

REPORT

City of Kelowna Kelowna International Airport

Agricultural Impact Assessment Kelowna Airport Expansion



April 2016

ISO 9001 and 14001 Certified | an Associated Engineering Company

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Executive Summary

Associated Environmental Consultants Inc. was retained by the Kelowna International Airport – City of Kelowna (Kelowna Airport) to complete an Agricultural Impact Assessment (AIA) of the proposed expansion of operations at the Kelowna International Airport (YLW) on to adjacent agricultural properties located in the Agricultural Land Reserve (ALR). The Kelowna Airport plans to expand its operations over the next 30 years to accommodate the projected increase in air passenger traffic. The first phase of this expansion is proposed to occur within the next five years to accommodate terminal complex and apron expansion south of the existing terminal and the development of additional airside services east of the runway. This expansion will occur on four properties located adjacent to YLW (the Exclusion Area).

The purpose of the AIA is to evaluate the effects of this proposed expansion on agriculture in the vicinity of the Kelowna Airport and the Central Okanagan region and to identify mitigation options. It was completed following the guidelines published by the City of Kelowna (Appendix A). This assessment report will form part of the application to the Agricultural Land Commission (ALC), the agency responsible for administering land in the ALR. The AIA of the Application Area will be used to support an application to the ALC for exclusion of the lands.

The results of the AIA indicate that airport expansion in the Exclusion Area will result in the loss of approximately 22 hectares (ha) of Class 2 and 3 (improved) agricultural land. Most of the Exclusion Area is located within a Transport Canada safety buffer zone (i.e. area required to reduce wildlife hazards through appropriate land use), so much of this land is not recommended for farming. If the safety buffer is subtracted from the 22 ha, the net loss of agricultural land that is available for farming is approximately 9 ha. Ideally, any ALR losses would be compensated for by adding the same amount of similar or better capacity land to the ALR in the Kelowna region. This compensation is not considered feasible because of the lack of suitable non-ALR land. However, the Kelowna Airport will implement the following mitigation measures and agricultural enhancement strategies to offset the negative effects of the exclusion/non-farm use:

- A topsoil enhancement strategy that would use surplus topsoil from the Exclusion Area to improve soil fertility in other areas of the ALR,
- A new produce kiosk (Farm to Flight) and wine, craft beer and distillery bar featuring BC products to promote agri-business at YLW, located at the departures terminal;
- Proposed air cargo services that will create more market opportunities for local producers to offset negative effects on agriculture in the region;
- Anticipated growth of local, domestic and international air service providing travellers with the ability to easily travel to the Okanagan and have the opportunity to enjoy and support Okanagan agri-tourism; and
- Continued support of Okanagan agriculture and agri-tourism through advertising opportunities at the Airport.

Furthermore, best management practices and detailed planning and monitoring during design, construction, and operations will ensure that potential negative effects on agriculture are minimized.

If all mitigation measures and strategies, as described in this report, are implemented, then the residual adverse effects on agriculture are likely negligible given that only 9 ha of the land would be farmed under current regulations and much of this is isolated from other agricultural lands by Highway 97 and Old Vernon Road.

Although 22 ha total loss (or 9 ha net loss) is more than the average net loss of 6 ha (annually from the ALR in the Central Okanagan region), the cumulative effects of the exclusion, in combination with other potential exclusion applications (including future potential expansion of the airport), are negligible because the Exclusion Area is not being farmed and there is a low probability that it will be because of the safety buffer. The Kelowna Airport recognizes, however, that the planned reduction in ALR land to enable development is a concern, and will commit to the implementation of the mitigation measures described in this report.

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1 Introduction

1.1 BACKGROUND INFORMATION

Associated Environmental Consultants Inc. was retained by the Kelowna International Airport – City of Kelowna (Kelowna Airport) to complete an Agricultural Impact Assessment (AIA) for the proposed expansion of operations at the Kelowna International Airport (YLW) on to four agricultural properties located in the Agricultural Land Reserve (ALR). The purpose of the AIA is to evaluate the effects of expansion on agriculture in the vicinity of the Kelowna Airport and the Central Okanagan region and to identify mitigation options. It was completed following the guidelines published by the City of Kelowna (Appendix A).

The Kelowna International Airport - City of Kelowna (Kelowna Airport) plans to expand the Kelowna International Airport (YLW) over the next 30 years to accommodate the projected increase in air passenger traffic. Since 2004, passenger numbers at YLW have increased 78%, and according to the 2025 Airport Master Plan, the passenger volume through YLW is expected to grow an additional 51% to 2.4 million passengers per year by 2025 (the current volume is 1.6 million). To accommodate the expected growth, YLW will require a new taxiway, terminal expansion, apron expansion, airside services that require access to the airside infrastructure (i.e., cargo/courier, fuelling, mechanical maintenance, charter), additional airport parking and groundside services.

Kelowna Airport plans to expand YLW over several phases. The first phase is proposed to occur within the next five years to accommodate terminal complex and apron expansion south of the existing terminal as well as additional airside services east of the runway. This expansion will occur partly within the four agricultural parcels adjacent to YLW that are in the ALR (the Exclusion Area) (Figure 1-1).

As a requirement of the expansion, Kelowna Airport must apply for an exclusion from the ALR through the Agricultural Land Commission (ALC), the provincial agency responsible for administering land in the ALR, and both local governments (i.e., City of Kelowna and RDCO). To fulfill ALR exclusion application requirements, an assessment of agricultural effects as well as mitigation measures for offsetting any negative effects on agriculture are typically required for projects of this scale. This AIA will be used to support an application to the ALC for exclusion/non-farm use of the lands.

This report describes the assessment of the effects of the proposed ALR exclusion (the Exclusion) on agriculture resources in the vicinity of the airport and the wider region, and describes the methods for completing the assessment. The report provides a summary of the baseline information and an overview of the potential effects on agriculture as a result of airport expansion, mitigation measures to minimize effects on agriculture, and residual and cumulative effects. It also provides details on alternatives to the airport expansion.

1.2 AGRICULTURAL IMPACT ASSESSMENT OBJECTIVE

The requirements for completing an AIA in Kelowna are outlined in City of Kelowna's Agricultural Impact Assessment Terms of Reference (TOR) (Appendix A). The TOR is intended as a general guide for

preparing AIAs in the City of Kelowna and is not a comprehensive list of requirements. The guidelines advise the Qualified Professional completing the AIA to work with Kelowna staff to review and confirm a site-specific TOR prior to commencing work. Therefore, in March 2016, Associated consulted with City of Kelowna staff to discuss AIA requirements. Based on these discussions, the objectives of this AIA are to:

1. Summarize the baseline agricultural conditions;
2. Assess the potential effects of the Exclusion on agricultural resources in the vicinity of the airport;
3. Develop a mitigation strategy to avoid or reduce any detrimental effects;
4. Determine any residual effects that cannot be reasonably mitigated;
5. Identify any cumulative effects of the Exclusion; and
6. Identify alternatives to the Exclusion.



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Subject properties



PROJECT NO.: 2016-8053.000.000

DATE: April 2016

DRAWN BY: BdJ

FIGURE 1-1 PROJECT LOCATION

Kelowna International Airport
– City of Kelowna
Agricultural Impact Assessment

2 Methods

The methods used to complete the AIA were based on the City of Kelowna Agricultural Impact Assessment TOR (Appendix A), which included the following tasks:

- Review of existing information, including: aerial photographs; soil and land capability maps and reports; Official Community Plans and Agricultural Plans; Kelowna Airport Master Plans; land use maps and reports; survey and engineering drawings; and agricultural statistics.
- A site visit conducted by Katarina Glavas, P.Ag., on March 24, 2016 to assess the soils and agricultural capability of the Exclusion Area and to review existing land use in the vicinity of YLW.
- Meetings with City of Kelowna and RDCO agricultural advisory committees and ALC staff to discuss potential effects and mitigation measures
- Interviews with adjacent landowners (Sandhers cherry producers).
- A meeting with ALC staff - Mr. Ron Wallace, Land Use Planner for the Okanagan and Mr. Martin Collins, Regional Planner for the Okanagan - to review the proposed changes to ALR lands at the airport and to discuss mitigation options.
- Assess potential effects on agricultural as described in the City of Kelowna (TOR)
- Identify mitigation measures to offset potential effects
- Preparation of this report.

3 Study Area

The study area for this assessment comprises the Exclusion Area, which includes the local agricultural area that may be impacted, primarily the Ellison area located within the boundaries of the RDCO. A wider regional study area that comprises the Central Okanagan was also considered, which includes the municipalities of Kelowna, Lake Country, Peachland, West Kelowna, and two rural areas (East and West Electoral Area).

4 Baseline Information

4.1 SITE DESCRIPTION

YLW is located within the boundaries of the City of Kelowna, approximately 15 km northeast of downtown (Figure 1-1) at an elevation of 430 metres above sea level (masl) in the Okanagan Valley.

The Exclusion Area is comprised of four parcels of land (Parcels 1, 2, 3, and 4 shown in Figure 1-1). These parcels of land are located to the west and east of the runway. Parcel 1 is located within the boundaries of the City of Kelowna on the west side of the runway. Parcels 2, 3, and 4 are located on the east side of the runway in the Ellison area of the RDCO (East Electoral Area). All four parcels are owned by the City of Kelowna. Land title numbers and areas of each parcel are provided in Table 4-1.

Table 4-1
Description of Parcels within the Exclusion Area

Parcel	PID	Address	Legal Description	Area	
				Acres	Hectares
1*	011-510-625	5269 Highway 97 N	Plan: KAP1629, Lot: 3, Section: 11, District Lot: 122, Township: 23	16.88	6.83
2	011-510-544	4310 Old Vernon Rd.	Plan: KAP1629, Lot: 2, District Lot: 122, Electoral Area: I	12.52	5.07**
3	001-482-530	4210 Old Vernon Rd.	Plan: KAP1629, Lot: 1, District Lot: 122, Electoral Area: I	13.18	5.33
4	009-766-791	4130 Old Vernon Rd.	Plan: KAP8953, Lot: 1	11.13	4.50
Total				53.71	21.73

Notes:

* Parcel 1 is located within airport perimeter fencing

**1.86 ha of the western section of Parcel 2 is located within airport perimeter fencing

The Exclusion Area occupies level to nearly level valley bottom with some gently to moderately sloping (15%-30%) terrain on Parcel 2, and the eastern portions of Parcels 3 and 4.

4.2 LAND USE

The YLW lands were formerly part of the Dickson Ranch, a cattle ranch that operated in the area up until 1946. The City of Kelowna purchased 320 acres of land in 1946 when residents voted in favour of purchasing the Dickson Ranch to establish an airport (Note: the ALR was established in 1973). Additional adjacent lands, including the Exclusion Area and Shadow Ridge Golf Course, were more recently acquired by the City of Kelowna for future airport expansion.

The Exclusion Area has been previously leased for forage production; however, none of the parcels are currently cultivated or used for grazing. The Exclusion Area is bordered by a mixture of agricultural, community, and recreational land use. Adjacent land use includes:

- North – Ellison Dog Park (ALR), Kelowna Airport parking lot
- East – Cherry orchards (ALR) and Ellison Community Hall/Fire Hall (ALR)
- South – Horse stables, paddocks and polo field (ALR); Shadow Ridge Golf Course (ALR)
- West – Proposed Okanagan Rail Trail and hobby farm (llamas) (ALR)

Surrounding land use includes the UBC Okanagan campus, existing (e.g., gravel pit) and future commercial/business park development (west of Highway 97), High Noon Park, commercial grounds, rural residential, and various agricultural activities including orchards, forage crop, turf production, and horse stables in the Ellison area. Agricultural lands in the Ellison area are mostly smaller rural residential properties with hobby farms. Agricultural lands to the south are generally larger agricultural holdings.

4.3 AGRICULTURAL LAND RESERVE AND ZONING

The Exclusion Area is located within the ALR. The ALR is a provincial zone in which agriculture is recognized as the priority use, where farming is encouraged and non-agricultural uses are controlled. According to the City of Kelowna's Agricultural Plan (1997), approximately 42% (8,927 ha) of the City of Kelowna land area is within the ALR.

The Exclusion Area is zoned by the City of Kelowna as A1 Rural and by the RDCO as A1 Agricultural. A1 zoning allows general agricultural uses; however, not all land in this zone is actively used for agricultural purposes. Areas zoned as A1 have a minimum parcel size of 5 acres (2 ha) under the City of Kelowna Zoning Bylaw 3500. The RDCO does not set a minimum parcel size.

4.4 AGRICULTURAL SOCIO-ECONOMIC PROFILE

Agriculture is important to the economy of the Central Okanagan. The soil, topography, and warm climate (and the ready availability of water for irrigation) in the Okanagan Valley make the Central Okanagan one of the most important agricultural centres in the province.

Approximately 31,368 ha of land is farmed in the Central Okanagan with 62% of the farm area owned by producers (Statistics Canada 2011). Farms in the region produce a variety of crops with apples, cherries, and grapes amongst the most important commercial crops (14% of the province's total). Fruits, particularly

cherries, are important agricultural exports that provide significant contributions to the agricultural economy in BC. In 2015, approximately \$80 million worth of cherries were shipped outside of Canada (i.e., mostly to US, China, and Hong Kong) (RDCO 2015).

In 2011, the gross farm receipts for the Central Okanagan totalled \$96,546,394 and total salaries and wages paid was \$28,669,674 (Statistics Canada 2011). Total gross farm receipts have increased by approximately 104% between 1991 and 2011. This is primarily due to the growth of the wine industry and cherry exports, as well as the Okanagan's reputation as a world class agri-tourism destination.

At the same time; however, significant population growth and urbanization throughout the Central Okanagan is contributing to increased pressure on agricultural land. In turn, the increased pressure to urbanize agricultural land is contributing to the high cost of agricultural land, which can act as a deterrent to prospective entrants into the farming industry (RDCO 2015).

4.5 CLIMATE

The closest Environment Canada climate station is the Kelowna A Station (Climate ID 1123970). This station is located at YLW at an elevation of 430 masl. The climate in Kelowna is characterized by warm, dry summers and mild winters. The normal daily January temperatures are -0.2°C (maximum) and -7.4°C (minimum) and daily mean July temperatures are 27.6°C (maximum) and 10.5°C (minimum) (Environment Canada 2015). Mean annual precipitation is 380.5 mm, with 101.8 mm (water equivalent) falling as snow.

Figure 4-1 shows the monthly normal precipitation compared to the estimated potential evapotranspiration (PET), as estimated using the Priestley-Taylor equation (Shuttleworth 1993). Between May and September the region is characterized by a soil moisture deficit. Therefore, the majority of agricultural operations in Kelowna rely heavily upon irrigation.

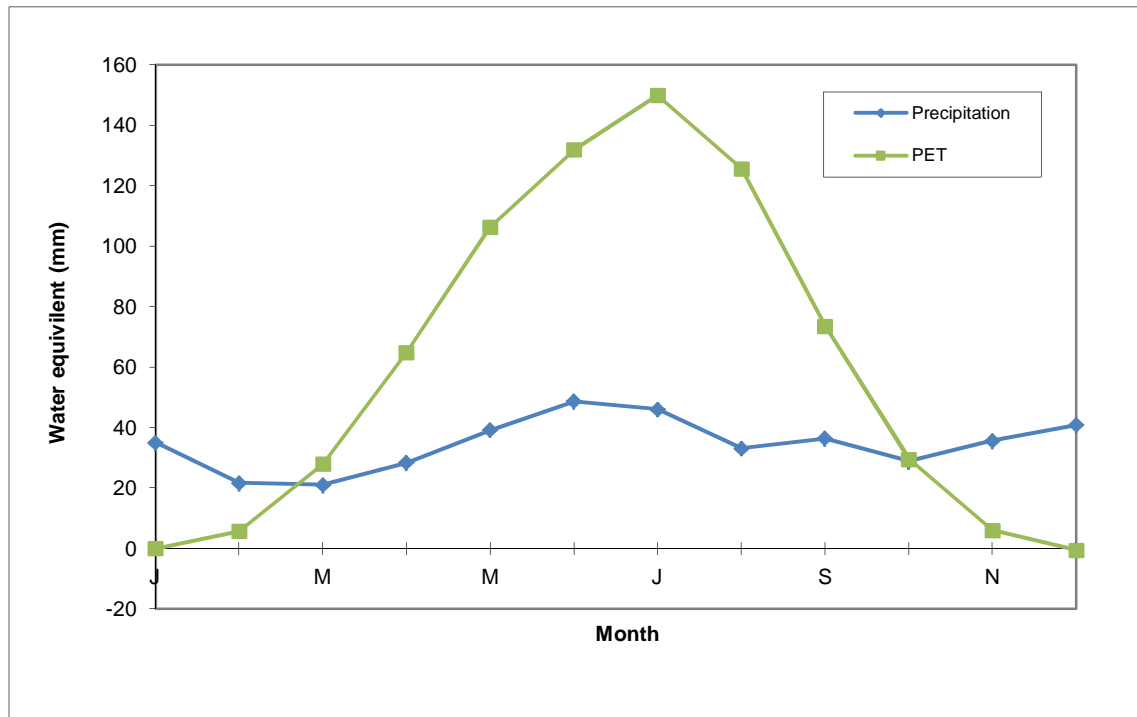


Figure 4-1
Kelowna: precipitation and potential evapotranspiration

4.6 SOIL AND LAND CAPABILITY FOR AGRICULTURE

Soils in the Exclusion Area have developed on a combination of fluvial and glaciolacustrine surficial materials with a small amount of organic material southwest of YLW. Published soil mapping indicates that several soil types (soil series) corresponding to these surficial materials occur in the Exclusion Area (Wittneben 1986). Soils are primarily composed of Ratnip Fan soils accompanied by Winslow Fan, Rutland, Tanaka Fan, Westbank, and Rumhor soils by area. These soils and their locations were verified during the field investigation and were found to be consistent with that of the published soil mapping.

Table 4-2
Published description of soil series that occur within the Exclusion Area

Soil Series	Soil Material	Drainage	Classification	Soil Management Group
Ratnip Fan	Surface: gravelly sandy loam to gravelly loamy sand Subsoils: range from gravelly loamy sand to gravelly sand Parent material: gravelly coarse-textured fluvial fan deposits	Well to rapidly drained, mod. to rapidly pervious, and low to mod. water holding capacity	Orthic Dark Brown Soils	Stemwinder
Winslow Fan*	Surface: sandy loam or occasionally loam Subsoils: gravelly loamy sand Parent material: 10-50 cm thick, mod. coarse, gravel-free veneer overlying gravelly, coarse-textured fluvial fan deposits	Poorly drained mod. to rapidly pervious, and mod. to low water holding capacity	Rego Humic Gleysol	Guisachan
Rutland	Surface: sandy loam or loamy sand Subsoils: gravelly sand or gravelly loamy sand Parent material: mod. coarse veneer, 10 - 25 cm overlying gravelly and stony, very coarse glaciofluvial deposits	Rapidly drained, rapidly pervious, slow surface runoff and low water holding capacity	Orthic Dark Brown	Gammil
Tanaka Fan*	Surface: sandy loam to silt loam with occasional silty clay loam Subsoils: sandy loam or gravelly sandy loam Parent material: gravel-free, mostly medium to moderately coarse-textured fluvial fan deposits	Poorly to very poorly drained, mod. to slowly pervious, high water holding capacity.	Rego Humic Gleysol	Guisachan
Westbank	Surface: silty clay loam, clay loam, and clay Subsoils: clay or heavy clay but may become sandy Parent material: fine to mod. fine glaciolacustrine deposits	Mod. well drained, slowly pervious, high water holding capacity	Orthic Gray Luvisol	Glenmore

Soil Series	Soil Material	Drainage	Classification	Soil Management Group
Rumohr*	Surface: peaty Subsoils: sandy fluvial deposits Parent material: mesic organic material usually between 20 and 60 cm thick	Very poorly drained, high fluctuating water table	Rego Gleysol: Peaty and calcareous phase	Rumohr

Source: Wittneben 1986, Gough et al. 1994

Notes: *Drainage has been improved in Parcel 1, such that the soils are imperfectly drained

4.7 LAND CAPABILITY FOR AGRICULTURE

In BC, agricultural capability is rated through a classification system known as the Land Capability Classification for Agriculture in British Columbia (Kenk and Cotic 1983). The system describes seven land capability classes for agriculture (Class 1 to Class 7), and is consistent with the system of the Canadian Land Inventory. The highest classification soil (Class 1) has very slight limitations for agriculture; the lowest class (Class 7) has no capability for agriculture (Table 3-3). Along with these classes, the ALC assigns limitations to soils (Table 3-4). In most agricultural regions of BC, two ratings are assigned to a piece of land to reflect the current condition of soils and the condition after management improvements to limitations are implemented (ALC 2013). Improvements typically include drainage systems, irrigation, stone picking, and amendments.

Table 4-3
BC land capability classes for agriculture

Class	Description
Class 1	Land either has no or only very slight limitations that restrict its use for the production of common agricultural crops.
Class 2	Land has minor limitations that require good ongoing management practices or slightly restricts the range of crops, or both.
Class 3	Land has limitations that require moderately intensive management practices or moderately restricts the range of crops, or both.
Class 4	Land has limitations that require special management practices or severely restricts the range of crops, or both.
Class 5	Land has limitations that restrict its capability to producing perennial forage crops or other specially adapted crops.

Class	Description
Class 6	Land is non-arable but is capable of producing native and/or uncultivated perennial forage crops.
Class 7	Land has no capability for arable or sustained natural grazing.

Source: ALC 2013

Table 4-4
BC land capability limitations to agriculture

Symbol	Limitation	Major Improvements
W	Water	Drainage systems
L	Permeability (organic soils)	Unimprovable
D	Soil structure /permeability	Organic matter additions
N	Salinity	Unimprovable
I	Inundation	Diking
A	Moisture	Irrigation
F	Fertility	Fertilizer additions
T	Topography	Unimprovable

Source: ALC 2013

Based on a review of published agricultural capability and the field investigation, the agricultural capability of the Exclusion Area is primarily improved Class 2 to 3, with some Class 5 land located on Parcel 1. The improved land capability is the appropriate indicator of land quality because the majority of Exclusion Area has access to irrigation water through the Glenmore Ellison Improvement District (GEID). Soils on Parcel 1 are primarily limited by excess water (W), while soils of Parcels 2, 3, and 4 are primarily limited by a soil moisture deficit (A) and stoniness (P) (Table 4-5).

Table 4-5
Verified agricultural capability of Exclusion Area

Parcel Identifier	Unimproved	Improved
Parcel 1	4W, 4AW	2W
Parcel 2	4AP, 5TA, 4AD	3PA, 5TA*, 3D
Parcel 3	4AP, 5A	3PA, 2T**
Parcel 4	4AP, 5A	3PA, 2T**

Notes:

*Published agricultural capability information indicates that topography on Parcel 2 is improvable to Class 3; however, this is not considered feasible.

**Class 2T land is located on the farm homeplate.

4.8 DRAINAGE, IRRIGATION AND WATER QUALITY

YLW is located in the Upper Mill Creek Basin that includes three watersheds: Mill Creek, Whelan Creek, and Scotty Creek. All three creeks occur within or in close proximity to the Exclusion Area (Figure 4-2). Mill Creek is located east of the runway. It is approximately 36 km long with about two-thirds of the total watershed area located up-gradient and east of YLW (Summit 2007). Mill Creek has been channeled alongside the runway to avoid airport operations. The channelized creek passes under the runway through a culvert, runs parallel to the northern boundary of Parcel 1 and then flows south towards Bulman Road. Whelan Creek flows towards the airport (north of Parcel 2) from the east and joins Mill Creek. Scotty Creek flows west joining Mill Creek at Bulman Road. Mill Creek flows for a distance of about 13 km (from YLW) before reaching Okanagan Lake. In general, site drainage for Parcels 2, 3, and 4 is primarily south towards Scotty Creek, and site drainage for Parcel 1 is west towards Mill Creek.

Groundwater discharge (from the hillside) into low lying spots in the lower valley is significant, particularly around the airport (City of Kelowna 1998). The combination of groundwater discharge as well as high water table conditions creates drainage difficulties in the surrounding agricultural areas around Bulman Road, which is prone to seasonal flooding.

Within the Exclusion Area, the soils are primarily moderately well drained on Parcels 2, 3, and 4, due to the coarse-textured rapidly drained soils. Soils on Parcel 1 are imperfectly drained. Due to the soil moisture deficit that occurs between April and October (as described in Section 3.2), irrigation is required during the summer. All four parcels have access to irrigation (irrigation mains observed on all properties); however, no irrigation equipment was observed on any of the parcels. Irrigation water in the Ellison area is withdrawn by GEID from Mill Creek upstream of the airport.



4.9 FARM ACCESS AND TRANSPORTATION

Parcel 1 is accessed through the airport parking lot and is currently located in the airport perimeter area, which has restricted access (security gate and fence). It can only be accessed by airport personnel. Parcels 2, 3, and 4 are accessed from Old Vernon Road by way of Old Vernon Road or Bulman Road. Old Vernon Road is maintained by the Ministry of Transportation and Infrastructure (MOTI) while Bulman Road is maintained by the City of Kelowna. These roads are all two-lane secondary roads primarily used by agricultural and rural traffic as well as local traffic.

4.10 FARM INFRASTRUCTURE (FENCING)

All of the properties in the Exclusion Area are currently fenced off with chain-link perimeter fencing, with the exception of the south perimeter of Parcel 4, which is a barbed wire and post fence. The height of the chain-link fencing enclosing Parcel 1 is eight feet tall and is topped with security barbed wire to keep trespassers out of the airport restricted zone. The height of the chain-link fencing enclosing Parcels, 2, 3, and 4 is approximately four feet. Parcels 2 and 3 were previously farmed as one unit so the perimeter fencing encloses both of these fields. In addition, there is an eight foot perimeter fence along the entire length of the airport and City of Kelowna lands adjacent to the polo field and paddocks that are located to the south.

5 Assessment of Effects on Agriculture

The following effects were assessed as part of the AIA:

- Loss of agricultural land
- Loss of agricultural revenue
- Disruption of drainage, irrigation and water quality
- Farm access and transportation
- Compatibility and property speculation
- Severance or isolation
- Degradation of soils on agricultural land
- Temporary loss of infrastructure (fencing)

Details for each effect are described in Section 5.1 through 5.8.

5.1 LOSS OF AGRICULTURAL LAND

The proposed expansion will result in the loss of approximately 22 ha of ALR land. The areas that would be removed are primarily composed of Class 2 and 3 soils, based on the improved land capability ratings. As noted above, the improved land capability rating is the appropriate indicator of land quality because irrigation and other improvements have been widely implemented throughout the Exclusion Area.

No parcels within the Exclusion Area are currently used for agricultural purposes, although they have been leased to forage producers in the past. Kelowna Airport has indicated that these lands are no longer leased for agricultural production in order to comply with Transport Canada guidelines to reduce wildlife hazards (i.e. bird strikes). Agricultural land uses are known to create wildlife hazards in the vicinity of an airport by attracting wildlife to food sources (Transport Canada 2004). Agricultural land uses that increase wildlife hazards include:

- crops (grains, forage, legumes);
- livestock feedlots, pig farms (not recommended within 3.2 km of airport reference points);
- pasture lands;
- plowing, haying, harvesting activities that attract flocks of birds;
- vineyards;
- orchards; and
- berry farms.

Transport Canada recommends that these types of agricultural land uses are kept more than 1,200 feet away from runways to reduce wildlife hazards. If these guidelines for minimum distances are applied to the Exclusion Area, agricultural land loss would be reduced to a net loss of approximately 9 ha of land from the

ALR (Table 5-1)¹. To put this loss into context, the average farm size in the Central Okanagan is 31.0 ha (Statistics Canada 2011), and this net loss is equivalent to losing about one-third of an average-sized farm.

Table 5-1
ALR land loss with buffers

Parcel	Gross Loss (ha)	Transport Canada 1,200 ft Buffer Zone	Net Loss (Land that could be farmed)
1	6.83	4.65	2.18
2	5.07	2.81	2.26
3	5.33	3.08	2.25
4	4.50	2.48	2.02
Total	21.73	13.02	8.71

Regardless of the actual area lost by the proposed expansion, any loss of agricultural land is considered an adverse effect on agricultural use because of the importance of preserving high capability agricultural lands within the ALR. It is the mandate of both the City of Kelowna and the RDCO to preserve agricultural land in the ALR to support agricultural viability. The ALC, along with municipal governments, generally discourage removal of land from the ALR unless there is a demonstrated net benefit to agriculture through compensation or improvements as a result of non-agricultural development in the ALR.

The mitigation measures to offset loss of agricultural land are described in Section 6.1.

5.2 LOSS OF AGRICULTURAL REVENUE

Where there is permanent land loss and/or soil degradation, farmers may experience lost or reduced revenue due to their smaller land-base (many producers in the region farm multiple properties in the Kelowna area) and/or lower crop yields where temporary disturbances result in soil degradation. Although the Exclusion Area is no longer farmed in order to comply with Transport Canada guidelines, this area was previously leased for forage production; therefore, there is a permanent loss of potential agricultural revenues associated with YLW operations as well as the proposed expansion. In contrast, soil degradation

¹ Transport Canada buffer zone guidelines are only applied to land owned by the City of Kelowna. They cannot be applied to private lands; however, Kelowna Airport works with adjacent neighbours to reduce the risk of wildlife hazards.

in adjacent areas or laydown areas is considered reversible; therefore, the economic implications of soil degradation are considered temporary.

The mitigation measures to offset economic effects associated with permanent land loss in the ALR are described in Section 6.2.

5.3 DRAINAGE, IRRIGATION AND WATER QUALITY

Development within the Exclusion Area has the potential to affect drainage in surrounding agricultural areas by disrupting drainage patterns (i.e., reducing infiltration and increasing surface runoff). This has the potential to incrementally increase flooding and saturated soils in adjacent agricultural areas, which can result in reduced yields, delayed planting in the spring, and harvesting problems.

Any changes to drainage patterns due to development on Parcels 2, 3, and 4 are not expected to significantly increase flooding or saturated soil conditions, particularly if stormwater best management practices are implemented. However, development on the west side of Parcel 1 has the potential to negatively impact flood levels downstream, as portions of the natural flood plain will be removed from the system. Mill Creek is prone to flooding, particularly around YLW and the Bulman Road area (City of Kelowna 1998). The City of Kelowna is aware of this issue and has commissioned several studies over the years to determine the best options for dealing with flooding in the Upper Mill Creek Basin (particularly around YLW). Proposed capital projects include developing storm water retention areas, upgrading culverts, and widening channels.

From a water quality and irrigation perspective, farmers in the GEID are most concerned about the negative effects of high sediment concentrations (which can damage pumps), and, to a lesser extent, spills or leachate from industrial areas.

The mitigation measures to minimize potential effects on drainage, irrigation and water quality are described in Section 6.3.

5.4 FARM ACCESS AND TRANSPORTATION

With expected development, traffic in the Ellison area, along Old Vernon Road and connector roads (Bulman Road), is expected to increase due to employee traffic associated with the proposed airside services (i.e., to and from work). To estimate the maximum potential increase in vehicle traffic along Old Vernon Road, the current number of employees/square foot at the largest YLW tenant, KF Aerospace (located west of the runway), was used to estimate the maximum number of employees for the proposed airside operations.

Based on these estimates, there will be a maximum of 780 vehicles per day in the long-term (approximately 45 years based on growth at KF Aerospace). Therefore, it is likely that the number of employees would be significantly less in the short-term. Furthermore, KF Aerospace's operations are labour-based. If the

proposed airside development was a second fuelling center, it is anticipated that the number of employees would be significantly less than estimated.

KF Aerospace staff members generally work morning or evening shifts. If the same type of shift work is assumed for the proposed airside development, only an estimated 400 staff would be driving to work for the morning shift. There would be overlap during shift change that would likely occur around 4:00 pm with 400 staff leaving work. This would result in a significant increase in traffic during short periods of time, three times a day. Traffic is not expected to increase outside of these times, as it is not anticipated that the operations would be focused on airside activities and would not require travel on Old Vernon Road.

In general, roads throughout the Central Okanagan region are supporting traffic volumes that are increasing with growing farm businesses, escalating tourist traffic (buses and farm tours), and general regional growth (RDCO 2005). Higher traffic volumes in agricultural areas have the potential to increase conflict with slow-moving farm vehicles and make it difficult for farmers to access their farm lands. Roads developed and maintained for agricultural purposes may experience deterioration due to increased volumes, increased weight of vehicles (trucks and buses), and increased speeds. Old Vernon Road is currently maintained by contractors responsible to MOTI.

No effects on agricultural transportation are associated with Parcel 1 as this is an isolated parcel.

The mitigation measures to offset the effects of increased traffic are described in Section 6.4 and will be outlined in a Transportation Management Plan.

5.5 COMPATIBILITY AND PROPERTY SPECULATION

When land uses, such as the proposed airside development, are located in agricultural areas there is an increased potential for land speculation to occur, which tends to reduce the level of active farming and reduce agricultural investment. This is because the perception may be that the Exclusion Area has become more developed and its character is more commercial rather than agricultural. In general, farm properties along the urban-rural fringe (primarily relating to residential development but can include commercial developments) are more likely to be farmed at a lower intensity or held by speculators despite being in the ALR. In addition, agricultural operators on adjacent areas may have complaints related to airside odour or dust, and farmers may experience increased difficulty in farming operations or littering or trespassing by the public. In general, however, when compared to other land use such as residential, commercial/industrial developments often make good agricultural neighbours when compared to residential developments (Metro Vancouver 2014).

Potential speculation of the agricultural areas directly adjacent to YLW is considered low as the City of Kelowna owns most of the adjacent land for future airport development. Speculation may increase for those areas not currently owned by the City of Kelowna that are located adjacent to YLW, if there is a feeling that land zoned for small holdings could be re-zoned as commercial. Conversely, the attractiveness of rural properties may decrease as air traffic increases. Speculation on the small hobby farm located west of

Parcel 1 is considered high as this area will become isolated if the exclusion/non-farm use application is successful. More information on this property is provided in the following section. Speculation in the wider Ellison area is not expected to occur as a result of airport expansion.

The mitigation measures to offset potential compatibility effects are described in Section 6.5.

5.6 SEVERANCE OR ISOLATION

The Exclusion has the potential to further isolate the parcel of agricultural land located west of Parcel 1 from other agricultural areas making it susceptible to speculation, as described above. The property is currently bounded by City of Kelowna/YLW owned land to the north and east, non-ALR land to the south and Highway 97 to the west. This parcel of land was previously part of Parcel 1, prior to Parcel 1 being sold to the City of Kelowna. The area of this parcel of land is approximately 2 ha.

Note that this land is already relatively isolated and that its agricultural viability is therefore considered low. In its current state (without the airport expansion), speculation on this property is considered high given the location next to Highway 97 and YLW. Therefore, the Exclusion is not expected to substantially increase isolation and speculation on this property.

No severance and or isolation effects are expected on any other adjacent areas.

5.7 DEGRADATION OF SOILS ON AGRICULTURAL LAND

There are no plans to use adjacent agricultural lands as temporary work or laydown areas during development of the Exclusion Area, because there is adequate space for such activities on existing YLW property. Therefore, no effects on agricultural soils outside the Exclusion Area will occur.

The mitigation measures to reduce the potential for degradation to agricultural soils are described in Section 6.7.

5.8 TEMPORARY LOSS OF FARM INFRASTRUCTURE (FENCING)

During construction, some existing fences in the Exclusion Area will need to be removed. Agricultural fencing is not only important for livestock protection, but also helps to deter trespassing, vandalism, theft, and dumping. If fencing is not reconstructed in a timely manner or to discourage public access, there is potential for farm operations to be negatively affected.

The mitigation measures to reduce effects of fencing removal are described in Section 6.8.

6 Mitigation Strategies

The following mitigation measures are intended to offset the effects on agriculture in the Exclusion Area, as described in Section 5. The effects and mitigation strategies are summarized in Table 6-1

Table 6-1
Summary of potential effects and mitigation measures

Potential Effects	Mitigation Strategies
Loss of Agricultural Land	<ul style="list-style-type: none"> Salvaging topsoil for ALR use outlined in a Topsoil Management and Enhancement Plan
Loss of Agricultural Revenue	<ul style="list-style-type: none"> Farm to Table program at YLW Wine/craft beer/distillery themed bar at YLW Air cargo services for export of local produce Agri-business advertising at YLW Support of agri-tourism by arriving visitors Foreign farm workers arriving directly via YLW (e.g. Mexico City to Kelowna, direct)
Disruption of Drainage and Irrigation	<ul style="list-style-type: none"> Storm water Management Plan Sediment and Erosion Control Plan Spill Management Plan Limit water main construction to off-peak irrigation season Improvements to Mill Creek at Bulman Road
Farm Access and Transportation	<ul style="list-style-type: none"> Transportation Management Plan for Old Vernon Road
Compatibility and Property Speculation/ Fencing	<ul style="list-style-type: none"> Installation of perimeter fencing along areas adjacent to agricultural land (south) Installation of landscape buffers that minimize conflicts between urban and agricultural uses.
Severance or Isolation	<ul style="list-style-type: none"> n/a
Degradation of Soils	<ul style="list-style-type: none"> No laydown or temporary work areas in agricultural zones Implement erosion and sedimentation control plans during development Implement a customized Spill Management Plan

6.1 LOSS OF AGRICULTURAL LAND

Ideally, any agricultural land losses in the ALR would be compensated for by adding the same amount of similar or better capacity land back into the ALR. This compensation is not considered feasible because of the lack of suitable non-ALR land in Kelowna and the Ellison area. However, the mitigation strategies outlined in the next section (Section 6.2 Agricultural Revenue) would offset future potential lost revenue that would occur as the result of the projected agricultural land loss. As noted earlier, the land is not currently being farmed, so no farm revenues are being generated.

To further help offset loss of agricultural land, topsoil will be salvaged from the Exclusion Area and used to enhance soils on other nearby agricultural lands in the ALR. Surplus topsoil from the Exclusion Area can be used to improve soil fertility on sites with shallow topsoil and poor nutrient status and to improve drainage by lowering the water table (in imperfectly drained areas), thereby increasing crop yields and revenue.

Several areas in the Ellison area have been identified as candidate sites for improvements based on published soil mapping information (Appendix B). These areas are generally composed of Knox and Rutland soils which typically have shallow topsoil and/or poor fertility status.

A detailed Topsoil Salvage and Enhancement Strategy will be developed to ensure that topsoils are used within the ALR to enhance low fertility soils. The strategy will include the following requirements:

- Handling of topsoils will be minimal to avoid potential soil degradation and should be delivered to agricultural lands as soon as possible (avoid stockpiling if possible).
- Gravelly and non-gravelly salvaged soils will be managed separately.
- Farmers will be identified prior to soil salvaging to ensure that soils can be placed in the ALR and used to improve agricultural capability.
- Farmers in the vicinity of the Airport will be given priority over farmers in other agricultural areas of Kelowna.

Estimated topsoil volumes based on the field investigation and published maps are outlined in Table 6-1 and are categorized by soil texture.

**Table 6-2
Topsoil volumes in the Exclusion Area**

Parcel ID	Silt Loam	Clay Loam	Gravelly, Sandy Loam
Parcel 1	17,000 m ³	-	-
Parcel 2	-	1,800 m ³	800 m ³
Parcel 3	-	-	7,600 m ³
Parcel 4	-	-	7,600 m ³
Total volumes	17,000 m ³	1,800 m ³	16,000 m ³

Notes:

Topsoil volumes will be refined once earthworks commence

Disturbed areas (occupied by the farm homeplate) were not included in these calculations.

6.2 LOSS OF AGRICULTURAL REVENUE

Economic losses can partly be mitigated or offset by improving the agricultural productivity and/or viability of existing farm parcels that are currently underutilized. This includes salvaging topsoil from permanent disturbance areas to be used in areas as described above. In addition, there are opportunities to support the agri-tourism industry through programs at YLW. YLW has a long history of supporting and promoting agricultural initiatives. Existing initiatives include:

- Okanagan Estate Wine Cellar, which is located in the departures areas and offers a broad selection of wines exclusively from Okanagan wineries with complimentary packing in custom carry-on packages.
- Supporting agriculture and agri-tourism by providing signage opportunities in the terminal and on the main roads entering the Airport (e.g. Farm to Table, Wine Trails, Mission Hill, BC Apples and the Okanagan Bucket List)
- Sponsorship and/or partnership with local organizations or special events (e.g. Mile High Wine and Music Promo Pour)
- Promoting agri-tourism opportunities and products in YLW Connect, YLW's free magazine.

Kelowna Airport will continue to support local agri-business through these programs, but proposes to implement new services to further promote agri-business in the Okanagan. Two key initiatives planned for the future include:

- Providing a retail fruit kiosk beyond the security point with carry-on fruit boxes that are made-to-fit under airplane seats or in overhead compartments (Farm to Flight); and
- Building a wine, craft beer and distillery themed bar in the departures area that will serve Okanagan-based products.

More details about these services are provided in Kelowna International Airport Supporting Growth and Sustainability for Agriculture and Agri-Tourism document (Appendix C).

In addition, potential increased cargo services resulting from the proposed airside development would be able to provide local farmers with the capacity to deliver produce directly to export markets, particularly cherries. As stated above, export is vital to agri-business and cherry producers in the region. Currently, all cherries that are exported by air to overseas markets are loaded onto refrigerated trucks and transported to Vancouver International Airport. The proposed airside development would provide capacity for air transport directly from YLW to overseas markets as the volume of exports grows. The close proximity of this facility to major cherry producers (including the Sandhers family who are located directly across the proposed airside development) is considered a significant benefit to agricultural producers, particularly cherry producers, in the Okanagan region. With airport expansion, there is also the potential for additional direct flights from Mexico to YLW which may improve accessibility for seasonal farm workers to the Okanagan and reduce the costs incurred by farmers for transporting workers.

The combination of additional agri-business services at YLW, proposed cargo services, and improved access to seasonal farm workers will provide a net benefit to agriculture in the region. These are expected to offset any losses as a result of the Exclusion and have the potential to contribute significantly to agricultural revenues in the Central Okanagan.

6.3 DRAINAGE, IRRIGATION AND WATER QUALITY

To minimize potential effects on drainage, stormwater best management practices will be implemented during and after construction in the Exclusion Area to ensure that the development does not adversely affect drainage in the surrounding agricultural area (i.e., result in ponding or standing water or impede flow of water into Mill Creek). Any water main construction will take into consideration the peak irrigation season to avoid disruption of irrigation. A Stormwater Management Plan will be developed prior to construction.

Additionally, the City of Kelowna has identified a number of storage and diversion options to mitigate issues related to flooding in the Upper Mill Basin. The City of Kelowna is committed to working towards a program of culvert improvements, in-channel upgrades, and hydraulic improvements to alleviate occasional flooding in the Upper Mill Basin related to the current and future conditions.

An Erosion and Sedimentation Control Plan will be developed to ensure that irrigation water quality is not affected during construction. In general, standard sediment and erosion control measures will be implemented to reduce the risk of sediments entering surface water watercourses that may be used for irrigation purposes.

YLW's spill and environmental emergency response plans will be updated to reflect the planned development on the Exclusion Area lands.

If improvement to Mill Creek and standard best management practices are implemented and followed through construction and operation, no negative effects on water quality as it pertains to agriculture are expected to occur.

6.4 FARM ACCESS AND TRANSPORTATION

To minimize effects on agricultural transportation, particularly in the Ellison area, Kelowna Airport will work with the RDCO/City of Kelowna and MOTI to devise a practical Transportation Management Plan specific to Old Vernon Road and connector roads (Bulman Road). Components of the Plan will include transportation objectives that are outlined in both the Kelowna Agricultural Plan and RDCO Agricultural Plan. These include:

- Monitoring traffic volumes in and around Old Vernon Road and considering road improvements where high traffic volumes impede agricultural operations;
- Reviewing signage on rural roads, and where appropriate, installing farm vehicle signs; and
- Expanding information signs, warning travellers of slow moving vehicles.

In addition, Kelowna Airport will consult with farmers to indicate when peak traffic is expected so that they can schedule activities to avoid potential conflict. Kelowna Airport will also work with airside businesses to educate business owners and employees about the potential impact on farm operators in the area by:

- Encouraging staff to carpool to reduce traffic volumes on Old Vernon Road; and
- Educating Airport staff about agricultural traffic specifically, hidden driveways, agricultural trucks turning, slow moving farm traffic, spray drift, and farm equipment crossings.

The proposed traffic management strategies are expected to offset any potential transportation effects on farm operators along Old Vernon Road and the Ellison Area. Therefore transportation effects are considered negligible.

6.5 COMPATIBILITY AND PROPERTY SPECULATION

To mitigate potential compatibility effects with adjacent agricultural, land visual buffers may be installed along areas abutting agricultural land to enhance the rural feel of the areas adjacent to the Exclusion Area, where appropriate. Visual buffers will only be installed if they comply with Transport Canada guidelines (i.e., do not increase wildlife hazards and do not disrupt runway sight lines). The need for visual buffers will be determined based on consultation with landowners affected. Private property signage will also be posted along areas adjacent to agricultural areas to discourage littering and trespassing. Visual buffers, such as vegetated buffers, would be designed to standards as outlined in the City of Kelowna and RDCO Agricultural Plans relating to agricultural edge planning. Any vegetative buffers would be installed on the non-agricultural lands so as not to interfere with agricultural operations.

6.6 SEVERANCE OR ISOLATION

Mitigation measures relating to speculation/isolation are not required as there are no severance and or isolation effects on adjacent agricultural areas.

6.7 DEGRADATION OF SOILS ON AGRICULTURAL LAND

The following mitigation measures are recommended to reduce the potential for degradation to agricultural soils during construction:

- Temporary laydown areas must not occur on agricultural lands. All temporary laydown areas will be located on non-ALR land or land slated for development.
- Topsoil should be salvaged in construction areas and used in other areas of the ALR, according to the Topsoil Salvage and Enhancement Strategy describe in Section 6.1
- Incorporate erosion and sedimentation control strategies to reduce wind and water erosion.
- Develop a spill plan to prevent accidental spills and contamination.
- A qualified professional should be responsible for monitoring soil salvaging activities or any earthworks on agricultural lands to prevent residual disturbance.

If these mitigation measures are implemented, then residual adverse effects on soils are not expected when compared to the baseline conditions.

6.8 FENCING MITIGATION MEASURES

Kelowna Airport will replace any agricultural fences that may be impacted as a result of the YLW expansion. The following best management practices for fence replacement will be implemented:

- Existing fencing will be moved just prior to construction and replaced to meet farm requirements.
- Consult with individual farmers of properties bordering the Exclusion Area who have livestock or horses (i.e., polo field to the south of the Exclusion Area), prior to installing the new and/or replacement fencing to ensure that the appropriate fence is installed to maintain both livestock and public safety. Fencing may have to be placed prior to the start of construction.

As long as existing fences are replaced and heights of any new fences are adequate, then issues dealing with fencing and compatibility (public access and security) are considered negligible and residual effects are not expected.

7 Residual Effects

Residual effects for agricultural land loss related to this ALR application remain despite the mitigation strategies outlined in Section 6. Net losses of useable ALR land as a result of the application will total about 9 ha when the Transport Canada guidelines for safety are applied. Ideally, any ALR losses would be compensated for by adding the same amount of similar or better capacity land to the ALR. This compensation is not considered feasible because of the lack of suitable non-ALR land in the region. However, the mitigation strategies outlined in Section 6.1 (Topsoil Enhancement Strategy) and 6.2 (Economic Mitigation) would offset potential future lost revenue caused by the application. The proposed cargo services would also provide producers (particularly cherry producers) in the Okanagan with the opportunity to export more produce to international markets. This has the potential to increase agricultural net revenues in the Okanagan. With this level of mitigation, the net loss of 9 ha of land from the ALR is not considered significant.

8 Cumulative Effects

Cumulative effects measure the potential effects of a project (primarily ALR exclusions) in combination with other past, present and future projects. Cumulative effects assessment considers the effects due to other projects and the thresholds where negative effects outweigh positive effects, or create a negative feedback loop.

Exclusion applications in the Central Okanagan, specifically in Kelowna, are not very common, although pressures for non-farm use are on the increase. According to the City of Kelowna website, there are 20 active ALR applications within the boundaries of the City of Kelowna with only two exclusion applications (one which is for Parcel 1, which was put on hold and is now part of the current application). The ALC also reports all applications as part of their annual reporting. A review of the annual reports over the last seven years indicates that on average approximately 8.1 ha (net of inclusions) of land are removed from the ALR annually in the Central Okanagan (ALC 2009-2015):

- 2014-2015 – 0 ha excluded
- 2013-2014 – 55 ha excluded
- 2012-2013 – 8 ha excluded
- 2011-2012 – 0 ha excluded
- 2009-2011 – 23 excluded, 29 included

The future expansion (i.e. beyond the 5 year plan described in this report) may impact the ALR within the Central Okanagan (particularly in the City of Kelowna). According to the 2045 Airport Master Plan (Appendix D, slide 20), in addition to the parcels identified in this AIA, Kelowna Airport proposes to eventually develop other lands adjacent to the Airport including High Noon Park, Ellison Dog Park, and part of the adjacent agricultural parcel for airside development. The areas slated for future airside and groundside development (beyond the 5 year plan) are all currently owned by the City of Kelowna. In all, the proposed development may require the use of an additional 27 ha and of land from the ALR (Table 8-1).

Table 8-1
Future Proposed ALR Exclusion Areas associated with future Airport expansion (i.e. beyond five years)

PID	Address	Legal Description	Area		Current Use
			Acres	Hectares	
011-518-146	5525 Airport Way	Plan# KAP1505, Lot 6, Section 14, District Lot 32, Township 23	12.7	5.15	Vacant Airport land (forested land between the federal lands and Llama farm)
009-458-921	4680-4720 Old Vernon Road	Plan# 11796, Lot 1	54*	22*	Park and agriculture
Total			66.7	27.15	

*Approximate areas

High Noon Park and Ellison Dog Park are both currently used for non-farm uses. High Noon Park is currently zoned as P3 (parks and open space) and appears to have been filled to level out the field to accommodate a parking lot and six baseball diamonds. Given this status, it would therefore be difficult to reclaim this back to agricultural land. However, Ellison Dog Park could feasibly be converted back to agricultural use. Thus the total net loss is calculated to adjust for land that is no longer considered agriculturally viable (excluding the Transport Canada buffer zone and High Noon Park) to approximately 17 ha of land.

In addition to this future Airport expansion, it is understood that Westbank First Nation is also proposing to develop a site located to the south of YLW for industrial lands, subject to land use authorizations. The project team is currently not aware of any other large scale exclusions that are proposed in the Central Okanagan region.

Although 22 ha total loss (or 9 ha net loss) is more than the average net loss of 9 ha (annually from the ALR), the cumulative effects of the Exclusion, in combination with other exclusion projects (including future potential expansion at YLW – approx. 17 ha net), are negligible because the Exclusion Area is not being farmed and there is a low probability that it will be because of the safety buffer. The Kelowna Airport recognizes, however, that the planned reduction in ALR land to enable development is a concern, and will commit to the implementation of the mitigation measures and agricultural enhancement strategies described in this report.

9 Alternatives to Airside Development in the ALR

The only land available for airside development necessary to support the growth at YLW, is on the east side of the runway on lands located in the ALR and zoned for agriculture. The only land that currently has airside access is on the west side of the runway, directly to the north of the terminal building. This land is already fully developed and leased to airside tenants. The lands to the west, between the old Okanagan rail and Highway 97 could not be developed as airside as it does not have direct access to the runway. One tenant of the current airside development on the west side of the runway received a special exemption to tug planes across to the groundside land, but the maintenance and work performed takes weeks per plane, so planes are not being tugged frequently. This sort of set-up would not be conducive to the types of airside tenants that would require direct 24-hour access to the taxiway, as proposed for the new airside development.

The land directly south of the terminal building and adjacent to the runway, is planned to be used for further expansion of the terminal complex, apron and taxiway as the only direction the terminal complex can expand is to the south.

Therefore, alternatives to the Exclusion are not considered feasible. However, when developing the 2045 Master Plan, Kelowna Airport looked at options for reducing effects to agricultural land. Compared to the 2025 Master Plan (Appendix D, page iii), the effects on one of the agricultural parcels on Old Vernon Road (part of the long-term proposed airside development) were reduced.

10 Conclusions

The Kelowna Airport commissioned Associated to complete an Agricultural Impact Assessment (AIA) for the proposed expansion of the Kelowna Airport on four agricultural properties located in the ALR (the “Exclusion Area”).

The results of the AIA indicate that the exclusion of ALR land will result in the loss of approximately 22 hectares (ha) of Class 2 and 3 agricultural lands (improved rating). Much of this land is not being farmed because of Transport Canada’s buffer zones for airports, so the land that can practically be used for farming is approximately 9 ha of land. Ideally, any ALR losses would be compensated for by adding the same amount of similar or better capacity land to the ALR. This compensation is not considered feasible because of the lack of suitable non-ALR land. Therefore other mitigation measures such as topsoil enhancement and promoting agri-business at YLW, and the proposed cargo services that will provide more market opportunities for local producers will be implemented to offset negative effects to agriculture. Furthermore, management practices and careful planning and monitoring during design, construction and operations will ensure that potential negative effects to agriculture are minimized.

If all of the mitigation measures and strategies, as described in Section 6, are implemented, then the residual adverse effects on agriculture are likely to be small. Cumulative effects of the Exclusion, in combination with other potential exclusion applications (including future potential expansion of YLW), are negligible because the Exclusion Area is not being farmed and there is a low probability that it will be because of the safety buffer. Despite this, Kelowna Airport is committed to the mitigation measures and enhancement strategies outlined in this report to offset the projected long-term loss of ALR land.

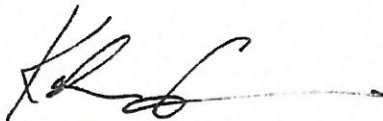
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11 Closure

This agriculture impact assessment is intended to assess the potential effects on agriculture and discuss mitigation measures from the proposed expansion of the Kelowna Airport. Any decisions that may be derived from this report will be just one of several sources of information that local governments and the ALC will use to make their decision regarding the proposed extension.

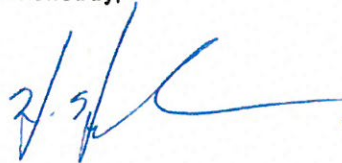
We trust that you will find the report satisfactory. If you have questions or comments, please call me at (604) 293-0195.

Yours truly,



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Appendix A – Terms of Reference

1. Introduction

The City of Kelowna [Development Application Procedures Bylaw](#) (Bylaw No. 10540) establishes that the Director, Land Use Management may require the applicant to provide information on, and a systematic detailed assessment of, the proposal to assist the City's decision making. As such, an Agricultural Impact Assessment (herein after referred to as the "Assessment") will be required to determine if a development proposal will adversely affect existing and future agricultural activities onsite and/or in the area surrounding the proposed development or change in land use.

An Assessment is not a soils assessment. An Assessment is a comprehensive consideration of the potential for agricultural production in all of its forms; along with a prediction of likely outcomes (both positive and negative) as a result of the proposed development. An Assessment typically includes a soils analysis.

Assessments will normally accompany applications under the [Agricultural Land Commission Act](#) (i.e. exclusion, subdivision, or non-farm use) in addition to applications to amend the City's [Official Community Plan](#) or [Zoning Bylaw](#) where the land is presently zoned for agriculture. Assessments may also be required when seeking approval for residential uses (e.g. Additional Dwelling for Farm Employee or Temporary Farm Worker Housing) on land zoned for agriculture.

2. Selection of Personnel

Assessments are to be prepared and/or coordinated by one or more "Qualified Professionals (QPs)" as necessary. The number and qualifications of individuals involved will be site/context dependent. For this purpose, a "Qualified Professional" is typically a Professional Agrologist (P.Ag.) registered in British Columbia.

Assessments will be prepared, signed and sealed by the QP(s), unless otherwise approved by the Director of Land Use Management. Where information or expertise are required outside of an individuals professional competencies, additional QP(s) will be required. In these cases, the submission must be signed and sealed by each contributor.

Consistent with the BCIA [Code of Ethics](#), QPs must only provide service in areas of their professional competence, and practice within the limits of their training, ability, and experience.

3. Consultation with City Staff

The information contained within these TOR is intended as a general guide only and is not a comprehensive list of requirements. Each Assessment should be site specific and is likely to be unique in the information required. **The QP is therefore advised to work with City staff to review and confirm a site specific TOR prior to commencing work on the Assessment.** In some instances (i.e. smaller developments, or those with little or no perceived impact) it may only be necessary to assess a few of the issues contained herein. In larger or more complex proposals, the applicant may be required to address considerations not identified herein.

Every effort will be made to clarify the requirements in the early phases of each development application. **It is the responsibility of the applicant to confirm the TOR for the Assessment prior to undertaking the Assessment.**

4. Key Policy Considerations

In preparing an Assessment, the QP should consider how the proposal meets or does not meet City policy including, but not limited to the Official Community Plan as follows:

- **Protect Agricultural Land.** Retain the agricultural land base by supporting the ALR and by protecting agricultural lands from development, except as otherwise noted in the City of Kelowna Agricultural Plan. Ensure that the primary use of agricultural land is agriculture, regardless of parcel size.
 - **ALR Exclusions.** The City of Kelowna will not forward ALR exclusion applications to the ALC except in extraordinary circumstances where such exclusions are otherwise consistent with the goals, objectives and other policies of this OCP. Soil capability alone should not be used as justification for exclusion.
 - **Urban Uses.** Direct urban uses to lands within the urban portion of the Permanent Growth Boundary, in the interest of reducing development and speculative pressure on agricultural lands.
 - **Agri-tourist Accommodation.** Agri-tourist accommodation will only be approved and operated in a manner that supports agricultural production and which limits the impact on agricultural land, City services and the surrounding community.
 - **Non-farm Uses.** Support non-farm use applications on agricultural lands only where approved by the ALC and where the proposed uses:
 - are consistent with the Zoning Bylaw and OCP;
 - provide significant benefits to local agriculture;
 - can be accommodated using existing municipal infrastructure;
 - minimize impacts on productive agricultural lands;
 - will not preclude future use of the lands for agriculture;
 - will not harm adjacent farm operations.
 - **Subdivision.** Maximize potential for the use of farmland by not allowing the subdivision of agricultural land into smaller parcels (with the exception of Homesite Severances approved by the ALC) except where significant positive benefits to agriculture can be demonstrated.
 - **Housing in Agricultural Areas.** Discourage residential development (both expansions and new developments) in areas isolated within agricultural environments (both ALR and non-ALR).
 - **Farm Help Housing.** Accommodation for farm help on the same agricultural parcel will be considered only where:
 - agriculture is the principal use on the parcel, and
 - the applicant demonstrates that the additional housing is necessary to accommodate farm employee(s) whose residence on the farm property is considered critical to the overall operation of the farm. The primary consideration is whether the scale of the farm operation is large enough that permanent help is deemed necessary.
- Temporary farm worker housing (e.g. bunkhouse accommodation on non-permanent foundations) is the preferred solution where the need for farm worker housing is justified.
- **Homeplating.** Locate buildings and structures, including farm help housing and farm retail sales area and structures, on agricultural parcels in close proximity to one another and where appropriate, near the existing road frontage. The goal should be to maximize use of existing infrastructure and reduce impacts on productive agricultural lands.
 - **Public Use.** Discourage the use of agricultural lands for public or institutional uses such as schools, parks and churches except as identified in the OCP.
 - **Service Corridors.** Minimize the impact of penetration of road and utility corridors through agricultural lands, utilizing only those lands necessary and to the maximum capacity prior to seeking new corridors. Provision should be made for farm traffic to cross major roads.

5. Professional Standards

- 5.1. One (1) original signed and sealed Assessment must be retained on file (a photocopy signature and seal will not be accepted). The person or corporation who prepared the Assessment must be identified along with the person or corporation who requested and funded the Assessment.
- 5.2. The Assessment must include the following information:

- All personnel working on the project and their contributions.
 - A 1-page biography or C.V. of each professional and technical staff contributing to the results, interpretations and recommendations as an addendum.
 - The level of effort in terms of personnel and time spent on site evaluations must be clearly stated including the time of year and length of site evaluations.
- 5.3. The Assessment must conform to all municipal bylaws and plans, provincial and federal legislation, regulations, standards and best practices.
 - 5.4. Site conditions likely to be absent during the period of evaluation need to be documented and assessed by appropriate alternative methods.
 - 5.5. The Assessment must reflect the site conditions prior to the proposed disturbance and the anticipated site conditions post-development.
 - 5.6. The Assessment must acknowledge off-site developments (both existing and those permitted by current regulations) and the impact these developments may have on the subject property.
 - 5.7. The Assessment should reflect an “Avoid - Mitigate - Compensate” approach to negative impacts. Mitigation should be considered where it has been determined that negative impacts cannot be avoided. Where impacts can neither be avoided or mitigated, QPs should identify appropriate compensation measures to ensure no negative net impacts and ideally a positive net impact.
 - 5.8. The Assessment should account for “cumulative effects”. Cumulative effects are changes that are caused by an action in combination with other past, present and future actions. Cumulative effects assessment considers the effects due to other projects and the thresholds where negative effects outweigh positive effects, or create a feedback loop.
 - 5.9. Methods used in the Assessment must be repeatable and based on agency and/or scientific standards appropriate the landscape being assessed. All data and non-standard methods contributing to the results, interpretations and recommendations contained in the Assessment must be included as appendices.
 - 5.10. Any past Assessments for the subject property or a portion thereof must be identified and their relevance/usefulness in completing this Assessment noted.

6. Basic Assessment Requirements

- 6.1. Briefly outline the history, type and extent of agricultural operations on the subject property (vegetative & crop cover, agricultural buildings, etc.), including recent changes.
- 6.2. Describe the soil types and agricultural capability of the land using best available secondary data (e.g. Canada Land Inventory, Terrestrial Ecosystem Modeling, etc.) for the subject property.
- 6.3. Describe adjacent land uses including the location and description of the type and intensity of surrounding agricultural and non-agricultural land uses.
- 6.4. Describe any non-agricultural land uses and indicate conflicts with existing and potential on-site agriculture. If agriculture is no longer taking place on the subject property and/or area, outline the limiting factor(s) and provide an estimate of barriers, if any, to re-establishing farming on the subject property and/or portion of the subject property under consideration. Current commodity prices and/or input costs should not be used as a barrier to production.

- 6.5. Describe the proposed use and its compatibility, or incompatibility within an agricultural area and potential to cause secondary impacts. A determination of the types and extents of potential impacts that may result from the proposed development should be identified.
- 6.6. Where the principal justification for the proposal is based on soil or land limitations, primary investigation of soils is required. In this case, the QP will ensure that the sample locations and number of pits/samples provides for a representative understanding of the subject property or area being considered.
- 6.7. Identify and describe site and soil improvements completed in the past (e.g. drainage, irrigation, contouring).
- 6.8. Identify and describe future site and soil improvements that are, or may be possible. Provide an estimate of the costs to undertake the improvements and a cost/benefit analysis of each.
- 6.9. Examine possible alternative sites for the intended use that would avoid or lessen agricultural impacts (i.e. urban areas/industrial areas). If no alternative sites can be identified, the Assessment should include a determination of mitigative actions that would be required if the proposal were to proceed (i.e. confining the development to areas with the least productive soils and/or terrain).
- 6.10. Estimate the value in the long term, of the loss of any agricultural production and mitigative measures to offset the loss.
- 6.11. Assess the flexibility of the site for different types of agricultural operations (alternatives). A feasibility & capacity assessment must consider each available opportunity for the following at a minimum:
 - anticipated barriers or constraints;
 - the area potentially affected;
 - the estimated development (capital) costs; and
 - the estimated annual return.
- 6.12. Assess the degree to which the proposal will sever or fragment agricultural land and describe/quantify the impact.
- 6.13. Consider the impact of the proposed use on drainage (on site and neighbouring properties).
- 6.14. Consider the impact of traffic (vehicular, pedestrian and cycling) of the proposed use to determine if proposed traffic volumes will impede farmers moving vehicles between fields and if recreational traffic will be kept out of agricultural land.
- 6.15. Examine and report on what it would take to develop the site for:
 - Crops and by-products that would be new to the site and area;
 - Non-soil based agricultural options (i.e. vegetable or nursery greenhouse, etc.); and
 - Accessory farm uses (i.e. B&B, agri-tourism, on-farm processing, on-farm retail).
- 6.16. Examine and report on alternative financial models for farming and their appropriateness to this site such as:
 - Leasing to other farmers;
 - Joint ownership by two or more farmers;
 - Community supported agriculture;
 - Leased garden plots for urban residents; and
 - Other.

- 6.17. Farm Home Plate - Assessments triggered by site development for residential uses on A1 zoned land should include a recommendation for the suitable location for the farm home plate. The farm home plate must be sited so as not to have a negative effect on the existing agricultural operation or potential for future agricultural operations.
- 6.18. Agricultural Worker Dwellings - Assessments triggered by site development of Agricultural Worker Dwellings (including temporary) should indicate the “need” for the additional dwelling onsite and why farm help cannot be accommodated offsite, along with the net benefit to agriculture.

7. Data Deliverables

- 7.1. Site description including legal description (i.e. lot & plan number, etc.), OCP designation, Zoning category, and Agricultural Land Reserve (ALR) status should be illustrated on the location map or stated at the outset of the assessment. For large parcels, UTM coordinates of the site location where specific works will occur may be required.
- 7.2. Location Map at an appropriate scale (1:20,000) indicating the regional setting. This information should be overlaid on the most current cadastral map.
- 7.3. Site Map(s) at an appropriate scale (minimum 1:200 and maximum 1:5,000) indicating the layout of the project components and activities. This information should be overlaid on the most current cadastral map outlining surrounding property boundaries. Map legends should show clear descriptions of all symbols used as per provincial standards.
- 7.4. Cross sections in sufficient number to demonstrate terrain conditions prior to the proposed site disturbance and intended conditions post-development. A topographic survey must show natural slope contours (at appropriate contour levels e.g. 1 or 5 m) and the post-development contours.
- 7.5. Site Plans/sketches/colour photographs indicating the project location, site features and activities should be indicated with relation to easily identifiable landmarks such as those found on accompanying maps.
- 7.6. Appropriate referencing of all image and data sources, with a clear indication of the date of when the information was obtained.
- 7.7. Final Submission - shall include the following at a minimum:
- 1 colour hard copies.
 - 1 digital copy in .pdf format and unprotected.
 - Maps should be printed on 8-1/2 x 11 or 11 x 17” paper as appropriate and to scale.
 - Where available, digital copies of supporting information should be provided in a format compatible with the ESRI platform (shapefiles) in NAD83 UTM Zone 11.

8. Incomplete or Deficient Assessments

If it is determined by the Director, Land Use Management, that an Assessment is incomplete or deficient, the applicant will be notified in writing the nature of deficiencies.

9. Third Party Review

The City of Kelowna reserves the right to seek a third party review of the Assessment submitted. If necessary, the third party reviewer will be a mutually acceptable QP and the cost of the review shared equally among the applicant and municipality.

Appendix B – Soils and Agricultural Capability Investigation

Legend

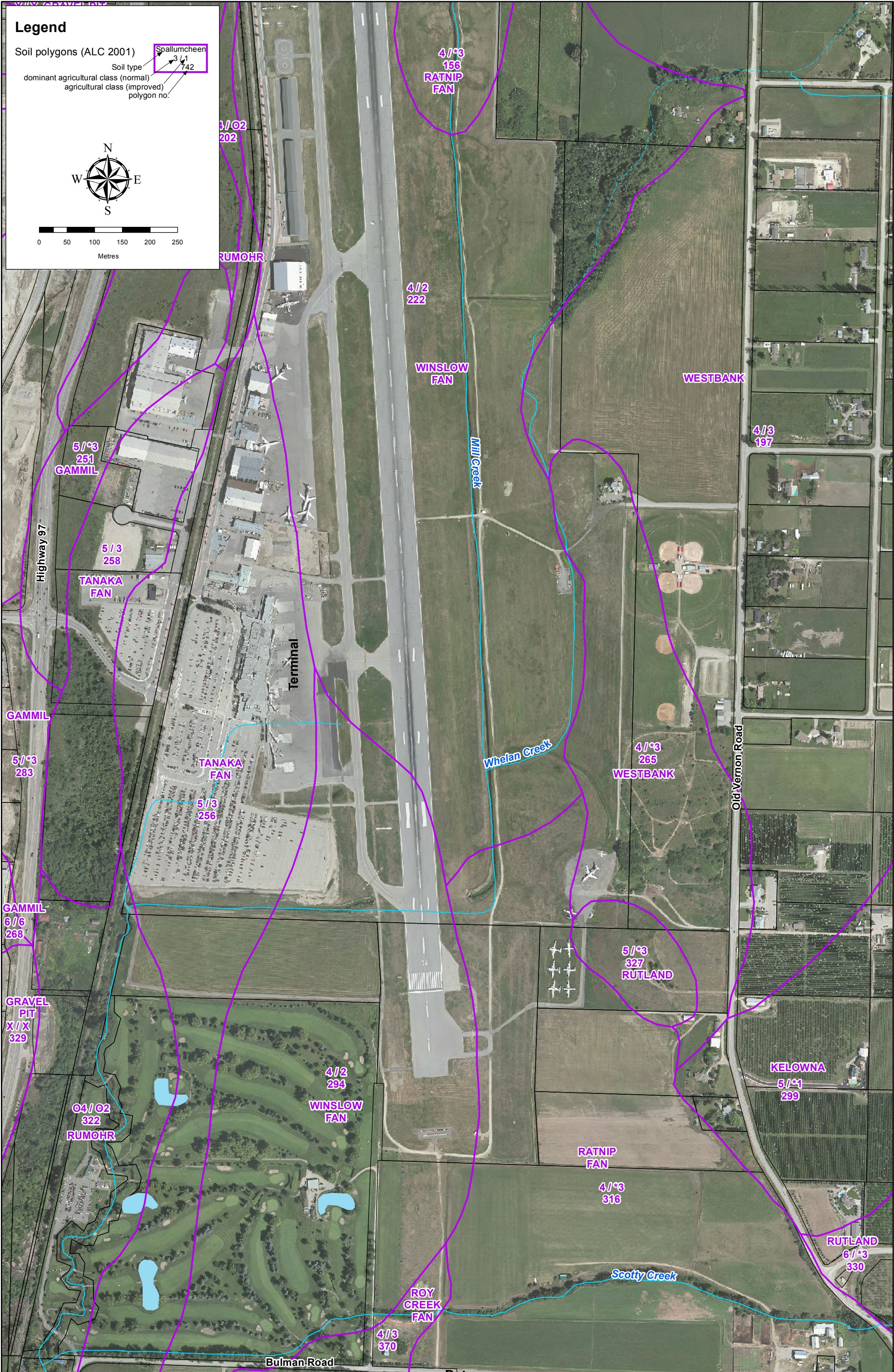
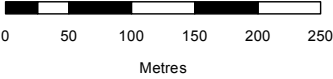
Soil polygons (ALC 2001)

Soil type

dominant agricultural class (normal)

agricultural class (improved)

polygon no.



Appendix C – Supporting Growth and Sustainability for Agri-tourism – City of Kelowna

Kelowna International Airport

Supporting Growth and Sustainability for Agriculture and Agri-Tourism

Kelowna International Airport (YVLW) Links Travellers with Okanagan Valley Agriculture and Agri-Tourism

Surrounding YVLW is the vibrant agricultural landscape that the Okanagan Valley is renowned for. The unique landscape, environment and climate are primary decision makers when people choose to visit and relocate to the Okanagan Valley.

Being the 11th largest airport in Canada, with 1.6 million passengers passing through its doors in 2015, YVLW provides travellers with the ability to access the Okanagan Valley from a variety of provincial, national and international locations.

Without YVLW, access and exposure to the Okanagan Valley and its agriculture-based businesses and agri-tourism would be significantly restricted.

3rd

Busiest Airport in
British Columbia

11th

Busiest Airport in
Canada

1.6

Million passengers
in 2015



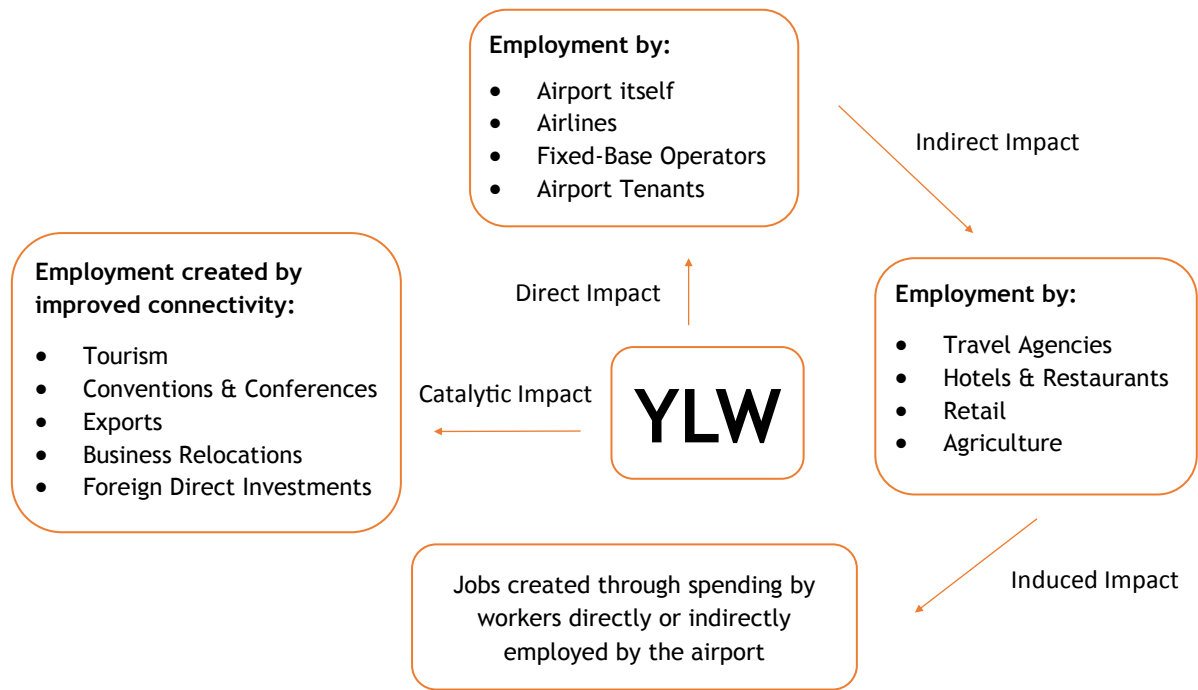
YVLW's Economic Impact

YVLW's 2015 Economic Impact Study has estimated that the airport's direct economic impact is \$152 million in GDP, \$83 million in direct wages and 1,411 jobs. These represent increases of 27, 19 and 9 per cent, respectively, over the 2010 Economic Impact Study.

In addition to the direct economic impact that YVLW has on the Okanagan Valley, the Economic Impact Study estimated that, including its contribution to Okanagan tourism, YVLW's total economic impact is 4,545 jobs and \$789 million in total economic output to the province of British Columbia.

It is safe to say that a significant portion of the indirect, induced and catalytic economic impacts are positively affecting the Okanagan Valley's agricultural-based industries and agri-tourism, resulting in positive and lasting outcomes for the regional economy.

Economic Impact



YLW Supports Okanagan Valley Agriculture and Agri-Tourism

YLW community partners have established programs to assist in the growth of the agri-tourism sector, including:

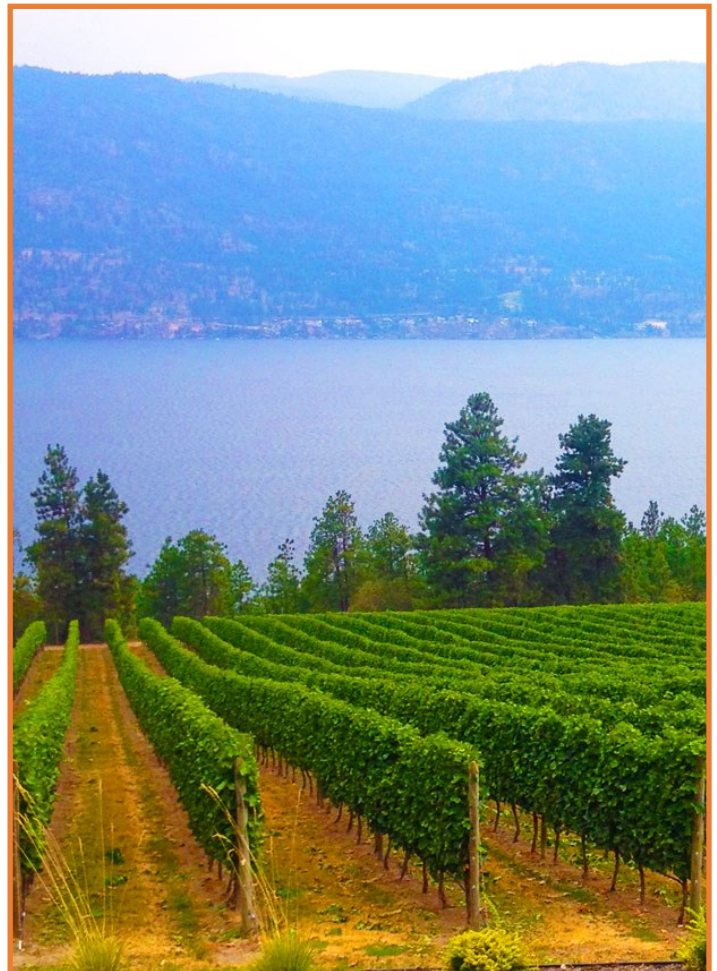
Farm to Table, which provides visitors with an opportunity to tour a local farm and enjoy a delicious meal made from fresh, local products.

Wine Trails provides visitors with maps of the many wineries located throughout the Okanagan, allowing visitors to easily guide themselves from winery to winery while enjoying local beverages and food.

Okanagan Bucket List is a list highlighting four iconic experiences unique to the Okanagan, one of which is Mission Hill Family Estate Winery.

YLW recognizes the importance of agriculture and agri-tourism as an economic driver for both the Okanagan Valley and the airport. YLW has been active in supporting the local agri-tourism economy by identifying opportunities to highlight the sector to travellers, partnering with local agri-tourism businesses and involving community partners wherever possible.

Some recent examples are highlighted on the following pages.



Retail Initiatives at YLW



**Okanagan Estate
Wine Cellar**

The Okanagan Estate Wine Cellar is located in the departures area of YLW and offers a broad selection of wines, exclusively from Okanagan wineries, with complimentary custom carry-on packages. Providing this service to passengers eliminates the worry of wine bottles breaking in checked bags during transit and provides a convenient carry-on option to purchase wine once clearing security. The shop also provides wine tastings for passengers during high traffic periods.



**Wine, Craft Beer
& Distillery Bar**

YLW is in the process of renovating its Departures Lounge, and future development plans include a wine, craft beer and distillery themed bar.

This will provide travellers with the ability to try local wines, craft beer and distillery products while waiting to board their flight. If they find something they enjoy, they will have the option of walking next door to the Okanagan Estate Wine Cellar to purchase a bottle or two to take home. Construction of the bar is anticipated to be complete by the end of 2018.



**Gifts of the
Okanagan**

YLW's *Gifts of the Okanagan* Departures Lounge gift shop provides travellers with the opportunity to purchase various pieces of art. The airport's partners at Suk'wtemsqilxw West Kelowna Arts Council have curated both Aboriginal and non-Aboriginal artworks from Okanagan Valley artists, many of which are agriculture related.



Farm to Flight

YLW has partnered with De Simone Farms, a local produce distributor that grades and packages local fruit, in order to provide passengers with fresh, in-season produce that they can take home with them. The produce, consisting of various in-season fruits, will be packaged in specially designed boxes that will fit easily under airplane seats or in overhead compartments to ensure the fruit arrives at its destination in perfect condition. Farm to Flight products will be available for travellers to purchase in the Departures Lounge gift shop in Summer 2016, providing individuals with the ability to take home a unique, one of a kind gift to share with family and friends.

YLW Signage

YLW has made a collaborative effort to ensure its advertising is focused on Okanagan-based products, services and experiences. This provides advertising opportunities to agricultural-based businesses with signage positions throughout the terminal, departures lounge and parking lots, but concentrated primarily in the arrivals and baggage areas for maximum exposure.

The advertising rates are affordably priced to allow even the smallest owner-operated businesses to participate and gain additional exposure to arriving customers. Current 2016 examples have been included below.



Sponsorships, Partnerships and Events

Food Services at YLW

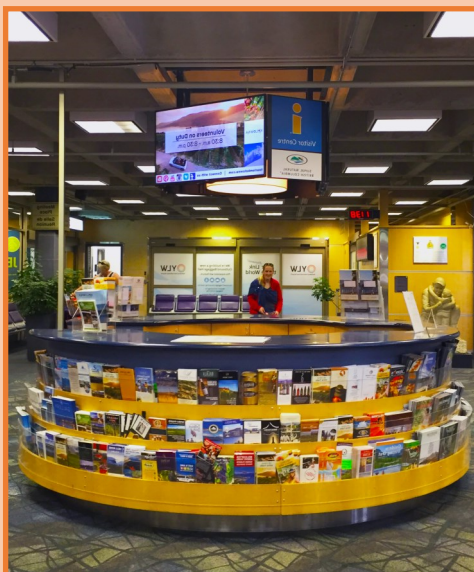
White Spot is one of two main food service providers at YLW.

White Spot has a passion for using fresh, regional ingredients in order to attain an authentic, local experience for travelers. The restaurant supports local suppliers wherever possible.

Tourism Kelowna Information Kiosk

YLW provides space to Tourism Kelowna for the Information Kiosk located in the arrivals area.

Here, businesses can purchase rack card space to advertise their business and be provided with referral business from volunteers that man the station during peak arrival times. Much of this space is filled with pamphlets from agriculture-related businesses.



YLW Advertising (ongoing)

YLW regularly advertises in various local wine publications, including the Okanagan Wine Festivals Tasting Booklet and the Wine Tour Handbook to British Columbia.

Slow Food Canada (2012)

YLW sponsored Slow Food Canada's National Meeting, which took place in Osoyoos. The organization discussed the state of Slow Food in Canada and showcased the culinary and agriculture heritage of the host location.

Wine Bloggers Conference (2013)

The Wine Bloggers Conference was held in Penticton to highlight local food and wine to visiting media and bloggers. To kick off their visit to the Okanagan, YLW hosted a welcome wine tasting.

Mile High Wine & Music Promo Pour (2015)

YLW, in partnership with the Okanagan Wine Festival Society, hosted a wine tasting event in the arrivals area for local residents and visiting guests to promote Okanagan wines and the various local Wine Festivals held throughout the year. Three wineries participated and parking was provided free of charge.

YLW Connection Magazine

YLW Connection magazine is a quarterly publication that keeps the public informed about YLW and promotes tourism throughout the Okanagan Valley. The free publication is available to passengers, the Okanagan business community and the tourism industry. Circulation is 18,000 with an estimated 45,000 impressions per issue.

Past issues have featured agriculture and wine-related content and all issues provide a platform for agriculture-based businesses to purchase advertising space to target potential tourism customers. Agriculture-based articles included in previous issues include:

- Fall 2015 - *Produce, People & Passion, Make the Okanagan a Culinary Destination*
- Summer 2015 - *Life is good in the Okanagan Valley* (highlights on local restaurants and wineries)
- Summer 2015 - *Discover... Wine-Art-Music*
- Summer 2014 - *Okanagan Wine Tours*
- Winter 2013 - *Local Wines Honoured with Prestigious Awards*
- Fall 2013 - *Wine Talk*

Previous issues are available at: <http://www.kelowna.ca/CM/Page1346.aspx>



Agriculture on YLW Lands

YLW has a history of leasing Airport owned-lands eligible for agriculture to farmers at a very reasonable rate for the production of hay and alfalfa.

Between 2010-2015, YLW offered a licence to use 38.59 acres of City-owned land adjacent to the airport for farming purposes for the nominal rate of \$1.00.

In addition, YLW offered a licence to cut and remove hay from 165 acres of City owned lands surrounding the airport from 1998 to 2003. The licensee paid an annual fee of \$500.00 to the City.

Transfer of Soil to ALR Lands

In 2016, a private developer will be constructing an airport plaza, which will include a gas station, convenience store and new restaurant options at YLW.

The clearing of the lands commenced in March 2016, and YLW has requested that the soil be sent out for testing to ensure its agricultural quality. In the meantime, YLW has reached out to the City of Kelowna and Regional District of Central Okanagan to determine whether there are any local farmers looking for additional soil. YLW's intent is to transfer the soil to a local farm to help improve its agricultural ability.

YLW Supports Agriculture

YLW has a long history of supporting and promoting agricultural initiatives and is at the forefront of advocating the expansion of agriculture and agri-tourism within the Okanagan Valley.

YLW has a strong commitment to the communities it serves and ensures that the role agriculture and agri-tourism plays in the future economic success of the Okanagan Valley is robustly represented and promoted at the airport.

As YLW moves forward with continued growth, development and expansion, there will be continual and additional opportunity to support agriculture and agri-tourism at YLW.

The agricultural sector is an integral characteristic and economic driver of the Okanagan Valley, and a key factor in YLW's journey toward further growth and economic success.