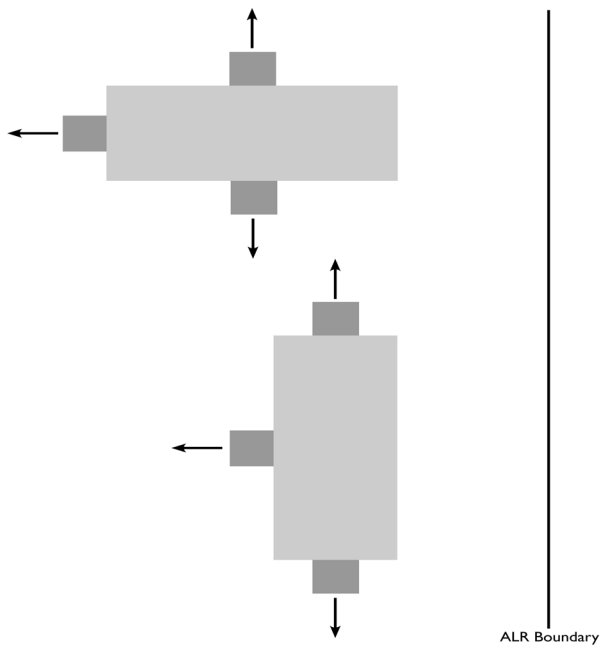
- Use impermeable surfaces for all composting activities and storage.
- Cover composting materials and compost between October 1 and April 1 in areas with more than 600 mm average precipitation during those months.
- Maintain *aerobic decomposition* through design, mechanical turning or porous ventilation.
- No liquid hog or poultry manure may be composted.
- Manage *solid manure* used for composting according to the commodity-specific EPA guidelines .
- Agricultural waste to be composted that is not generated on the farm is limited to *agricultural solid waste*, excluding mortalities. Lawn clippings and branches may be composted if done in accordance with the *Environmental Management Act* or the Organic Matter Recycling Regulation (BC Reg 18/2002).
- The maximum total volume of compost production on site, including mixed and finished compost, is limited to 100 cubic metres at any one time.

4.7 Noise, Odour and Dust Management

Special management guidelines that apply throughout the designated EPA have been established to deal with noise, odour, and dust management. These guidelines are separated into two categories – general and commodity specific. By addressing management of specific farm activities, the impacts of noise, odour, and dust will be mitigated effectively.

4.7.a General – Noise, Odour and Dust Management

- The following activities are limited to being conducted between 6 am and 10 pm:
  - loading and unloading of hogs and beef;
  - feed milling; and
  - all input deliveries (e.g. feed, woodwaste, mushroom compost).
- Cover or enclose *woodwaste* storage.
- Locate on-farm feed mills on the opposite side of the farm building to the agriculture-urban boundary.
- Provide hoods for all fans 36 inches or less.
- Orient fans parallel to or away from the agriculture-urban boundary.
- Fur farms must orient fans on the side of the building furthest away from the agriculture-urban boundary.



Fan orientation for:

- Beef farms
- Dairy Farms
- Greenhouses
- Mushroom Farms
- Soil-based crops

4.7.b Commodity Specific – Noise, Odour and Dust Management

The following management requirements are categorized according to the commodity and must be employed in addition to the general management requirements.

Beef, Small Ruminant and Dairy Farm Operations

- No *Category A noise scare devices* should be located within 300 metres from the agriculture-urban boundary; and *Category B noise scare devices* should be located 200 m or more from the agriculture-urban boundary.
- Feed bunks and water troughs should have a minimum 2.5 metre concrete aprons that are sloped away to facilitate drainage.

- Collect contaminated runoff from *confined livestock areas* and store with manure.
- Collect & store silage effluent with manure.

Fur Farm Operations

- Contain all feed storage, mixing, thawing, barrel and utensil cleaning in a room with concrete floors sloped to a drain, then to a tank and field tile for final disposal. The room should be fly proof, rat proof, and contain smooth walls to a height of 2 metres to facilitate adequate cleaning.

Hog Farm Operations

- No free range hogs within 60 metres of the agriculture-urban boundary

Horse Farm Operations

- Minimize dust generation in outdoor riding arenas by watering.
- For outdoor riding arenas or exercise tracks that are less than 30 m from the agriculture-urban boundary, install a vegetative buffer between the arena or track and the agriculture-urban boundary to minimize dust drift as per buffer requirements in Section 12, page 43.

Poultry Farm Operations

- 6 am – 10 pm for:
  - Hatching egg pick up (Breeder Birds); egg pick up (Layers); poultry stock delivery
  - Clean-out and sanitization of buildings
- Turn off truck engines for adult bird loading; use of truck engine brakes is prohibited.
- Use nipple drinkers for ducks.
- No free range ducks within 60 metres of the agriculture-urban boundary.
- Remove mortalities from barn daily and dispose of in sealed containers, incinerate, or compost.
- Broken eggs must either be stored in sealed containers and disposed of off-farm or applied to the land and incorporated into the soil within the same calendar day (Layers and Breeder Birds).
- Ensure all new or expanding production buildings have concrete floors.

Mushroom Farm Operations

- For mushroom buildings located between 30–100 m from the agriculture-urban boundary install a vegetative buffer between the mushroom building and the agricultural area boundary.

Soil-based Crop Farm Operations

- Operate *Category A* and *Category B noise scare devices* so they are consistent with BC Ministry of Agriculture's Farm Practices Wildlife Damage Control guidelines, notably a 300 metre setback from the ALR boundary for Category A devices and 200 metres setback for Category B devices.

4.8 Light Management

Special management guidelines that apply throughout the designated EPA have been established to deal with lighting from greenhouses. In addition, all greenhouses that are located within 15 to 100 metres of the agriculture-urban boundary need to install a vegetative buffer.

Greenhouse Operations

- Night lighting designed to exceed 5,000 lux must be set back at least 100 m from the ALR/Urban bound-

ary;

- and either
  - ensure there is a minimum of 4 hours of continuous darkness starting at 6 pm or
  - install interior or exterior opaque screening of side walls to prevent horizontal light emissions of 25 lux (street lamp intensity) measured at the agriculture-urban boundary.
- Already established greenhouses with currently existing night lighting must adapt to 100 m setback restrictions within 10 years.
- For greenhouses located 15-100 m from the agriculture-urban boundary install a vegetative buffer between the greenhouse and the agriculture-urban boundary as per buffer requirements outlined in Section 4.12.

4.9 Safety and Security Measures

Special management guidelines that apply throughout the designated EPA have been established to address safety issues associated with ostriches and emus, which have a potenitally harmful kick, and mink, which can be damaging to native wildlife.

Ostriches and Emus

- Install a vegetative buffer (farm-side Buffer A or B) and a 2 metre high chain link or solid wood fence along the agriculture-urban boundary or install double fencing comprised of 2 metre-high chain link or solid fence along the agriculture-urban boundary and a second security fence inside the agricultural area with a minimum distance of 2 metres between the fences.

Mink

- Establish a security fence to contain animal escapes.

4.10 Setback Distances

The following setback distances apply to buildings and structures located within designated EPAs. Setback distances are measured from the ALR/Urban boundary on the farm side.

15 metres for:

- Greenhouses
- Crop storage

30 metres for:

- Mushroom barns
- Spent compost storage

50 metres for:

- Boilers
- Open loading areas
- Refrigeration units

100 metres for:

- Agricultural solid waste storage
- Composting and finished compost storage

- Confined livestock areas (except horse paddocks, which can be set back 15 m)*
- Feed mill and feed storage*
- Incinerators
- Livestock and poultry housing*
- Manure storage*
- Milking facilities*
- Silage Storage*
- Medical Marihuana Production Facilities.

* The setback for these buildings and structures can be reduced to **60 metres** (horse paddocks can be set back 7 metres) provided the additional management requirements in section 4.11 are met.

4.11 Additional Management Requirements for Buildings and Structures (60-99 metres)

For buildings and structures located 60-99 metres from the Agriculture-Urban Boundary, the 100 m setback requirement can be reduced to 60 m for certain buildings and structures provided the *additional* management requirements listed below are met, the maximum number of animals in the table in Section 4.4 are followed, and a vegetative buffer is installed as per the guidelines in Section 4.12.

4.11.1 Extra Manure, Noise, Odour and Dust Management

- Beef and Dairy - cover confined livestock areas in areas with more than 600 mm of precipitation during October to April.
- Dairy - handle and store manure as a solid only.
- Beef & Dairy - orient fans parallel to or away from the agriculture-urban boundary.
- Fur, Hog and Poultry - locate load out doors so they do not face the agriculture-urban boundary.
- Hog and Poultry - orient fans on the side of the building furthest away from the agriculture-urban boundary.

4.12 Farm-Side Buffers

There is opportunity to reduce the setback for certain buildings and structures from the agriculture-urban boundary to 60 metres if certain management requirements are met, animal numbers are reduced, and a vegetative buffer is installed. The following guidelines outline the design criteria for farm-side setbacks and vegetative buffers.

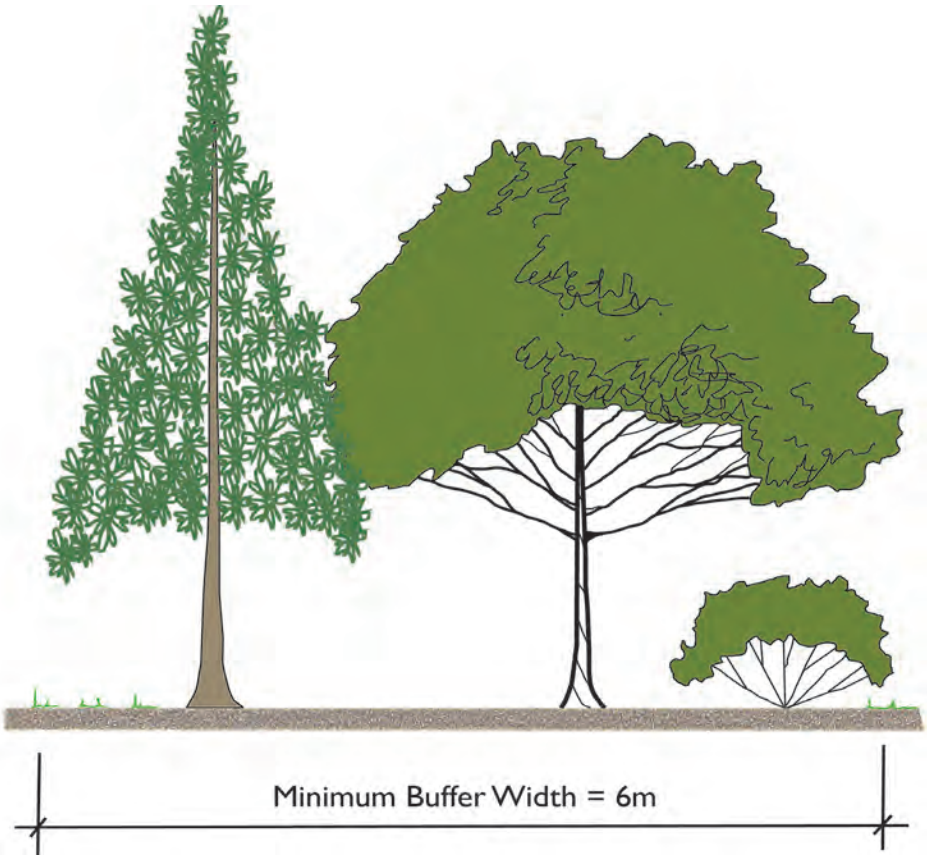
Farm-Side Setback & Buffer Design Criteria			
	Setback Distance and Buffer Size	Buffer Height	Buffer Design Features
Farm-side Set-back and Buffer	**Setback** **60 m** from the agriculture-urban boundary (except horse paddocks = **7 m**) **Buffer Width** **6 m -** buffer is located within the 60 m setback **Exception for Greenhouses**: Buffer applies to greenhouses located **15-100 m** from the agriculture-urban boundary	**6 m** (finished height)	➢ The length of the vegetative buffer should be established within 15 m of the farm building or structure and extend a minimum of 5 m beyond the length of the wall facing the agriculture-urban boundary. ➢ Plant either a double row of evergreen conifers or mixed planting of deciduous/coniferous tree and hedging/ screening shrub species with foliage from base to crown – minimum of 60% evergreen conifers. ➢ A berm with hedging/screening shrubs is also acceptable provided the target farm structures are screened. ➢ Crown density of approximately 50-75%. ➢ Design specifications and layout will be as per Farm-side Buffer A or B.

In addition to helping mitigate conflicts with urban neighbours, buffers can provide additional benefits and even economic opportunities for farm operations.

4.12.1 Farm-Side Buffer A (no berm) – Design specifications and layout

The Farm-side **Buffer A** shall include:

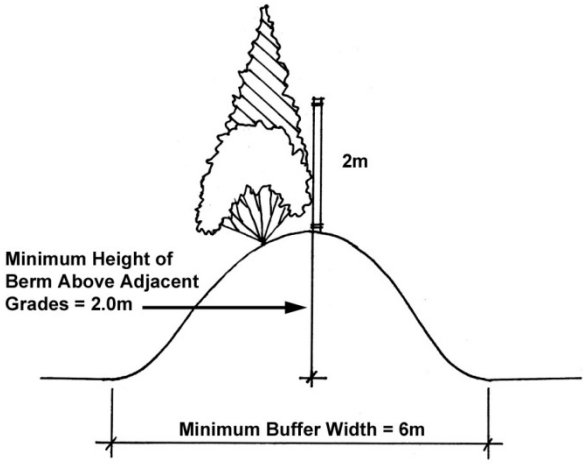
- double row coniferous or mixed deciduous/coniferous trees (See Appendix B for plant list)
- single row hedging/screening shrubs (See Appendix B for plant list)



4.12.2 Farm-Side Buffer B (with berm) – Design specifications & layout

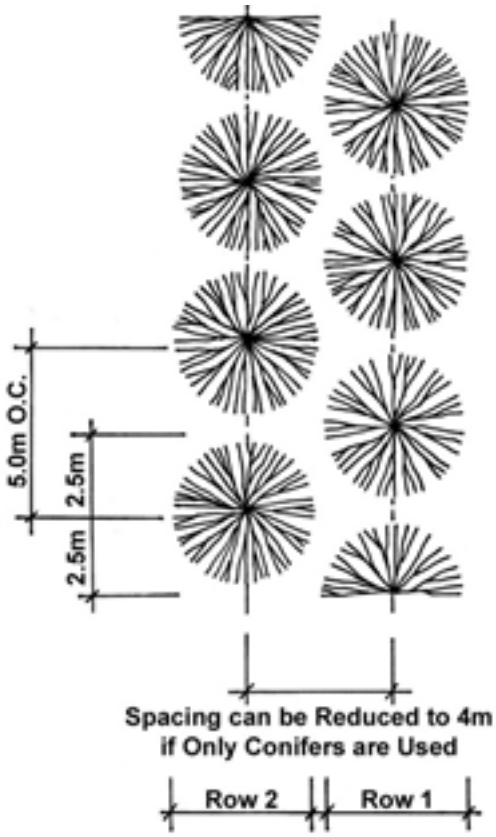
The Farm-side **Buffer B** shall include:

- single row hedging/screening shrubs (See Appendix B for plant list)
- berm with minimum height 2 m above adjacent grades
- for ostriches and emus, install solid wood fence or chain link fence with a height of 6 feet (1.8 metres) and build as per the fencing specifications outlined in Appendix C.



4.12.3 Farm-side Buffer A or B – Spacing

Single row hedging/screening shrubs



Double row coniferous or mixed trees

List of Appendices

Appendix A - Development Permit Areas and Guidelines to Protect Farming

Appendix A provides an example of development permit area (DPA) provisions that can be applied in identified edge planning areas on the urban side to protect farming and promote urban-rural compatibility. This example is not exhaustive, but is a sample of objectives and guidelines and should be adapted to meet the specific needs of each community[5].

Annotated Sample DPA for the Protection of Farming

Designation:

The Farmland Protection Development Permit Area is shown on Map __ and includes all land within 300m of the urban side boundary of the Agricultural Land Reserve (ALR).

Research has shown that impacts from farming such as noise, dust, odour and spray drift, etc. can be experienced up to 300 m on the urban side.

Authority:

The Farmland Protection Development Permit Area is designated a development permit area pursuant to Section 919.1(1)(c) of the *Local Government Act* for the protection of farming.

Justification:

This Development Permit Area is adjacent to land that is within the ALR. The BC Agricultural Land Commission (ALC) and the BC Ministry of Agriculture (BCMA) have acknowledged that the development of lands adjoining or reasonably adjacent to farmlands may compromise the agricultural use of ALR lands. These lands therefore require protection in order to ensure long-term agricultural use.

Fifteen metre vegetated buffers and 30 metre setbacks are effective at preventing trespass, litter, crop damage, and harassment of livestock, as well as mitigating the effects of noise, light and dust or spray drift, and odour. The incorporation of vegetated buffers and setbacks between developed lands and agricultural lands that meet the specifications of the BCMA's Guide to Edge Planning will promote greater compatibility between the uses while protecting the agricultural uses from urban impacts. Addressing subdivision layout, building design and stormwater management, employing disclosure statements and signage, and incorporating landscaped and siting buffers between new subdivisions and ALR lands will protect the agricultural use of the ALR lands and minimize complaints for the benefit of both farm and urban residents.

It may be tempting to compromise and reduce the setbacks and vegetated buffer width to acheive acceptance of the DPA, but the research does not support anything less than 15 m vegetated buffers and 30 m setbacks as being effective at mitigating the full suite of potential impacts.

Objectives:

1. To plan and regulate new development in a manner that protects the long-term agricultural potential of adjoining or reasonably adjacent

5 Development Permit Areas and guidelines are not the only ways to establish urban-side buffers. A local government may wish to take a more regulatory approach by including the buffer requirements in screening and landscaping provisions of a zoning bylaw. Another possibility is to secure the buffer through park dedication at time of subdivision.

agricultural lands.

2. To minimize the impacts of urban development on agricultural lands.
3. To protect farmland by mitigating conflict between agriculture and residential, commercial, industrial and institutional uses.
4. To provide greater definition of the boundary of the ALR.
5. To develop effective vegetated buffers along the boundary of the ALR.
6. To visually screen farmland from adjoining or reasonably adjacent urban development.
7. To mitigate adversive effects of agricultural operations such as noise, dust and odour on nearby urban residents and users.
8. To increase the compatibility of adjacent land uses with farm uses.
9. To protect agricultural water supplies from non-agricultural uses and development of the landscape.

Development Approval Information:

This Development Permit Area is designated as an area for which development approval information (DAI) may be required in accordance with Section 920.01(1)(c) of the *Local Government Act*, and the [local government]'s Development [Application Procedures/Approval Information] Bylaw No. ___. The designation of this area as an area for which DAI may be required is based on the special conditions or objectives supporting the designation of the DPA and the [local government] may require applicants to provide reports, studies or information on the anticipated impacts of the proposed activity or development and appropriate mitigation measures.

Designating the DPA as a DAI area allows the local government to ask for reports and studies as required.

Applicability:

All development in this Development Permit Area is exempted from the requirement to obtain a Development Permit, except:

1. Subdivision of land that adjoins agricultural land or that drains into agricultural land;
2. Construction of new residential dwellings and residential accessory buildings within the DPA or additions to existing residential dwellings located partially or wholly within 30m of the ALR boundary;
3. Construction of buildings or structures located within 30 m of the ALR boundary.
4. Construction of a building or structure that would result in more than ___ m2 of new impervious surfaces, or alteration of the existing drainage regime on properties that adjoin or drain into agricultural land

Prior to commencing any of these activities, the owner must obtain a development permit in accordance with the Farmland Protection Development Permit Area Design Guidelines

The reverse wording shown here works in situations where the focus of the DPA is quite narrow as it clarifies that most minor development occuring within the 300 m DPA is exempt from having to obtain a DP but is required for those types of development that are of most concern. For instance, new subdivisions that are within 300m that have the potential to have drainage and stormwater impacts on farms would be required to get a DP, whereas someone building a minor addition to an existing residence that is greater than 30m from the ALR boundary would not. Impervious surface area has been left blank for local governments to fill in based on local topography and soils.

Exemptions:

For clarity, the following activities are also exempt from any requirement for a development permit:

1. Any construction occurring outside of the Development Permit Area.
2. The placement of impermanent structures such as benches, tables and garden ornaments, provided they are not located within a required vegetated buffer area.
3. Repair, maintenance, alteration or reconstruction of existing legal buildings, structures or utilities, including those that are legal non-conforming, providing there is no expansion of the footprint.
4. Farm operations as defined in the *Farm Practices Protection (Right to Farm) Act* and farm uses as defined in Section 2(2), (3), (4) and (5) of the Agricultural Land Reserve Use, Subdivision, and Procedure Regulation.
5. Construction, repair, maintainance or alteration of a residential fence that is located further than 15m from the boundary of the ALR.
6. Construction, repair, maintainance or alteration of a non-residential fence that is located further than 8m from the boundary of the ALR.
7. Construction, repair, maintanance or alteration of a residential or non-residential fence within 15m or 8m respectively of the boundary of the ALR, so long as the disturbance of vegetation is restricted to 0.5 metres on either side of the fence.
8. The construction of a small residential accessory building such as a pump house, gazebo, garden shed or play house provided:
   - The building is located a minimum of 15 metres from the ALR boundary
   - No shrubs or trees are removed; and
   - The total floor area of the accessory building is less than 10 m2.
9. subdivision of land for public utility, nature reserve, or park uses.

In cases where reverse applicability wording is used, this section can be used to further clarify which minor activities are exempt, otherwise this section can be used as is typical.

Guidelines:

Development permits issued in this area shall be in accordance with the guidelines set out below:

General Guidelines:

1. A disclosure statement in the form of a restrictive covenant under section 219 of the *Land Title Act* must be placed on title of all newly created lots located partially or wholly within the DPA. This covenant must specify that the lot is located near a farming area, that the following impacts can be expected:
   - Noise from farm operations at various times of the day, including propane cannons and other devices used to deter wildlife
   - Farm odours and chemical spray
   - Unappealing aesthetic appearance of fields (unkempt, storage of materials, etc.)

Impacts from farming may be experienced as much as 300m from the Urban-ALR edge. As such, the covenant should be registered on all lots in the DPA. For some developments that are not immediately adjacent to the edge, this may be the only requirement of the permit.

- Light from greenhouses

and that the following restrictions apply:

- Vegetated buffers are to be maintained
- No habitable structures shall be built within 30m of the boundary of the ALR

2. The [Local government] may consider variances to subdivision or building and structure siting or size regulations to enable developments to meet the objectives of this DPA.

Subdivision Design:

Local governments can do much to reduce speculation (which increases development pressure and the cost of farmland) by asking for farm-friendly subdivision designs.

1. Subdivision design must minimize potential negative impacts that may occur between farm and non-farm land users. Subdivision design and construction must minimize erosion. Ground water quality and levels shall be maintained through an integrated stormwater management plan prepared by a professional engineer or qualified professional.
2. Subdivisions must be designed to allow for clustering of lots, buildings and structures away from agricultural land.
3. Where a subdivision will require 5% parkland dedication as stipulated in section 941 of the *Local Government Act*, the dedication should be located next to the ALR boundary and include the required landscape buffer.
4. New single family residential lots larger than 0.10 ha must not be located along the boundary of the ALR.
5. Road endings or stubs which point directly into the ALR are not permitted except where required for access by farm vehicles.
6. Half roads and half cul-de-sacs along the boundary of the ALR shall not be permitted.
7. The road pattern must be designed in such a way to direct urban traffic away from routes used by farmers to move equipment.
8. Extensions of utilities such as water and sewer lines into the ALR are not permitted.
9. Public and strata open spaces should be located next to the boundary of the ALR, with the required landscape buffer forming part of the open space. Open spaces should be designed for water retention capacity and stormwater attenuation.

Large single family lots tend to generate more farm practices complaints than smaller lots or townhouse or apartment developments.

Stormwater Management;

The amount of impervious surface is left blank for local governments to fill in based on their local topography and soils.

1. Applications for development that create more than ___m2 of impervious surface must include an integrated stormwater management plan and/or drainage plan prepared by a Professional Engineer or other Qualified Professional. This plan must outline any expected changes to the drainage regime that will result from the proposed development, and identify any conditions that should be incorporated into the development permit to protect property from flooding, erosion or from other undesirable impacts as a result of changes to stormwater runoff. Particular attention should be paid to ensuring that drainage changes will not result in detrimental impacts such as

flooding or reduced groundwater availability on agricultural lands. Whereever possible, the plan should include stormwater detention and slow release into the system, and/or rainwater harvesting for on-site needs (such as landscaping).

2. Open spaces with landscaped buffers that are designed with water retention capacity or adequate rainwater/storm drainage system shall be located along the ALR edge.
3. Alteration of natural drainage systems that disrupt the natural hydrological cycle shall not be permitted.
4. Development must not result in the pollution of surface or groundwater supplies.

Building Location:

1. No residential building shall be located within 30m of the boundary of the ALR.
2. No commercial and industrial building shall be located within 15m of the boundary of the ALR.
3. Parks and nature reserves situated adjacent to the ALR should be designed to locate active recreation facilities, such as playing fields, as far as possible from the boundary of the ALR.
4. Passive recreation and parking facilities with permeable surfaces could be located near the boundary of the ALR provided there is a vegetated buffer that will inhibit trespass along the boundary.
5. Applications to locate any of the above noted buildings, structures or recreational facilities closer than stipulated above shall be accompanied by an assessment completed by a qualified professional outlining how the objectives of the DPA will still be met.
6. Buildings and structures must be clustered away from the boundary of the ALR.

15m vegetated buffers are effective at mitigating the impact of noise, and intercepting dust and chemical sprays, as well as preventing tresspass (with appropriate plant selection) and providing a visual screen. 8m vegetated buffers will mitigate the impacts to a level acceptable in non-residential areas, but will not mitigate the full suite of impacts.

Landscaping:

1. For parcels located immediately adjacent to the ALR, a vegetated buffer must be provided and maintained parallel to and along the urban side of the ALR boundary in accordance with the following criteria:
   - All vegetated buffers intended to screen residential development from ALR lands must be continuous and be a minimum 15m in width as measured as a perpendicular distance from the ALR boundary.
   - All vegetated buffers intended to screen commercial or industrial uses from ALR lands must be continuous and be a minimum 8m in width as measured as a perpendicular distance from the ALR boundary.
   - All vegetated buffers must be designed, established and maintained in accordance with the British Columbia Ministry of Agriculture (BCMA) Guide to Edge Planning, Section 3.6, Urban-side Buffers - Urban-side Buffer Design Criteria (http://www.agf.gov.bc.ca/resmgmt/sf/publications/823100-2_Guide_to_Edge_Planning.pdf).

- All buffer areas must be landscaped using materials set out in Appendix B of the BCMA Guide to Edge Planning. If appropriate vegetation already exists on the site it must be retained as part of the buffer. Existing vegetation may serve as the entire buffer, provided a registered landscape architect has provided a report stating that it will meet the objectives of this development permit area.
- Plant layout, spacing and support must be in accordance with the BCMA Guide to Edge Planning, Section 3.6 Urban-side Buffers - Design Specifications and Layout.
- The design and construction of the landscaped buffer must be to the standard of the BC Society of Landscape Architects/BC Nursery Trades Association publication BC Landscape Standards, most recent edition.
- Irrigation must be provided during the first 2 years after planting and permanent irrigation must installed where the landscape architect indicates it is necessary to ensure long term plant survival.
- Vegetated buffers shall be installed prior to final subdivision registration or the issuance of any building permit. A letter of credit should be deposited with the [local government] in an amount equal to 150% of the cost of the work to be completed.
- Paths and/or passive recreational uses should typically not be part of the vegetated buffer. Paths and/or passive recreational uses that are necessary to complete a trail network or that form part of a parks or trail plan may be included as part of a vegetated buffer; however, they must not take up more than one-third the width of the buffer and must be located away from the ALR boundary. The remaining two-thirds of the buffer must be designed with special attention to inhibiting trespass onto ALR land and a registered landscape architect must certify that the overall effectiveness of the buffer will be the same as if the entire width were vegetated and that it will meet the objectives of the development permit area.
- If adequate fencing does not currently exist, fencing must be constructed where a subdivision adjoins the ALR boundary. Fencing must be constructed in accordance with local government standards or the BCMA Guide to Edge Planning, Appendix C;
- Provide landscaping with trees, including coniferous trees, as a major landscaping component, as well as dense vegetation, within the required landscaped buffer. Wherever possible, double rows of trees should be planted. Any existing mature trees within the buffer area are to be preserved. A majority of the plant material selected should include low maintenance, indigenous vegetation and should be able to survive with little or no fertilizers.
- For added effectiveness of the buffer, consider provision of a low landscaped berm as part of the buffer. In the absence of a natural barrier such as an existing watercourse or ravine next to the agricultural area, a continuous fence along the edge of the agricultural area should be installed and maintained. A transparent fence (e.g. a split rail or picket fence) in combination with a dense and continuous evergreen hedge is preferred. A chain link fence may be

The letter of credit is to ensure that the landscaping is completed by the developer or that the local government will have funds to plant the buffer should the developer be unable to complete it for whatever reason..

provided only if it is combined with dense landscaping or a hedge on the outside.

- Where possible, existing landscaping or native vegetation that meets the intent of these guidelines should be retained. Landscape plans should:
  - Integrate and augment any existing landscape; and
  - Retain existing trees and integrate them into the proposed site and landscape design.

2. A buffer maintenance plan must be developed and signed off by a registered landscape architect or registered professional biologist with experience in developing landscaping maintenance plans.
3. A section 219 covenant as per the *Land Title Act* for the buffer specified in the Farmland Protection Development Protection Area Design Guidelines must be registered on title. This covenant shall prohibit the removal of vegetation and the construction of, or addition to, any buildings or structures within the buffer area other than fencing in accordance with local government standards or the BCMA Guide to Edge Planning. Under section 22 of the Agricultural Land Commission Act, this covenant may require the Commission's approval, prior to registration.
4. All landscaping should meet the British Columbia Landscape Standard published by the British Columbia Society of Landscape Architects and the British Columbia Nursery Trades Association and should be covered by a performance bond for a period of two years from the date of final installation, in order to ensure survival or replacement of plantings. All landscaping should be maintained in perpetuity.
5. Surface parking or roads abutting agricultural lands require a minimum 7.5 metre (24.6 feet) wide landscaped buffer to separate the paved surface from the agricultural area. Buildings or structures should not be built within the buffer area.

Appendix B – Buffer Plant List

The plants in this list have been chosen for their fast growth, disease resistance, and hardiness. The 'Notes' column highlights special traits of certain species to aid in selecting the appropriate plant for a particular buffer. Species highlighted in yellow have leaf and form characteristics that make them good spray drift barriers. Species that are native are identified in the Notes column. Plant materials not included in this list may also be considered. Retention of existing vegetation when compatible with adjacent farm operations is encouraged. Ultimately, the selection of plants will depend on the site specific conditions.

General Requirements

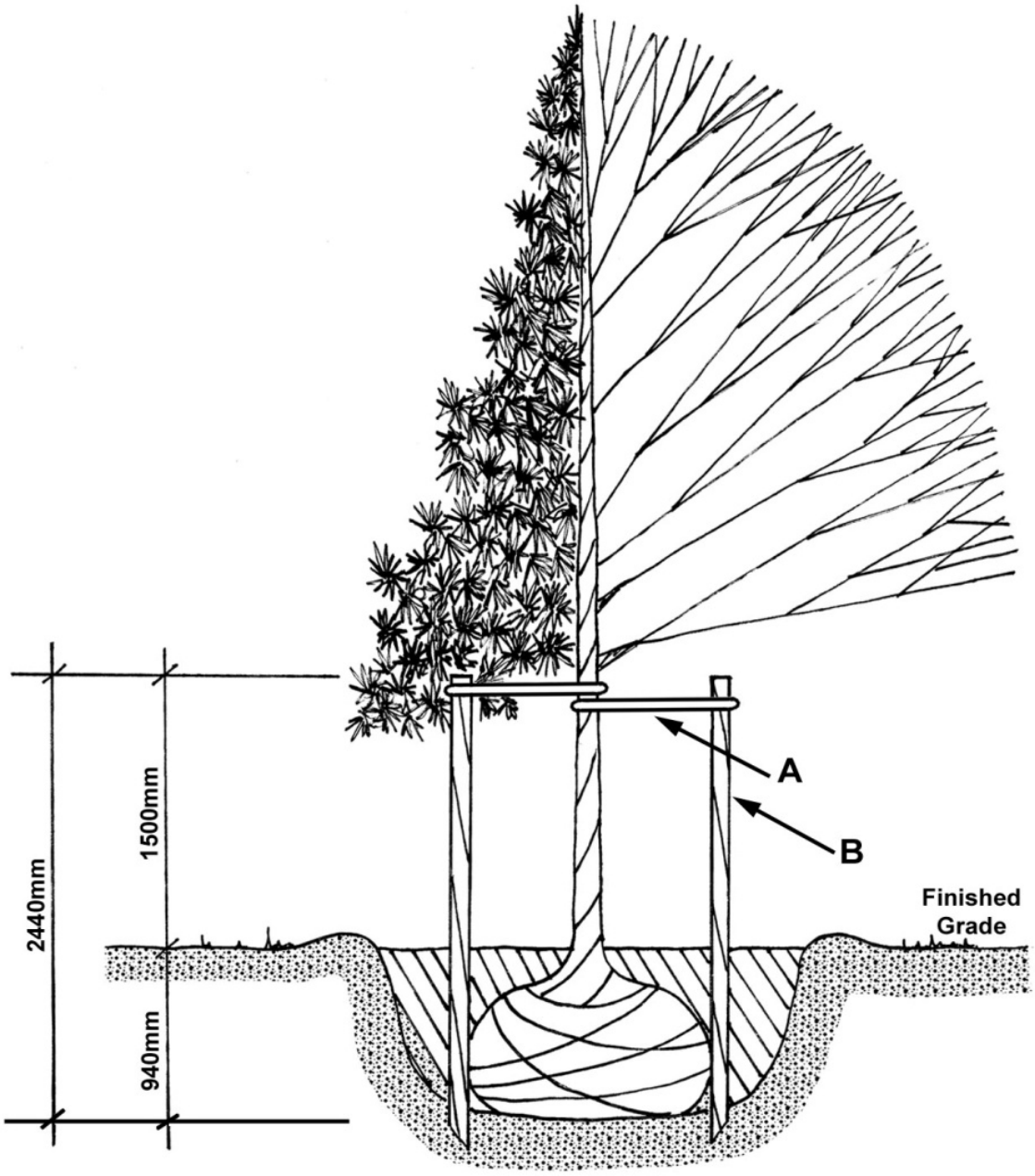
1. The following plant list indicates the minimum acceptable size for each species/variety at the time of planting. Where shortages occur, smaller size plant material may be considered.
2. All plants must be true to name, type and form. Plants must be compact and properly proportioned.
3. All plants must be healthy with vigorous root systems and free of defects, decay, disfigured roots, sun scald injuries, abrasions of the bark, plant diseases and insect pests.
4. Trees must have straight stems unless that is uncharacteristic and must be well branched for the species/variety.
5. Root balls and soil in containers must be free from noxious weeds.
6. Immediately following planting of trees, all trees shall be braced in an upright position, using stakes with ties as shown on the following page. Tree stakes and straps shall be removed once the trees are stable. Tree stakes and straps should remain for a maximum of two years.
7. A maintenance plan must be developed and procedures must be undertaken for all buffer plantings on a regular basis during the growing season.
8. Weeds in the planted areas must be prevented from becoming a problem; weed removal at least once per month during the growing season is recommended.
9. Pests and diseases that have the potential to damage or kill the trees or shrubs must be controlled.
10. If the area receives limited rainfall during the growing season, some form of irrigation must be used.

Staking for Deciduous / Coniferous Trees

Applies to deciduous trees with <6 cm caliper; coniferous trees <2.5 m height

1. All support stakes shall be equally spaced about each tree, shall be pressure treated, be standard 50-70 mm round, and a minimum of 2440 mm in length.
2. Support stake shall be driven vertically into the ground a minimum of 940 mm and support at least 1500 mm of the tree stem.
3. Soft Strapping shall be used to connect each support stake to the tree trunk.

A	25 mm soft strapping
B	50-70 mm round pressure treated stakes



Deciduous Trees – Tall (>15 m)				
Botanical Name	**Common Name**	**Hardiness**	**Planting Size**	**Notes**
Acer platanoides 'Crimson King'	Norway Maple	to zone 3-4	7 cm. calliper	Fast growth, full sun
'Emerald Queen'	"	"	"	"
'Summershade'	"	"	"	"
A. pseudoplantanus	Sycamore Maple	to zone 5	"	Adaptable, full to partial sun
A. rubrum 'Armstrong'	Red Maple	to zone 3	7 cm. calliper	Fast growth, full sun
'October Glory'	"	"	"	"
'Schlesingeri'	"	"	"	"
'Shade King'	"	"	"	"
A. saccharum	Sugar Maple	to zone 3	7 cm. calliper	Full to partial sun
Aesculus x carnea 'briotii'	Red Horsechestnut	to zone 4	"	Drought tolerant, full sun
Betula papyrifera	Paper Birch	to zone 2	2 m ht.	Full to partial sun, **Native,** tolerates moist soil
Cercidiphyllum japonicum	Katsura Tree	"	"	Full sun
Davidia involucrata	Handkerchief or Dove Tree	to zone 6	"	Full to partial sun
Fagus sylvatica	European Beech	to zone 4	7 cm. calliper	Slow growth, full sun
'Laciniata'	Cutleaf Beech	"	"	"
'Purpurea'	Purple Beech	"	"	"
'Riversii'	Copper Beech	"	"	"
Fraxinus pennsylvanica	Green Ash or Red Ash	to zone 2	"	Full sun
Larix kaempferi	Japanese Larch	to zone 4	2.0 m ht.	"
L. occidentalis	Western Larch or Tamarack	to zone 4-5	"	Fast growth, full sun
Liquidambar styraciflua 'Palo Alto'	American Sweet Gum	to zone 5	7 cm calliper	Fast growth; roots may damage sidewalks and drainage systems, full sun
Magnolia kobus	Magnolia	"	"	Full to partial sun
Metasequoia glyptostroboides	Dawn Redwood	"	2.0 m ht.	Fast growth, takes up much space, full sun
Plantanus x acerifolia	London Planetree	"	"	Hardy, full sun

Deciduous Trees – Tall (>15 m)				
Botanical Name	**Common Name**	**Hardiness**	**Planting Size**	**Notes**
Populus tremuloides	Quaking Aspen	to zone 1	"	Fast growth. Has aggressive water-seeking roots - set well back from drainage systems, full sun, **Native**
Prunus sargentii	Sargent Cherry	to zone 4	"	Hardy, full sun
Quercus palustris	Pin Oak	"	7 cm. calliper	2' a yr growth, full sun
Q. rubra	Red Oak	to zone 3	"	2' a yr growth, full sun
Robinia pseudoacacia 'frisia'	Black Locust or Frisia Black Locust	"	"	Fast growth, very hardy. Has aggressive water-seeking roots - set well back from drainage systems

Deciduous Trees – Small to Medium (<15 m)				
Botanical Name	**Common Name**	**Hardiness**	**Planting Size**	**Notes**
Acer campestre	Field or Hedge Maple	to zone 5	5 cm cal.	Full to partial sun
A. circinatum	Vine Maple	to zone 4	2.0 m ht.	Full to partial shade, **Native**
A. davidii	David's Maple	to zone 5"	"	Full to part sun
A. ginnala	Amur Maple	to zone 2	"	"
A. glabrum var. douglasii	Douglas Maple	to zone 3	"	Part shade to full sun, tolerates dry conditions, **Native**
A. negundo	Boxelder	to zone 2	"	Fast growth: 15 - 20' in 4-6 yrs. Shade tolerant
Amelanchier laevis	Shadbush	to zone 4	"	Full sun
Betula jacquemontii	Whitebarked Himalayan Birch	to zone 1	5 cm cal.	Rapid suckering, full sun
Carpinus betulus	European Horn-beam	to zone 4	"	Good screening as a hedge, full to partial sun
Cercis canadensis	Eastern Redbud	to zone 5	"	Requires good drainage, full to partial sun
Cornus mas	Cornelian Cherry	to zone 4	"	Good screening as a hedge, full to partial sun
C. nuttallii 'White Wonder'	Pacific Dogwood	"	"	Full or partial sun, **Native**
Fagus sylvatica	European Beech	to zone 4	5 cm cal.	Trim as hedge to retain leaves through winter, full sun
'Dawyckii'	Dawyck Beech	"	"	"
'Zlatia'	Golden Beech	"	"	"
Halesia monticola	Mountain Silver-bell	to zone 5	"	Full to partial sun
Maackia amurensis	Amur maackia	to zone 4	2.0 m ht.	Full sun, wet soil
Magnolia dawsoniana	Dawson Mag-nolia	to zone 7	2.0 m ht.	Full sun or full shade
M. sieboldii	Oyama Magnolia	"	"	Shade tolerant
Oxydendron arboreum	Sorrel Tree or Sourwood	to zone 5	2.0 m ht.	Full to partial sun
Prunus emarginata	Bitter Cherry		6 cm cal.	Full sun, moist soil, **Native**
Prunus padus	European Bird Cherry	to zone 3	6 cm cal.	Full sun, do not plant in tree fruit production areas
P. subhirtella	Higan Cherry	"	6 cm cal.	Full sun, do not plant in tree fruit production areas

Deciduous Trees – Small to Medium (<15 m)				
Botanical Name	**Common Name**	**Hardiness**	**Planting Size**	**Notes**
P. x yedoensis 'Akebono'	Daybreak Cherry or Akebono Yoshino Cherry	to zone 6	"	"
Rhamnus purshiana	Cascara Buckthorn	to zone 7	1 m ht.	Shade, drought tolerant, **Native**
Salix discolor	Pussy Willow	to zone 4	1.5-2 m ht.	Fast growth, dry to moist sites, full to partial sun
Salix glauca	Gray Willow	to zone 4	1 m ht.	Full sun, moist soil, salt and compaction tolerant, **Native**
Salix lucida	Pacific Willow	to zone 5	"	Full to partial sun, moist soil, **Native**
Salix scouleriana	Scouler's Willow	to zone 6	"	Full to partial sun, moist soil, **Native**
Salix sitchensis	Sitka Willow	to zone 4	"	Full to partial sun, moist soil, **Native**
Sophora japonica 'Regent'	Regent Pagoda Tree or Japanese Pagoda Tree	to zone 4	5 cm cal.	Fast growth: 10 - 12' in 5 yrs. Hardy, full sun
Sorbus aucuparia 'Rosedale'	European Mountain Ash	to zone 3	"	Full sun, do not plant in tree fruit production areas
Stewartia pseudocamellia	Japanese Stewartia	to zone 5	"	Partial sun
Styrax japonicus	Japanese Snowdrop or Snowbell	"	"	Fast growth: 10' in 7 yrs, full to partial sun.
Tilia x euchlora	Crimean Linden	to zone 4	"	Full to partial sun

Coniferous Trees – Tall (>15 m)				
Botanical Name	**Common Name**	**Hardiness**	**Planting Size**	**Notes**
A. concolor	Colorado White Fir	to zone 4	"	Full sun
A. pinsapo	Spanish Fir	to zone 6	"	"
A. grandis	Grand Fir	to zone 6	2.0 m ht.	Full to partial sun, moist soil, **Native**
Calocedrus decurrens	Incense Cedar	"	2.0 m ht.	Full to partial sun
Cedrus atlantica	Atlas Cedar	"	2.0 m ht.	"
C. deodara	Deodar Cedar	"	"	Full sun
Chamaecyparis nootka-tensis	Nootka Cypress or Alaska Yellow Cedar	to zone 4	"	Full sun, **Native**
'Lutea'	Yellow Cypress	"	"	Full sun
Cryptomeria japonica	Japanese Crypto-meria or Japa-nese Cedar	to zone 6	"	"
Picea abies	Norway Spruce	to zone 2	2.0 m ht.	Fast growth, full sun
P. glauca	White Spruce	to zone 1	"	Hardy, full sun, **Native**
P. pungens	Colorado Spruce	to zone 2	2.0 m ht.	Hardy; somewhat drought tolerant, full sun
P. stitchensis	Sitka Spruce	to zone 7	"	Full to partial sun, **Native**
Pinus contorta	Lodgepole Pine or Shore Pine	to zone 4	2.0 m ht.	Full sun, not suitable for coastal areas, **Native**
P. nigra	Austrian Pine	"	"	Hardy, full sun
P. ponderosa	Ponderosa Pine	to zone 3	"	Full sun, **Native**
P. strobus	White Pine or Eastern White Pine	"	2.0 m ht.	Fast growth, full sun, use blister rust resistant stock
P. sylvestris	Scotch Pine	to zone 2	"	Full sun
P. thunbergii	Japanese Black Pine	to zone 5	"	Good wind break. Tolerates poor sandy soils; drought tolerant
Pseudotsuga menziesii	Douglas Fir	Rocky Mtn type to zone 4; Pacific type to zone 6	"	Full sun, very dry to moist montane sites, **Native**
Sequoia sempervirens	Coast Redwood	to zone 7	"	Full sun
Sequoiadendron giganteum	Giant Redwood or Sierra Red-wood	to zone 6	"	"

Coniferous Trees – Tall (>15 m)				
Botanical Name	**Common Name**	**Hardiness**	**Planting Size**	**Notes**
Thuja plicata	Western Red Cedar	to zone 5	"	Few diseases and insects, **Native**
Tsuga heterophylla	Western Hem-lock	"	"	Full sun, **Native**
T. mertensiana	Mountain Hem-lock	to zone 4	2.0 m ht.	Full sun, **Native**
Tilia x euchlora	Crimean Linden	to zone 4	"	Full sun

Hedging / Screening Shrubs (Deciduous)				
Botanical Name	**Common Name**	**Hardiness**	**Planting Size**	**Notes**
Amelanchier florida	Saskatoon Berry	to zone 4	#2 pot	Prefers well drained sites, **Native**
Buddleia davidii	Butterfly Bush	to zone 5	"	Fast growth, full sun
Caragana arborescens	Siberian Peashrub	to zone 2	#5 pot	Hardy, full sun
Clethra alnifolia	Sweet Bush	to zone 4	#2 pot	Good shade plant
Cornus alba	Tartarian Dog-wood	to zone 2	"	Fast growth, full to partial sun
C. sanguinea	Tartarian Dog-wood	to zone 4	"	Full to partial sun
C. stolonifera	Red Osier Dog-wood	to zone 2	"	Fast growth, full sun, **Native**
Corylus cornuta var. calif	Beaked Hazelnut	to zone 4	"	Full to partial sun, **Native**
Cotinus coggygria 'Royal Purple'	Smokebush	to zone 5	#5 pot	Drought resistant, full sun
Cotoneaster acutifolius	Peking Coto-neaster	to zone 2	#1 pot	Full to partial sun, do not plant in tree fruit production areas
C. lucidus	Hedge Coto-neaster	"	#1 pot	"
Elaegnus commutata	Silverberry	"	#5 pot	Fast growth; suckers, full sun
Euonymus alata	Winged Burning Bush	to zone 3	"	Can be invasive, full to partial sun
Forsythia x intermedia	Border Forsythia	to zones 4-6	#2 pot	Fast growth, full to partial sun
Hamamelis virginiana	Common Witch-hazel	to zone 3	#5 pot	Full to partial sun
Holodiscus discolor	Creambush	to zone 5	#2 pot	Full to partial sun, dry to moist sites, **Native**
Hydrangea paniculata 'gran-diflora'	PeeGee Hydran-gea	to zone 3	"	Fast growth, full to partial sun
Kolkwitzia amabilis	Beauty Bush	to zone 4	"	Full to partial sun
Lonicera korolkowii 'zabel-lii'	Zabel's Honey-suckle	to zone 2	#2 pot	"
L. maackii	Amur Honey-suckle	to zone 2	#2 pot	Full to partial sun
L. tartarica 'Rosea'	Tartarian Honey-suckle	"	"	Vigorous, full to partial sun
Oemleria cerasiformis	Indian Plum	to zone 6	"	Full sun , dry to moist soil, **Native**
Philadelphus x virginalis	Mock Orange	to zone 4	"	Full to partial sun

Hedging / Screening Shrubs (Deciduous)

Botanical Name	Common Name	Hardiness	Planting Size	Notes
Physocarpus capitatus	Pacific Ninebark	to zone 5	#5 pot	Tolerates drought on coast but prefers moist soil, full to partial sun, **Native**
Prunus tomentosa	Manchu Cherry	to zone 2	"	Full sun
P. triloba 'Multiplex'	Chin. Flwring Almnd	to zone 3	"	Full to partial sun
Ribes alpinum	Alpine Current	to zone 2	#2 pot	Very hardy, full to partial sun
R. sanguineum	Flowering Current	to zone 5	"	Full sun, drought tolerant, **Native**
Rubus parviflorus	Thimbleberry	to zone 3	"	Full sun, **Native**
Rubus spectabilis	Salmonberry	to zone 5	"	Full to partial sun, moist soil, **Native**
Salix hookeriana	Hooker Willow	to zone 6	#5 pot	Full sun, moist soil
Sambucus canadensis	American Elderberry	to zone 3	"	Fast growth, full or partial sun
S. racemosa	Red Elderberry	"	"	Full sun, wet soil, **Native**
Symphoricarpos albus	Snowberry	"	"	Full to partial sun, moist soil, **Native**
Sorbaria sorbifolia	Ural False Spirea	to zone 2	"	Fast growth, full to partial sun
Spiraea douglasii	Pacific Hardhack	to zone 5	#2 pot	Full to partial sun, moist to dry soil
Symphoricarpos albus	Common Snowberry	to zone 3	#2 pot	Full sun to full shade, moist to dry soil
Syringa vulgaris (cult.)	Common Lilac	to zone 3	#5 pot	Full sun
Viburnum x burkwoodii	Burkwood Viburnum	to zone 4	"	Full or partial sun
V. cassinoides	Witherod	to zone 2	"	"
V. dentatum	Arrowwood	to zone 3	"	"
V. opulus 'Roseum'	Snowball Bush	to zone 2	"	Easy to grow, full to partial sun
V. trilobum	Amricn Crnbry Bush	"	"	
Weigelia x 'Centennial'	Weigelia	to zone 4	"	Tolerates air pollution, full sun

Hedging / Screening Shrubs – (Conifers & Broadleaf Evergreens)

Botanical Name	Common Name	Hardiness	Planting Size	Notes
Arbutus unedo	Strawberry Tree	to zone 8	#5 pot	Full sun
Camellia japonica (var.)	Japanese Camellia	"	"	Full or partial sun
Ceanothus velutinus	Snowbrush	to zone 5	"	Full sun, dry to moist soil, **Native**
Chamaecyparis lawsoniana 'Ellwoodii'	Ellwood cypress	to zone 5	#5 pot	Excellent hedge, even in exposed or shady positions
Cotoneaster salicifolius	Willowleaf Coto-neaster	to zone 6	"	Full to partial sun, do not plant in tree fruit production areas
Cryptomeria japonica 'El-egans'	Plume Crypto-meria or Plume Cedar	to zone 6	"	Vigorous, full to partial sun
Cupressus macrocarpa	Monterey Cypress	to zone 7	"	Full sun
Elaeagnus x ebbingei	Silverberry or Ebbinge's Silver-berry	to zone 7	"	Ideal shelter belt; large leaves, full to partial sun
E. pungens 'Maculata'	Thorny Elaeagnus or Silverberry	to zone 6	"	Fast growth; drought tolerant, full to partial sun
Escallonia rubra	Escallonia	to zone 8	"	Full to partial sun
Juniperus virginiana	Eastern Red Cedar	to zone 2	"	Should not be used near orchards due to susceptibility to cedar-apple rust, full sun
Ligustrum japonicum	Japanese Privet	to zone 8	#2 pot	Fast growth, full to partial sun
Ligustrum ovalifolium	California Privet or Golden Privet	to zone 7	"	Loses leaves in cold areas, full sun
Lonicera tartarica 'Rosea'	Tartarian Honey-suckle	to zone 2	"	Vigorous, full to partial sun
Osmanthus armatus	Chinese Osman-thus	to zone 7	"	Dense habit, spiny teeth, full sun
Photinia x fraseri	Photinia	"	"	Fast growing, full sun
Pieris japonica	Japanese Androm-eda or Japanese Pieris	to zone 5	"	Full or partial sun
Prunus laurocerasus	Cherry Laurel or English Laurel	"	"	Vigorous, full to partial sun
'Reynvaanii'	Russian Laurel	"	"	"
Rhododendron varieties with mature height > 1.5 m	Rhododendron	most to zone 4	#7 pot	Can make good understory planting, partial sun
Syringa vulgaris	Common Lilac	to zone 2	#5 pot	Suckers freely, full sun
Taxus x media 'Hatfieldii'	Hatfield Yew	to zone 4	1.5 m ht.	Tolerates shade
'Hicksii'	Hick's Yew	"	"	"
Thuja occidentalis 'Aureos-picata'	White Cedar or American Arbor-vitae	to zone 2	"	Thrives in almost any well-drained soil, full sun
'Brandon'	"	"	"	"

Hedging / Screening Shrubs – (Conifers & Broadleaf Evergreens)

Botanical Name	Common Name	Hardiness	Planting Size	Notes
'Fastigiata'	Pyramidal Cedar	"	"	"
Tsuga canadensis	Canada Hemlock or Eastern Hemlock	to zone 3	1.5 m ht.	Shade tolerant
Vaccinium ovatum	Evergreen Huckleberry	to zone 7	#2	Full to partial sun, **Native**
Viburnum tinus 'Robustum'	Laurustinus	to zone 8	#5 pot	Full to partial sun

Trespass Inhibiting Shrubs				
Botanical Name	**Common Name**	**Hardiness**	**Planting Size**	**Notes**
Berberis x 'Chenaultii'	Chenault Barberry	to zone 4	#5 pot	Dense habit, full to partial sun, can be host to wheat stem rust
B. darwinii	Darwin's Barberry	to zone 7	"	Full to partial sun, can be host to wheat stem rust
B. julianae	Wintergreen Barberry	to zone 6	"	Evergreen, full or partial sun, can be host to wheat stem rust
B. x mentorensis	Mentor Barberry	to zone 5	"	Fast growth; no fruit, full to partial sun, can be host to wheat stem rust
Chaenomeles speciosa	Flowering Quince	to zone 4	#5 pot	Full to partial sun, do not plant in tree fruit production areas
Elaeagnus pungens 'Maculata'	Thorny Elaeagnus or Silverberry	to zone 7	"	Evergreen. Fast growth; drought resistant, full to partial sun
Mahonia aquifolium	Oregon Grape	to zone 5	"	Evergreen, partial sun, can be host to wheat stem rust, **Native**
M. x 'Charity'	Oregon Grape	"	"	"
Osmanthus armatus	Chinese Osmanthus	to zone 7	"	Evergreen, full to partial sun
O. heterphyllus	Holly-Leaf Osmanthus	"	"	Full to partial sun
Pyracantha coccinea 'Kasan'	Scarlet Firethorn	to zone 6	"	Full to partial sun, do not plant in tree fruit production areas
P. fortuneana 'Cherri Berri'	"	"	"	"
P. x 'Mohave'	"	"	"	"
P. x 'O. Glow'	"	"	"	"
Rosa acicularis	Prickly Rose	to zone 1	#2 pot	Full sun, **Native**
Rosa gymnocarpa	Baldhip Rose	to zone 4	"	Full sun to full shade, dry to moist soils, **Native**
Rosa nutkana	Nootka Rose	"	"	Full to partial sun, **Native**
Rosa spp.	Shrub roses	to zones 2-4	"	Fast growers, full sun, do not plant in tree stone fruit production areas
Yucca filamentosa	Adam's Needle	to zone 4	#5 pot	Full to partial sun
Y. glauca	Soapweed	to zone 3	"	Full sun

Appendix C – Fencing Specifications

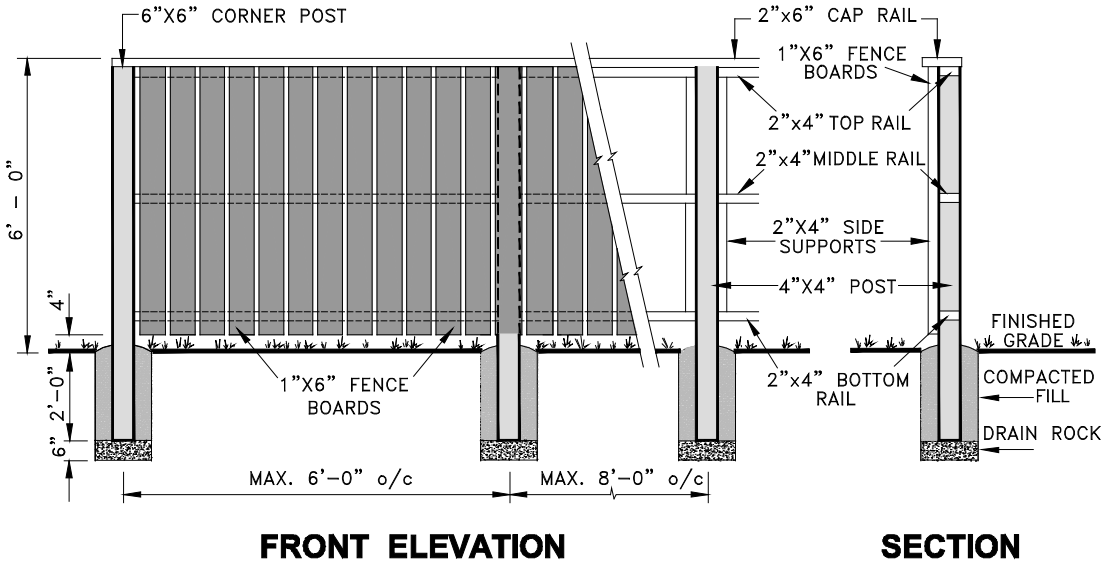
1: Solid Wood Fence

The following specifications are recommendations. A local government can use its own specifications if they meet or exceed the following specifications.

1. All posts and rails shall be rough sawn of "No. 1 Structural" grade, pressure treated with a wood preservative non-toxic to surrounding plant material, in accordance with CSA Standard 080.2 and compatible with staining requirements below.
2. All fence boards and planks shall be rough sawn of "Quality Fencing" grade, finished with penetrating stain with preservative, conforming to CGSB Standards 1-GP145M and 204M, applied to all surfaces prior to installation and on any cuts thereafter.
3. Line posts shall be minimum 8.0 ft. in length and at least (standard) 4"x 4".
4. Corner posts shall be minimum 8.0 ft. in length and at least (standard) 6"x 6".
5. Fence rails (min. 3) shall be maximum 7.5 ft. in length and at least (standard) 2"x 4".
6. Cap rails shall be at least (standard) 2"x 6". Cant to drain.
7. The finished height of opaque fencing shall be at least 6.0 ft.
8. All nails used in fence construction shall meet the following specifications:

8.1	Minimum gauge of nails used - #9, common in post/rail connections
8.2	Minimum gauge of nails used - #11.5,common in rail/fence board connections
8.3	Galvanized - CSA G164

9. Line posts shall be placed no more than 8.0 ft. O.C. and be firmly anchored in the soil to a depth of not less than 2.0 ft.
10. The fence shall be constructed in accordance with these specifications and details provided in the drawings which forms part of these specifications.



2: Wire Fabric Fence with Two Strands Barbed Wire

1. All posts and brace poles shall be pressure treated in accordance with CSA Standard 080.5, using a wood preservative non-toxic to surrounding plant material.
2. Line posts shall be 8.0 ft. in length and 4” - 5” in diameter.
3. Corner and brace posts shall be 8.0 ft. in length and 5” - 6” in diameter.
4. Bracing poles shall be 3” - 4” in diameter.
5. All line and corner posts shall be machine pointed to permit driving of posts.
6. The wire mesh fencing material shall meet the following specifications:

6.1	Minimum wire gauge - 12.5 A.W.G.
6.2	Overall Height - 48”
6.3	Min. number of horizontal strands - 9
6.4	Max. spacing between horizontal strands - 8”
6.5	Max. spacing between vertical stays - 16”
6.6	Wire intersections of non-slip design
6.7	Galvanized - CSA G164

7. The barbed wire fencing material shall meet the following specifications:

7.1	Number of strands - 2
7.2	Minimum wire gauge - 12.5 A.W.G.
7.3	Maximum spacing between barbs - 6”
7.4	Number of points per barb - 4
7.5	Galvanized - CSA G164

8. Brace wire shall meet the following specifications:

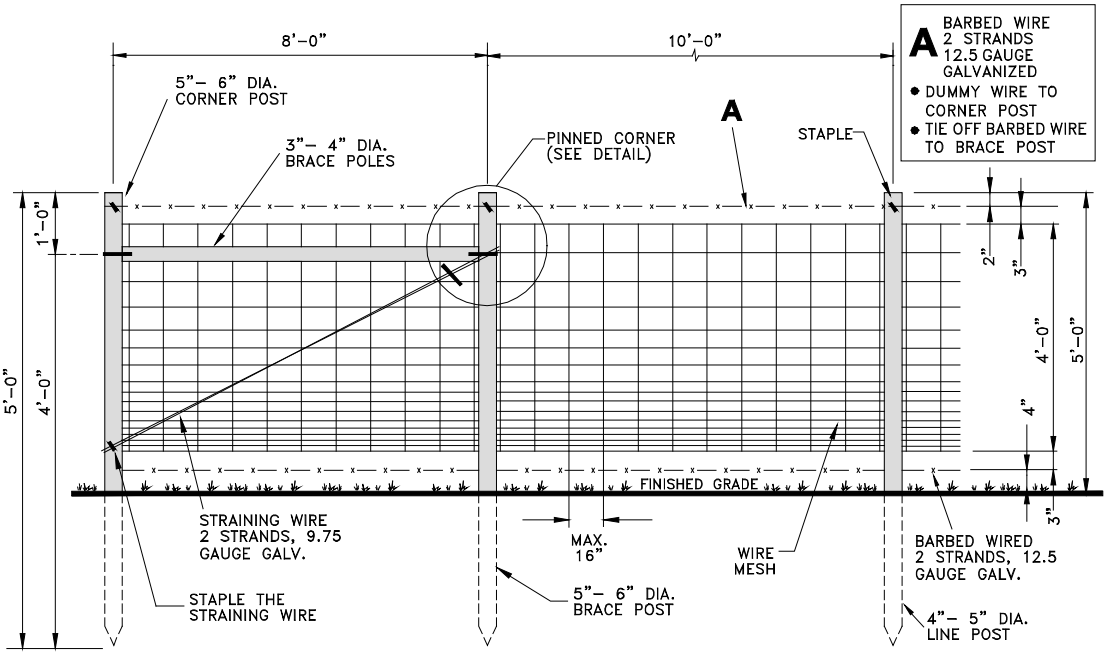
8.1	Number of strands - 2
8.2	Minimum wire gauge - 12.5 A.W.G.
8.3	Galvanized - CSA G164

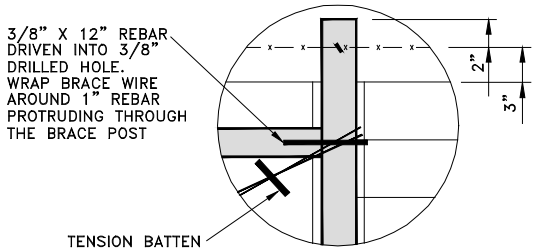
9. The staples used in fence construction shall meet the following specifications:

9.1	Minimum wire gauge - 9.0 A.W.G.
9.2	Minimum length - 1.75”
9.3	Galvanized - CSA G164

10. Line posts shall be placed no more than 10.0 ft. apart and be firmly anchored in the soil to a depth not less than 30”.
11. Corner brace assemblies shall be constructed as indicated in the drawings.
12. An intermediate brace assembly shall be constructed as shown in the drawings and spaced as required by terrain or every 660.0 ft.
13. Barbed wire shall be pre-stretched prior to tieing off. Tension wire to 600 lbs., relax to 250 lbs., then staple securely to brace assemblies. Securely staple barbed wire to line posts allowing for wire movement.
14. Wire mesh shall be stretched and securely attached by staples at each wire intersection with the brace assembly posts. At line posts, wire mesh shall be attached by staples at alternate wire intersections with posts. Securely staple to line posts allowing for wire movement.
15. Wire mesh and barbed wire shall be spaced as shown in the drawings.

16. The fence shall be constructed in accordance with these specifications and details provided in the drawings which forms part of these specifications.





PINNED CORNER

3: Chain Link Fence

1. Line posts shall be constructed from 2" (50 mm) standard galvanized steel pipe (0.125" wall thickness), 8.5 ft. (2.5 m) in length. Galvanized to CSA G164 standard.
2. Corner and straining posts shall be constructed from 2.5" (64 mm) standard galvanized steel pipe (0.125" wall thickness), 10 ft. (3 m) in length. Galvanized to CSA G 164 standard.
3. Diagonal corner bracing shall be constructed from 1.25" (32 mm) standard galvanized steel pipe. Galvanized to CSA G164 standard.
4. Posts shall be securely anchored in the soil using 2,500 PSI concrete extending from the soil surface to 6" (15 cm) below the bottom of the post. Posts shall be spaced no more than 8.0 ft. (2.5 m) O.C.
5. The chain link fencing material shall meet the following specifications:

   5.1 Minimum height: 5' 8" (1.8 m)

   5.2 Minimum wire gauge: 11.0 AWG

   5.3 Maximum mesh size: 2" (50 mm x 50 mm)

5.4 Be galvanized (to CSA G164) or plastic coated

6. If barbed wire is deemed necessary, the material shall meet the following specifications:

   6.1 Number of strands: 2

   6.2 Minimum wire gauge: 12.5 AWG

   6.3 Maximum spacing between barbs: 6" (15 cm)

   6.4 Number of points per barb: 4

   6.5 Galvanized: CSA G164

7. All accessory materials shall meet the following specifications:

   7.1 Post caps and extension arms: of pressed steel or cast or malleable iron and galvanized to CSA G164 standard.

   7.2 Tension wire: bottom and top wires 6.0 gauge (5 mm) medium tensile galvanized wire.

   7.3 Tie wire: 9.0 gauge aluminum wire for mesh fixing to line posts.

   7.4 Hog ring clips: 9.0 gauge galvanized steel wire clips for mesh fixing to top and bottom tension.

   7.5 Tension bar: minimum ¼" x ¾" (6.25 mm x 19 mm) galvanized mild steel flat bar.

   7.6 Tension bands: 1/8" x ¾" (3 mm x 19 mm) galvanized formed mild steel flatbars with galvanized bolts and nuts for all tension bar fixing.

8. All terminal posts (posts at ends, corners or intersections), all line posts and any intermediate tensioning posts shall be set plumb into concrete footings in augured or dug holes to the depths and regular spacing.

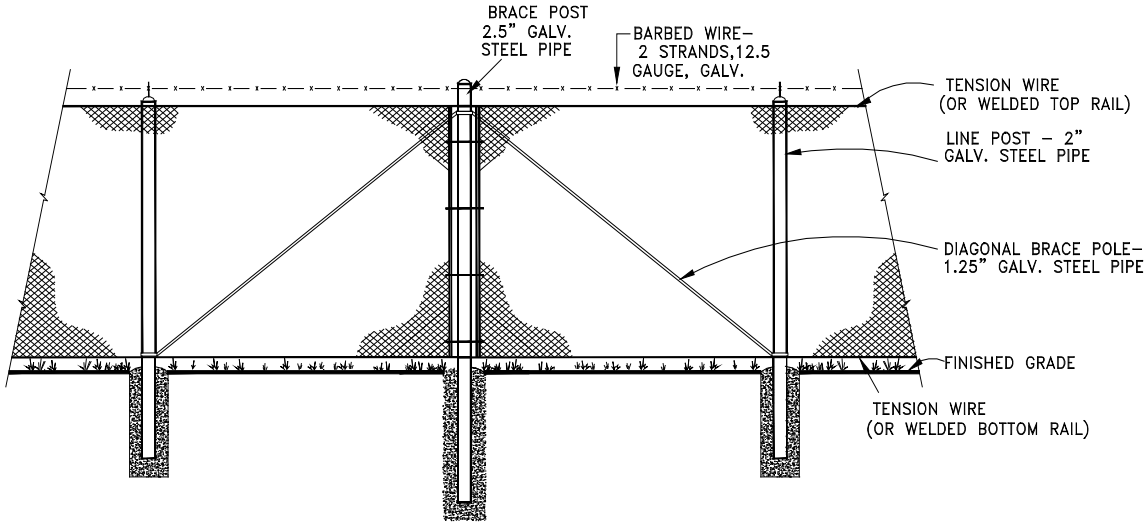
9. All posts shall be securely fitted with the appropriate weather-tight caps and extension arms.

10. If top and bottom welded rails are not used, top and bottom tension wires shall be securely fixed taut and sag-free to terminal posts and any intermediate tensioning posts. Top tension wire shall pass through line post tops.

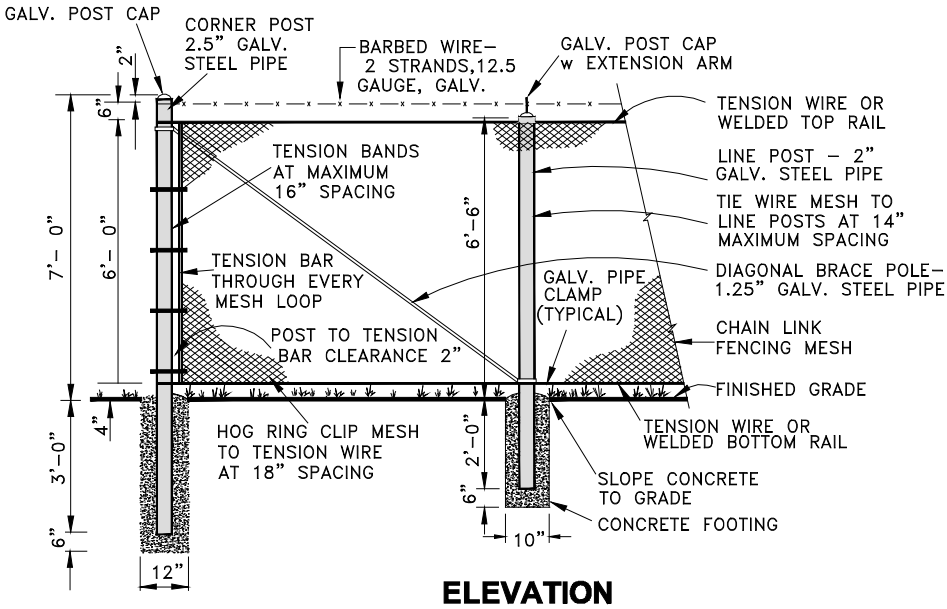
11. Intermediate tensioning assemblies shall be provided where terminal posts are more than 500.0 ft. (150 m) apart, and at any subsequent 500.0 ft (150 m) spacing to consist of a straining post with diagonal pipe braces to adjoining line posts each way.

12. Chain link fencing mesh shall be stretched between terminal posts and any intermediate tensioning posts using proper equipment, and secured with tension bars and bands, tie wire and clips. Joins in the length of wire mesh shall be made by weaving the mesh together with a single wire picket to form a neat continuous mesh.

13. If deemed necessary, barbed wire shall be installed in the slots of all extension arms and secured to extension arms at terminal and intermediate tensioning posts taut and free of sags.



ELEVATION



ELEVATION

Appendix D – Definitions for Farm-side Edge Planning Area Guidelines

Aerobic Decomposition	means the microbiological conversion of organic matter in the presence of oxygen.
Agricultural Solid Waste	means a by-product of agriculture and includes manure, used mushroom medium and agricultural vegetation waste.
Agricultural Unit	means live weight of 455 kg (1000 lbs) of livestock, poultry, farmed game or fur-bearing animals or any combination of them equaling 455 kg, defined under the Code of Agricultural Practice for Waste Management, *Environmental Management Act*.
Agricultural Waste Water	means water which contains any unwanted or unused products or by-products of agriculture such as milk, fertilizers, pesticides, detergents, acids, phosphates, chlorine, and manures.
Broiler Equivalents	means 1.929 kg of live weight of chicken.
Category 'A' Noise Scare Device	means a device used to protect crops and feed that creates an impulse sound generated from impacts or explosions and includes propane-fueled cannons. Firearms and shell launchers such as orchard pistols are not included.
Category 'B' Noise Scare Device	means any stationary device used to protect crops and feed, not in Category 'A', which generates sounds to scare or disturb animals. Devices that broadcast animal calls or other sounds through loudspeakers are included in Category 'B'. Firearms and shell launchers such as orchard pistols are not included.
Confined Livestock Area	means an outdoor, non-grazing area where livestock, poultry, or farmed game is confined by fences, other structures or topography, and includes feedlots, paddocks, corrals, exercise yards, and holding areas, but does not include seasonal feeding areas, free range poultry at a density of less than 1 agricultural unit per 100 m^2, horse riding rings, or exercise yards.
Enclosed Liquid Manure Storage	means a liquid manure storage facility that excludes precipitation and is physically protected from wind.
Feed Lot	means a fenced area where livestock, poultry or farmed game are confined solely for the purpose of growing or finishing, and are sustained by means other than grazing.
Feed Mill	means a facility for processing and/or mixing animal feed inputs.
Free Range Layers	means birds housed the same as free run layers and have access to a contained outdoor environment.
Free Run Layers	means birds housed on the floor inside a barn with all litter or partial litter and total or partial raised wire or slatted flooring.
Game Birds	means the following birds: guinea fowl, pheasant, partridge, pigeon, quail, silkies, squab, and tinamou.
Grazing Area	means a pasture or rangeland where livestock, poultry or farmed game is primarily sustained by direct consumption of feed growing in the area.
Greenhouse	means a structure covered with translucent material, used for the purpose of growing plants, and is of sufficient size for persons to work within the structure.
Manure	means waste material excreted from animals including livestock, poultry, farmed game and fur bearing animals; and may include some *agricultural waste water* and/or associated bedding.
Manure, Liquid	means manure that has a moisture content of 80% or higher.
Manure, Solid	means manure that has a moisture content of less than 80%.
Meat Chickens	means broiler, cornish and roaster birds.

Milk House	means a farm building or farm structure used to cool or store milk or farm separated cream and to clean, sanitize, and store milking equipment used in the production and storage of milk or farm separated cream.
Milking Facilities	means farm buildings or structures used on a dairy farm, including milking barns, milking rooms, milking parlours and milk houses.
Mushroom Medium	means a composted mixture that is used for growing mushrooms.
On-farm Composting	means composting of agricultural waste or raw materials, which may include manure, straw, vegetative waste, woodwaste, ground paper, other sources of carbon and nitrogen, and bulking agents, to generate finished compost but does not include production of mushroom medium.
Poultry	means domesticated birds kept for eggs, meat, feathers, hide or cosmetic or medicinal purposes, and includes broilers, cornish, layers, breeding stock, replacement pullets, roasters, ducks, geese, turkeys, ostriches, emus and game birds.
Propane Fueled Cannons	means automatic exploders powered by a gas, such as propane or butane, that produce sounds similar to shotgun blasts, used to scare birds and other wildlife.
Seasonal Feeding Area	means an area a) used for forage or other crop production and b) used seasonally for feeding livestock, poultry or farmed game that is primarily sustained by supplemental feed, but does not include a confined livestock area or grazing area.
Shell Launchers	means guns or orchard pistols that launch bird scaring shells instead of bullets to scare b0rds and other wildlife.
Small Ruminants	includes llamas, alpacas, sheep and goats.
Soil Based Crops	includes berry crops, vegetable crops, fruit trees, vineyards, forage crops, turf, specialty wood crops, nursery crops including nursery mat0erial grown in pots and excludes mushrooms and greenhouse crops.
Specialty Wood Crops	means salix and populus species as prescribed by the Minister of Agriculture.
Sub-canopy Manure Deposition System	means a method to apply liquid manure beneath the canopy of a growing crop and includes deep injection, shallow injection, and manure banding with or without soil aeration.
Wood waste	means wood materials including hog fuel, mill ends, wood chips, bark, and sawdust, but excluding demolition waste, construction waste, tree stumps, branches, logs and log ends

Appendix E – Agricultural Units* Conversion Table

		Typical Top Weight			
Livestock	Sub Type	Information	(lb's)	(kg's)	Agricultural Unit
Alpaca			110	50.0	0.11
Beef Cattle	Calf	0 to 8 months	506	230	0.51
	Feeder	9 mo to slaughter	1,320	600	1.32
	Cow		1,397	635	1.40
	Bull		3,300	1,500	3.30
Dairy Cattle	Calf	0 to 6 mo	359	163	0.36
	Heifer	7 to 26 mo	1,173	533	1.17
	Cow	over 26 mo	1,397	635	1.40
Emu			94.6	43.0	0.095
Game Birds					
Pheasant			3.00	1.40	0.003
Pigeon			2.20	1.0	0.002
Quail			0.66	0.30	0.00065
Silkie Chicken			1.98	0.90	0.002
Goat	Buck		130	59.0	0.13
	Doe		100	45.0	0.10
	Kid		50	23.0	0.05
Hog	Piglet	0 to 21 day	11	5.0	0.011
	Nursery (wean)	22 to 56 days	45	20.5	0.045
	Wean to Finish	57 to 165 days	45-140/140-240	20-64 / 64-109	0.23
	Sow		451	205	0.45
Horse			1200	545	1.20
	Foal		120	54.0	.12
Llama			400	182	0.40
Mink			5	2.3	0.005
Ostrich			350	160	0.35
Poultry					
Broiler			4.244	1.92	0.0042
Broiler Breeder	Pullet	0 to 23 wk	5.45	2.48	0.0054
	Layer	24 to 60 wk	9.34	4.24	0.0093
Layer	Pullet	0 to 18 wk	2.977	1.35	0.0030
	Layer	over 18 wk	4.180	1.90	0.0042
Duck	Pullet		7.24	3.29	0.0072
	Layer		7.55	3.43	0.0075
	Broiler		7.94	3.61	0.0079
Turkey			19.80	9.00	0.020
Breeder	Female		24.50	11.00	0.024
	Male		62.50	28.00	0.062

			Typical Top Weight		
Livestock	Sub Type	Information	(lb's)	(kg's)	Agricultural Unit
Sheep	Ewe		200	91.0	0.20
	Lamb	Spring	50	25	0.05
		Market	100	45	0.10

* 1 agricultural unit = 455 kg

Appendix F – Reference List – Building the Guide to Edge Planning

The consideration to develop ways to improve planning along the agriculture/urban edge began in 1997. Chapter 8 'Planning Along Agriculture's Edge' in "Planning for Agriculture" laid the initial groundwork for development of the edge planning tools and techniques found in this Guide. Below is a complete list of the literature and studies that helped to form the basis for the "Guide to Edge Planning". Of particular note:

- Relevant federal and provincial legislation was reviewed to ensure that the guidelines and definitions were developed in a manner consistent with existing legislation;
- The ALC Landscaped Buffer Specifications formed the basis of the Guide to Edge Planning buffer specifications; and
- Extensive discussion and consultations was undertaken with BCMA staff when developing the farm-side management guidelines.

Agriculture and Agri-Food Canada. 1997. Hog Environmental Management Strategy. Web site http://res.agr.ca/manurenet/en/hems/

Alberta Agriculture, Food and Rural Development. 2000. 2000 Code of Practice for Responsible Livestock Development and Manure Management. Web site http://www.agric.gov.ab.ca/agdex/400/400_27-2.html.

American Planning Association. 1990. Buffering Can Prevent Headaches. *Zoning News* American Planning Association, February issue.

Arendt, Randall. 1994. *Designing Open Space Subdivisions*. Natural Lands Trust through Environmental Protection Agency.

BC Agricultural Land Commission. 1993. *ALC Landscaped Buffer Specifications*. British Columbia.

BC Green Zone Committee. 1978. Agricultural Zoning and Waste Management. A Position Paper - Draft 1.

BCMAFF, 2003. *An Investigation of Existing Vegetative Buffers in BC and Their Effectiveness at Mitigating Conflict*. Resource Management Branch, unpublished.

BCMAFF. 2001. Draft *Agriculture and the Environment Reference Guide for Livestock Producers in BC*, unpublished.

BCMAFF. 2000. *Separating Agricultural and Residential Land Uses – An Investigation of the Effectiveness of Landscaped Buffers*. Resource Management Branch, unpublished.

BCMAFF. July 2000. Integrated Bird Management. *Blueberries Fact Sheet*. British Columbia.

BCMAF. December 1999. Management of Dust in Broiler Operations. *Poultry FactSheet*. British Columbia.

BCMAF. August 1999. Management of Noise on Poultry Farms. *Poultry FactSheet*. British Columbia.

BCMAF. 1998. *Bylaw Review*. Resource Management Branch, unpublished.

BCMAFF. 1995. Discussion paper on Noise for Normal Farm Practices..

BCMAFF. September 1994. Agricultural Issues in the Fraser Valley. Survey, Abbotsford.

BCMAL, 2006. B.C.'s Food Self Reliance – Can B.C.'s Farmers Feed Our Growing Population?

Berry, D., E. Leonardo, and K. Bieri. 1976. The farmer's response to urbanization. University of Massachusetts at Amherst Regional Science Research Institute, discussion paper series (92).

British Columbia Wetlands Network News (BCWNN). 1994. 'Cates Hill on Bowen Island: Developer Consults with Local Nature Club to Preserve Wetland', vol.1 No.1, Friends of Boundary Bay.

Buckingham County, Virginia. 1997. Siting ordinance.

Caldwell, Wayne J. and Michael Toombs. 1999. Draft. Rural Planning, The community and Large Livestock Facilities: An Across-Canada Checkup. Paper presented at the Canadian Institute of Planners annual conference, June 1999.

Canadian Pork Council. 1996. Code of Environmentally Sound Hog Production. Manitoba.

Canagir, Mevlut and Steven Kraft. 1983. Suburbia Meets Farm. R_x for the Edge. *Landscape Architecture,* July:79-80.

Christian Farmers Federation of Ontario. November 15, 2000. Standards for Agricultural Operations Act. A policy statement of the Christian Farmers Federation of Ontario.

City of London, Planning Division Liaison sheet. May 9, 2001. 'Rural/urban interface policy – lands within 300 m of the northern municipal boundary'.

City of Surrey, Planning and Development Department. 1996. Surrey Official Community Plan By-law, No. 12900.

Coppock, Ray and Marcia Kreith. Editors. 1995. Farmers and Neighbors: Land use, pesticides and other issues. Summary report of a workshop at the Agricultural Issues Center University of California, Davis.

Corporation of the District of Central Saanich. Official Community Plan, Schedule A to By-Law No.773.

County of Huron, Ontario, Wayne Caldwell General comments about managing intensive livestock operations. 1999.

Daniels, Tom and Deborah Bowers. 1997. *Holding Our Ground.* Island Press, Washington, D.C.

Daughton, Kevin. 1984. Presence of Farm and Non-farm Produced nuisances within the urban fringe of Eugene and Springfield, Oregon. Master's Thesis.

Department of Natural Resources. 1997. *Planning Guidelines: Separating Agricultural and Residential Land Uses.* The State of Queensland.

Diamond, Lawrence. 1985. The Interface between Farmland and Housing. University of British Columbia.

District of Chilliwack, 1993, Zoning Bylaw 1841.

District of Pitt Meadows. 1992 Zoning Bylaw.

Environmental Defense Fund. 1998. New Operations: Performance Standards. Hogwatch website.

Faraca, Paul A. 1986. 'The public-private partnership for park preservation: The Massachusetts model'. In Integrating Man in Nature in the Metropolitan Environment. Proceedings of a National Symposium on Urban Wildlife. Adams, Lowell W. and Daniel L. Leedy. Eds., 15-17. Maryland, National Institute for Urban Wildlife.

Great Valley Centre, 2002. Can City and Farm Coexist? The agricultural buffer experience in California.

Hair, Jay D. 1986. 'Cooperation between Conservation Advocates and Corporate Interests'. In Wildlife Conservation and New Residential Developments. Proceedings of a National Symposium on Urban Wildlife. January 20-22, 1986. Eds. Stenberg, Kathryn and William W. Shaw, 2-7.

Hammond, Sonya. 2000? Buffer Planning Workbook, Draft.

Heber, Albert J. 2000. Odour Based Setbacks. Purdue Agricultural Air Quality Laboratory. Website – http://danpatch.ecn.purdue.edu/~odor/setback.html.

Henderson, Harold. 1998. Noxious Neighbors. *Planning,* November issue.

Holland, Pat, Bill May and John Maber. 2000. Spray drift from Orchards. HortResearch, New Zealand. Website - http://hortnet.co.nz/publications/science/sprydrft.htm.

Hughes-Games, Geoff. 1995. Draft discussion paper on Particulate Matter Emissions (Dust) for Normal Farm Practices, Resource Management Branch, BCMAFF.

Kalmakoff, Jonathan J. 1999. The 'Right to Farm': A Survey of Farm Practices Protection Legislation in Canada. *Saskatchewan Law Review*, Vol. 62: 225-268.

Kalmakoff, Jon. 1998. Discussion Paper on Separation Distances. Agricultural Operations Review Board.

Kartez, Jack D. 1980. A zoning administrator's view of farmland zoning. *Journal of Soil and Water Conservation,* November-December, Vol.35, No.6.

Kelsey, T.W. and G. Vaserstein. 2000. Farming and Non Farming Neighbors: Conflict, Coexistence, and Communication. *Journal of Soil and Water Conservation,,* Vol. 55, No. 4, 462-465.

King County, Washington. 1999. Livestock Programs. Eric Nelson, Livestock Program Manager, Department of Natural Resources.

Knack, Ruth Eckdish. 1999. Small is Fruitful. *Planning,* June issue.

Knapp, Gerrit and Arthur C. Nelson. 1992. *The Regulated Landscape. Lessons on State Land Use Planning in Oregon.*

Lincoln Institute of Land Policy, Cambridge, Massachusettes.

Lines, J.A., S.R. Lee and M.A. Stiles. 1994. Noise in the Countryside. *J. agric. Engng Res.*, 57, 251-261.

Manitoba Agriculture, The Agricultural Guidelines Development Committee. 1998. *Farm Practices Guidelines for Hog Producers in Manitoba*. Winnipeg, Manitoba.

Marchand, Lynn and Ken McEwan. 1997. *The Impact of Township Zoning By-laws on Ontario Swine Farms*. Ridgetown College, University of Guelph.

Martens, M.J.M. 1981. Noise abatement in plant monocultures and plant communities. *Applied Acoustics*, 14/3, 167-189.

Minnesota Department of Agriculture. 1996. *Planning and Zoning for Animal Agriculture in Minnesota: A Handbook for Local Government*. Minnesota.

National Farmers' Union. Date unknown. *NFU's new code of practice for bird scarers*. Bailey Litho, Dursley, Glos.

Natural Resources Conservation Service and United States Department of Agriculture. 1999. Animal Feeding Operations.

Nicholas School of the Environment. 1996. *Policy Recommendations for Management of Agricultural Animal Waste in North Carolina*. Duke University, North Carolina.

Nicolai, Richard E. 1996. *Managing Odours from Swine Waste*. University of Minnesota Extension Program. Publication AEU-8.

North Carolina State. 1995. The Swine Farm Siting Act, 1995 Senate Bill 1080.

Ontario Ministry of Agriculture, Food and Rural Affairs. McTavish, Gary and David Lee. 2000. *Farmer and Neighbour Relations- A Framework for Avoiding Farm-related Conflicts*. Queen's Printer for Ontario.

Ontario Ministry of Agriculture, Food and Rural Affairs. 1995. *Guide to Agricultural Land Use*. Ontario.

Ontario Ministry of Agriculture, Food and Rural Affairs. 1995. *Minimum Distance Separation I (MDS I)*. Ontario.

Ontario Ministry of Agriculture, Food and Rural Affairs. 1995. *Minimum Distance Separation II (MDS II)*. Ontario.

Prestbo, J., editor. 1975. *This abundant land*. Princeton: Dow Jones Books.

PEI Department of Fisheries, Aquaculture and Environment; PEI Department of Agriculture and Forestry; Environment; Agriculture and Agrifood Canada. 2000. *Best Management Practices for Agricultural Waste Management*. P.Jacobs & Associates Ltd. - writers.

Prince Edward Island. 1999. Agricultural & Environmental Resource Conservation Program.

Regional District of Nanaimo. 1999. Arrowsmith Benson-Cranberry Bright Official Community Plan, Appendix A – DPAs, Bylaw No. 1148

Richmond Planning Department. 1986. Methods for Implementation of the Urban-Rural Interface in Richmond. Document 4105K.

Schwab, Jim. 1999. Confining the Impacts of Confined Animal Feeding. *Zoning News*, American Planning Association, April issue.

Sobering, Craig and Peter Andzans. 1990. Urban-Rural Fringe Conflict Mitigation Techniques. District of Matsqui Planning Department Report No. 90-240.

Sokolow, Alvin D. 2000. Agriculture in Urbanizing Communities. Outline of presentation to USDA Policy Advisory Committee on Farmland, Listening Forum, University of California, Davis.

Sokolow, Alvin D. 1999. "Farmland Protection in City General Plans", segment from Chapter 5, "How Cities Look to the Future: General Plans in the Sacramento Region". Sustainable Communities Consortium and the California Communities Program, University of California, Davis.

Smith, Barry. 1998. *Planning for Agriculture – Resource Materials*. Provincial Agricultural Land Commission.

Steiner, Frederick R. 1981. Farmland protection in the Netherlands. *Journal of Soil and Water Conservation*, March-April, Volume 36, No. 2.

Township of Langley. 1994. Urban / Rural Interface Study – Unseen – referenced in *Review of Agricultural Regulations, Issues and Options in the Township of Langley*. 1997. Prepared by Gary Runka and George E. Penfold.

Tulare County, California. 1985. California Zoning Ordinance.

Tyndall, John and Joe Colletti, 2000. Air Quality and Shelterbelts: Odor Mitigation and Livestock Production A Literature Review. Forestry Department, Iowa State University.

United States Department of Agriculture & United States Environmental Protection Agency. 1999. *Draft Unified National Strategy for Animal Feeding Operations*. Washington, DC.

University of Minnesota, Extension Service, Deptartment of Biosystems and Agricultural Engineering. 2000. Livestock and Poultry Odor, Workshop I, Emissions, Measurement, Control, and Regulation. University of Minnesota.

University of Minnesota, Extension Service, Deptartment of Biosystems and Agricultural Engineering. 2000. Livestock and Poultry Odor, Workshop II, Biofilters, Covers, OFFSET, and Odor Management Plans. University of Minnesota.

Van Kleeck, R.J. and N.R. Bulley. 1982. An Assessment of Separation Distance as a Tool for Reducing Farm / Neighbour Conflict. Ministry of Agriculture and Food, Abbotsford.

Voris, John C. 1995. Reducing the Conflict: Current Approaches. Part of proceedings of a workshop "Farmers and Neighbors. Land use, pesticides and other issues." UC Kearney Agriculture Centre.