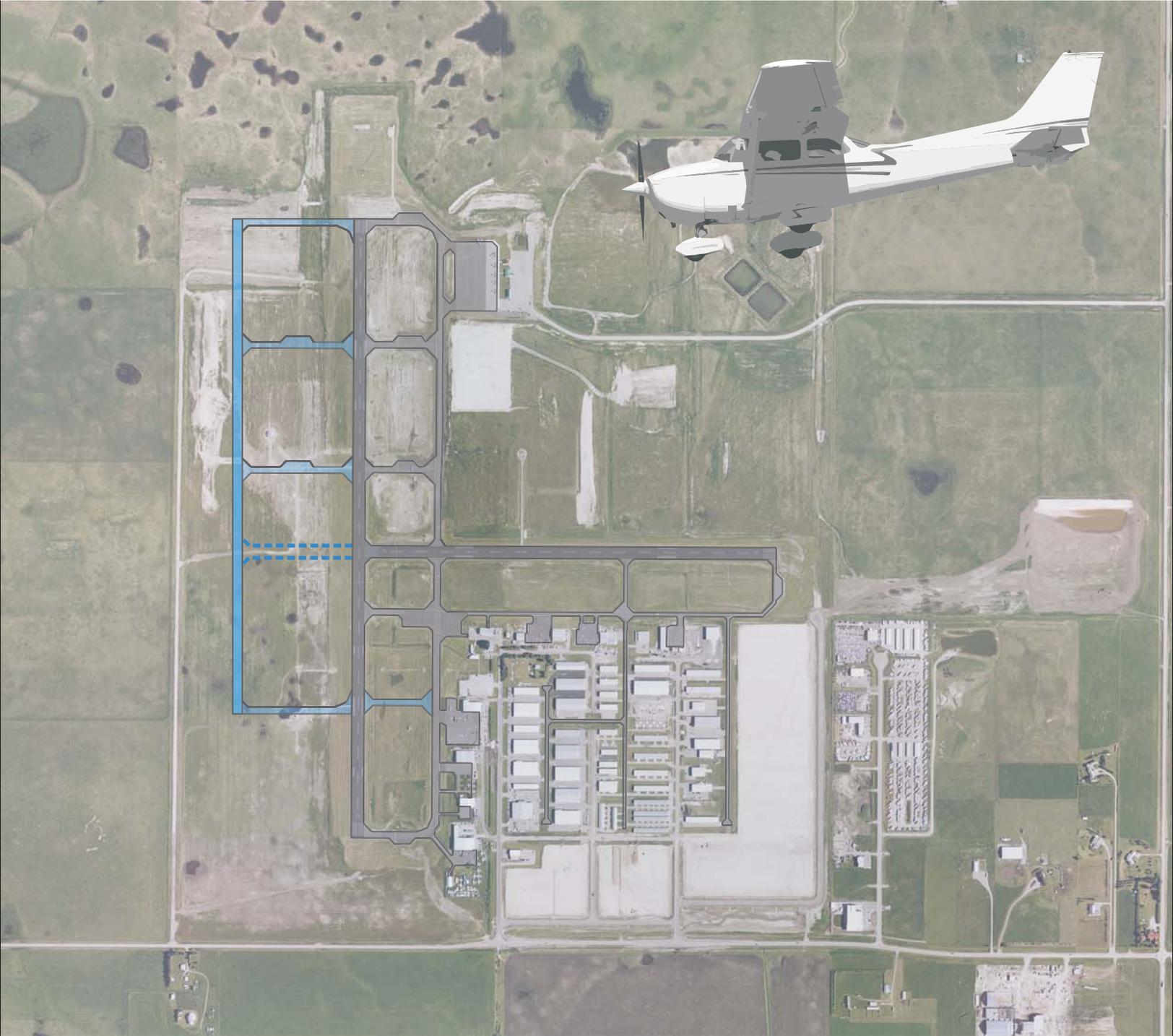


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# Springbank Airport Master Plan 2009-2029





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## EXECUTIVE SUMMARY

This Master Plan has been developed to guide the planning and development at Springbank Airport over the next twenty years. The Master Plan provides readers with the context of Springbank Airport and likely development plans based on expected demand and other factors. The Master Plan is not, however, a guarantee about future actions or developments as all factors will be reassessed on a periodic basis. Any such reassessment will be expressed in future updates to the Master Plan.

As the primary general aviation reliever airport for the Calgary International Airport, Springbank Airport will continue to support light aircraft operations, flight training, charter operations and aircraft maintenance and associated services.

Recent changes at Springbank include the introduction of light jet traffic, lengthening of Runway 16/34 to 5,000 ft. and the installation of a certified Instrument Landing System. Growth in aircraft movements at the airport has been particularly significant over the past four years and continued growth is expected in aircraft movements and the development of land for airport related businesses.

This past and projected future growth have led to a number of important improvements that will be considered over the period of this Master Plan:

- New parallel Runway 16R-34L
- Land development north of Runway 07-25
- North storm water detention pond
- Utility improvements and upgrades
- Helicopter operations improvements

The Master Plan consultation process included detailed consideration of issues related to compatibility with the Springbank area community. A new Noise Exposure Forecast has been produced and provided to the M.D. of Rocky View to utilize in their land use planning framework to ensure that the future development of the Springbank area community is compatible with aircraft operations at Springbank Airport.

The Master Plan development process included close attention to consultation with airport users, government agencies, airport committee memberships, developers and others to ensure that all relevant issues were raised and discussed. These consultation processes will continue as we go forward.

## 1. INTRODUCTION

### 1.1 Purpose

The purpose of the Springbank Airport Master Plan is to provide a long term framework for the future development of the facility over the next 20 year period. The Master Plan is guided by the mandate of The Calgary Airport Authority (the Authority) as well as the Springbank Airport Role Statement. The Master Plan takes into account the findings of numerous background studies that have been prepared as part of the overall Master Plan initiative. In addition, it has been influenced in large part by the input received as part of a communication and consultation program that was undertaken during the preparation of the Plan.

### 1.2 Location

Springbank Airport is located approximately 21 km west of Calgary's Central Business District, on a site north of the Trans-Canada Highway (Highway 1).

At present, it is generally surrounded by agricultural lands. Country Residential, Commercial and Light Industrial uses also exist within the general vicinity of the airport. The location of Springbank Airport is shown on Figure 1.1.

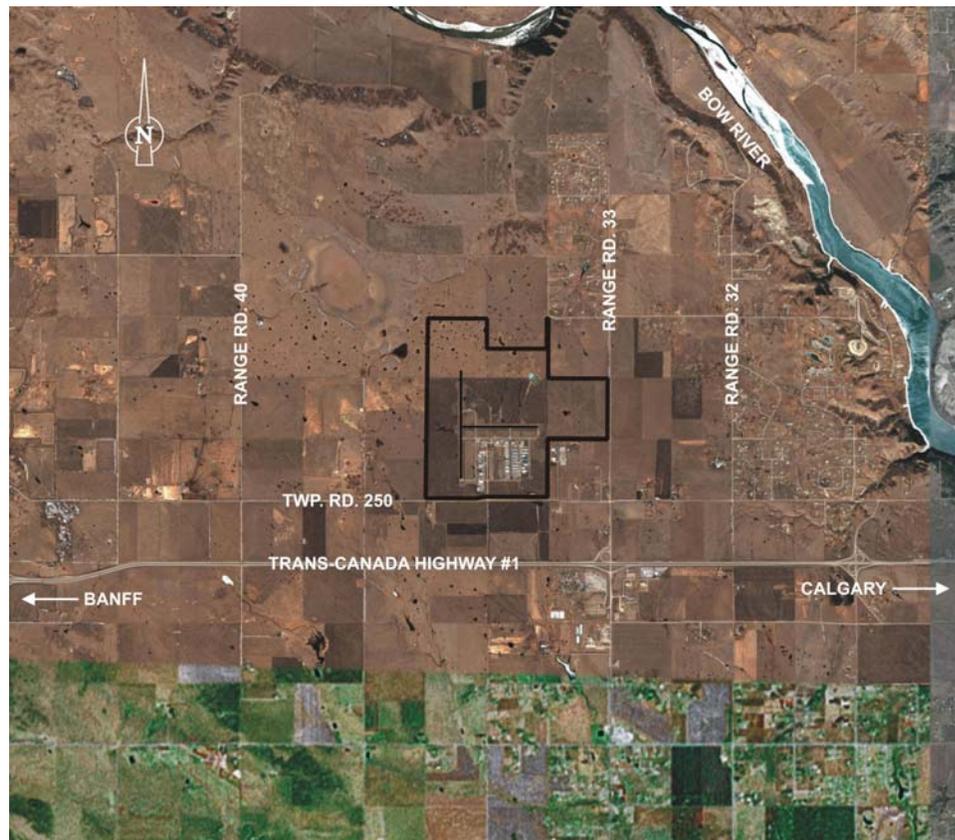


FIGURE 1.1 LOCATION OF SPRINGBANK AIRPORT

### **1.3 The Calgary Airport Authority – Mandate**

The Calgary Airport Authority is a Not-For-Profit corporation established in 1990 and incorporated under the Provincial Regional Airports Authorities Act. The Authority holds long-term leases with Transport Canada for both the Calgary International Airport and the Springbank Airport, and is responsible for all operating and capital costs associated with both of these facilities.

The legislated mandate of The Calgary Airport Authority is:

To manage the airports for which it is responsible in a safe, secure and efficient manner, and to advance economic and community development by means that include promoting and encouraging improved airline and transportation service and an expanded aviation industry; for the general benefit of the public in our region.

### **1.4 Springbank Airport – History and Background**

The Springbank Airport began operations in February 1969 and was officially opened in July 1971. The airport, constructed and operated initially by Transport Canada, was intended to act as a reliever airport for the Calgary International Airport by acting as a home base for light aircraft operations. In 1997, the operation of the airport was transferred from the federal government to The Calgary Airport Authority under the terms of a long term lease agreement.

In 2002, the Airport Authority adopted the Springbank Airport 10 Year Development Plan. Since that time, the 10 Year Development Plan has served to guide the development of the facility. The majority of projects envisioned by the Plan have either been completed or are currently under construction. These projects include:

- Lengthening and widening of Runway 16/34
- Instrument approach for Runway 34
- Development of a community fire hall facility
- Introduction of a Canada Customs presence at Springbank Airport
- Land development within the southeast quadrant of airport

### **1.5 Master Plan Process**

The goal of the Master Plan is to provide ongoing and seamless planning and development direction for the airport. As a key part of the Master Plan process, The Calgary Airport Authority engaged in discussions and consultation with a variety of key stakeholders including:

- Nav Canada
- Owners and operators at Springbank Airport

- The Municipal District of Rocky View
- Springbank Airport Noise Consultative Committee
- Land Developers
- Transport Canada
- Province of Alberta
- Landowners and general public

Public Open Houses were held in June and September of 2008 in order to reach out to other interested parties and the general public. Copies of the draft plan were also placed on The Calgary Airport Authority website to further engage the public and seek out comments with respect to long term airport development.

## 2. EXISTING FACILITIES

### 2.1 General

Springbank Airport is located on approximately 420 hectares (1040 acres) of land within the M.D. of Rocky View. The Airport is a certified aerodrome, operated by The Calgary Airport Authority. As a certified aerodrome, Springbank Airport must meet applicable Transport Canada standards, and is subject to regular inspections by Transport Canada to ensure compliance.

Under the Federal Government's National Airports Policy, Springbank Airport falls into the category of a "satellite airport". This policy recognizes the role that such airports play – that being to complement the operations of a larger international airport. With regard to Springbank, the larger airport that it supports is the Calgary International Airport. Satellite airports such as Springbank "...help ensure the safe and efficient operation of the larger international airports they serve by diverting small, general aviation (recreational and training aircraft) away from the larger airport." (Transport Canada – National Airports Policy – 1994). The facilities at Springbank Airport have been designed to support the above function.



Figure 2.1 Illustrates the current airfield layout and associated facilities.

## **2.2 Runways**

The runway system at Springbank Airport currently consists of two paved intersecting runways designated Runways 07/25 (1043 m or 3423 ft) and 16/34 (1524 m or 5000 ft.).

## **2.3 Taxiways**

The runway system is supported by a system of taxiways. Two main taxiways service the associated runways as follows:

- Taxiway A – is parallel and east of Runway 16/34.
- Taxiway C – is parallel and south of Runway 07/25.

In addition to the main airfield taxiway system, there are a number of taxiways that support and provide access to hangars throughout the south-east sector of the airport. These taxiways are designated as D, E, F and G.

## **2.4 Aprons**

A common use apron is located near the intersection of Taxiways A and C.

A dedicated apron has been developed on the east side of Taxiway A – at its northern end - by the Province of Alberta's Department of Sustainable Resources Development (SRD) for their exclusive use.

Other aprons at Springbank Airport exist within tenant leased areas in the south-east sector and are for the sole use of their respective tenants or sub-tenants.

## **2.5 Communication and Navigational Aids**

Springbank Airport historically has been equipped with a non-certified Instrument Landing System (ILS) on Runway 34. As part of the 2007 Runway 16/34 extension, the ILS was upgraded by NavCanada such that it is now fully certified. The ILS is certified to a non-precision standard until such time as approach lighting may be provided for Runway 34.

The Airport also has a Certified Non-Precision GPS approach for Runway 34 which is published in the Canada Flight Supplement.

Springbank also has a VOR or Very High Frequency Omni Range (VOR) and Distance Measuring Equipment (DME). This equipment is located between existing Runway 16/34 and the future parallel runway.

In terms of Communication Facilities, the airport currently has VHF Receivers located in the Air Traffic Control Tower and VHF transmitters are located in the contract weather office. All referenced Communication and Navaids are located on Figure 2.1

## 2.6 Aviation Support Facilities



Nav Canada's air traffic control tower is a state-of-the-art facility that currently operates between the hours of 07:00 and 23:00. This new tower became operational in October of 2001 and replaced an outdated tower structure that was subsequently demolished.

Another key Aviation Support facility is the Airport Manager's Office Complex. This facility – which is co-located with Nav Canada's Pilot Information Kiosk and pilots' lounge - is comprised of a series of portable structures that were installed in 1987.

While they are in acceptable condition, they are temporary structures and will need to be replaced in the future.

Adjacent to the Airport Manager's office complex is the airport's Maintenance Facility. This building was constructed in 1977, and houses the Airport's maintenance equipment. Space for snow clearing and other airfield maintenance equipment will necessitate an expansion to the maintenance facility in the future. Options for this expansion are described in Section 9.3.



This facility is also home to Canada Custom's Satellite Clearing facility.



## 2.7 Tenant Facilities

Since the adoption of the 2002 10 Year Development Plan, a significant amount of land and facility development has occurred at Springbank Airport. The majority of the development can be described as private hangar construction related to a variety of sub-sets of the General Aviation Sector, including private / recreational aviation, flight training – for both fixed and rotary wing, as well as aircraft and helicopter maintenance.

Historically, all development at Springbank has occurred in the southeast quadrant of the airport. Over the last 5 year period, limited development has started to occur on the lands north of Runway 07/25. The first new development in this area is the Province of Alberta's Forestry Protection Base – which has developed on a 10 acre parcel of land immediately east of the threshold of Runway 16.

Land development initiatives in 2008 will consume a further portion of the vacant and undeveloped land in the SE quadrant. Future land use development plans to accommodate future demand is discussed in Chapter 9.



### **3. REGIONAL CONTEXT**

#### **3.1 Airports in the Calgary Region**

In 2000, a study entitled the Calgary Area Airport Systems Study (CAASS) was undertaken in order to assess all airports in the Calgary Region. The main objective of the Study was to establish an inventory of aerodromes in the region, and to further help define Springbank Airport's role within a larger regional context.

This Study was updated in 2006. This Study maintained the Tiered Airport System as a way of categorizing airports within the region. An overview of the Tiered System is provided below, along with a list of the airports that fall within each of the top 3 tiers.

##### **Tier 1: Calgary International**

Calgary International is a Certified Aerodrome whose purpose is to serve as a hub for regional, domestic, transborder and international air carriers. The Airport has been designed to accommodate airline and air cargo operators, as well as other high performance commercial and private aircraft which are equipped to operate under Instrument Flight Rules (IFR).

##### **Tier 2: Springbank Airport**

Springbank is the only other Certified Aerodrome in the Calgary Region. Historically, it has been designed to operate as a reliever airport for Calgary International, and has become home for all levels of flight training activity, charter activities as well as private and recreational flying.

##### **Tier 3: Olds/Didsbury, Beiseker, Airdrie, High River, Okotoks Air Ranch, Strathmore (Murray Airfield)**

These facilities are Registered Aerodromes that provide a base for a variety of General Aviation activities within the Calgary Region, including entry level flight training, recreational and private flying.

##### **Tier 4:**

These airports are also Registered Aerodromes, and typically have one non-paved runway with restricted hours of operation.

##### **Tier 5:**

These airports are Non-Categorized Aerodromes, again with non-paved runways, and have with minimal services. Activities operating out of these airports are typically small private aircraft, including ultra-lights and gliders.

Key Findings from the 2006 update report are as follows:

- In terms of overall general aviation runway capacity, there is a healthy surplus. The Study suggests that, exclusive of Calgary International, there is an

estimated capacity of 970,000 annual aircraft movements given the current number of airports and associated runways. The current surplus is estimated to be in the range of 725,000.

- With the exception of Springbank Airport, capital funding for the balance of the airports in the region is severely limited. They are not eligible for Federal funding. Their main source of funding comes from the Province of Alberta's Community Airport Program. With average funding levels in the \$2 million range for the entire Province, this funding source is limited.
- Most Tier 3 airports do not have formal plans in place to help guide their future development (Master Plans, Capital Plans, Business or Strategic Plans).

### **3.2 Economic Impact**

In 2007, an Economic Impact Study was undertaken for Springbank Airport. The report was based on an interview and survey process, with input received from roughly 60 firms. With 345 full-time equivalent employees (FTE's) and an aggregate labour income of approximately \$19.9 million, the report identifies the Direct Impact of Springbank Airport as being in the range of \$53 million. When Indirect and Induced Multipliers are taken into consideration, the Economic Impact was estimated to be in the range of \$106 million.

The report also took into consideration the "one-time" economic benefits of the Airport Authority's capital construction program – as well the construction undertaken by airport tenants. This analysis resulted in total economic impact of Springbank Airport in 2007 being estimated at \$122.8 million.

### **3.3 Land Use in the Vicinity of Springbank Airport**

Decisions regarding land use in the vicinity of Springbank Airport rest with The Municipal District of Rocky View. One of the key planning documents that establishes a land use planning framework within the vicinity of Springbank Airport is the North Springbank Area Structure Plan. This plan is focused on a relatively small area surrounding the Springbank Airport. While a number of "airport interface" areas are identified in the plan, the majority of the lands within the plan area are currently slated for conversion from agricultural to residential use.

Another key planning document is the Harmony Concept Plan, which was adopted in 2007. This community, which is being planned as a mixed use development (residential, commercial, business parks, light industrial) will be home for up to 10,000 new residents. The Concept Plan acts as an equivalent to an Area Structure Plan. In September 2008, amendments were made to the North and Central Area Structure plan boundaries to remove any parcels of land that overlapped with the Harmony Plan. Today all three plans stand alone and act as independent planning documents.

Other land development is also being proposed in the airport vicinity. These initiatives suggest that the area surrounding Springbank is undergoing a transition. Lands that have historically been used for agricultural purposes are in the planning stages of being converted to various urban uses.

In the not too distant future, Springbank Airport may find itself located within an environment that is very much urban in nature. In order for these new developments to co-exist harmoniously with the Springbank Airport, compatible land use planning is critical. Close coordination and communication between local developers, residents, business owners and the MD of Rocky View is key with regard to achieving the goal of ensuring compatible land use in the vicinity of Springbank Airport.

## 4. AIRPORT ROLE STATEMENT AND DEVELOPMENT PARAMETERS

### 4.1 Changing Roles; the Evolution of Springbank Airport

Springbank Airport came into being to act as a reliever airport for the Calgary International Airport. A fundamental underpinning of its role was – and still is – to provide a base for smaller aircraft within the Calgary Region. In contrast, the role and future development of Calgary International Airport is focused on supporting passenger, airline, air cargo, corporate and other complementary aerospace activities and associated services. Airport services at Springbank (eg. Snow removal and emergency response) do not support unit toll operations at this time.

Some types of activities that have remained constant over the years at Springbank Airport include the following:

- Flight Training – for both fixed wing (airplanes) and rotary wing (helicopters)
- Private and corporate aviation (for both fixed and rotary wing)
- Aircraft Maintenance
- Fixed Base Operations

It is anticipated that these types of activities will continue to be based at Springbank Airport in the future. During the last number of years, there have been new uses or activities that have found a home at Springbank Airport. They include:

- The introduction of light jet traffic in 2007. This activity is restricted to “Chapter 3” jets, which have newer generation engines that are quieter than those on older jets. The newer jet engine technology has also been proven to be quieter than many existing piston aircraft.



- The new Forestry Protection Base for the Province of Alberta's Sustainable Resources Development (SRD). As a result of a gap in SRD's fire fighting coverage, the Province identified Springbank as an ideal location for a new base of operations. The aircraft associated with this base are an exception to what is allowed and would normally be seen at Springbank Airport and the SRD operation was approved in recognition of the significant community benefit.

### 4.2 Springbank Airport Role Statement

Springbank Airport is the most significant General Aviation airport in the Calgary Region. It offers a wide range of services to its users and acts as a base for private and commercial aircraft operations in both the fixed wing and rotary wing categories. Next to Calgary International, Springbank is the only other certified aerodrome within

the Calgary region. Consequently, Springbank Airport plays an important role within the area's system of airports.

*The operations and development of Springbank Airport will be directed to supporting light aircraft flight activity including flight training, recreational flying, corporate and air charter activity and compatible aircraft maintenance, manufacturing and support operations.*

### **4.3 Development Parameters**

To effectively support the role statement, a series of development parameters have been developed. These will help to direct development and manage development requests in line with the role statement intent.

The overall principle behind the development parameters is to support those aircraft types and sizes that are compatible with the design standards of the airfield, that are consistent with the different roles of Calgary International and Springbank Airports and that do not compromise current businesses operating at Springbank Airport.

Specifically, the business strategies include the following principles:

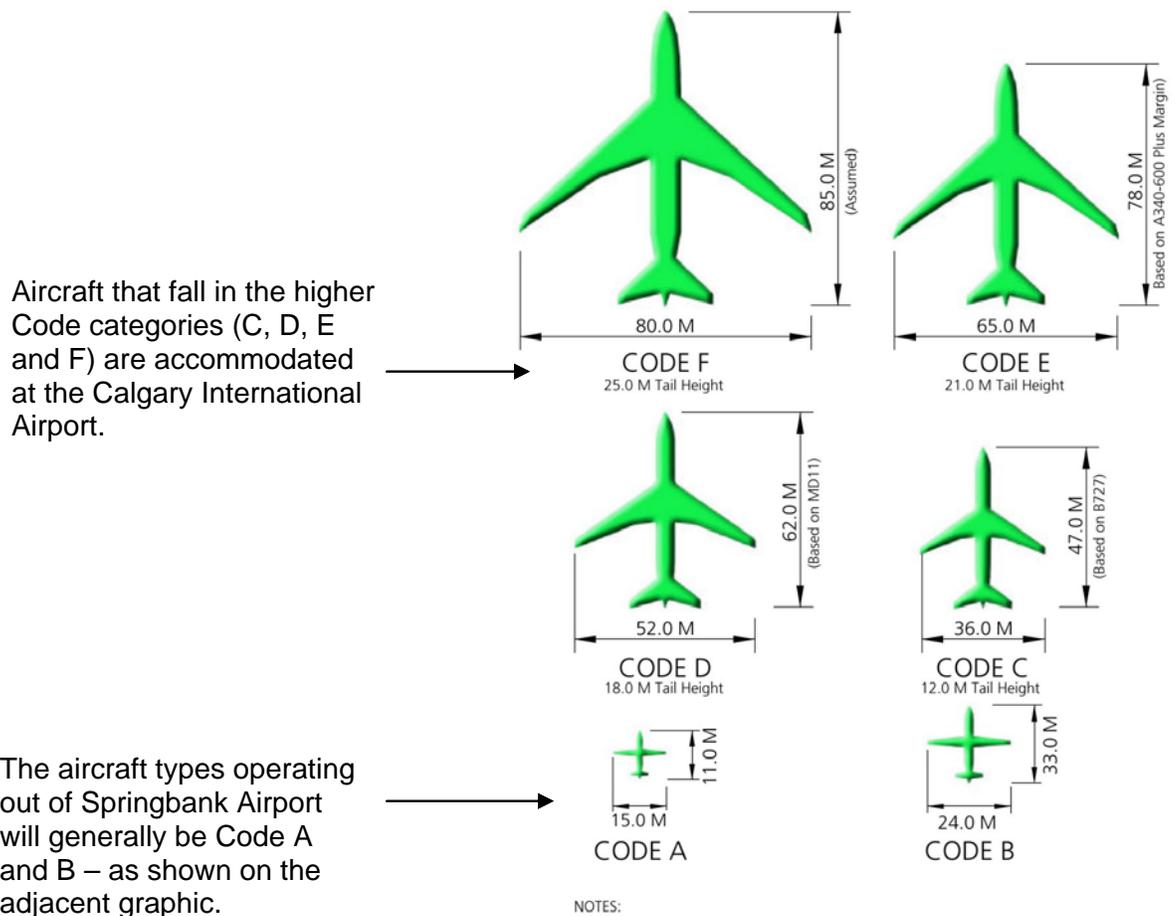
- Aircraft type limited to Code B wingspans (see 5.1)
- Aircraft Load Rating 4 (ALR) weight limit
- Maximum Gross Take Off Weight (MGTOW) of the aircraft being 30,000lbs
- No unit toll passenger (scheduled passenger service) activity

The combination of these principles will allow Springbank to continue operate, retain and attract business and activity in keeping with the defined role.

## 5. AIRCRAFT TYPES

### 5.1 Design Aircraft

The range of typical aircraft types that are either currently operating at Springbank Airport, or that may do so in the future, generally fall into Codes A and B – as defined in Transport Canada’s document “Aerodrome Standards and Recommended Practices – TP312E”. These aircraft have a wingspan up to 24m (79 ft.). In general, the airfield system for Springbank Airport will be designed around the ability to accommodate these categories of aircraft.



- NOTES:
1. Wingspan Based on Aerodrome Reference Code (ICAO)
  2. Aircraft Length and Tail Height Based on Maximum Known Aircraft Type for Relevant Code.

Some typical Code A and B aircraft types that currently operate, or could operate out of Springbank Airport in the future, are shown on the following images.



Chapter 3 Jets / Very Light Jets



Propeller Aircraft – typically less than 30,000 lbs.

Rotary Wing Aircraft (Helicopters)

An exception to the typical design aircraft for Springbank referenced on the previous page are some of the aircraft associated with the Province of Alberta’s Department of Sustainable Resource Development (SRD) Forestry Protection Base, which fall into Transport Canada’s Code C classification system. Certain airside facilities at Springbank have been designed and constructed by the Province of Alberta to accommodate their aircraft.

In terms of background, SRD is responsible for the management of public lands, forests, fish and wildlife and acts in a stewardship role with regard to these important resources. A review by SRD identified gaps in their wildfire coverage, and further identified Springbank Airport as the most effective location for a new forest protection base that would fill in those gaps. In 2007, The Calgary Airport Authority leased 10 acres of land to the Province of Alberta in order to facilitate the development of this new base. In September 2007, the new base became operational, thus providing area residents with better protection from the threat of wildfire.



As stated by SRD Minister Ted Morton; “The new Springbank air tanker base allows Sustainable Resource Development to meet its operational goal of responding within 30 minutes to wildfires in areas near Canmore, Bragg Creek, Kananaskis Country and the Bow Valley”.

The exception for SRD’s Code C aircraft has been made based on the important public service role that this facility provides for the region.

## 6. RUNWAY DEMAND AND CAPACITY

### 6.1 Historic Growth and Current Demand

Historic aircraft movements for Springbank Airport are illustrated in Figure 6.1 below. As the graph indicates, aircraft movements at Springbank Airport have fluctuated over the years. Strong connections to the economy exist, and associated up and downturns in flight training activity levels are not uncommon.

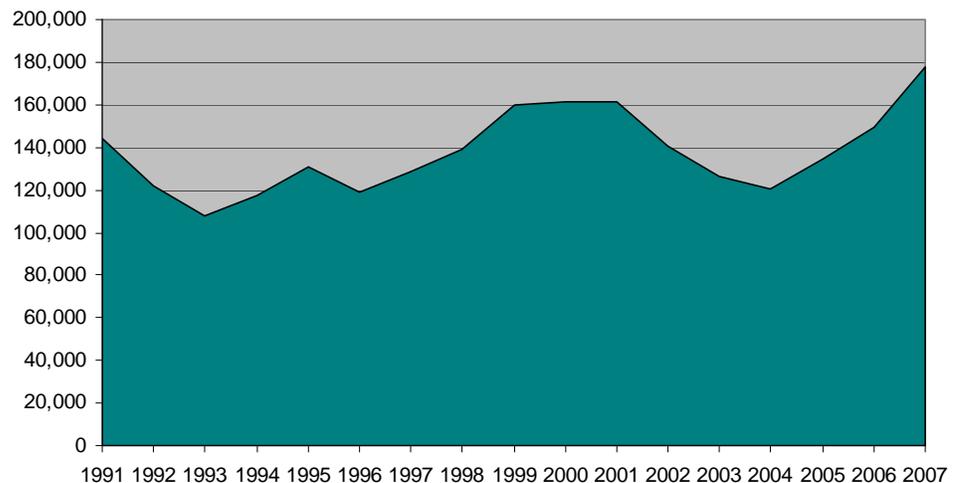


FIGURE 6.1 HISTORIC AIRCRAFT MOVEMENTS

The categories of aircraft movements used to classify aircraft movements at Springbank Airport are as follows:

- **Itinerant Movements.** These are aircraft movements that leave the five mile control zone of the airport.
- **Local Movements** These consist of circuit training traffic aircraft that remain within the Springbank Airport local airspace. Local movements represent approximately 2/3 of total aircraft movements.

In addition to the above, “through traffic” that passes at high altitude (7,000 ft. ASL south of Runway 07/25 and 6,500 ft ASL north of Runway 07/25) through Springbank airspace is managed by air traffic controllers at Springbank Airport. While this through traffic has an impact on the workload of the air traffic controllers at Springbank, it has no effect on the airfield infrastructure on the ground. Thus, for the purposes of facility planning, through flights are not considered as part of the Springbank Airport demand.

The fluctuating nature of aircraft activity is further illustrated by Figure 6.2. This graphic illustrates the strong swings in annual activity. Growth since 2005 has averaged 14% annually with peak annual growth approaching 20%. The average annual growth of total aircraft movements for the period 1991 to 2007 is 1.91% and is shown on Figure 6.2.

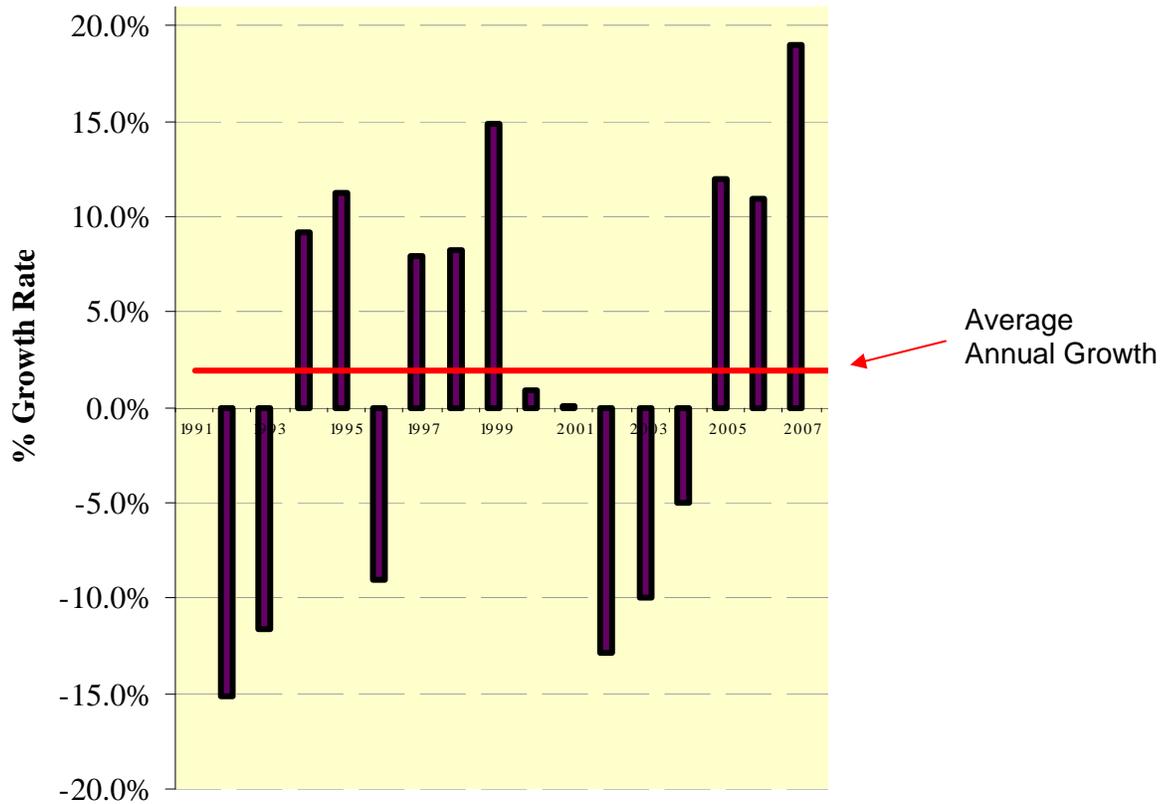


FIGURE 6.2 AIRCRAFT MOVEMENTS HISTORIC GROWTH RATES

**6.2 VFR vs. IFR Traffic**

A defining characteristic of the demand at Springbank Airport relates to the split between the number of movements classified as Visual Flight Rules (“VFR”) and (“IFR”) Instrument Flight Rules. For 2007, the breakdown was approximately 4% IFR and 96% VFR – as shown on Figure 6.3.

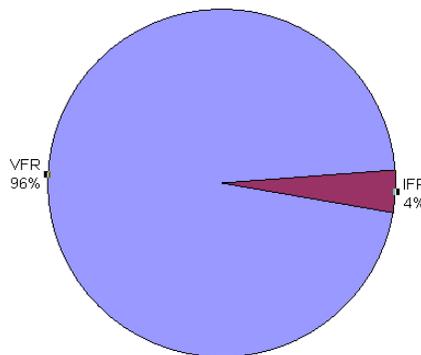


Figure 6.3 2007 Split - VFR vs. IFR

With the recent improvements made to the landing aids at Springbank Airport (non-precision GPS and ILS) combined with the introduction of jet traffic in 2007, the

percentage of IFR activity will likely increase in the future. It is important to monitor this split, as an increasing percentage of IFR traffic will reduce runway throughput. IFR traffic requires greater aircraft separations which reduces the number of aircraft capable of being handled on a runway during a specified period of time.

**6.3 Forecasts**

Based on the increasing mix of IFR and jet traffic at Springbank combined with the fluctuating nature levels of activity and future demand at the airport.

The Master Plan includes three scenarios for future demand.

- Low 1.9% / annum
- Medium 2.5% / annum
- High 3.3% / annum

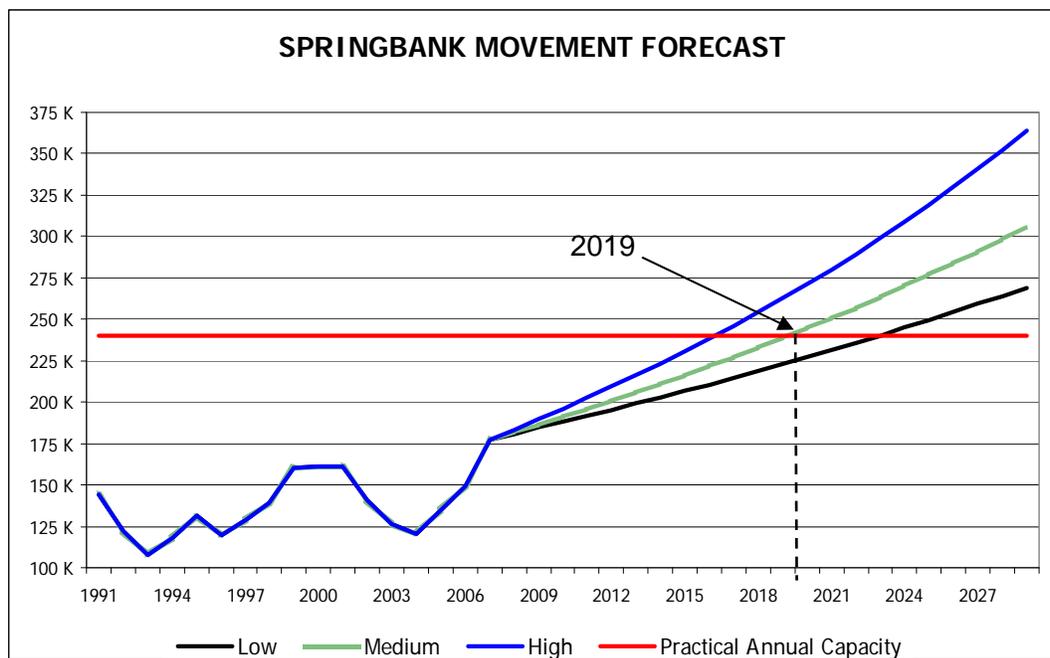


FIGURE 6.4 HISTORIC AND FORECAST AIRCRAFT MOVEMENTS

**6.4 Capacity**

The term “capacity” of an airport generally refers to the ability of the total runway, taxiway and airspace system to accommodate aircraft movements. The overall capacity of an airport is dependent on a range of variables including:

- Airport configuration
- Weather conditions, such as visibility, ceiling, winds

- Proportion of IFR and VFR traffic
- Mix of aircraft using the system and their range of performance characteristics
- Mix of operations (landing, takeoff)
- Availability of aircraft awaiting landing or takeoff to allow efficient sequencing
- Demand profile over a typical day (proportion of time peak period traffic flows are likely)
- Navigation (landing) aids installed
- Human factors (pilot and air traffic controller performance).

Due to the many variables involved, it is normal to apply a range of values to the annual capacity of an airport.

A detailed assessment of airfield capacity for Springbank Airport was undertaken as part of the 1986 Calgary Area Aviation Master Plan (CAAMP). This study included a thorough review of capacity at both the Springbank and Calgary International Airports.

With regard to Springbank Airport, the CAAMP study made an assessment that was based on the now current airfield configuration (Runway 16-34 at a length of 5,000 ft. / Runway 07-25 at a length of 3,400 ft.). This particular capacity analysis anticipated that the airport's role "would be expanded to that of a broader scope GA reliever airport". The assessment assumed the introduction of slightly heavier traffic (greater than 12,500lbs.), as well as IFR capability at the facility. This is in essence the present situation at Springbank Airport.

In this configuration, the report estimated the Practical Annual Capacity for Springbank at 244,000 aircraft movements.

The CAAMP study also made a similar assessment of airfield capacity with the parallel runway in place for VFR traffic – used predominately for training traffic. In this instance, a Practical Annual Capacity of 357,000 movements was provided for Springbank.

With the estimated capacity of the existing airfield being in the range of 244,000 annual movements, and with reference to the traffic forecasts, a parallel runway will need to be considered within the planning period of this Master Plan. The current estimated timeframe for the new parallel runway would be based on the medium growth scenario. See Figure 6.5.

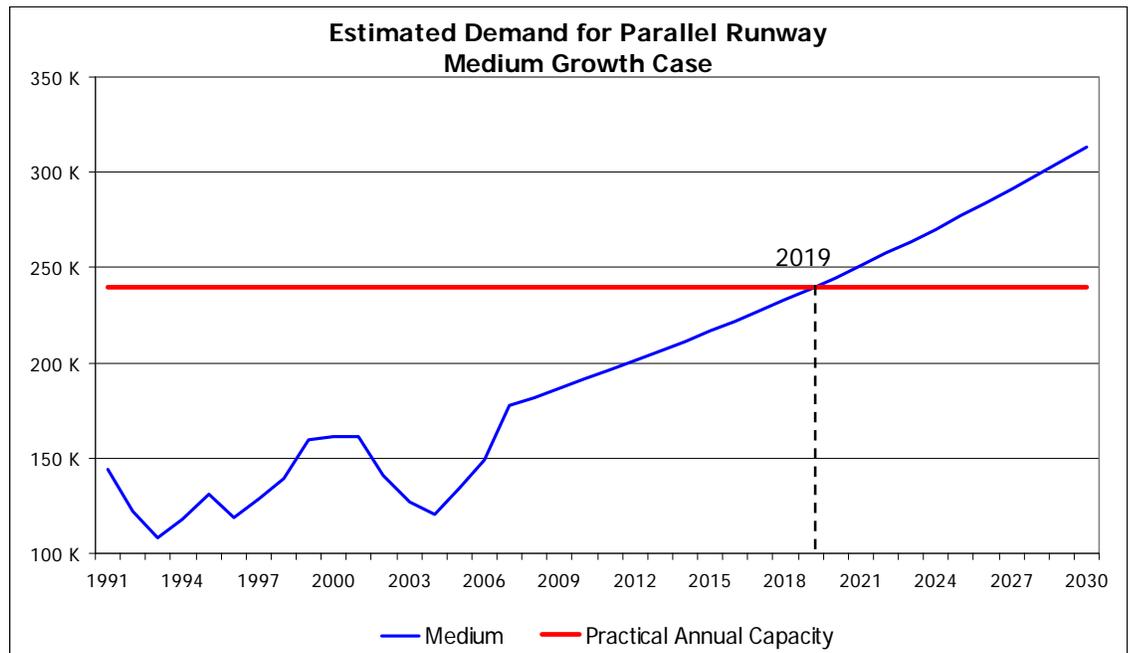


Figure 6.5 Airfield Capacity

The previous analysis is a practical annual capacity or macro view of capacity. There are other indicators of capacity that focus on a more micro view of the demand/capacity.

On a more micro view, there are factors in place today that indicate capacity may be an issue earlier than the practical annual capacity suggests.

Other local factors influencing the overall capacity include:

- Nav Canada’s priorities for managing IFR and itinerant traffic versus training and circuit traffic
- the expectation that the proportion of IFR traffic at Springbank will grow
- the existing training circuit is often times full at busy times today.

These other factors may limit the activity on the existing airfield to the point that the annual capacities described will not be able to be achieved.

## 7. MOVEMENT AREA

### 7.1 Runways

#### Existing Configuration

The Airfield layout in Figure 7.1 depicts Springbank Airport's existing Airfield System. The Airport has two intersecting runways:

- Runway 16/34, 1524 m (5000 ft) long x 30m (98 ft) wide; asphalt; and is designated as a non precision instrument runway.
- Runway 07/25, 1043m (3423 ft) long x 30m (100 ft) wide; asphalt; and is currently a non instrument runway.

Runway 16/34, being the longer of the two runways and being equipped with an instrument landing system, is used for the majority of IFR traffic and jet activity. Dependent on wind and weather conditions, both runways are used for flight training circuits.

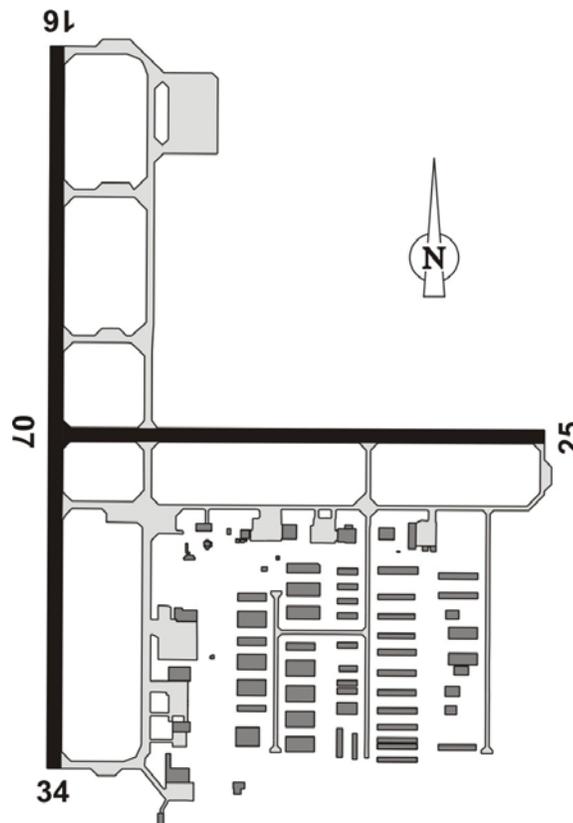


Figure 7.1 Existing Airfield Layout

### **Existing Airfield Capacity**

As described in the previous section, the airfield capacity is estimated to adequately meet expected growth in demand over the next ten years. Beyond that timeframe, a parallel Runway 16R/34L may need to be considered to supply additional capacity.

Over the next decade, taxiway infrastructure will be optimized to reduce runway occupancy times and to extract all available capacity from the existing runway layout. Growth in jet and IFR traffic will also be monitored over this time to maintain a perspective on demand and runway capacity.

### **Future Airfield Improvements**

The runway and taxiway concepts outlined in this Master Plan are illustrated in Figure 7.2. The existing Airfield System is shaded in black. A future parallel runway, which is discussed later in this section, is shown in blue. Future taxiways are shown in light blue.

### **Future Parallel Runway 16R/34L**

The Springbank Airport Zoning Regulations, in place since 1976, protect for the development of a parallel runway to the west of the existing Runway 16/34, as shown in Figure 7.2. The existing Zoning Regulations provide the necessary protection for the runway to function as a non instrument runway.

Discussions with airport operators have revealed that during key training periods, the training circuit is at capacity. Given that training traffic is given the lowest priority in terms of air traffic management, an increasing amount of IFR traffic at Springbank Airport will tend to limit growth in flight training activity. The provision of the parallel runway would enhance the overall level of service provided to the flight training community.

The parallel runway is proposed to be 4,000ft long x 75ft wide and would be located 304.8m (1000ft) west of the existing Runway 16/34.

These runway dimensions are deemed appropriate to accommodate VFR flight training activities in the future when demand cannot be managed on the existing airfield.

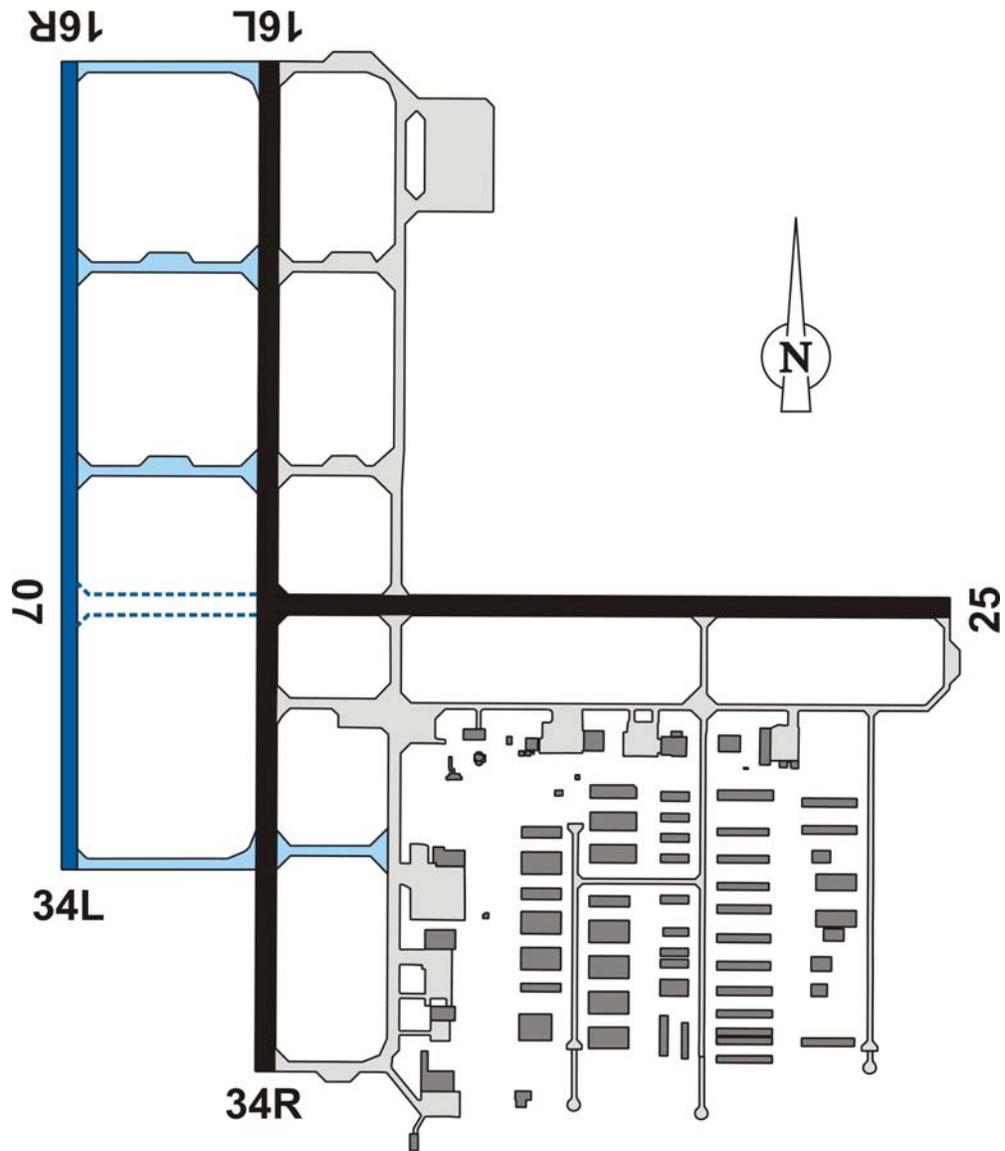


FIGURE 7.2 Future Parallel Runway 16R/34L

### Other Airfield Improvements

As part of the consultation process associated with the preparation of this Master Plan, stakeholders indicated that the provision of high speed exits for Runway 16-34 would be beneficial from both the end users perspective, as well as from an airfield operations perspective. High speed exits would reduce runway occupancy times, a key consideration as traffic at Springbank Airport continues to grow. Further analysis will be undertaken to determine optimum exit locations.

In addition, the consultation process identified a potential need for an extension to Runway 25 to accommodate landing requirements for larger Code B aircraft. One option is shown in Figure 7.2 to extend Runway 25 to the west to add additional runway length for landing aircraft.

Maintaining existing runway thresholds in this scenario would allow for an extension without the need to modify the registered Airport Zoning. This potential project will also require further analysis to determine actual demand, benefit and associated timing.

## **7.2 Taxiways**

The primary taxiways are A and C which parallel runways 16/34 and 07/25. These taxiways have the following dimensions:

- Taxiway A 15m (49ft) wide
- Taxiway C 10.67m (35ft) wide

### **Future Northern Parallel Taxiway**

In anticipation of the full development of the SE quadrant over the next few years, a new land development concept has been developed. This concept proposes a new parallel taxiway on the north side of Runway 07/25 with access taxiways to the hangar development areas. This area will be developed in a phased approach. A key development consideration will be the segregation of fixed and rotary wing activity.

### **Taxiways Providing Access to GA Facilities**

In addition to the main airfield taxiway system, there are a number of supporting taxiways that provide access to hangars throughout the south-east sector of the airport. These taxiways are typically 7.6m (25ft) wide – suitable for Code A aircraft.

These taxiways are all ‘uncontrolled’ or, in other words, Nav Canada does not control aircraft traffic movement nor have visual contact with all surfaces on these taxiways. Feedback from the users of Springbank Airport highlighted associated problems with this condition, specifically the fact that “head to head” encounters between aircraft can happen from time to time due to their uncontrolled nature, especially with regard to traffic using taxiways D, F and G.

In order to help resolve the issue of “head to head” encounters between aircraft on some of the uncontrolled taxiways in the south east sector, a lay-by is being considered at the intersection of Taxi D and Taxiway F. This lay-by is shown on Figure 7.3.

Taxiway E and associated land to the east remains as the last available property in the SE quadrant. To be as flexible and accommodating as possible for all Code A and B aircraft demands in this precinct, Taxi E will be considered for widening to 10.5 meter Code B width over time.

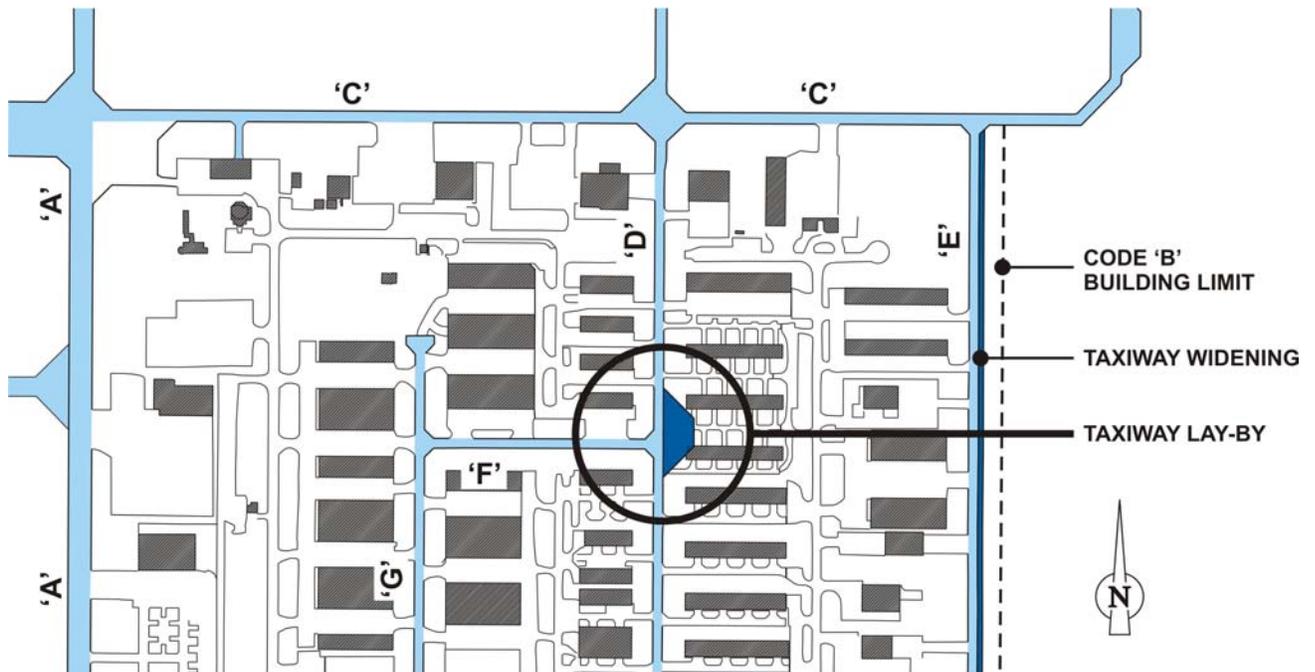


FIGURE 7.3 TAXI LAY-BY CONCEPT

As demand for leasable land increases, the development focus will move from the SE quadrant to the lands north of Runway 07/25. The concept being considered is illustrated on Figure 7.4. Future development and the associated taxiway system will accommodate both Code A and B aircraft.

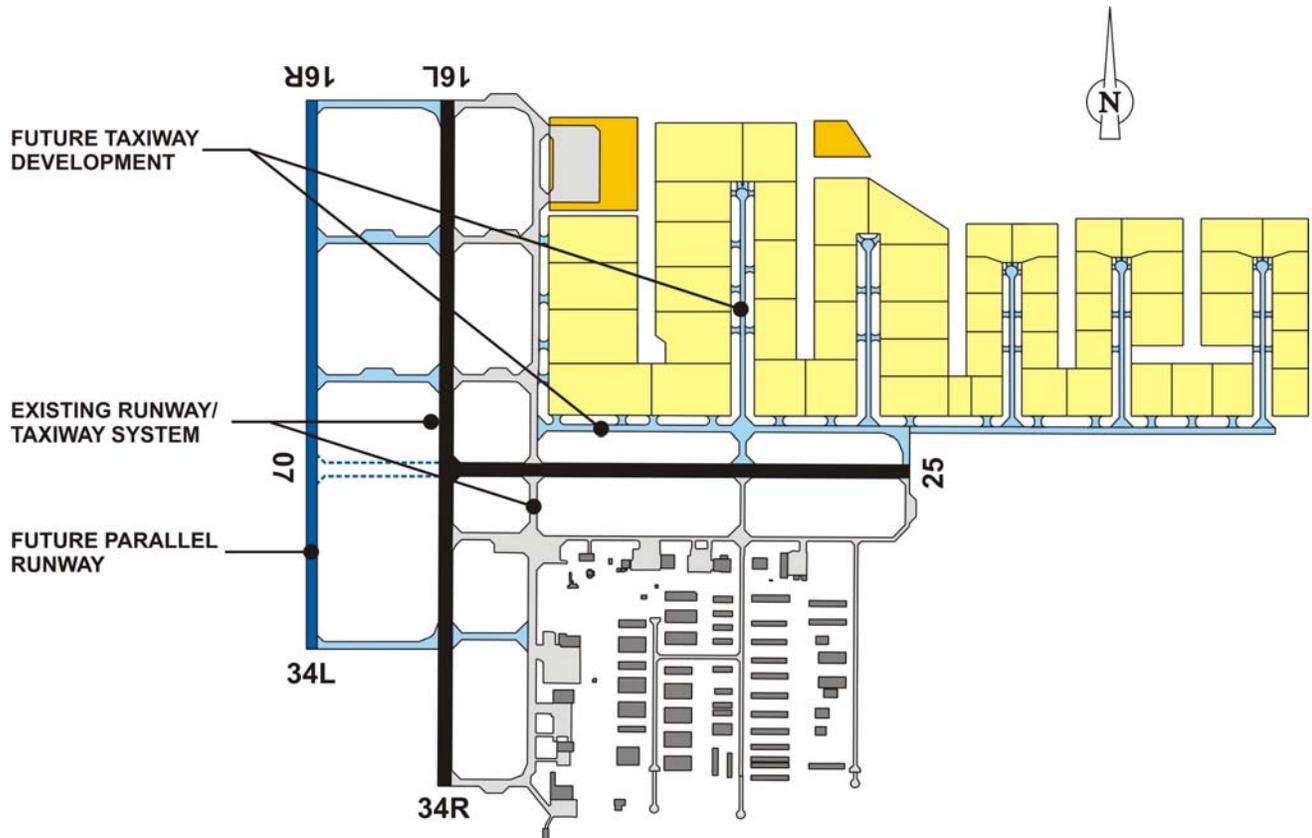


FIGURE 7.4 FUTURE AIRFIELD

### Link Taxiways

There will be a need to link taxiways between Taxiway A and Runway 16/34 as well as between the new parallel taxiway north of 07/25. Further study will be undertaken to develop discrete identifiers for each taxiway.

### 7.3 Aprons

The primary itinerant apron at Springbank is located east and south of taxiways A and C. This apron at times can be fully occupied and there has been a stakeholder need identified to provide additional parking. Current capacity of this apron is one Code B aircraft or two Code A aircraft. A reserve for apron expansion has been shown in Figure 7.5. Demand for this parking need will be monitored over time.

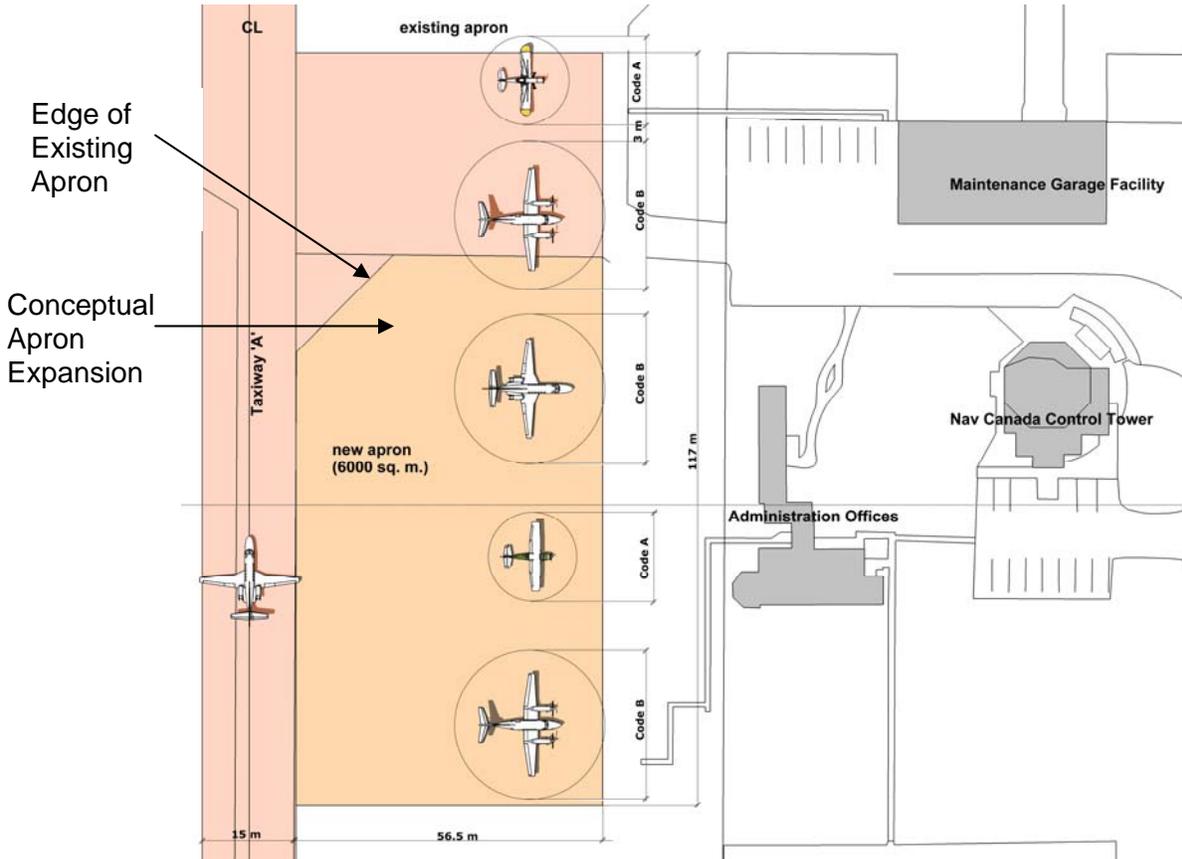


FIGURE 7.5 CONCEPTUAL APRON EXPANSION

### Airside Facilities Associated with Helicopter Training

As part of the consultation process associated with the Master Plan, the helicopter operators indicated that once the south east sector of the airport is fully developed, the new building development will eliminate their ability to use the Runway 25 threshold area for emergency training.

On-airport helicopter training – for emergency landing / auto-rotate maneuvers - typically occurs on the runway threshold ends of the “non-active” runway (the runway not being used for fixed wing traffic). When Runway 16/34 is used for fixed wing activity, helicopters will use the holding bay and threshold of Runway 25 for emergency training.

A possible solution would involve developing a training pad within the airfield area east of Runway 25 for helicopters to use for emergency training purposes. This will require further study and dialogue with stakeholders and agencies such as Transport Canada and Nav Canada with respect to safety, air traffic management and other considerations. The basic concept of an emergency training helicopter pad is illustrated on Figure 7.6.

The other improvement being implemented is aiming points for helicopter operations. These aiming points will allow Nav Canada to direct helicopters for subsequent air taxi to thresholds or taxiways.

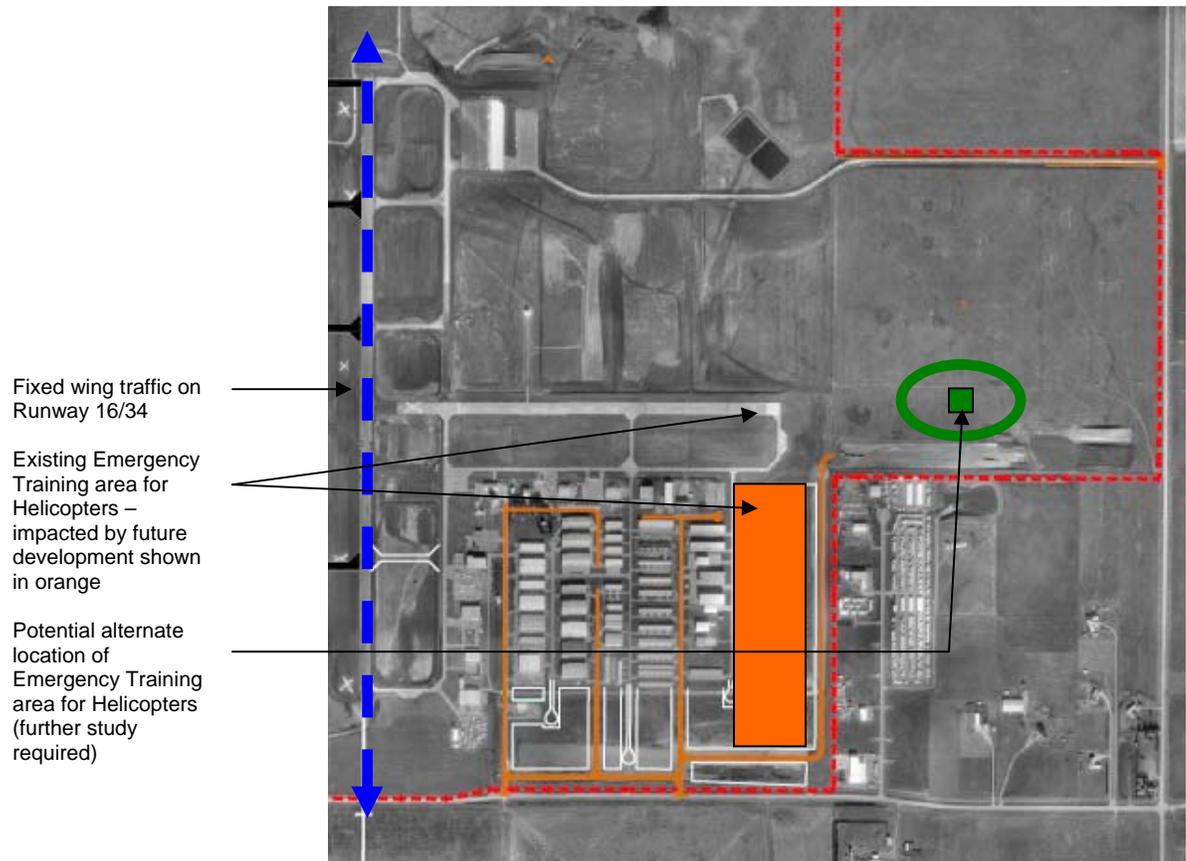


FIGURE 7.6 POTENTIAL ALTERNATE HELICOPTER TRAINING AREA

## **8. NAVIGATION, COMMUNICATION AND LANDING AIDS**

### **8.1 Introduction**

With the exception of the airport's airfield lighting system, all navigation, communication and landing aids are the responsibility of NavCanada.

### **8.2 Control Tower**

The existing control tower is a relatively new "state of the art" facility which became operational in October 2001.

The existing control tower is therefore planned to be retained at its current location throughout the 20 year planning horizon of this Master plan.

### **8.3 VOR**

A non certified Very High Frequency Omni-directional Radio range (VOR) was relocated in 2007 to a location between the existing Runway 16/34 and future parallel runway. As a result of various modernization initiatives being undertaken by NavCanada, this facility may be phased out during the 20 year planning period of this Master Plan.

### **8.4 VHF Radio Transmitter and Receiver**

A VHF receiver and transmitter are located in the contract weather office and air traffic control tower respectively. A back-up receiver and transmitter are located in the flight service station.

The current radio transmitter and receiver installations are planned to be retained in their current locations.

It may be necessary within the 20 year horizon of the Master Plan to replace part or all of these facilities due to advances in technology. However, such technology advances are likely to result in smaller facility requirements and it is assumed that any future VHF equipment will continue to be housed at their current locations.

### **8.5 Instrument Landing System**

A certified non-precision instrument landing system (ILS) is installed on Runway 34 approach. "Non-precision" means the system is not capable of providing the minimum decision height limit for arriving aircraft.

The glide path antenna with a co-located DME (Distance Measuring Equipment) is located between Runway 16/34 and the future parallel runway, offset by 125m from the Runway 16/34 centerline and at a distance of 269m from the Runway 34 threshold.

The localizer is located within the airport boundary on the extended Runway 16/34 centerline at a distance of 220m north of the Runway 16 threshold.

**8.6 GPS Approaches**

A GPS approach is published that allows non-precision instrument approaches to both ends of Runway 16/34.

**8.7 Visual Guidance Systems**

Runways 16-34 and 07-25 are equipped with PAPI (Precision Approach Pathway Indicator).

**8.8 Runway Lighting**

The lighting system associated with Springbank Airport is the responsibility of The Calgary Airport Authority.

With regard to runway lighting, Runway 07-25 has threshold lighting as well as edge lighting. Runway 16-34 is similarly equipped. Runway 16/34 has also been equipped with REILS (runway end identification lights).

**8.9 Runway Approach Lights**

In order to achieve a precision approach for Runway 34, the installation of an approach lighting array would be required. This would require that additional land be acquired – or an easement be obtained – on lands south of the current airport boundary. This issue will be further reviewed going forward.

**8.10 Taxiway Edge Lighting**

Taxiway edge lights are currently installed on all controlled taxiways at Springbank Airport. Future controlled taxiways will be similarly equipped.

All Nav Canada navigation, communication and landing aids have electronic protection zones that must be respected when other development occurs. The Electronic Zoning Plan is being updated to reflect the new VOR location and extension of Runway 16/34.

## 9. LAND USE AND DEVELOPMENT

### 9.1 The Demand for Land

The 10 Year Development Plan laid out a framework for how the lands in the south east quadrant of the airport would be developed over time. The land in this quadrant of the airport has been serviced and much of the land has subsequently been leased.

As part of the Master Plan process, areas for future land development have been explored.

### 9.2 Northlands Concept

The demand for future airport land will be met through the development of lands north of Runway 07-25. Opportunities exist to coordinate the planning and development of this area with development proposals for lands immediately adjacent to the airport. The Concept Plan shown on Figure 9.1 is a potential layout for how these lands can be developed for future aviation uses, along with a small amount of Groundside Commercial Uses.

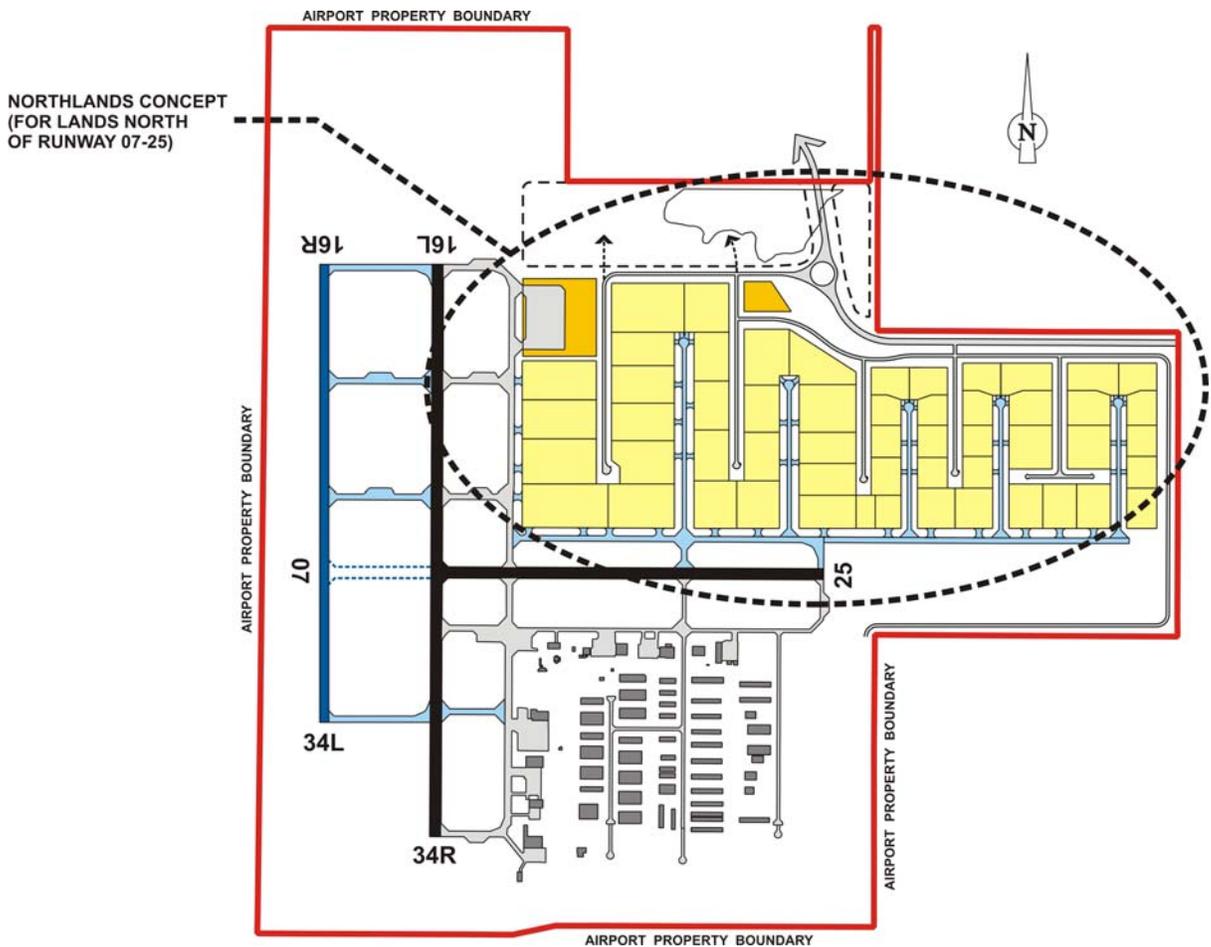


FIGURE 9.1 NORTH LAND DEVELOPMENT CONCEPT

**9.3 Land Use Plan**

To support the need for additional land development areas, a revised Land Use Plan for Springbank Airport has been developed. This Plan is illustrated in Figure 9.2.

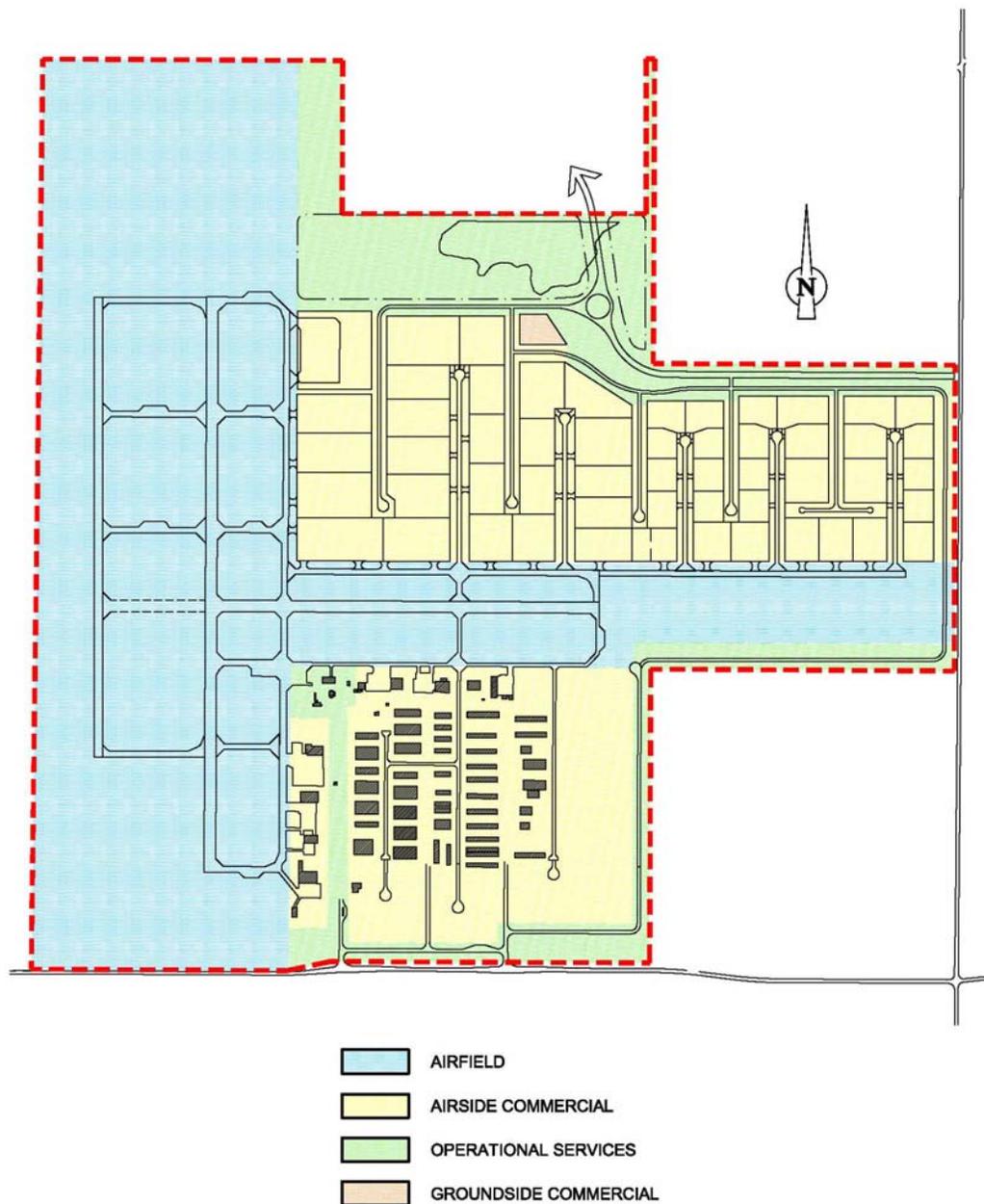


FIGURE 9.2 LAND USE PLAN

#### **9.4 Land Use Districts**

The Land Use Plan shown on Figure 9.2 divides the airport into four (4) distinct land use districts. These districts are listed below, along with a description of their general purpose:

##### **Airfield District**

The airfield district accommodates the main airfield operational elements including runways, main taxiways, navigation and landing aids, etc. In addition, restricted agricultural or recreational activities could be accommodated in some zones within the airfield district

##### **Airside Commercial District**

The airside commercial district accommodates the various GA facilities associated with the airport – such as hangars, flight schools, aircraft maintenance facilities, fixed base operations, and fire hall / ERS facilities. It also includes the access taxiways that provide airside access to these lands, as well as infrastructure and services essential for airport operations.

##### **Operational Services District**

The operational services district accommodates uses such as the air traffic control tower, airport management offices, airport maintenance facilities, and government inspection services (Canada Customs). This district also provides for significant infrastructure items such as the airport's underground water storage reservoir, as well as existing and future storm water ponds.

##### **Groundside Commercial District**

The groundside commercial district includes lands that are difficult to provide with airside access. The amount of groundside commercial included in the Land Use Plan is quite small. It is intended to accommodate small commercial and /or light industrial uses that would be synergistic with the airport and surrounding community.

#### **9.5 Development of Key Aviation Support Facilities**

Additional expansion of the Airport Authority's Maintenance facilities can be accommodated within the Operational Services District. Expansion to the Maintenance and Storage Garage may be necessary in order to accommodate additional snow removal equipment.

Expansion or redevelopment of the Airport Managers office is also possible on its current site, as is expansion to the itinerant apron.

## 9.6 Helicopter Facilities

Currently, helicopter aprons and support facilities are located within the GA facilities area in the south-east sector and helicopter operations are mixed with fixed wing aircraft operations.

Where possible, it is desirable to keep fixed wing and helicopter operations relatively separate as issues such as noise (particularly helicopters), rotor downwash, propeller wash, aircraft parking and different start up, approach and departure procedures have the capacity to cause conflicts.

In the land development concept this issue has been addressed by planning for a separate helicopter operating zone separating helicopters from fixed wing operators. This principle can be “blurred” where a single operator has both rotary and fixed wing aircraft in their fleet. In such cases it will, of course, be necessary to mix operations of both aircraft types. Facilities for such operators should be located at the interface between zones reserved for fixed wing and rotary aircraft operators, if possible.

Helicopter facilities could be provided in a cul-de-sac arrangement similar to that proposed for the north-east sector.

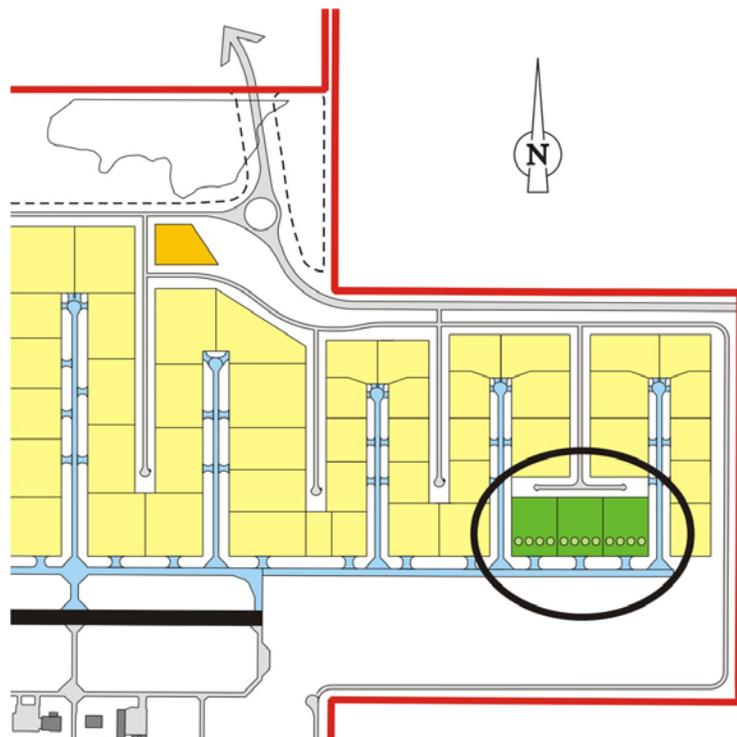


FIGURE 9.4 HELICOPTER FACILITIES TYPICAL

**9.7 Aesthetics and Landscaping**

As part of the Master Plan consultation process, interest was expressed by area residents regarding the overall appearance of Springbank Airport. In response to this interest, the Building Design Guidelines for Springbank Airport have been reviewed and updated. In addition, a landscaping plan and implementation program – suitable for an airport environment - will be developed. Such a plan will include the provision of connections to the area's regional pathway system, an airport entrance sign and other features such as parks and aircraft viewing areas.

## **10. UTILITIES**

### **10.1 Introduction**

The utility infrastructure at Springbank Airport has been the subject of numerous studies over the years. A number of key challenges exist relative to the planning of future utility systems for the airport – systems that are necessary in order to accommodate the future growth of the airport. Some of these key challenges include:

- Urbanization pressures within the region in which agricultural lands will likely transition into urban environments;
- The lack of a regional strategy with regard to servicing the larger areas outside the boundaries of the City of Calgary. Work is currently underway in this regard through the preparation of a Regional Servicing Study by the City of Calgary;
- Issues and initiatives related to sustainability such as the Province of Alberta's South Saskatchewan River Basin Plan and the Water Management Plan for the South Saskatchewan River Basin in Alberta. Such initiatives have resulted in certain actions being taken, including a Provincial moratorium on the issuance of additional water licenses to draw water from the Bow River.

Given the context described above, the most recent utility studies that have been prepared for Springbank Airport do not necessarily point to single solutions relative to the future servicing of the airport. Instead, a range of options are typically identified, along with a message that larger decisions regarding servicing within the broader regional context may have to be made prior to a final option being selected for Springbank Airport. This chapter of the Master Plan acts as a summary of the key findings and recommendations coming out of the various utility studies undertaken for Springbank Airport.

The Authority is confident that solutions will be found to meet the long term needs for airport servicing.

### **10.2 Water Supply and Distribution**

The airport's existing water distribution system consists of a recently expanded 250,000 imperial gallon (1.15 million liter) underground reservoir along with a piped system which delivers treated water to airport tenants. The treated water is regularly supplied by tanker truck to the airport reservoir from the Town of Cochrane.

Based on the Airport's development plans, recent studies have suggested that average daily water consumption will increase over the long term from the present demand of 20 cubic meters per day up to 40 cubic meters per day.

With the increase in water storage capability, the airport has sufficient capacity for near term development, including fire flow storage.

Options for a more permanent water supply solution to Springbank Airport include a potential tie-in to the City of Calgary system that may be extended to the Town of Cochrane, or a potential connection to water systems that may be installed as part of some of the larger scale developments in the vicinity.

Once the regional servicing study is complete and the MD has made decisions regarding development in airport adjacent areas, the best alternative for permanent water supply needs should become more evident.

### **10.3 Wastewater Collection and Treatment**

The airport is currently served by a system of lift stations and sanitary sewer mains – all leading to a dual sewage lagoon located north of Runway 07-25. The sewage lagoons are occasionally emptied onto airport lands that are currently used for agricultural purposes via a spray irrigation system. The sewage lagoons and associated irrigation system operate according to provincial standards and good engineering practices.

A 2006 report indicates that the existing lagoon system cannot accommodate the future development plans for the Springbank Airport. Furthermore, the very notion of developing the lands north of Runway 07-25 will necessitate that the sewage lagoons be decommissioned and an alternative wastewater system implemented.

A number of alternatives hold the possibility of providing Springbank Airport with the long term wastewater management solution that is necessary for it to continue to develop. The two that are currently the most promising include:

- Linking to the wastewater collection and treatment system associated with adjacent development.
- Linking into the sanitary sewer line referred to as “the Cochrane Line”. This existing wastewater pipeline connects the Town of Cochrane to the City of Calgary’s sanitary sewer treatment system. The pipeline runs immediately adjacent to the Springbank Airport boundary and is controlled by the City of Calgary. This line has capacity but the City preference would be to wait for the completion of the Regional Servicing Plan.

Both options have merit and both have relatively good potential to meet the wastewater demands of the future.

### **10.4 Stormwater Management**

The Springbank Airport falls within two drainage sub-basins – one which drains north to the Bow River, the other draining south to the Elbow River. Historically, stormwater drainage at Springbank Airport has been provided by a system of open ditches and natural low-lying depressions – with drainage occurring to both of the sub-basins.

Since the adoption of the Ten Year Development Plan, more significant stormwater management facilities have been developed – including a stormwater management pond in the south east corner of the airport property.

A Stormwater Management (SWM) Plan for the Airport has been adopted by the Airport Authority. This SWM Plan contains recommendations for the facilities required to manage stormwater associated with what was referred to as Ultimate Conditions.

A key component of the system in the SWM Plan is the shifting of the airport's southerly discharge into the Elbow River sub-basin to the north. This diversion will ease flooding and erosion problems that currently occur along Springbank Creek - downstream of Springbank Airport.

To accommodate the ultimate condition, a new stormwater detention pond along the airport's northern border is required. With this overall system in place, the discharge rates of stormwater off of the airport site will be at predevelopment discharge rates – in accordance with standard development practice established by the Municipal District of Rocky View which require that stormwater detention facilities be used to control both the rates of discharge and the quality of runoff leaving the airport site. Sedimentation requirements – as established by the Province of Alberta – will also be met.

With regard to an on-site conveyance system that will direct stormwater to the new pond, the use of open ditches and swales that will run adjacent to roads and taxiways is planned. The only exception to this would be a section of piping that would facilitate stormwater flows from the southern detention pond to the north detention pond.

The main elements of the proposed stormwater management system are illustrated in blue on Figure 10.1, illustrated below.

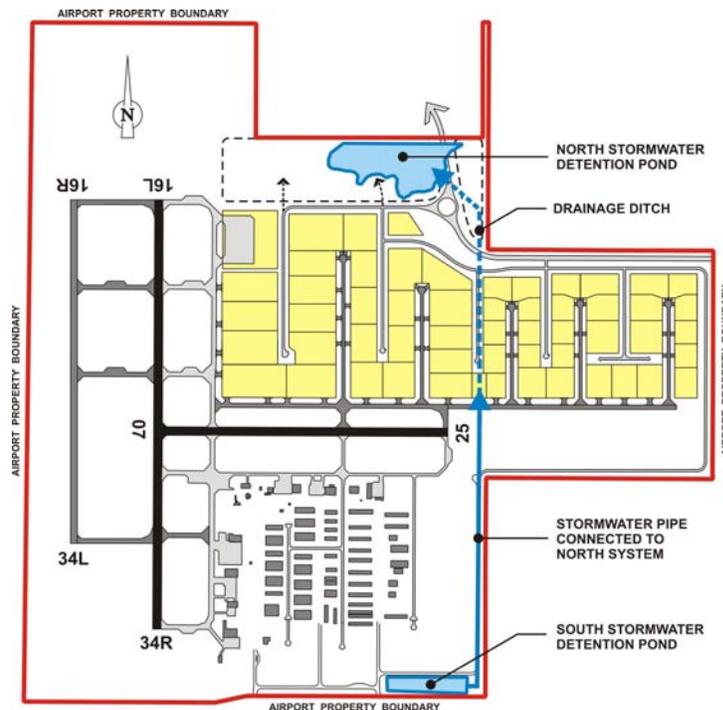


FIGURE 10.1 PROPOSED STORMWATER SYSTEM

**10.5 Power**

Primary electric power is currently provided by Fortis from the Springbank Substation located south of the airport. Power requirements associated with the future development of Springbank Airport, particularly the north lands, may require Fortis to upgrade the capacity of the existing system, depending on the timing of development.

Power transmission is currently provided to the various buildings on site via a system of overhead lines and poles – as well as via underground lines. In the future, power transmission lines will predominately be placed underground.

**10.6 Gas**

Natural gas is provided to the Springbank Airport by ATCO Gas from a regulating station located 1.5km. north of the facility. A system of distribution mains and service lines provide natural gas service to airport facilities. ATCO is currently planning to upgrade their supply system at the Northeast corner of the airport to meet current gas pressure deficiencies as well as meet longer term demand.

**10.7 Telecommunications**

Telecommunication service is provided from the Bowness Exchange. The majority of telecommunication lines are overhead – carried on the poles used for electrical distribution. TELUS currently provides service to the Springbank Airport. TELUS indicates that they have the capacity to provide service to future development.

## 11. OFF-AIRPORT CONSIDERATIONS

The relationship between Springbank Airport / airport operations and off-airport property owners/uses has always been important. Key elements of this relationship are set out below.

### 11.1 Springbank Airport Zoning Regulations

Transport Canada established the Springbank Airport Zoning Regulations in 1976. They are a Federal Regulation, created pursuant to the Aeronautics Act. The main purpose of an airport zoning regulation is to keep areas in the vicinity of an aerodrome clear of any obstructions that could pose a hazard to aviation. Airport Zoning regulations are prepared according to Transport Canada and International Civil Aviation Organization (ICAO) standards. They typically involve three imaginary surfaces through which buildings, structures or other objects are not allowed to penetrate. Figures 11.1 and 11.2 provide graphical depictions of these surfaces for the Springbank Airport. The three surfaces can be described as follows:

- Approach Surfaces: are imaginary inclined planes extending out from the ends of runways.
- Transitional Surfaces: are imaginary inclined planes which extend out from the sides of runways.
- Outer Surface: an imaginary horizontal plane which surrounds the airport. It is typically a fixed elevation above an airport reference point.

In the case of Springbank Airport, the approach surfaces for the existing Runway 16/34 extend just over 50,000 feet from the runway ends and slope up and away from the runway at a 2% slope. This protection was put in place in order to ensure that the runway could be used as a full-instrument runway at some future date. The approach surfaces for Runway 07-25 extend just over 8,300 feet from the runway ends and slope up away from the runway at a 2.5% slope. Approach Surfaces are also in place to protect for the development of the future parallel runway – located west of the existing Runway 16/34.

The transitional surfaces shown in purple are sloping surfaces that run parallel to the runways. The Outer Surface, shown in tan, encompasses a fairly large area in the vicinity of the airport and is a horizontal plane located 150 feet above the Springbank Airport's reference point. (Reference point elevation = 3930 feet above sea level.)

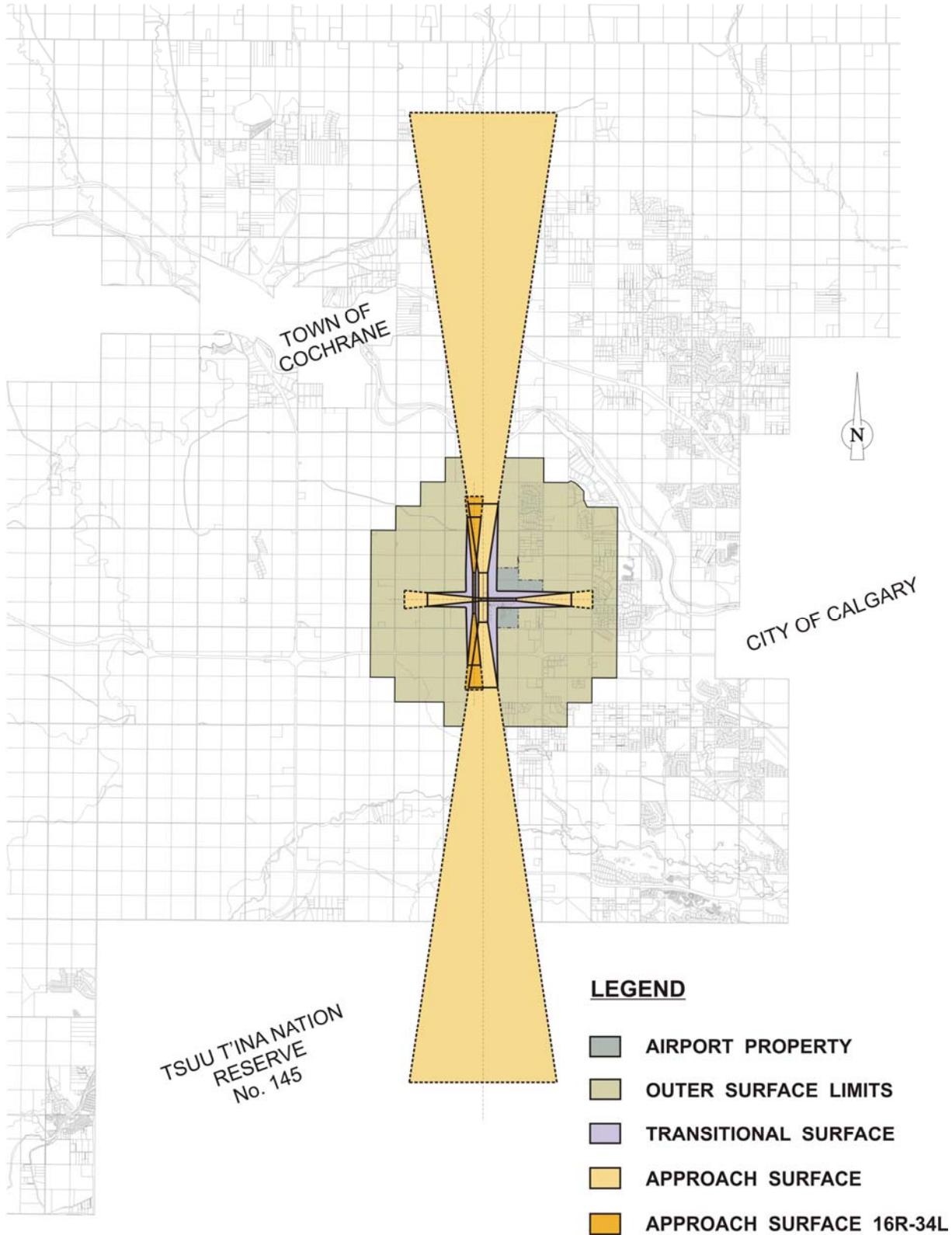


Figure 11.1 SPRINGBANK AIRPORT ZONING REGULATIONS

## 11.2 Airspace Considerations

NavCanada is responsible for managing the airspace associated with the Springbank Airport. How the airspace is used by pilots and managed by NavCanada is a reflection of the wide variety of aviation activities that occur at the Springbank Airport. The following is a very general overview of the types of traffic that occur at Springbank.

- **Itinerant Traffic:** involves aircraft which come into Springbank Airport from another location and land or take off at Springbank and depart the local Air Traffic Control Zone for other destinations. This traffic is generally illustrated by the green bands (arrivals) and yellow bands (departures) on Figure 11.3.
- **Fixed Wing Training Traffic:** involves aircraft which stay within the local Air Traffic Control Zone as part of a “training circuit”. Training traffic stays within the circuit, and practice “touch and goes” on either of the two existing runways at Springbank Airport. Thus the training circuits for Springbank Airport are associated with each of the two existing runways. Only one circuit will be in use at any given time, depending on wind conditions. There can be as many as 5 aircraft in the training circuit at any one time. The training circuits are generally depicted by the purple bands on Figure 11.3.
- **Rotary Wing Training Traffic:** Helicopters also train at Springbank Airport. This activity also has a training circuit which typically revolves around the runway threshold that is not being used for the fixed wing training circuit. For example, when Runway 16/34 is in use for fixed wing training, helicopter training will utilize the threshold of Runway 25 for training purposes. (not shown on graphic).
- **Over Flights:** This traffic is generally comprised of commercial aircraft that pass through the airspace for Springbank Airport at a higher elevation - enroute to the Calgary International Airport. They do not land or take off at Springbank Airport, but are simply “passing through”.

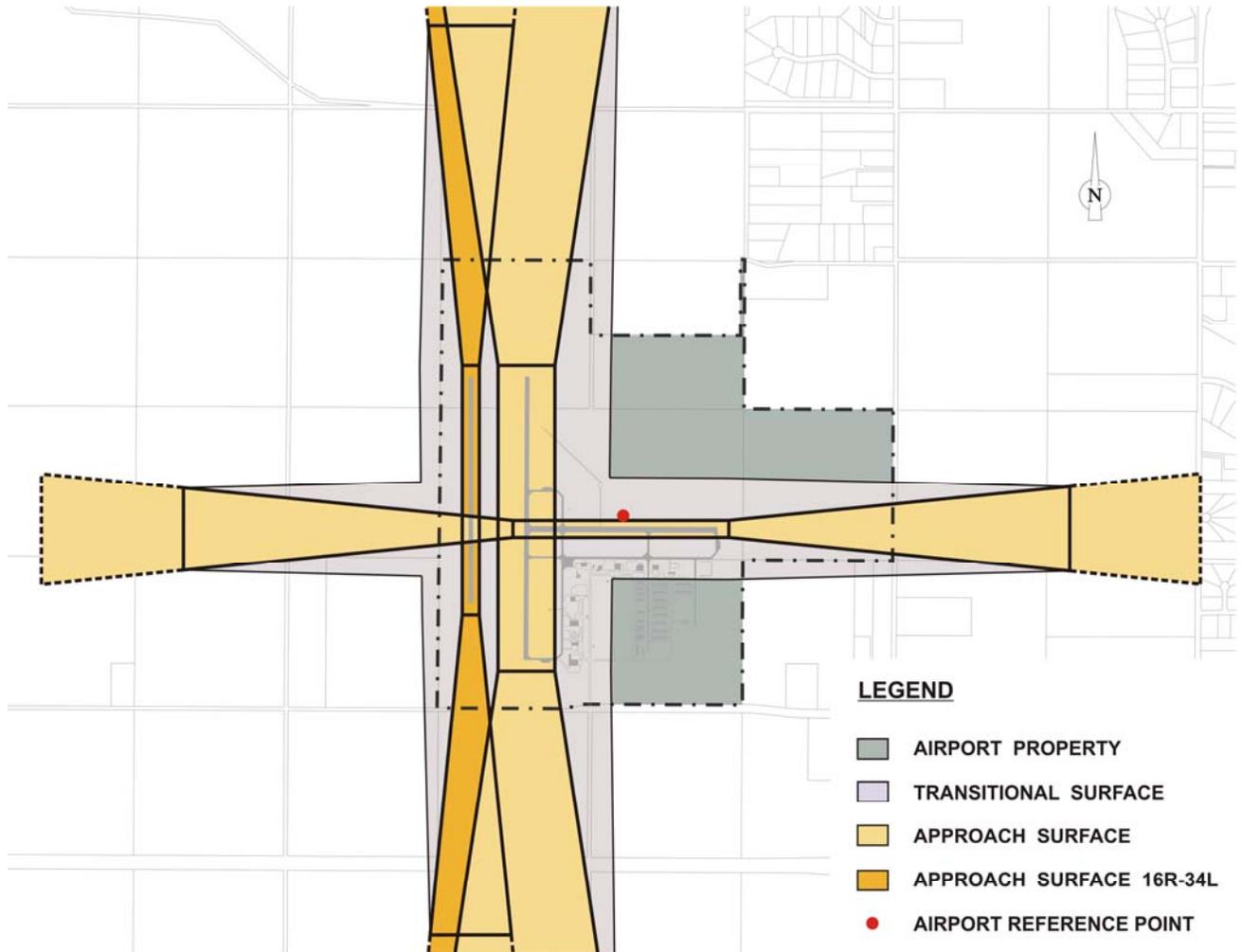


Figure 11.2 ZONING REGULATIONS; DETAILED VIEW

### **11.3 Land Use Compatibility**

Land use planning and development approval authority for the area surrounding Springbank Airport rests with the M.D. of Rocky View.

The implementation and maintenance of compatible land use designations in areas surrounding airports is a very effective way achieving longer term harmonious relations between airport operations and the surrounding community.

Important considerations include; compatible agricultural uses that reduce safety hazards such as bird activity; recognition of aircraft noise from arriving and departing aircraft; and recognition of aircraft noise associated with flight training circuits. In the later two respects, the airport authority has certain tools which can assist with the estimation and measurement of aircraft-related noise. This information is made available to the M.D. of Rocky View and other interested parties to assist with the compatible development of surrounding lands.

## **APPENDIX A**

### **POTENTIAL AIRPORT INFRASTRUCTURE DEVELOPMENT**

#### **2009 – 2018 TIMEFRAME**

North Land Development Phase 1 and 2

Widening Taxi E to Code B

Helicopter training area

Utility Improvements

Aesthetics and Landscaping

Maintenance Garage Expansion

North Stormwater Detention Pond

Airport Manager's Office Replacement

Lay by Taxiways D & F

High speed taxi exit Runway 34

Utility Improvements

Annual Restoration

#### **2019 – 2028 TIMEFRAME**

Parallel Runway 16R/34L

North Land Development Phase 3 and 4

Itinerant Apron Expansion

Annual Restoration

Lengthen Runway 25

As with any longer term development plan, the demand and timing for potential developments will need to be monitored against the actual demand over time. Decisions regarding future investment will also take into account financial, environmental and other considerations.

## APPENDIX B

### GLOSSARY OF TERMS

**TP 312E** - Transport Canada publication Aerodrome Standards and Recommended Practices

**Aerodrome reference point** - The designated point or points on an aerodrome normally located at or near the geometric centre of the runway complex that establishes the locus of the radius or radii of the outer surface (as defined in a Zoning Regulation).

**Aircraft Load Rating** - The Relative structural loading effect of a aircraft on a pavement (the ability of pavement to safely support an aircraft) assigned by ICAO.

**Airport** - An aerodrome for which, under Part III of the Air Regulations, an airport certificate has been issued by the Minister of Transport.

**Apron** - That part of an aerodrome, other than the maneuvering area, intended to accommodate the loading and unloading of passengers and cargo, the refueling, servicing, maintenance and parking of aircraft, and movement of aircraft, vehicles and pedestrians necessary for such purposes.

**ASL** - Above Sea Level – Elevations measured in feet against sea level elevation of 0 ft.

**Maneuvering area** - That part of an aerodrome to be used for the take-off, landing and take-off, landing and taxing of aircraft, excluding aprons.

**Non-precision instrument runway** – An instrument runway served by visual aids and a non visual aid providing at best directional guidance adequate for a straight in approach.

**Obstacle Limitation Surface (OLS)** - A surface that establishes the limit to which objects may project into the airspace associated with an aerodrome so that aircraft operations at the aerodrome may be conducted safely. Obstacle limitation surfaces consists of the following:

**Outer surface** - A Surface located in a horizontal plane above an aerodrome and its environs.

**Take-off/Approach surface** - An inclined plane beyond the end of a runway and preceding the threshold of a runway.

**Transitional surface** - A complex surface along the side of the strip and part of the side of the approach surface, that slopes upwards and outwards to the outer surface, when provided.

**Runway** - A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

**Taxiway** - A defined path on a land aerodrome established for the taxing of aircraft and intended to provide a link between one part of the aerodrome and another.