LPS AVIA CONSULTING

Master Plan 2012
Camrose Airport

Camrose Airport
2012 Master Plan

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Executive Summary

The Camrose Airport is a certified facility owned and operated by the City of Camrose. The Airport primarily serves recreational and General Aviation (GA) activities, although occasional Medevac operations, charter services, and special events are also supported. The airfield system is in need of rehabilitation and a phased plan for commercial development.

The Airport Master Plan presents a comprehensive review of the infrastructure and services currently at the airport and identifies both essential and desirable improvements for the future. It assesses activity and potential growth opportunities in the general aviation sector as well as potential introduction of local and/or regional air services.

The plan considers short-term (1-5 year), medium-term (5-10 years), long-term (10-20 years), and ultimate (20+ years) planning horizons. It assesses the capacity of the airport's facilities including but not limited to runways, taxiways, aprons, air terminal building, access roads, municipal services, and commercial lands available for development.

- The City of Camrose is located in the heart of Central Alberta. The area benefits economically from well-developed agricultural, manufacturing, and resource industries. Additionally, Camrose acts as a service and retail hub to many of the nearby rural communities.

The City's strategic position affords many roles for the airport including acting as:

- a potential point of service for local commuter air services;
- a base for charter aircraft operations and flight training activities;
- a base for corporate and private aircraft owners and operators; and
- recreational flying and general aviation support.

Over the last decade, the population of Camrose has grown rapidly. High commodity prices and the Alberta energy boom have helped most areas of the province. The City's proximity to Edmonton has helped it to obtain most of the benefits of a much larger population. Its population growth rate was slightly less than that for Alberta as a whole because of the particularly strong growth of Edmonton and Calgary. The median income for Camrose remains below the Alberta average although large energy projects have boosted incomes throughout the province. The growing population of fixed-income retirees in Camrose has also contributed to the lower personal incomes.

The airport lacks an Air Traffic Control (ATC) tower or a Flight Service Station (FSS) to accurately monitor activity. The airport operations databases systematically understate the true level of activity. In 1996, the Alberta Department of Transportation evaluated the devolution of 18 airports from the province to the municipalities. The study recommended that the "true" level of local movements be estimated as twice the number of reported movements. Actual itinerant movements were estimated by the Department of Transportation to be as much as six times the level of reported movements. These factors were applied to the raw airport operations counts to generate a base of "true" historic traffic.

Scheduled passenger service operations are not foreseen at Camrose Airport. However, if scheduled service were to commence, the likelihood of demand exceeding the capacity of a small commuter aircraft within the long-term planning horizon is low. The Citation XLS, a mid-size business jet, is currently operated by at least one private charter company serving Camrose. It is reasonable to assume that the XLS+ or an aircraft of similar size and performance will be used at Camrose Airport over the 20 year planning period and is therefore recommended as the design aircraft. Additionally, because small commuter aircraft types typically have lower performance characteristics than the recommended design aircraft, infrastructure designed to accommodate the Citation XLS+ would also accommodate 19 seat turboprop commuter aircraft.

The Camrose Airport currently provides 25 development lots available for long-term lease. Recent lease lot absorption suggests that all of these lots will be occupied in the very near future. The preparation of lots for both recreational and commercial users is required in the short-term to meet anticipated demand. In addition to lease lots, taxiways, access roads, and site servicing will be required.

Short-term improvements recommended to support the airport's role include:

- rehabilitation of all airfield pavement;
- construction of Apron II (former Taxiway 'C');
- establishment of Runway End Safety Areas;
- upgrading or replacement of airfield lighting system;
- decommissioning and removal of Taxiway 'E'
- construction of Taxiway 'F'
- preparation and servicing of development lots with water and sanitary sewer; and
- construction of access roads

Recommended medium and long-term developments include:

- expansion of Apron I;
- construction of Taxiway 'G';
- further preparation of development lots'
- construction of additional access roads; and
- extension of site servicing to new development lots.

The absorption of commercial land is projected at a rate of 1.5 lots per year. Phased lease lot development has been identified in the Plan and land should be made available to support recreational and commercial aviation uses. All future commercial facilities should be strategically located on the airport based on highest and best use airport planning principles. An Airport Land Use Plan is provided in the Plan.

The airport is currently operated with significant financial support from the City of Camrose. Analysis suggests that the airport has not been collecting operational revenues to the greatest potential in recent years. It is recommended that the City consider implementing typical airport user fees including but not limited to aircraft landing fees and aircraft parking fees.

The plan contains revenue and expenditure forecasts which demonstrate that with additional revenue sources the airport could move towards financial self-sufficiency over time and become less reliant on city funding. Revenue growth in the projections assumes that the recommended infrastructure improvements will be implemented, and that activity will grow over time as indicated in the financial model.

It is recommended that Federal and Provincial funding be sought for infrastructure restoration and development projects. Capital cost estimates are provided calling for investments of: approximately $3.5 million in the short-term and $1.5 million in the medium-term. Cost estimates do not include management, professional fees or contingencies.

Figure 7-1 illustrates the recommended development plan for the airport.

Glossary of Terms

AGL	Above Ground Level
ALR	Aircraft Load Rating
AOM	Airport Operations Manual
ARCAL	Aircraft Radio Control of Aerodrome Lighting
ARP	Aerodrome Reference Point
ASL	Above Sea Level
ATB	Airport Terminal Building
AWOS	Automated Weather Observation System
DME	Distance Measuring Equipment
FOD	Foreign Object Damage
GPS	Global Positioning System
MTOW	Maximum Take-off Weight
NDB	Non-Directional Beacon
NEF	Noise Exposure Forecast
PAPI	Precision Approach Path Indicator
PLR	Pavement Load Rating
RESA	Runway End Safety Area
TC	Transport Canada
TP	Transport Canada Publication
WAAS	Wide Area Augmentation System

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1 Introduction

1.1 Current Situation

The Camrose Airport is a certified facility owned and operated by the City of Camrose. The Airport primarily serves recreational and General Aviation (GA) activities, although occasional Medevac operations, charter services, and special events are also supported. The airfield system is in need of rehabilitation and a phased plan for commercial development.

The imminent closure of a major General and Business Aviation airport supporting Edmonton has the potential to place new demands on Camrose Airport infrastructure. The City of Camrose has expressed interest in correcting the existing infrastructure deficiencies while also further developing the airport to meet the needs of current and future aviation activities.

1.2 Plan Objectives

The Camrose Airport Master Plan is a planning document that will guide the development of the airport and provide advice to authorities concerning the suitability of surrounding land uses. The Master Plan focuses on the physical facilities and infrastructure of the airport, the improvements required to meet the future user needs, and the capital implications of those improvements.

The master planning process includes airport development concepts to address current deficiencies and future requirements of facilities and infrastructure.

The key objectives of the Airport Master Plan are:

- to ensure safe and economical operation of all aircraft that utilize the facility;
- to provide guidance to the airport owner regarding the progressive development of the airport in support of current and future aviation activity;
- to identify airside development options in the short, medium, and long-term supported by forecasted airport activities;
- to prepare a land use plan utilizing highest and best use principles in order to assist the City in rationalizing future airport development; and
- to identify current sources of aeronautical and non-aeronautical revenues for the airport and provide recommendations to enhance these revenues.

A systematically phased airport expansion will promote further growth of the airport and related aviation businesses in the region, allowing for safe and efficient air services for local industry, government, and the general public.

2 Catchment Area Profile

2.1 Geographic Context

- The Camrose Airport (CEQ3) is located at 53° 02' 23" North Latitude, 112° 48' 58" West Longitude, at an elevation of 739.4 m Above Sea Level (ASL).
- The airport encompasses approximately 75 hectares of land area and is located at the north east city limit of Camrose, approximately 75 air km southeast of Edmonton as shown in Figure 2-1. Camrose Airport is one of several facilities supporting the aviation needs of Central Alberta and the Greater Edmonton Area.
- The City of Camrose is located in the heart of Central Alberta. The area benefits economically from well-developed agricultural, manufacturing, and resource industries. Additionally, Camrose acts as a service and retail hub to many of the nearby rural communities.
- In addition to supporting the surrounding areas, Camrose plays host to the Big Valley Jamboree annually and is home of the Augustana Campus of the University of Alberta.

Figure 2-1 – Airport Location

2.2 Transportations System

2.2.1 Road

The City of Camrose and its catchment area is served by a road network that connects the community to the Province.

Highway 13 connects Camrose to Wetaskiwin and Highway 2 to the west with driving times of 35 minutes and 50 minutes respectively. Highway 2 is the major north-south transportation corridor linking Calgary, Red Deer, and Edmonton. Highway 13 also connects Camrose to the communities of Ohaton, Bawlf, and Daysland to the east, and further east to the Province of Saskatchewan. Highway 21 provides the most direct connection between Camrose and Edmonton (1.25 hrs), and the Edmonton International Airport (1 hr).

The majority of long distance road travel originating in, or destined for, Camrose utilizes the above mentioned road network.

2.2.2 Air

Aviation activities at Camrose Airport consist of a combination of general aviation, primarily in the form of recreational flying, and charter air services. Camrose Flight Center offers flight training and modest charter operations while Aerotechnical Services specializes in aircraft refurbishment and maintenance. The Camrose Flying Club is responsible for organizing several aviation related events for the public, including an annual fly-in breakfast that is well attended.

Beyond the aviation businesses located on site, charter and corporate aviation services operated by AirSprint, Airco Aircraft Charters, Can-West Charters, and Fast Air utilize Camrose Airport.

AirSprint, headquartered in Calgary, offers fractional ownership opportunities to corporate users who require on-demand flight availability. Fractional ownership, or Fractionally Owned Partnerships (FOPs), allow participants to purchase a portion (or fraction) of an aircraft giving them access to that aircraft for a proportionate number of flight hours per year.

AirSprint operates Pilatus PC-12 aircraft with 6-7 seats and Cessna Citation XLS aircraft with 9 seats. AirSprint utilizes the airport a few times per month on average and typical cities paired with Camrose include Calgary, Edmonton, and Kelowna.

Airco Aircraft Charters is an Edmonton based charter and Medevac service provider. Their fleet includes the 7 passenger Piper Navajo Chieftain, the 9 passenger Beechcraft King Air 100, and the 19 seat Beech 1900D. Based on a review of aircraft movement records, the majority of flights to Camrose by Airco utilize Piper Navajo aircraft. Typical destinations include Calgary, Edmonton, and Ft. McMurray.

Fast Air Executive Aviation Services is a Winnipeg-based charter and Medevac operator. Currently, they operate the Westwind Jet, the Beechcraft King Air 200, the Piper Cheyenne II, and the Piper Navajo Chieftain. The King Air 200 is typically used to serve clients originating, in or destined for, Camrose.

Can-West Corporate Air Charters is a charter and Medevac operator based at the Edmonton City Centre Airport with smaller bases in Slave Lake and Wabasca. Can-West operates a diverse fleet including the Cessna Citation V, Beechcraft King Air 200, and Piper Navajo aircraft. Most flights to Camrose are for Medevac purposes, including procedural training.

The majority of Medevac operations in the Camrose area are conducted by STARS Air Ambulance, with the exception of some contracted fixed-wing Medevac operators. STARS utilize the helipad located at St. Mary's Hospital exclusively for helicopter operations in Camrose.

2.2.3 Rail

The City of Camrose and surrounding area does not have scheduled passenger rail services. However, the City is located at the intersection of the north-south CN Rail line serving Edmonton and Calgary and the east-west CP Rail line. This location allows Camrose to better support heavy industry. For example, raw materials for use by local pipe manufacturing plants are delivered by rail, while finished pipe products are transported across North America either by rail or truck.

2.3 Government Jurisdictions

The Camrose Airport falls within three (3) government jurisdictions with varying responsibilities as described below.

2.3.1 Government of Canada

The Camrose Airport is a Transport Canada certified facility and is subject to a variety of federal regulations and operational requirements to maintain its certification. Certification is required, among other criteria, in order to allow operation of scheduled air services for the public. At times, the Airport has served as an alternate for small aircraft not granted clearance to land at Edmonton International Airport. The City intends to maintain certified airport status in the interests of public safety and to provide flexibility for the possible introduction of larger-scale charter or air taxi passenger services, should these become viable in the future.

Transport Canada currently owns, operates, or subsidizes approximately 150 of the 726 certified airports in Canada. These airports generally include those within the National Airport System (NAS) and smaller Remote Airports where air services are essential for year-round access. Camrose Airport does not fall under either of these two classifications.

Limited funding is provided to airports not owned by Transport Canada through the Airports Capital Assistance Program (ACAP). This program has a limited budget and provides funding to smaller certified airports offering scheduled air services that require funds to facilitate airport safety improvements and infrastructure renewal. The Camrose Airport does not currently support scheduled passenger air carriers, therefore the Airport is not eligible for ACAP funding. However, Camrose Airport has been the recipient of Federal funding for a number of projects including the 1987 Distance Measuring Equipment (DME) installation ($85,000) and the 1993 runway extension and taxiway construction project ($1.52M).

2.3.2 Government of Alberta

There are 72 paved community airports in Alberta. Community airports are considered an important component of transportation infrastructure and provide access to communities for resource, medical, and tourism travel. The Government of Alberta's Community Airport Program (CAP) provides funding to community-owned airports to meet rehabilitation and construction requirements. Eligible projects include major capital rehabilitation of the airside portion of the airport. Typical projects involve pavement rehabilitation, including overlays. In the recent years the program has had a budget ranging from $1 to $3 million annually. Camrose Airport received partial funding from the Province of Alberta in 1977 for a pavement project ($583,000), the construction of the air terminal building in 1979 ($190,000), and the installation of a Non-Directional Beacon (NDB) in 1984 ($35,000).

Although CAP provides funding for a number of airport related projects, a number are not covered, which include, but are not limited to, the following:

- all buildings, including terminals and storage areas/sheds;
- new cross-wind runways, secondary runways and taxiways, and runway extensions;
- development areas, access roads, fencing and drainage;
- lighting, navigation aids, runway marking painting, water/sewer, power and utilities; and
- operating and normal routine maintenance.

2.3.3 City of Camrose

The City of Camrose is the eleventh largest city in Alberta with a population of 17,286 (Statistics Canada, 2011). The main economic sectors include manufacturing, agriculture, and retail.

The City of Camrose owns and operates the Camrose Airport, has financial responsibility for the Airport, and provides all staff and required resources to maintain the airport's operational status. City staff, in coordination with City Council and the Camrose Airport Commission, is responsible for approving development applications and for administering all infrastructure projects related to the Airport.

2.4 Community Consultations

A series of airport stakeholder consultations were conducted by LPS AVIA in order to identify and better understand airport deficiencies from the perspective of current airport users and to prioritize future development projects.

2.4.1 Airport Physical Development

Consultations held with airport stakeholders identified a number of airside and groundside improvements that address both deficiencies in current facilities and future airport use.

One of the primary concerns is the condition of the airside pavement. The pavement is deteriorating in general and there are areas where pavement failures could require the closure of portions of the manoeuvring surfaces. Some charter operators elect to back-track the entire length of the runway to mitigate the risk of damaging their aircraft by utilizing Taxiway 'B'. With the exception of Taxiway 'D', which was constructed in 2011, the rehabilitation of all airside pavement surfaces is considered by many stakeholders to be a top priority.

The sale of Jet A fuel at the airport was a point of interest for both airport tenants and charter operators. The vast majority of charter companies utilizing Camrose Airport use Jet A fuel to operate turboprop and jet aircraft. Currently, charter or Medevac operators are required to carry enough fuel for all legs of a trip or to make an additional stop at one of the surrounding airports that offer Jet A fuel.

Airport users suggested that if fuel facilities are expanded with the addition of a dedicated Jet A storage tank, that the location of the fuel facility be reviewed to ensure that it is positioned to best meet the needs of current and future users (i.e. does not inhibit the movement of aircraft on the apron). Members of the Airport Commission stressed that: in order to maintain fuel quality and prevent the loss of potential revenue, future on-site demands of Jet A fuel should only be supplied by the City.

Consultations revealed that many stakeholders agree the installation of an Automated Weather Observation Station (AWOS) would be most beneficial to charter and Medevac pilots as recreational pilots typically file VFR flight plans and avoid flying in poor weather conditions. City officials believe that the installation of an AWOS and the weather information it provides to pilots could increase the availability of the airport and reduce the number of missed approaches.

Several stakeholders expressed their approval of the development of Wide Area Augmentation System (WAAS) approaches for Camrose Airport. The system has been developed for use in precision flight approaches. Currently, GPS alone does not meet the navigation requirements for accuracy and availability. WAAS corrects for GPS signal errors caused by atmospheric disturbances, timing, and satellite orbit errors. Like AWOS, the majority of current airport users believe that the development of WAAS approaches for Camrose will benefit charter and Medevac operations, but will have little impact on recreational pilots whose aircraft typically are not equipped to utilize a WAAS approach. However, a WAAS approach will likely be used by the Camrose Flight Center and neighbouring flight schools for training purposes and will have the potential to increase airport revenue through associated aeronautical fees.

2.4.2 Airport Commercial Development

Furthering airport commercial development through the preparation of additional airside lots was identified as a high priority by City officials. In recent years, there has been an absorption rate of, on average, 1.5 new developments per year. However, some stakeholders believe Camrose could see an increase in demand as a result of the closure of Edmonton City Centre, which is expected within the next two years. Several stakeholders requested that the segregation of business and private commercial lots be considered by the City in an effort to reduce private pilot's exposure to noise generated by aviation businesses.

2.4.3 Non-Aviation Development

City officials agree that non-aviation development (e.g. light manufacturing, storage units, warehousing) should not be permitted on airport property as there is a finite amount of space available. A tour of the city's industrial developments revealed that there is ample capacity available for non-aviation development off of the airport property. As a result, airport lands should be reserved for users and businesses that require direct access to the airfield.

2.4.4 Helicopter Operations

Consultations held with experienced helicopters operators in the Camrose area suggest that helicopter operations are conducted infrequently at the airport and almost exclusively with light helicopters. These helicopters are unlikely to cause damage to airport pavement and do not produce enough downwash to threaten small fixed wing aircraft.

For this reason, the development of a helipad and helicopter specific manoeuvring surfaces was not considered to be a high priority. Should helicopter movements increase at Camrose or medium or heavy helicopter operations commence, the development of these facilities should be re-evaluated.

2.4.5 Stakeholder Consultations

Discussions with officials at the City of Camrose identified stakeholders with future interest in the Airport's development. Stakeholder consultations included, but were not limited to, airport tenants, current and previous aircraft operators at the airport, and the City of Camrose. The list of stakeholder consultations conducted during the assessment process is provided in Table 2-1 on the following page.

Table 2-1 – Stakeholder Consultations

Name	Title	Organization
Jeremy Enarson	Assistant Municipal Engineer	City of Camrose
Wayne Steel	Airport Manager	City of Camrose
Doug Campbell	Fleet Management and Safety	City of Camrose
Ray Leiren	Superintendent of Roads and ROW	City of Camrose
Kriss Sarson	General Manager Engineering Services	City of Camrose
Mark Barrett	Director of Infrastructure Services	City of Camrose
Allen Kurtz	President	Camrose Flight Center
Terry Matthews	Owner	Aerotechnical Services
Doug Dobson	Employee	Aerotechnical Services
Barry Graham	Commission Chair / President	Camrose Airport Commission / Camrose Flying Club
Blain Fowler	Commission Member	Camrose Airport Commission
Dennis Gagnon	Commission Member	Camrose Airport Commission
Steven Dammann	Commission Member	Camrose Airport Commission
Doug Freeman	Commission Member	Camrose Airport Commission
Steven Hall	Airport Tenant	-
Greg Slater	Airport Tenant	-
Ron Grue	Airport Tenant	-
Jadene Mah	Member	Camrose Flying Club
Richard Near	Airport Tenant	-
Les Hanberg	Airport Tenant	-
Amanda Dequiar	Operations Manager	AirSprint
Ed Schlemko	Operations Manager	Airco Air Charters
Art Schooley	President	Can-West Corp Air Charters
Ray Snaith	General Manager	Fast Air Executive Aviation

3 Airport Profile

3.1 Role and Designation

3.1.1 Airport Role

The Airport Role Statement forms the basis for classifying current activity and determining a future position in terms of long-term activities and development at the airport.

The Airport serves the needs of itinerant charter aircraft, Medevac operations, a number of community fundraisers, as well as General Aviation (GA) users primarily engaged in recreational aviation activities.

In order to maximize the economic potential of the airport, the future role should be to provide:

- a potential point of service for local commuter air services;
- a base for charter aircraft operations and flight training activities;
- a base for corporate and private aircraft owners and operators; and
- recreational flying and general aviation support.

3.1.2 Airport Designation

The Camrose Airport is certified in accordance with the requirements of Transport Canada document TP312 Aerodrome Standards and Recommended Practices. The Airport Certificate states that the airport meets all regulatory and operational requirements of the Canadian Aviation Regulations (CARs), which allows the airport to support scheduled passenger-carrying commercial operations, although scheduled services are not provided at this time.

The Camrose Airport is not classified under Transport Canada's National Airport System (NAS).

3.2 History

The lands currently occupied by the Airport were originally developed in 1962 by the Camrose Flying Society. The airport was developed with a single turf runway at that time. In 1970, the runway was upgraded from turf to a gravel surface and an apron and taxiway were provided. At that point, the City of Camrose took over daily operations of the airport.

In 1975, the City of Camrose purchased additional property so that the runway could be re-oriented to 135º/315º. Subsequently, the runway was paved, lighting was provided, and Avgas was made available for sale at the airport.

The Air Terminal Building (ATB) was constructed in 1979 to support the increase in air traffic movements associated with the 1979-1980 economic boom. The ATB was constructed to be capable of handling itinerant charter operations, flight training activities, and scheduled passenger services.

A Non-Directional Beacon (NDB) was installed in 1983, while Distance Measuring Equipment (DME) was installed in 1987.

A runway extension planning study was undertaken in 1990, which subsequently lead to the extension of the runway in 1993. A similar runway extension study was undertaken in 1991, which estimated that the runway extension would cost approximately $1,000,000 and an existing asphalt surface overlay would cost $600,000. Funding was provided for the $1.6 million dollar runway extension and upgrade, however, not all of the funds were needed to complete the project. The surplus funds were used to construct a parallel Taxiway 'B' and provide Runway 13-31 (now 14-32) with Abbreviated Precision Approach Path Indicators (APAPI).

In the summer of 2011, the construction of Taxiway 'D' was undertaken near the end of Taxiway 'A'. The new taxiway is 15 m in width and is capable of serving additional airside lots.

3.3 Land Use

3.3.1 On-Airport Land Use Regulations

The Airport site is zoned "Airport District – AIR" under the City of Camrose Land Use Plan.

The City of Camrose Land Use By-Law #2567/07 lists several permitted uses as well as discretionary uses for lands in the Airport District for the exclusive use of aviation orientated endeavours servicing the community. Several permitted uses include:

- Aircraft instrumentation, sales and service;
- Aircraft storage;
- Aviation fuel and oil sales;
- Equipment rentals (aviation based);
- Commercial aviation companies;
- Hay crop farming;
- Flight training or flight charter service; and
- Other aviation oriented structures as approved by the Development Officer.

The By-Law also outlines requirements for these permitted developments, which include maximum site coverage, maximum building height, as well as building offsets to the side and rear of buildings.

3.3.2 Vicinity Land Use

The lands surrounding the airport are designated within the City of Camrose Land Use By-law and consist of:

- A quarter section of land designated as "CR-1 – County Residential" to the west.
- "M3 – Heavy Industrial District" to the east and to the south.
- A combination of "M1 – Restricted Light Industrial District" and "RI – Rural Industrial" located to the southwest. Some sparse sections of "PR- Park and Recreation District" are also located to the southwest.

Lands to the north of the airport property fall under the jurisdiction of the County of Camrose.

3.4 Layout and Constraints

The future development of the Airport is constrained by various natural and man-made features. A Right-Of-Way reserved for the future North Ring Road is located immediately south of the airport property and limits the extension of the runway to the south.

To the west, a privately owned quarter section of land limits the ultimate development of aviation commercial lots.

- It is recommended that the City investigate the availability of a portion of this land to allow for continuous lease lot development should demand warrant it.

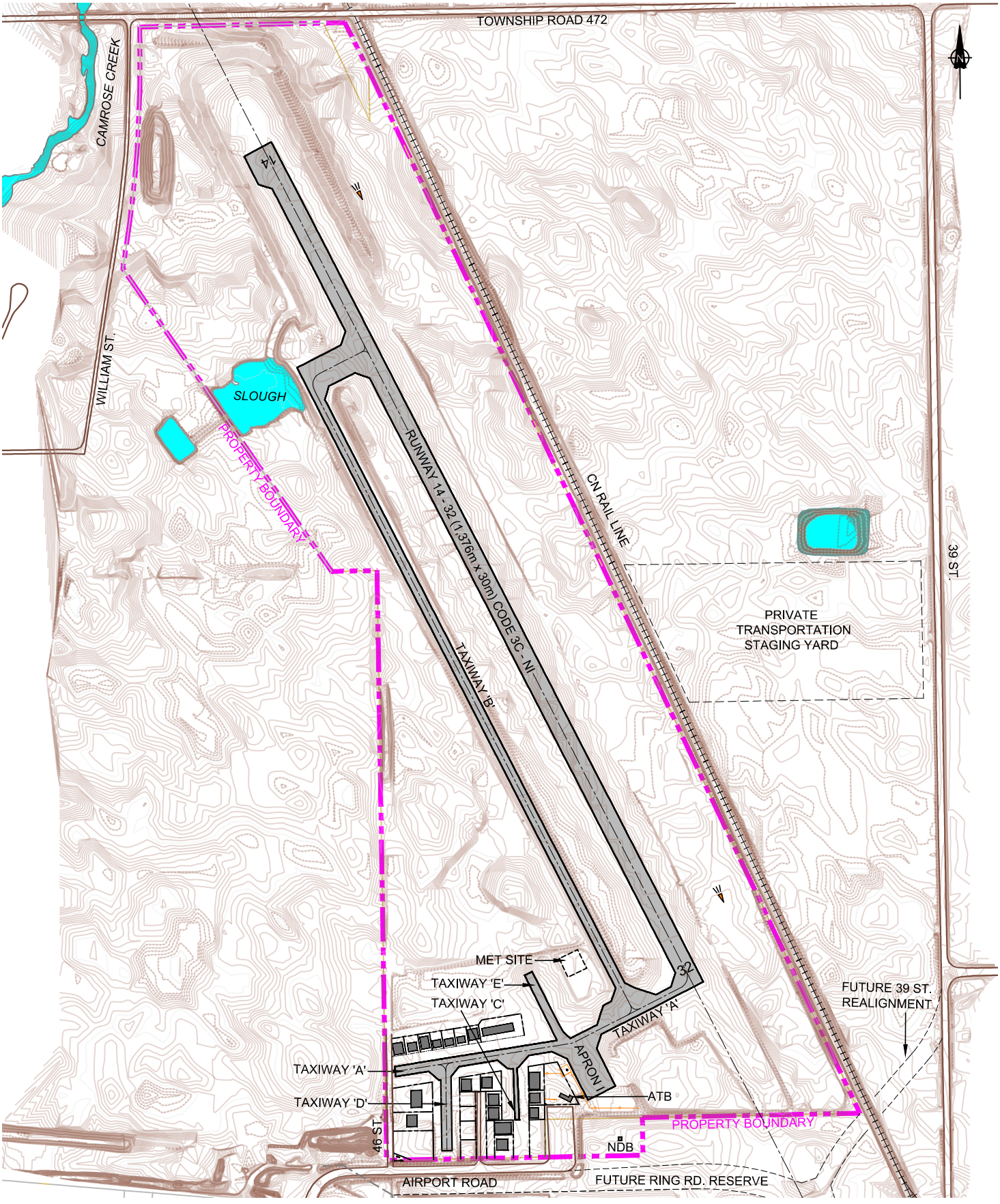
The north end of the airport is constrained by a storm water dugout located in the northwest corner as well as Township Road 472 beyond the end of Runway 32.

A CN Railway line runs parallel to the eastern boundary of the airport property. This limits the usability of the lands between the runway and the eastern boundary for future commercial lot development. Constraints are illustrated in Figure 3-1.

3.5 Aerodrome Standards and Zoning

Airports in Canada which are certified are required to comply with national standards for airport safety and security. All current operations and future planning activities must adhere to Transport Canada's Aerodrome Standards and Recommended Practices (TP312). Compliance with these Standards is also mandatory in order to maintain the airport's Operating Certificate. TP312 outlines protection areas around certain airport components to protect the safety and security of aircraft operations.

At the Airport, given the nature of existing facilities and location of various man-made features adjacent to the site, other restrictions also apply. These restrictions are summarized below.



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Title

CAMROSE AIRPORT MASTER PLAN

AIRPORT LAYOUT AND DEVELOPMENT CONSTRAINTS

Notes

1. Preliminary
2. All dimensions approximate

Figure No.	3 - 1
Drawn By	AIM
Approved By	EGL
Date	JANUARY 2013
Scale	1:7,500
Filename	CEQ3 Airport.dwg

3.5.1 Physical Zoning

Physical zoning refers to the obstacle limitation surfaces protecting airspace around the airport which must be maintained free of obstacles. It defines the maximum height to which structures may be permitted. Zoning criteria are described in Transport Canada's Aerodrome Standards and Recommended Practices (TP312) and are based on the runway reference code. The physical zoning associated with the airport resembles Code 3C-NI standards.

Figures 3-2 and 5-1 illustrate the current Code 3C-NI physical zoning requirements established for Runway 14-32 at the Camrose Airport. The threshold of Runway 14 is currently displaced to mitigate the proximity of Township Road 472.

3.5.2 Electronic Zoning

Airport developments and operations must also be compatible with a variety of electronic transmissions occurring on or near the airport, all of which are critical to the safety of airport operations. Electronic zoning is designed to protect the integrity of the electronic systems of the airport. The zoning criteria are described in Transport Canada's document entitled TP1247 – Land Use in the Vicinity of Aerodromes.

The Airport is equipped with two navigation aids: a Non-Directional Beacon (NDB), and Distance Measuring Equipment (DME). Figure 3-3 illustrates the current electronic zoning requirements stipulated by TP1247 necessary for protecting the integrity of the airport's electronic systems from interference or disruption. A number of structures are already within the protective areas of both the DME and NDB at Camrose Airport. Consultations revealed that no noticeable interference has resulted. The construction of additional structures in these areas should be evaluated prior to approval. Criteria such as building materials should be included in these evaluations.

3.5.3 Noise Exposure Forecast

One environmental impact of airport activity is noise generated by aircraft landing or taking off. In order to estimate the presence of the potential noise impact on areas in the vicinity of airports, Noise Exposure Forecast (NEF) contours are prepared based on the types of aircraft operating at the airport and their respective flight frequencies.

Noise exposure contours are based on the busiest (peak) months of the year to illustrate the maximum effect of aircraft noise. Peak aircraft use occurs during the summer at Camrose Airport.

Over the years, guidelines have been developed that predict the probable community response to various aircraft associated noise levels.

Transport Canada (document TP1247) and the Canada Mortgage & Housing Corporation (CMHC) provide guidelines concerning different types of land uses and construction in the vicinity of airports to accommodate potential noise concerns. NEF levels and their associated community response predictions are presented in Table 3-1 below.

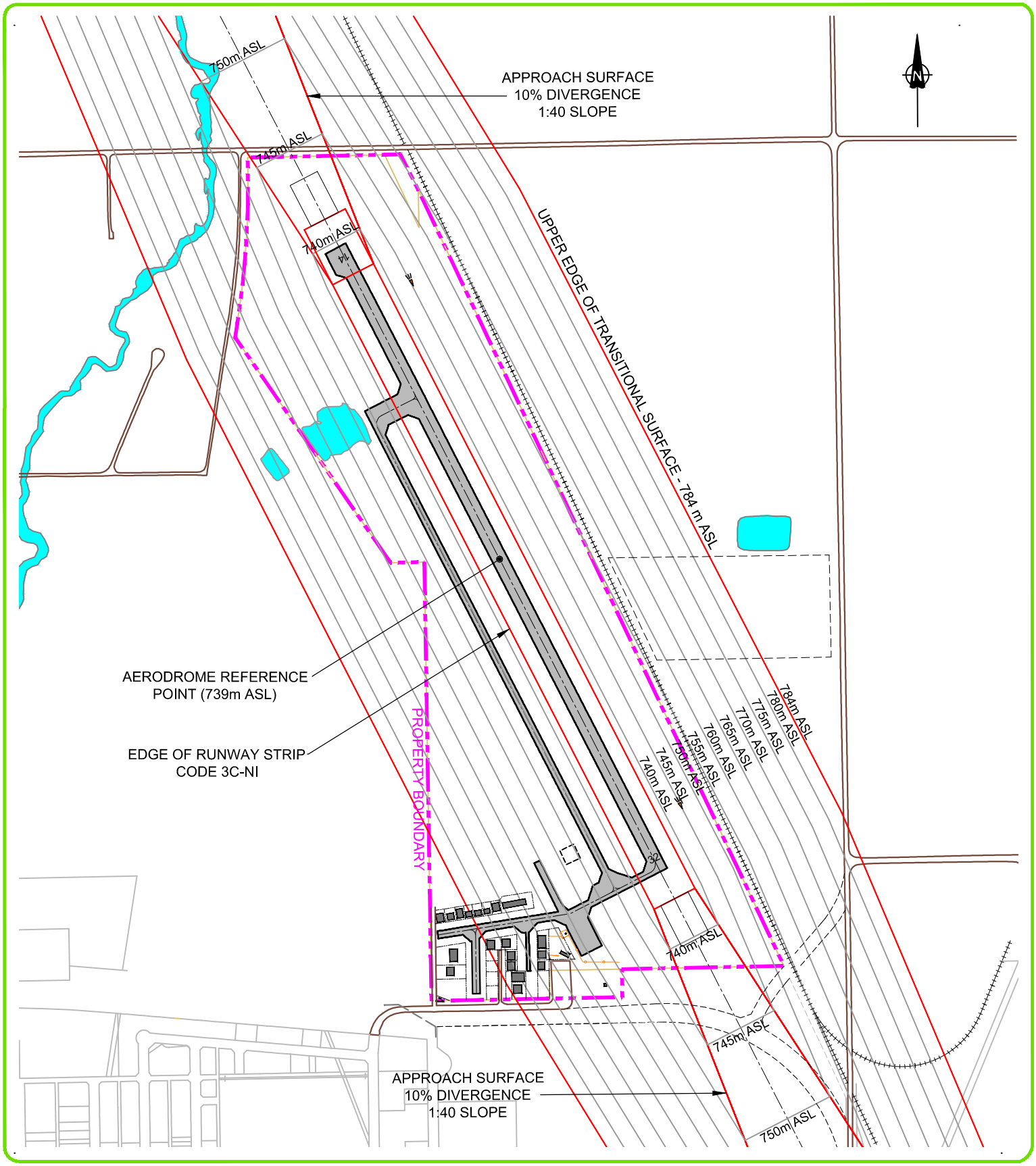
Table 3-1 – NEF Response Prediction

NEF Index (Response Area)	Response Prediction
Over 40 NEF	Repeated and vigorous individual complaints are likely. Concerted group and legal action might be expected.
35 - 40 NEF	Individual complaints may be vigorous. Possible group action and appeals to authorities.
30 - 35 NEF	Sporadic to repeated individual complaints. Group action is possible.
Below 30 NEF	Sporadic complaints may occur. Noise may interfere occasionally with certain activities of the resident.

It should be noted that the above community response predictions are generalizations based upon experience resulting from the evolutionary development of various noise exposure units by other countries. For specific locations, the above response areas may vary somewhat in accordance with existing ambient or background noise levels and prevailing social, economic, and political conditions.

NEF Contours presented in County of Camrose by-law No. 672 identify the 30-35 NEF overlapping a portion of the residential subdivision north east of the runway.

Although this by-law is no longer in effect, the City does refer to it when new developments are proposed. However, noise has not been raised as an issue at Camrose Airport during consultations, and no complaints have been recorded by airport management. This is likely due to the location of the airport at the north east limit of the city and also due to relatively low traffic volumes. Because of the predominance of agricultural and industrial land use in the vicinity of the airport, aircraft noise is not expected to be a concern throughout the planning period.



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CAMROSE AIRPORT MASTER PLAN

CURRENT PHYSICAL ZONING

Notes

1. Preliminary
2. All dimensions approximate

Figure No.	3 - 2
Drawn By	AIM
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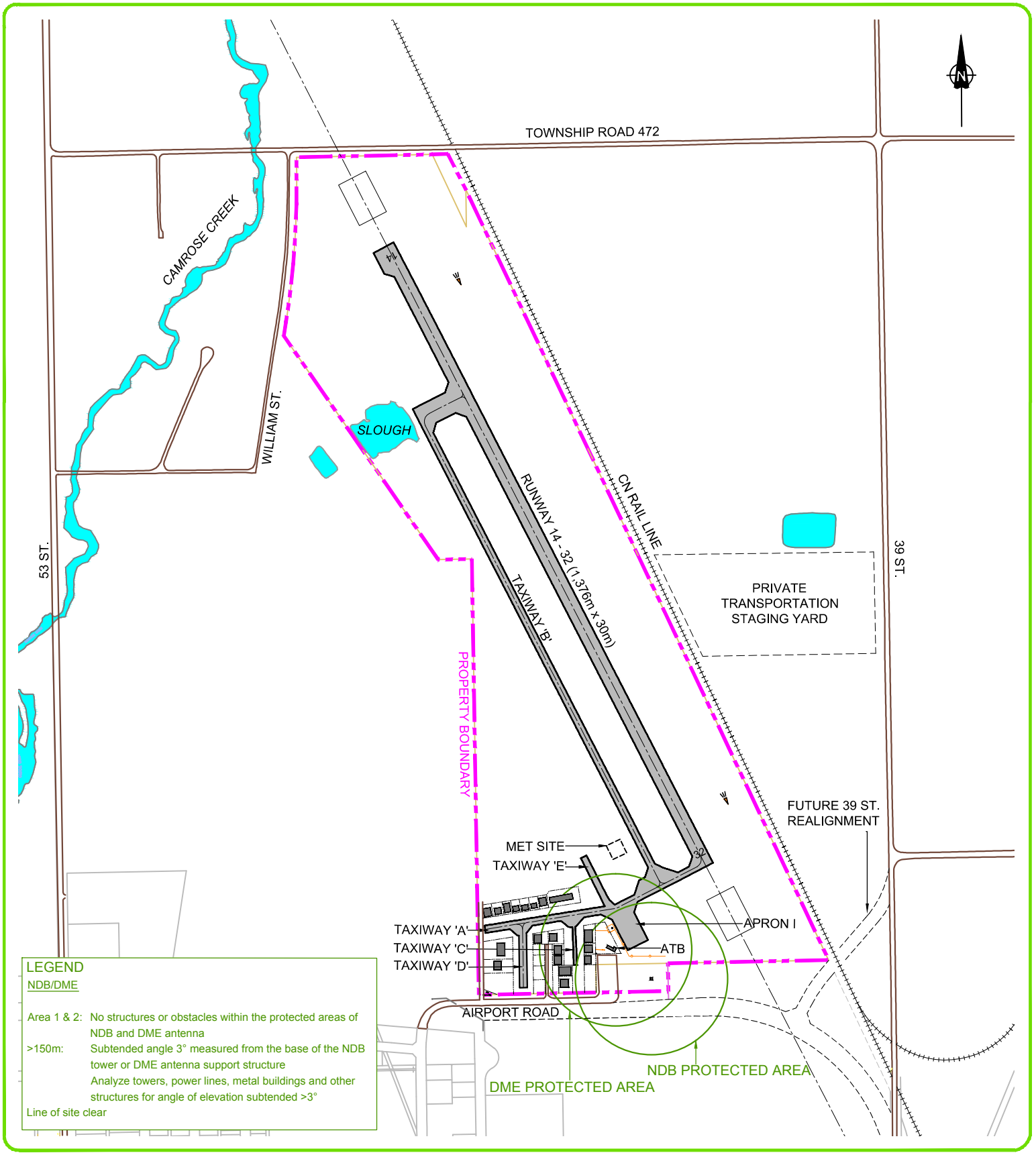
Date	JANUARY 2013
Scale	1:10,000
Filename	CEQ3 Airport.dwg



LEGEND

NDB/DME

Area 1 & 2: No structures or obstacles within the protected areas of NDB and DME antenna

>150m: Subtended angle 3° measured from the base of the NDB tower or DME antenna support structure

Analyze towers, power lines, metal buildings and other structures for angle of elevation subtended >3°

Line of site clear

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Title

CAMROSE AIRPORT MASTER PLAN

ELECTRONIC ZONING

Notes

1. Preliminary
2. All dimensions approximate

Figure No.	3 - 3
Drawn By	AIM
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Date	JANUARY 2013
Scale	1:10,000
Filename	CEQ3 Airport.dwg

4 Aviation Activity and Forecasts

4.1 Planning Horizons

The Master Plan considers requirements and development needs within stipulated time frames, or planning horizons. The following planning horizons are considered for the Camrose Airport Master Plan:

- Short-Term – 1-5 years;
- Medium-Term – 5-10 years;
- Long-Term – 10-20 years; and
- Ultimate – Beyond 20 years.

Activity forecasts have been developed and run to 2032 in annual increments. This two-decade interval is sufficiently long to permit the Airport to consider emerging trends in the community and the Canadian economy, and to plan accordingly. The forecasts offer the framework within which to evaluate long-term infrastructure investments. Many such investments have a life span of approximately one to two decades.

4.2 Forecasting Approach

Forecasts are an important part of an Airport Master Plan. They describe the likely scale and scope of future activity and define a boundary of outcomes within which the airport can effectively prepare for the future. The forecasts help identify those capital expenditures for which the airport should prepare. While the development of facilities can be planned around specific future dates, the inception of each project will be event-driven, and will only become effective when the airport reaches certain threshold activity levels.

The forecasts reflect both the recent history of traffic at the Airport and the economic circumstances of the Camrose region. The next section summarizes the regional determinants of airport activity.

4.3 Demographic and Economic Base

The Camrose Airport serves a primarily agricultural area to the south and east of Edmonton. The City of Camrose is 50 kilometres east of Highway 2, Alberta's north-south corridor. The airport's proximity to the Edmonton system of airports has defined its role as a local general aviation field, meeting the needs of Camrose County. The forecasts envision no change to this fundamental role.

By the spring of 2012, Statistics Canada was still assembling the results of the 2011 census. During the last decade, the population of Camrose has grown rapidly, as shown in Table 4-1. High commodity prices and the Alberta energy boom have helped most areas of the province. The city's proximity to Edmonton has helped it obtain most of the benefits of a much larger population, while retaining its traditional ambiance. Its population growth rate was slightly less than that for Alberta as a whole because of the particularly strong growth of Edmonton and Calgary. In contrast, many communities elsewhere throughout rural Canada have experienced a steady erosion of population and economic activity.

The median income for Camrose remains below the Alberta average. Large energy projects have boosted incomes throughout the province. The largest cities and the sites of new energy developments, particularly Fort McMurray, have benefited disproportionately. The growing population of fixed-income retirees in Camrose has also contributed to the lower personal incomes. Nevertheless, the incomes for Camrose grew slightly faster than the provincial average between 2001 and 2005.

Table 4-1 – Camrose Demographics

Period	Camrose	Alberta
Population		
2001	14,780	2,974,807
2006	15,620	3,290,350
2011	17,286	3,645,457
Growth		
2001-2006	5.0%	10.6%
2006-2011	10.7%	10.8%
2001-2011	17.0%	22.5%
Median Income		
2000	$19,604	$23,025
2005	$25,025	$28,896
2011	N/A	N/A
Growth		
2000-2005	27.7%	25.5%
2005-2011	N/A	N/A
2001-2011	N/A	N/A

Source: Statistics Canada Community Profiles, 2001, 2006, 2011

The City of Camrose is surrounded by aspen parkland, a transition zone between the prairie and boreal forests. The region has excellent agricultural land. Camrose also has limited oil drilling activity. It is somewhat distant from the major oil-producing areas, such as the Leduc Field, the Bakken shale, and the oil sands. The community has several businesses involved in oilfield supply, provision of drilling mud, and horizontal drilling. It is an important service centre for regional agriculture and a growing retirement community. The forecasts see no major change to the city's economic role.

The large developments of the Alberta oil sands and strong commodity prices have favoured many cities in Alberta, including Camrose.

Many resource companies house their employees on-site. Workers commute in bi-weekly intervals between their homes and the resource developments.

This employment pattern allows residents of communities such as Camrose to share in the energy development, while avoiding the high costs of living in Calgary or Edmonton.

The forecasts reflect both a review of published materials, extensive meetings, and on-site discussions in the City of Camrose. The forecasting assumptions do not call for large or dramatic changes to the demographics or economic base of the city or the surrounding region. They also assume that the airport will continue to serve primarily as a general aviation and training field, serving the immediate community and retaining its current mix of business.

4.4 Activity Levels

4.4.1 Projected Aircraft Movement Levels

The Camrose Airport serves the immediate needs of the City's general aviation industry. Training activities at the Camrose Flight Center accounted for fully 79 percent of the flight operations captured on the airport's database. Other users included remote sensing firms, air ambulances and agricultural operations. The operations databases show the names of the entities owning the aircraft but not the underlying purpose of the flight. The airport's role in supporting other sectors of the regional economy must therefore be input from the ownership data.

The airport lacks either an Air Traffic Control (ATC) tower or a Flight Service Station (FSS) to monitor activity. Many pilots do not notify the airport of their operations. The airport operations databases therefore systematically understate the true level of activity. In 1996, the Alberta Department of Transportation evaluated the devolution of 18 airports from the province to the municipalities. The study recommended that the "true" level of local movements be estimated as twice the number of reported movements.

Actual itinerant movements were estimated by the Department of Transportation to be as much six times the level of reported movements. These factors were applied to the raw airport operations counts to generate a base of "true" historic traffic. The City provided data for 2007-2011 inclusive.

Even at the largest airports, general aviation is difficult to forecast. Operations patterns are usually very specific to individual airports. Factors affecting individual industries or operators can be decisive. General aviation has declined at many Canadian airports since 1990. Any forecasts based on long term trends would call for continuing declines. However, such a long term trend is seldom plausible.

The factors of two and six were applied to the reported movements to estimate the true level of activity for local and itinerant traffic, respectively. These approximations were developed from 16-year old province-wide data.

The data series includes only five years. While it could serve as the basis for a rudimentary time series model, the small sample size would create large inaccuracies. The 2007-2011 time period includes the recent global financial crisis, and the models could easily overstate the volatility of activity.

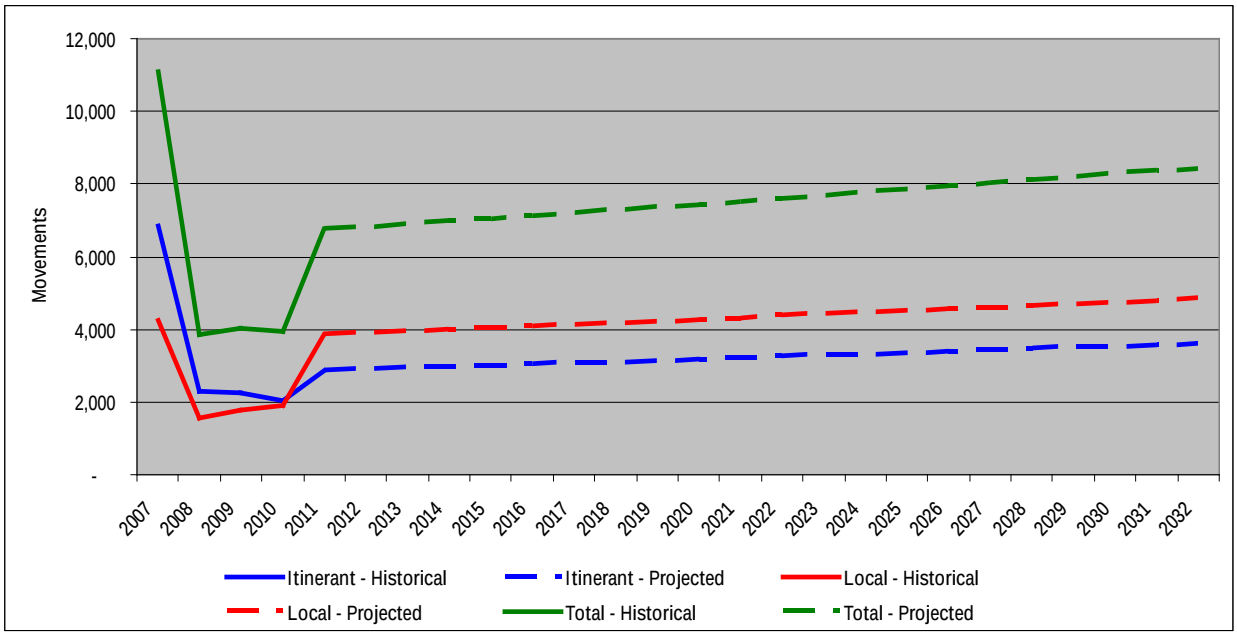
A regression model would falsely imply a much higher degree of precision and rigour than the data can realistically produce. The air traffic forecasts were therefore based on the government of Alberta's medium projections for the population of the Camrose Census Division. The model assumes that the airport's itinerant and local operations will grow at the same rate as the population of the area. Table 4-2 summarizes the projections to 2050. These projections, when applied to the 2007-2011 activity levels at the Camrose airport, create the forecasts shown in Figure 4-1. The City's most recent growth study assumes an annual growth rate of 2.5% beyond 2011. This report favours a more conservative growth rate based on Statistics Canada and Government of Alberta projections. However, the forecast should be utilized primarily to guide planning and all infrastructure projects should be event driven. A detailed table of the forecasts is presented in *Appendix A*.

Table 4-2 – Population Projections for Alberta Census Divisions

Census Division	Growth		Share of Alberta Total	
	2050 vs. 2011	Average Annual Rate	2011	2050
Medicine Hat	62.11%	1.25%	2.22%	2.25%
Lethbridge	57.69%	1.17%	4.24%	4.18%
Pincher Creek	8.30%	0.20%	1.04%	0.70%
Drumheller	41.02%	0.89%	1.49%	1.31%
Calgary	77.02%	1.48%	36.13%	39.95%
Stettler	-9.04%	-0.24%	1.11%	0.63%
Red Deer	69.58%	1.36%	5.30%	5.61%
Rocky Mountain House	34.09%	0.75%	0.59%	0.49%
Camrose	45.34%	0.96%	2.49%	2.26%
Edmonton	53.98%	1.11%	32.73%	31.48%
St. Paul	23.73%	0.55%	1.82%	1.41%
Whitecourt	11.78%	0.29%	1.88%	1.31%
Banff	-23.54%	-0.69%	1.02%	0.49%
Wood Buffalo	134.25%	2.21%	1.81%	2.65%
Slave Lake	41.52%	0.89%	1.73%	1.53%
Grande Prairie	61.64%	1.24%	2.94%	2.97%
Alberta	60.09%	1.21%	100.00%	100.00%

Source: Government of Alberta Finance and Enterprise, "Alberta Population Projections by Census Division", (Edmonton, 2012)

Figure 4-1 – Historical and Forecast Local and Itinerant Movements



Note: Historical movements derived by applying adjustment factors to the City's raw data. Local movements were adjusted by a factor of 2 while itinerant movements were adjusted by a factor of 6.

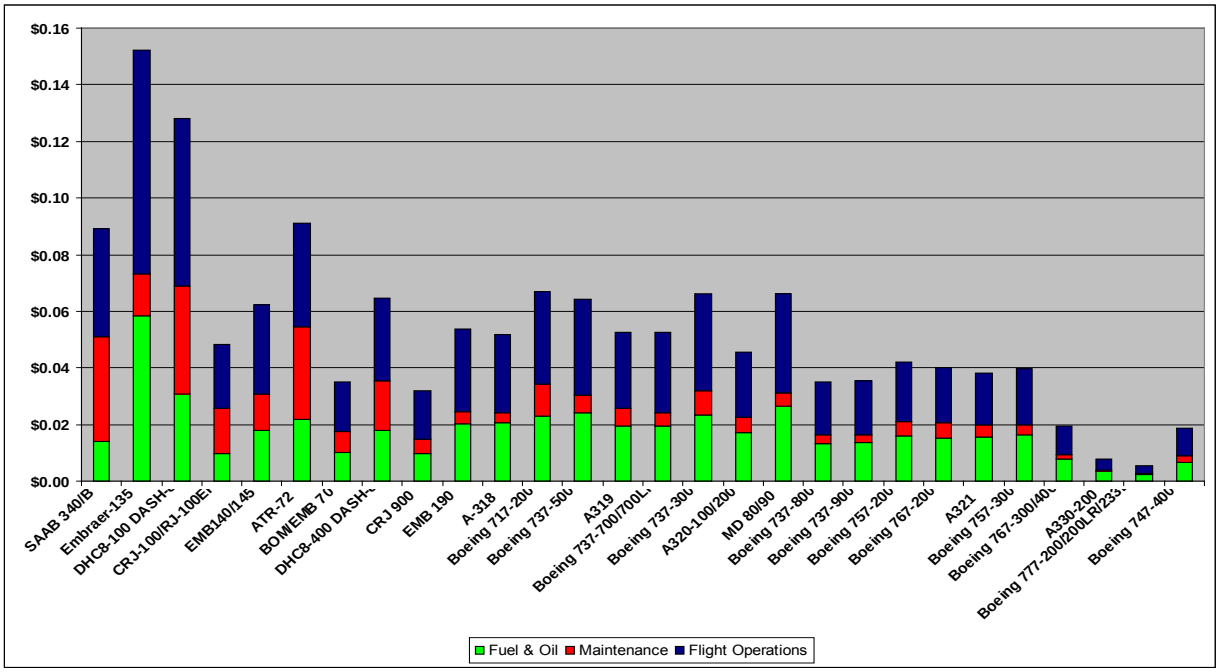
4.4.2 Airfield Capacity

Camrose Airport airfield capacity exceeds that of many neighbouring and competing airports while it experiences significantly fewer annual aircraft movements. For example, Wetaskiwin, Alberta, located approximately 22 nautical miles west of Camrose, has airfield facilities comprised of a 1,185m runway, a 5,265 square metre apron, and a simple taxiway system connecting the two. In 2011, Wetaskiwin experienced approximately 14,500 aircraft movements. In comparison, Camrose has a 1,372 m runway, a 3,375 square metre apron, and a full-parallel taxiway. In 2011, Camrose experienced approximately 6,750 aircraft movements. Based on this comparison, it is reasonable to conclude that Camrose Airport has surplus capacity and the growth of aircraft traffic will not be limited by airfield facilities within the long-term planning period.

4.4.3 Passenger Service

The short distance to the Edmonton airport greatly reduces the potential for a scheduled airline route to Camrose. Very few cities the size of Camrose have maintained scheduled services under similar circumstances. The most likely candidates for a hypothetical scheduled service would be routes to Calgary or Fort McMurray. These would be largely similar to Northwestern Air's scheduled flights from Red Deer to Kelowna and Edmonton City Centre. The flights would serve certain well defined market segments. Since the flights would likely be operated by 10-19 seat turboprop aircraft, ticket prices would be too expensive for all but premium passengers. These aircraft have relatively high operating costs per available seat-kilometre, especially on short stage lengths. The capacities of 10-19 turboprop aircraft allow air carriers to offer more frequencies than would be possible with larger equipment. However, these commuter aircraft have very high operating costs per seat-kilometre. Figure 4-2 shows cost per seat-kilometre rankings, with aircraft arranged by increasing seat capacity.

Figure 4-2 – Aircraft Operating Costs per Available Seat-Kilometre



The size of the Camrose scheduled market could be estimated by an analysis of tickets provided by global distributions systems, license plate surveys at the Edmonton and Calgary airports, or extensive interviews and questionnaires with regional residents, visitors and businesses. All such methods are labour-intensive, expensive, and subject to fundamental sources of error.

These circumstances call for a "cross sectional" approach. This analysis looks at a sample of other Canadian airports. These airports suffer only limited "leakage" to other facilities. The method derives a broad relationship between a region's socioeconomic variables and its demand for air transportation. The regression shows that population and recent migration patterns are strong predictors of traffic. Per capita personal income exercises a positive influence, but the coefficients fall slightly short of being statistically significant.

The model implies a total traffic base of 110,000 enplaned-deplaned passengers per year originating from or destined to Camrose, or 55,000 return trips. This estimate includes both residents making outbound journeys and visitors from distant communities who visit Camrose.

A hypothetical service to Camrose would capture far less than this hypothetical traffic base for several reasons. As suggested previously, fares from Camrose would likely be much higher than from Edmonton. Traffic volumes are insufficient for the 74-seat Bombardier turboprop aircraft that WestJet has on order. Passengers who seek to fly by WestJet would need to travel by surface to Calgary or Edmonton.

A small local or regional carrier would likely serve the route. It would have great difficulty obtaining joint fares with a major airline. This would render the proposed Camrose route uncompetitive for most destinations. The limited traffic volumes would constrain the number of daily departures. Passengers who require the choice of high frequency services would therefore most likely drive to a major airport. The small aircraft could be awkward for families, disabled passengers, or those with large quantities of luggage. These considerations suggest that the City of Camrose should not pursue scheduled services as a priority. The forecasts of airport activity do not include scheduled services.

4.4.4 Air Cargo

Air cargo operations include three categories:

- air courier;
- airfreight; and
- airmail.

Air courier operations involve the transportation of time sensitive goods, usually small in nature, at a higher unit rate. The low cost of ground transportation combined with the proximity of Edmonton and Calgary International Airports reduces the likelihood of air courier operations succeeding at Camrose Airport.

Airfreight typically involves the transportation of large or bulk items consolidated by a freight forwarder and shipped once large volumes have been amassed. Airfreight is less expensive, but less expedient than air courier. These operations connect points of origin of air freight with points of destination. Camrose industries were found to ship by road and rail with limited demand for airfreight operations.

Airmail is commonly transported between population centres by road or by air. If moved by air, it travels either as belly cargo on commercial flights, or on dedicated DC-10 and B727 freighter aircraft such as those operated by Kelowna Flightcraft. It is then transported by road to a final destination.

Camrose is a small population centre, not served by scheduled passenger flights, limiting the possibility of participation in airmail operations. Large airmail operations are handled through Edmonton and Calgary International Airports.

Like scheduled passenger service, the proximity of Camrose to Edmonton International Airport, and the nature of cargo items shipped to and from Camrose reduces the potential of establishing sustainable air cargo operations.

4.5 Design Aircraft

4.5.1 Background

An airport is designed to accommodate the regular use of aircraft up to and including a “critical” or “design aircraft”. The three operational parameters necessary for effective airport planning and design are the design aircraft’s runway length requirement, pavement strength requirement, and manoeuvring characteristics. All three of these parameters are typically associated with one aircraft, though sometimes each parameter may be dictated by a different design aircraft.

4.5.2 Current Design Aircraft

As listed in the Camrose Airport Operations Manual (AOM) the current design aircraft is the Cessna Citation. There are many variants of this aircraft, with the first being certified and delivered in the early 1970s. Based on consultations with airport management, the AOM refers to the Citation I. The Citation I is a corporate jet with a typical configuration for five passengers. This aircraft was identified based on the Airport’s operational capacity (e.g. runway length, pavement strength, etc.) and the use of the facility by Citation operators. Production of the first Citation model ceased in 1985 with over 600 aircraft delivered.

Due to the age of this aircraft model and introduction of more modern aircraft types, use of the Cessna Citation I as the design aircraft for the planning horizon is considered inappropriate.

4.5.3 Recommended Design Aircraft

The Citation XLS, the predecessor of the XLS+, is currently operated by AirSprint Private Aviation, a Fractionally Owned Partnership (FOP) based in Alberta. Though this operator currently utilizes the Pilatus PC-12 to serve clients destined for Camrose, the future utilization of Citation aircraft for this role is realistic.

It is reasonable to assume that XLS+ aircraft will be used at Camrose Airport within the 20 year planning period.

The proximity of Camrose to the Edmonton International Airport limits the probability of scheduled passenger services being established.

Although scheduled passenger service operations are not foreseen at Camrose Airport, if scheduled service were to commence, the likelihood of demand exceeding the capacity of a small commuter aircraft (e.g. B1900D, Jetstream 32) within the long-term planning horizon is low.

Because these aircraft types typically have lower performance characteristics than the recommended design aircraft, infrastructure designed to accommodate the Citation XLS+ would also accommodate 19 seat turboprop commuter aircraft, though consideration would have to be given to the reconfiguration of the terminal if these services were deemed to be sustainable.

Table 4-3 illustrates the performance characteristics of typical aircraft that currently utilize Camrose Airport, as well as the design aircraft recommended for future planning purposes. It should be noted that the runway length need not necessarily meet or exceed the corrected takeoff distance. The corrected takeoff distance is derived from the Maximum Take-off Weight (MTOW) of the aircraft. It is unlikely that any of the aircraft listed in Table 4-3 would operate at maximum weight on a regular basis. However, the pavement should be constructed to meet or exceed the Aircraft Load Rating of the design aircraft. The current Code B and C pavement dimensions meet the manoeuvring requirements of the recommended design aircraft.

- **It is recommended that the Cessna Citation XLS+ be the design aircraft for the planning period.** An aircraft of this size typically carries up to 9 passengers, and is believed to be capable of accommodating anticipated long-term demand.

Table 4-3 – Aircraft Performance Overview

	Aircraft	Corrected Takeoff Distance*	Reference Code	Max Aircraft Load Rating	Typical Passenger Configuration
Current	PC-12	3,332’	2B	2.0	6
	King Air 300	4,149’	3B	2.7	6
	Jetstream 32	5,692’	3B	2.3	19
	Citation I	3,345’	2A	2.8	5
Future	Citation XLS+	4,476’	3B	5.6	9
	B1900D	4,794’	3B	2.9	19

*Takeoff distance corrected for Camrose Aerodrome Elevation and ISA+15

5.1 Airfield System

5.1.1 Inventory

Airfield infrastructure at Camrose Airport includes one runway (14-32) supported by five taxiways (A-E) and one apron (I). Taxiway 'A' connects the threshold of Runway 32 to Apron I, which serves all aircraft traffic including recreational, charter, and flight training operations. Taxiway 'B' runs parallel to Runway 14-32 and was intended to increase airfield capacity. Taxiway 'C' and 'D' serve private hangars and connect to Taxiway 'A'. Taxiway 'E', originally intended to support future commercial development, connects to Taxiway 'A' and is currently used as a temporary tie-down area.

5.1.2 Runway 14-32

Runway 14-32 is of asphalt concrete construction and has dimensions of 1,375m x 30m. The runway underwent a runway extension and full overlay in 1992 to its current length of 1,375m. The Airport is currently certified as a Code 3C-NI facility, which, based on TP312 4th edition standards, is no less than 1,200m and no greater than 1,800m in length. The runway is of sufficient length to accommodate the current design aircraft (Cessna Citation I) as well as the recommended design aircraft (Cessna Citation XLS+).

Runway 14-32 (137˚-317˚) is well-aligned with the prevailing winds. In 1975, the City purchased land to allow for the runway to be reoriented to its current alignment. Based on consultations, there is no requirement for realignment of the existing runway at Camrose Airport as the prevailing wind direction favours the current runway orientation.

Table 5-1 – Camrose Airport Runway Characteristics

Characteristic	Runway 14	Runway 32
Length	4,512' (1,375m)	4,512' (1,375m)
Width	100' (30m)	100' (30m)
Magnetic Bearing	137°	317°
Takeoff Run Available (TORA)	4,512'	4,512'
Takeoff Distance Available (TODA)	4,712'	4,512'
Accelerate Stop Distance Allowed (ASDA)	4,512'	4,512'
Landing Distance Available (LDA)	4,312'	4,512'
Runway Surface Type	Asphalt	Asphalt
Theoretical Pavement Strength (PLR)	4.5	4.5
Reference Code	3C-NI	3C-NI
Runway Strip Width	295' (90m)	295' (90m)
Runway Graded Area	148' (45m)	148' (45m)
Clearway	200' (60m)	N/A

Localized crack sealing has been undertaken by the City on an as-needed basis since 1992. However, during consultations with the City, it was noted that over the past several years, minimal remedial works have been undertaken on the runway because the crack sealing is no longer an effective method for preventative maintenance. It is believed that the age and condition of the aircraft manoeuvring surfaces greatly reduce the crack sealing material's ability to adhere to the pavement.

In the 1990 Camrose Runway Extension Study, it is stated that the existing runway should be capable of supporting aircraft with an Aircraft Load Rating (ALR) value of 4.5.

The Pavement Load Rating (PLR) is a measure of a pavement's bearing strength based on the thickness and composition of the pavement structure, along with the subgrade bearing strength of the native soil. In order for a pavement structure to safely withstand the bearing capacity of an aircraft without weight restrictions, it is necessary that the aircraft ALR is less than or equal to the pavement load bearing capacity or PLR.

However, due to the age and condition of the pavement surfaces, it is possible the Pavement Load Rating (PLR) has diminished and may not be uniform across all surfaces.

The airside pavement surfaces are approaching 20 years of service, exceeding the typical service life.

- It is recommended that Runway 14-32 undergo full runway rehabilitation in the short-term, as the pavement surface is considered to have reached the end of its service life. Upon rehabilitation, the runway should be capable of accommodating the recommended design aircraft and have a bearing strength no less than PLR 5.6. This can be accomplished by either reconstructing the surface or adding pavement thickness in the form of an overlay.

Runway 14-32 does not currently have designated Runway End Safety Areas (RESAs). A RESA provides a cleared and graded area in the event of an aircraft undershooting or overrunning the runway. Although not currently required by Transport Canada, the regulations are expected to change and may make RESAs mandatory for certified airports in the next edition of TP312 (pending). In order to be compliant with anticipated regulatory changes, a RESA must extend a minimum of 90m beyond the end of the runway strip, or 150m beyond the runway threshold and be twice the width of the runway (60m).

- It is recommended that Runway End Safety Areas be constructed for both Runway 14 and 32 to satisfy anticipated regulatory changes.

5.1.3 Taxiways

Taxiway A

Taxiway 'A' is of asphalt construction and connects Apron I to the threshold of Runway 32. It also connects the development lots and associated Taxiways 'C', 'D' and 'E'. Taxiway 'A' is 15 m in width and is capable of accommodating Code B aircraft. The pavement surface of Taxiway 'A' is in poor condition and is in need of rehabilitation in the short-term. Taxiway can be separated into two segments. The overlay of the segment between the runway and Apron I can be funded by grants whereas the remainder of the taxiway to the west cannot.

- It is recommended that Taxiway 'A' undergo full pavement rehabilitation in the short-term, as the taxiway has reached the end its service life and must be strengthened to support the recommended design aircraft.

Taxiway B

Taxiway 'B' is of asphalt construction and parallels Runway 14-32. The taxiway was constructed in coordination with the runway extension in the early 1990s to increase airfield capacity and improve the flow of aircraft traffic. Taxiway 'B' is approximately 1,050m long, 15m wide, and is classified as Code C.

Taxiway 'B' is in especially poor condition as undulations have developed in the northern portion of the taxiway. Some operators choose to backtrack on the runway instead of using Taxiway 'B' due to its current condition.

- It is recommended that a geotechnical investigation be undertaken in the short-term to determine the cause of pavement undulations.
- It is recommended that the undulating sections of the northern portion of Taxiway 'B' be reconstructed progressively in the short-term to limit the risk of damage to aircraft.
- It is recommended that the remaining sections of the northern portion of Taxiway 'B' be rehabilitated.
- It is recommended that the southern portion of Taxiway 'B' undergo full pavement rehabilitation in the short-term as the taxiway has reached the end its service life.

Taxiway C

Three taxiways connect the airside development lots to Taxiway 'A' and subsequently Runway 14-32. Taxiway 'C' is located adjacent to the ATB and varies in width from 4-6 m. Taxiway 'C' varies in width and appears to be of inadequate structure to support aircraft loading as there are localized depressions throughout. Based on consultations with City officials, engineering best practices may not have been implemented in the construction of this taxiway. Taxiway 'C' does appear to not have adequate structure to support regular aircraft and vehicular movements. Additionally, the surface does not meet the required offsets to be designated as a taxiway.

- It is recommended that Taxiway 'C' be reconstructed in the short-term and designated as an apron (Apron II) to support Code A and B aircraft.

Taxiway D

Taxiway 'D' is 15 m in width, of asphalt construction, and provides access to Lots 1A, 1B, 2, 4, 5, 6, 7 and 8. Though the width of the pavement corresponds with a Code C facility, the limited offset distance between the taxiway centreline and adjacent hangars suggests that the taxiway should accommodate aircraft no larger than Code A, or Code B if designated as an apron.

Having been built in 2011, the pavement surface is in excellent condition and based on the intended use of the taxiway, no modifications or overlays are anticipated within the planning period.

- It is recommended that Taxiway 'D' be designated as an apron (Apron III) in the short-term to support Code B aircraft. Recommended offsets are presented in *Appendix B.*

Taxiway E

Taxiway 'E' is of asphalt construction and is 12 m in width. Constructed during the most recent overlay project (early 1990s), the pavement width suggests that the taxiway is intended to support Code B aircraft movements, however, offsets between the taxiway and neighbouring objects limit its use to Code A aircraft. Taxiway 'E' was originally intended to parallel Taxiway 'B' and service commercial development. However, this role can be filled by Taxiway 'B', and there is no future need for Taxiway 'E'. The taxiway currently serves as a temporary tie-down area. The removal of Taxiway 'E' would make available additional lands for commercial development.

- It is recommended that Taxiway 'E' be removed in the short-term and the area that it occupies be developed for commercial use.

Taxiway F (New)

Construction of a new taxiway is recommended in the short-term to provide access to the proposed commercial lots. The taxiway should be 10.5 m in width and be constructed to accommodate Code B aircraft.

Taxiway G (New)

Construction of a new taxiway is recommended in the long-term to provide access to the proposed commercial lots. The taxiway should be 10.5 m in width and be constructed to accommodate Code B aircraft.

Taxiway H (New)

Construction of a new taxiway is recommended in the ultimate term to provide access to additional commercial lots. The taxiway should be 10.5 m in width and be constructed to accommodate Code B aircraft.

5.1.4 Apron I

The Camrose Airport is served by one public apron that is approximately 3,500m^2 and located adjacent the Air Terminal Building (ATB). The apron supports four permanent tie-down areas for both itinerant and local aircraft. The apron is typically used by charter and itinerant recreational users and on occasion for special events including aircraft static display.

Similar to other airside pavements at the airport, the surface of Apron I has experienced severe longitudinal and transverse cracking throughout. The rehabilitation of the pavement should be coordinated with that of the runway and taxiways.

Consultations with various airport users and a site visit revealed that the apron does not currently have dedicated aircraft plug-ins. Operators that wish to provide power to their aircraft use long extension cords and plug directly into the ATB, via an exterior outlet. Concerns over the safety and aesthetic appeal of this solution have been raised.

It is anticipated that as aviation traffic grows at Camrose Airport, the apron will become more congested, reducing the safety and operational efficiency of aircraft operations.

Defining an apron taxilane and expanding the apron will increase capacity and promote the safe and expeditious movement of aircraft. Like the development of commercial lots and construction of new taxiways, the expansion of the apron should be event driven.

Large flood lights have been installed to illuminate the private transportation staging yard located east of the CN Rail line, off of airport property. Adequate shielding has not been installed on these lights and during night operations the resulting glare can hinder visibility for pilots both in the air and on the ground. To improve the safety of aviation activities, the glare from these lights should be addressed. TP 312, when referring to flood lighting on airport property, states that flood lighting should be installed to ensure a minimum of glare to pilots of aircraft in flight and on the ground, aerodrome and apron controllers, and personnel on the apron.

- It is recommended that Apron I undergo a full pavement rehabilitation in the short-term, as the apron has reached the end of its service life.
- It is recommended that dedicated aircraft plug-ins be provided on Apron I in the medium-term in coordination with the planned lighting replacement.
- It is recommended that the apron be expanded in the medium-term and an apron taxilane be defined to support higher traffic volumes.
- It is recommended that the owner of the private transportation yard be contacted and strategies for reducing glare produced by flood lights be discussed.

5.2 Air Navigation Facilities

5.2.1 Visual Approach and Landing Aids

Camrose Airport is equipped with several forms of airfield lighting to assist with the safe operation of aircraft both at night and in instances of poor visibility due to inclement weather. Visual aids in use at Camrose Airport are listed in Table 5-2.

Table 5-2 – Camrose Visual Aids

Visual Aid	14	32
Runway Edge Lights	ME*	ME*
Approach Lights	-	-
Precision Approach Path Indicators	V1*	V1*
Runway Identification Lights (RILS)	Yes	Yes
Runway Threshold Lights	Yes	Yes
Runway End Lights	-	-
Lighted Windsock	Yes	Yes

*ME – Medium Intensity, V1 - 2 - BAR VASIS for aircraft with eye-to-wheel height up to 10'

The runway, taxiway, and apron edge lighting were originally installed in the 1970's when the runway was realigned to its current orientation. The runway electrical lighting circuit was extended in the early 1990's in coordination with the extension of the runway to 4,500m and the installation of an APAPI system.

The airport has three circuits for aerodrome lighting, which include runway edge lighting, taxiway edge lighting, and APAPI's. In 2009, Lamont Electrical Services undertook Megger testing on each circuit. Table 5-3 summarizes the recorded readings.

Table 5-3 – Aerodrome Lighting Test Results

Circuit Designation	Megger Reading (Megohms)
Runway	0.25
Taxiway	0.1
APAPI	0.0

FAA Advisory Circular 150/5340-26B suggests a minimal Megger reading of 50 megohms for any circuit less than 10,000' in length. The low readings yielded by Lamont Electrical could mean that cable insulation degradation has occurred and there is a high potential for cable failures in the future.

However, based on consultations and the site visit, the airfield lighting system appears to be in operational condition, with no reports of lighting failure of any type.

- It is recommended that the airfield lighting circuit continue to be monitored as the recent Megger readings suggest that the lighting systems may be approaching the end of its service life.
- It is recommended that the airfield lighting system be upgraded or replaced in the medium-term as allocated in the City Capital Budget.

5.2.2 Electronic Navigation and Approach Aids

The airport is equipped with a Non-Directional Beacon (NDB) and Distance Measuring Equipment (DME). Both navigational aids are owned by the City and maintained on contract by Spencer Navigation of Calgary.

Based on consultations, the equipment is reported to be in good operating condition and replacement of either piece of equipment should not be required within the planning period. Should this equipment fail within the planning period, the City may consider contacting Nav Canada to inquire about equipment replacement. As the equipment is currently owned and maintained by the City and the airport is unlikely to be served by scheduled passenger services within the planning period, Nav Canada would likely be hesitant to accept the full or partial cost of new equipment.

The current air traffic control facilities for the airport are sufficient. The requirement for and Air Traffic Control Tower (ATCT) is dependent upon annual aircraft movements. 60,000 movements are required before Nav Canada will consider the construction of an ATCT. Camrose currently experiences on average approximately 6,000 movements per year.

5.2.3 Wide Area Augmentation System

To improve airport availability and the safety of aircraft operations in low visibility conditions, the City of Camrose has commissioned the development of Wide Area Augmentation System (WAAS) approaches for Runway 14-32.

WAAS is an enhanced navigational system which utilizes the Global Positioning System (GPS) data to provide enhanced navigational capability to users. GPS based navigation provides adequate accuracy for basic enroute navigation and non-precision approach capability. To acquire approach capabilities similar to an ILS, the GPS signals must be augmented to further improve the accuracy of the navigational service. This augmentation can be accomplished using WAAS.

However, in order to gain the benefits associated with a WASS approach, specifically a reduced decision height, Runway 14-32 must be designated as Code 3C-NP. The proposed physical zoning is presented in Figure 5-1.

- It is recommended that the WAAS approaches be implemented upon testing and approvals.
- It is recommended that Runway 14-32 be designated Code 3C-NP (Non-Precision) to accommodate WAAS approaches. Designating the runway as Non-Precision will reduce allowable hangar heights on certain lease lots. Additionally, an amendment to the AOM and associated Transport Canada approval would be required.

5.2.4 Meteorological Observations

There is currently a weather observation station located near the intersection of Taxiways 'A' and 'B'. The station is utilized for local weather observation and is not capable of providing all aviation weather parameters. No deficiencies have been identified with the Environment Canada weather observation system.

- It is recommended that the existing weather station be relocated north of the proposed development area in the short-term to facilitate commercial development. The relocation of the site should be driven by the demand for commercial lots.

5.2.5 Automated Weather Observation System

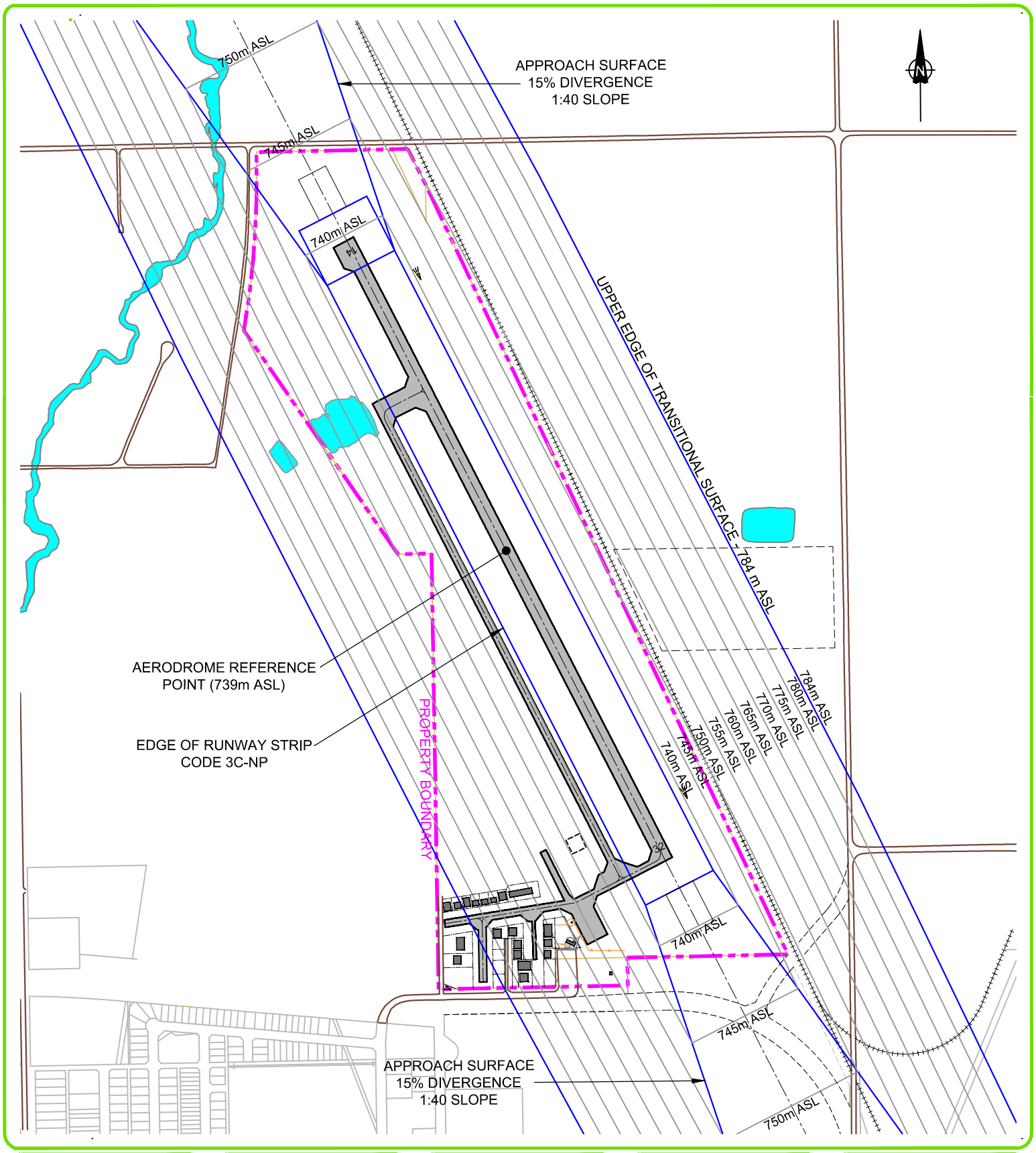
The installation of an Automated Weather Observation System (AWOS) would provide the quality of weather data required for pilots to make safe flight planning decisions. In addition to wind speed, wind direction, and temperature provided by the existing weather station, the AWOS also provides visibility and ceiling data that is crucial in flight planning activities.

- It is recommended that an AWOS be co-located with the weather station in the short-term, north of the development area.

5.2.6 Field Electric Centre

The Field Electric Centre (FEC), which controls the supply of power to the airfield lighting and navigational aids, is located on the lower floor of the terminal building. In order to compensate for the aging airfield lighting system, the regulators had to be upgraded, reducing the future capacity of the FEC in terms of area. However, should the field lighting system be replaced with an LED system in the short-term, it will reduce the electrical demand on the FEC. It is anticipated that the size and location of the FEC is adequate and will not require replacement within the planning period.

The FEC is not currently equipped with a back-up power supply. The installation of a back-up generator would ensure that the navigational aids and airfield lighting will continue to function if the electrical supply from the City is interrupted, increasing safety and ensuring airport availability.



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Client

Title

CAMROSE AIRPORT MASTER PLAN

NON-PRECISION PHYSICAL ZONING

Notes

1. Preliminary
2. All dimensions approximate

Figure No.	5 - 1
Drawn By	AIM
Approved By	EGL
Date	JANUARY 2013
Scale	1:10,000
Filename	CEQ3 Airport.dwg

5.3 Air Terminal Building

The existing Air Terminal Building (ATB) was originally constructed in 1979 and supports itinerant charter operations and flight training activities. The building also supports the administrative functions of the Airport Manager.

Camrose Flight Center occupies a portion of the terminal building with a large office for administrative functions on the upper floor and a large classroom and simulator located on the lower floor.

Renovations to the ATB were undertaken in 2011 by the City of Camrose, and included aesthetic upgrades such as installing drywall, improving lighting fixtures, and general painting works.

Consultations and visual inspection suggest that there are still some improvements that can be made to the ATB that would improve upon the visual appeal of the airport. The walkways are deteriorating and there appears to be some repairs to parging required along the foundation of the building. The City has plans to address the terminal's exterior in a second phase of improvements, which will include cladding. Consultations with City officials and members of the Camrose Flying Club indicate that the renovation of the lower floor of the terminal building, specifically the classroom area, could be considered for inclusion in a future phase of terminal improvements.

The land immediately south and east of the existing terminal building has not been slated for any future development. Due to the proximity of the NDB to the terminal, expansion of the terminal to the south east or the construction of other facilities in this area should be avoided. An appropriate use for this area is presented in Figure 7-1.

As requested by the City, suitability of implementing CANPASS at Camrose Airport has been investigated. CANPASS is a series of Canada Border Services Agency (CBSA) programs that expedites the border clearance process for frequent, low-risk, pre-approved travellers into Canada. Airports in Alberta currently participating in this system include Calgary-Springbank, Edmonton City Center, Milk River, Ponoka, and Warner.

Having this service available could attract itinerant private flights from the United States or attract tenants who regularly visit the U.S. Prior to commencing the application process, the City should investigate the costs associated with the system as well as determine the demand for CANPASS among existing and prospective tenants. As Camrose Airport is not currently served by scheduled passenger service nor is it likely within the planning horizon, the request for implementation of CATSA passenger screening is not recommended.

- It is recommended that planned ATB improvements be continued by the City and include upgrading the walkway and exterior cladding.

5.4 Access Roads and Parking

5.4.1 Access Roads

The airport is accessed by Airport Road (56 Ave). Construction of the North Ring Road is listed as a priority in the City's 20 Year Plan and would require the realignment of Airport Road. Additionally, the construction of a secondary access road from the east would improve emergency response access to the facility in the ultimate term. Based on current airport uses and traffic volumes, the existing access road will meet demand throughout the planning period. There is currently no pedestrian access to the airport. In the City's Transportation Master Plan, the possibility of the installation of the pedestrian trail in the area between the runway end and the proposed North Ring Road has been introduced.

- It is recommended that access roads be extended or constructed on a per phase basis

5.4.2 Parking

Airport parking consists of a gravel lot. There are no fees associated with parking, short-term or long-term. The lot is generally used by students of Camrose Flight Center ground school and other users of and visitors to the airport facilities. Based on current and foreseen airport uses, the parking lot, in terms of both size and construction, is sufficient for the duration of the planning period.

On occasion, the Airport hosts special events that require significantly more parking area than is provided at the terminal. For example, the annual fly-in breakfast forces patrons to park on both sides of the access road. This has the potential to impede access to the site should there be a medical emergency or a Medevac flight. However, the expansion of the parking area to meet peak demand one or two days of the year would not be an appropriate use of resources.

The development of a Special Event Parking Plan could allow special event participants to park their vehicles off site and then be shuttled to the site by bus. This would effectively reduce the demand on the parking area at the airport.

- It is recommended that a Special Event Parking Plan be developed in order to reduce congestion experienced during special events.

5.5 Utilities and Services

A review of the airport's existing municipal infrastructure was completed. The existing condition and capacity assessment was performed to determine the requirements for the forecasted growth at the airport. The utilities include: water distribution, sewage, and storm water collection. A description of the current utilities and services at the airport is provided below.

5.5.1 Potable Water and Fire Protection

Existing Condition & Capacity

The airport terminal and portion of the existing hangar area is serviced by a 150 mm diameter water main from the intersection of 46 Street and 56 Avenue. The water main extends both east (along 56 Avenue) and north (along 46 Street) from this location with 150 mm diameter asbestos cement (AC) pipe. The terminal building is serviced from the existing main along 56 Avenue. For hangars with water service, there are two water lines that extend off 56 Avenue and 46 Street.

The existing water main that extends north along 46 Street from 56 Avenue is approximately 320 m in length. This 150 mm diameter AC pipe terminates at the north end of the road right-of-way at a meter and reduces to 75 mm. The 75 mm high density polyethylene (HDPE) pipe extends north for 560 m where it bends 90 degrees to the east to service the areas located within the County.

Low expected water demand for the airport means that the fire flow requirements will likely be the greatest factor when designing the water distribution in the future commercial and recreational development areas. The 2006 Water Distribution Master Plan Update, Associated Engineering (Dec. 2007) indicates that there is a fire flow deficiency of more than 60% in the water distribution system at the airport. This area is between the 400 and 450 kPa pressure contour (58 to 65 psi) and is considered within the optimum operating pressure of 345-552 kPa (50-80 psi).

Current Water Demand

As of October 2012 development at the airport consisted of a Terminal Building with an approximate floor area of 200 m^2, 21 hangars with a total floor area of approximately 5,750 m^2, and 4 vacant lots.

The current water demand is calculated, based on gross land area, using the City's design standards. The following table shows the water demand for existing development (including the empty lots). Actual water demand could be verified by review of utility billing information.

Table 5-4 – Water Demand for Existing Development

Unit	Criteria	Existing
Gross Area (ha)		2.6
Equivalent Pop.	62 ppha*	161
Average Day Demand (m3)	350 lpcd**	57
Peak Day (l/s)	Peak Factor =2.0	1.3
Peak Hour (l/s)	Peak Factor =3.0	2.0

*ppha: Person per Hectare
**lpcd: Litres per Capita per Day

Fire Flow Requirement, as per the Fire Underwriter Survey (FUS) Guidelines, for Light Industry Non-Combustible construction is up to 2,900 m^2 =150 L/s, and for Commercial Non-Combustible construction Is up to 2,900 m^2 = 183 l/s. There is an existing hydrant located at the terminal building and two located near Lot 1B and near lot 3B.

- It is recommended that hydrant flow tests be conducted to confirm the flow at these locations.

5.5.2 Sanitary Sewers and Disposal

The airport lands currently have sanitary service from a 300 mm diameter pipe at 56 Avenue and 46 Street. There is an existing 75 mm HDPE force main servicing County lands to the North West (installed beside the water main mentioned previously) that connects to a manhole on 46 Street approximately 70m north of 56 Avenue. A 300 mm diameter sanitary pipe extends to the terminal building.

Existing Condition & Capacity

The Sanitary Sewer Master Plan, Associated Engineering (November 2007) indicated that the trunk sewer along 56 Avenue is at or exceeds capacity during major storm events. It was proposed that an upgrade (1,050 mm diameter trunk) be constructed as part of the North Ring Road construction.

The airport sanitary mains are assessed using the City's design standards for sewers. The sewage generation for the existing development is shown in the following table.

Table 5-5 – Sewage Generation for Existing Development

Unit	Criteria	Existing
Gross Area (ha)		2.6
ADWF (l/s)	0.25 l/s/ha	0.65
PDWF (l/s)	Peak Factor =2.0	1.3
I/I (l/s)	0.28 l/s/ha	0.73
PWWF (l/s)		2.03

The flows from this development are relatively low and the existing 300 mm diameter pipe size with an assumed minimum slope is adequate. However, low flows and velocity is of concern to ensure adequate flushing of solids. In order to ensure adequate flushing of solids the City, as part of annual operations, currently flushes a number of sanitary sewer pipes in the City. The airport main is one of those flushed. It is recommended that this practice continue.

5.5.3 Storm Drainage

Existing Site Drainage

The site is generally flat, with an overall slope from east to west and a split to the north and to the south. There is one large wetland area in the northwest portion that drains into Camrose Creek. This wetland is connected to a dug out on the adjacent property. There is a low area between the existing t-hangar and Taxiway `B` that is utilized as a snow dump area. There are three other smaller wetland type areas within the property as well.

Drainage Needs

The airside lands must have effective drainage to convey storm water run-off from the runway as well as adjacent contributing lands. There are no reported events of runway flooding. Facilities with standing water attract wildlife and pose a potential safety risk.

The following objectives should be considered in the development of a storm water management plan:

- reduce wildlife conflicts to increase safety;
- meet all federal and provincial policies and regulatory requirements; and
- satisfy water quality and safety requirements using Best Management Practices (BMPs)

The groundside lands must also have effective drainage to ensure that any storm water run-off is conveyed to the appropriate outlets. The underground piping of storm water to accommodate minor storm events is to be designed according to the City's Municipal Servicing Standards.

Storm Water Collection

The storm water management for the airport lands (airside and groundside) includes both the major and minor systems. The minor system is designed for 1:5 year storm event consisting of an underground piped system, and the major system for the 1:100 year storm event consisting of streets, channels, storm retention facilities, and overland flow paths carrying excess flow that exceeds the pipe system capacity.

Existing Condition & Capacity

The nearest storm water infrastructure to the airport lands is a newly constructed drainage ditch extending from the storm outlet at 56 Avenue west of 46 Street. The 1,500 mm diameter storm pipe, that conveys flows from south of the airport, discharges into the outfall channel. This channel drains into Camrose Creek and is meant to accommodate the future North Ring Road south of the airport.

Minor System

There is no underground pipe system (minor system) at the airport lands. The storm water from the hangars and terminal is conveyed overland to a ditch along the north side of 56 Avenue, which drains to the open channel ditch. There are some existing ditches along 46 Street adjacent to the hangars that also drain to the outfall channel.

Major System

The existing major drainage system, airside, is not currently capable of managing all the run-off from major storm events. The existing culverts, swales, and natural drainage paths convey the run-off to the existing wetland area and natural drainage paths that discharge to Camrose Creek. However, there are a number of areas where there is standing wet areas and ditches that do not drain at all, even after extended periods of dry weather. Storm water run-off from the terminal and hangar areas is conveyed overland to the ditches along the adjacent roads and then to the outfall channel. There have been no reported issues of surface flooding in these areas.

- It is recommended that the City commission an airport storm water management plan.

5.5.4 Natural Gas

Natural gas is provided by ATCO Gas. There are only a few lots which are serviced with Natural Gas, while the majority are not serviced. As each development scenario takes place, additional demand for natural gas will likely become evident.

- It is recommended as each new development lot servicing corridor is constructed, provisions be made for natural gas service.

5.6 Electrical and Communications

Electrical power is provided to the Camrose Airport by FORTIS Power. The current power supply meets the demand for the airport, although as each development scenario takes place, additional demands for power should be evaluated.

Telecommunication services to the air terminal building are provided by TELUS communications. Like the power supply, the requirements for telecommunications should be evaluated to determine demand.

5.7 Aircraft Services

5.7.1 Fuel Facilities

Avgas is an aviation fuel used to power piston-engine aircraft, and is provided to airport users by the City of Camrose via two (2) 22,700 litre underground fibreglass tanks. Avgas is provided on a 24/7 basis and requires pilots to fill out a fuel slip located in the ATB. This 'honour' system of dispensing fuel has been successful over recent years and based on consultations with current airport users and City officials, it is not justifiable to install a new card-type system for dispensing fuel with the current fuelling system.

The City has expressed interest in providing a Jet A fuel facility at the airport. Consultations with airport users suggest that Jet A is currently not in demand. However, providing Jet A fuel could aid the airport in attracting new tenants and users and increase the revenue generated from fuel sales.

- It is recommended that a Jet A fuel facility be provided when demand is identified. Long-term commercial development and optimal land uses should be considered when siting the future location of the fuel facility.

The existing fuel facility is in good operating condition, having passed a pressure test in the spring of 2012. However, consultations revealed that upon failure of the system, the City and airport tenants would prefer an alternate location for the facility that would reduce congestion experienced on Apron I. Because a Jet A fuel system would likely consist of above ground tanks and pumps, it could be moved to a new location should it be purchased prior to the failure of the existing AvGas facility. A card-type system may be considered for the relocated fuelling facility.

- It is recommended that an area at the intersection of Taxiways 'A' and 'B' be reserved for a future fuel facility capable of accommodating the proposed design aircraft.

5.7.2 Deicing Operations

Deicing operations are performed at Camrose Airport on an ad hoc basis and consist primarily of frost sprays. Because recreational and flight training are anticipated to remain the primary airport uses throughout the planning period, the construction of a deicing bay or the implementation of deicing fluid collection procedures is not recommended.

5.8 Access Control and Security

The Canadian Aviation Security Regulations SOR-2011-318 details access control criteria for certified aerodromes that provide scheduled passenger services for all Class I, II, and III aerodromes. The Camrose Airport falls under Part 7 – Other Aerodromes, and therefore security requirements are reduced when compared to larger Class Aerodromes. However, providing fencing and/or a suitable barrier is a recommendation outlined by TP312 4th edition. With the assistance of funding provided by the Camrose Flying Club, chain-link fencing has been installed to delineate airside and groundside areas in the vicinity of the air terminal building.

The City of Camrose has begun installing perimeter fencing around the airport in hopes of keeping large animals away from the runway, and other active areas of the airport. However, incidents involving wildlife were not identified as a regular occurrence.

Alternative or additional security measures could be implemented in coordination with the continuing installation of perimeter fencing. These alternatives include, but are not limited to: cameras, motion detection, lighting, and security personnel. However, these alternatives are not commonly implemented at municipal airports, especially those without scheduled passenger service. Incidents of trespassing and wildlife issues should be recorded and reviewed regularly to determine if alternative security measures are required.

- It is recommended that the City continue with perimeter fencing installation as funds become available.

5.9 Emergency Response

There are no dedicated on-site Emergency Response Services (ERS) at Camrose Airport. ERS are provided to the airport by the City of Camrose fire and police services. Ambulance services are provided by Alberta Health Services. Although Camrose is a certified airport, dedicated ERS is not required by regulation at the Airport because there are currently no passenger services.

The Camrose Fire hall is located 5 km south of the airport. The City's transportation master plan suggests the extension of specific roads in the long term to improve response time of ERS to the airport.

No deficiencies were reported with the current ERS arrangements. ERS requirements should be monitored and evaluated at regular intervals to ensure safety of airport users and the public is maintained as growth of aviation activity is experienced. However, the commencement of passenger operations is not anticipated within the planning period and the requirement for on-site ERS is not anticipated.

5.10 Airport Maintenance

Airport maintenance efforts are undertaken by the City of Camrose Public Works Department. There is currently no equipment or storage on the airport site. City employees undertake daily airport inspections including airside pavement surfaces and fuel facilities.

Airport maintenance equipment is owned and operated by the City of Camrose for airport related work, and includes:

- 02 JD TC44H Loader
- 08 Bobcat
- 08 JD 772D Grader
- 10 IHC 7400 Tandem/Sander
- 11 IHC Tandem
- 07 Graco Paint Machine
- 06 International Tandem x 2
- 06 Case 465 Skid Steer
- 06 International Tandem Sander
- 07 Ford 1 Ton
- 07 950H Cat Loader
- 08 JD 772D Grader
- 08 Tenco DV4000 Snow Blower
- 09 IHC Tandem x 2
- Magnetic Tow-bar

The maintenance equipment is used at the airport for general airport maintenance activities such as snow clearing and grass cutting; it is also used for other city projects. Procedures have been implemented to reduce the potential of salt contamination from City equipment. Because of the asset management plan implemented by the City, equipment is typically removed from service within 5 years. The requirement for airport specific equipment not already owned by the City is not anticipated within the planning period.

- It is recommended that an area be reserved for future onsite maintenance equipment storage.

5.11 Environmental Review

The potential issues related to airport development include: natural vegetation, Camrose Creek, wetlands, storm water, and wildlife management.

The proposed airport expansion would have minimal clearing of natural vegetation. The areas to be developed are not heavily vegetated or forested. The impact on existing vegetation is considered minimal.

Camrose Creek ultimately receives some water from the airport site and for the most part the water has been treated by retention in the wetland. For run-off conveyed in ditches that discharge to the outfall channel, there is minimal treatment in the water quality.

A portion of airport groundside land is currently used seasonally as an alternate snow dump by the City of Camrose. This is considered to be a suitable use of the land until the time where this land is required for aeronautical commercial development. Snow contaminated with road salt can cause premature corrosion in aluminum aircraft.

- It is recommended that this area be monitored to record the levels of resulting contamination and to ensure salinity levels on airside manoeuvring surfaces do not exceed acceptable levels.

Concerns relating to chemicals, fuels, de-icing fluids that are used can be mitigated by containment facilities and treatment systems. However, consultations with airport management and users suggest that fuel spills occur infrequently and are of insignificant volumes while deicing is performed on an ad hoc basis and typically on small, single-engine aircraft.

Further study will be required to determine the amount of the storm water that goes to the creek as well as the increase as a result of development. A storm water management plan should be developed to ensure site design elements are included to address the airport specific needs and lessen the impact to the environment and ensures safety.

The impact of airport expansion on the natural environment will require further study, such as an Environmental Impact Assessment (EIA).

During the site visit it was observed that water fowl were present in some of the areas of standing water on the airport property. It is likely that these sources of water are likely home to other flora and fauna. A survey of the plants and animals observed on the property over an extended period of time is often a requirement of an EIA. The risk posed to wildlife residing on or near the airport property could prevent or delay future airport development projects.

An Environmental Management Plan should also be developed and adhered to. This will ensure that the airport can respond to environmental situations as they arise.

The City has completed an Airport Wildlife Management Report (Sept 1, 2011). This report establishes the guidelines for management and control of birds and mammals at the Camrose Airport.

- It is recommended that a Storm Water Management Plan be undertaken.
- It is recommended that an Environmental Impact Assessment be undertaken on a per phase basis to determine the impact of development on the natural environment.

6 Commercial Facilities and Requirements

6.1 Current Inventory

The current development area is concentrated within the south west section of the site. Several land leases are in place and include the following commercial businesses:

- Camrose Flight Center offers flight training and modest charter operations.
- Aerotechnical Services specializes in aircraft refurbishment and maintenance.

Other land leases are held for private general aviation use.

6.2 Aircraft Maintenance

Aircraft maintenance activities include a number of support functions, several of which are being carried out at the Camrose Airport by Aerotechnical Services. The firm and has been situated at the airport for 14 years. Typical aircraft maintenance activities at a general airport include:

- Maintenance Repair and Overhaul (MRO) Activities, including maintenance for scheduled airline and maintenance for corporate aircraft;
- Engine Overhaul;
- General Aviation aircraft inspections and routine maintenance; and
- Airframe Inspections.

General Aviation aircraft maintenance is carried out at Camrose Airport but does not include engine overhauls. Aerotechnical Services also specializes in fabric aircraft repairs. The remainder of the aircraft maintenance activities listed above are not currently available onsite.

Existing aircraft maintenance activities have the potential to expand, however there are no immediate plans to expand the business.

6.3 General Aviation

General Aviation (GA) is defined as civil aviation activities operated by individuals, organizations, and business providing the following services:

- Public charter aircraft operations;
- Private charter operations serving the regional air transportation requirement of companies, organizations, and government departments;
- Private aircraft operations for business of personal use;
- Flight training;
- Public and private helicopter operations;
- Support activities for the above including repair; sale and inspection of aircraft and associated support material;
- Supply of fuel and oil;
- Private office and hangar space for GA operators; and
- Medevac services.

Exact historical levels of GA activity are unknown due to unavailability of detailed aircraft movement statistics for Camrose Airport. Unavailability of accurate information is due to a lack of operational recording equipment.

6.3.1 Business and Corporate Aviation

Business and corporate aviation activities are generally related to the transportation of company executives or large charter groups, such as sports teams. These individuals usually own or charter an aircraft for air transportation. There are currently few business and corporate aircraft operators utilizing the Camrose Airport.

6.3.2 Flight Training

Camrose Airport is not well-positioned to attract flight training as larger facilities are located in Edmonton. However, the impending closure of the Edmonton City Centre airport may increase demand for flight training at Camrose marginally.

Camrose Flight Center is an active user of the airport year round, serving as a flight training facility and also as an air taxi service, mainly for its local residents. The renovation and upgrade of the facilities at the airport such as improved groundside access road and airside pavement surfaces could improve the potential of increased operations on site.

6.3.3 Recreational and Experimental

The majority of airport users are recreational and experimental aircraft operators. Currently, the development area to support these operations is located off Taxiway 'A', while the future development is located off Taxiway 'B' with the provision of several large commercial lots directly off Taxiway 'B'.

6.3.4 Natural Resource and Public Service

Natural resource activity does not currently take place at the Camrose Airport. In the event there is demand in the future for natural resource operations, the commercial development region to the west of Taxiway 'B' could serve the need of these potential operators. Aircraft operations related to public service activity generally include government personnel transport, law enforcement, and other government applications.

6.3.5 Medevac and Fire Fighting Services

The majority of Medevac flights in the Camrose region are of rotary wing operations, which are served by the St Mary's Hospital Heliport, located in the center of the City. Fixed-wing Medevac operations which utilize the airport have been infrequent. Consultation with the Airport Manager suggests that Medevac operations are not expected to increase in the short-term.

6.4 Air Cargo

Limited air cargo traffic occurs at the Camrose Airport. Future demand for air cargo is seen as extremely limited due to the region's close proximity to major road and rail networks. The proximity of Edmonton International Airport with its high levels of air cargo activity limits Camrose to a relatively minor role in this sector.

6.5 Commercial Opportunities

LPS AVIA utilizes an extensive check-list of commercial development opportunities for planning, which provides an initial screening of opportunities.

Table 6-1 identifies a comprehensive list of potential aeronautical development opportunities, local competition, interest, constraints, and potential for development at the airport.

6.5.1 Aeronautical

The aeronautical commercial development scan identified the following aviation-related businesses as medium-high and medium-low potential opportunities for the Camrose Airport:

- Aircraft Hangars.
- Aircraft Maintenance.
- Flight Training.

The City is encouraged to develop and market the site for storage facilities that could be leased to aircraft owners. As shown in the Development Concept, lands adjacent to Taxiway 'B' would be suitable for this purpose.

The City is also encouraged to develop lands at the airport to support growth in the aircraft maintenance sector, particularly in the small aircraft engine repair market.

6.5.2 Non-Aeronautical

The City wishes to limit the airport commercial development to aeronautical activity, and leave the non-aeronautical activity development to occur at pre-existing industrial lands within the city limits.

Table 6-1 – Aeronautical Commercial Opportunities

Potential Use	Local Competition	Interest	Constraints	Possibility
Aircraft Hangars	Yes	Yes	None	Medium-High
Aircraft Maintenance	Yes	Limited	None	Medium-Low
Flight Training	Yes	Limited	None	Low
Fixed Base Operator	No	No	None	Low
Aircraft Overhaul	No	No	None	Low
Air Cargo Facility	No	No	None	Low
Aircraft Assembly	No	No	None	Low
Flight Kitchen	No	No	None	Low

6.6 Aviation Commercial Land

6.6.1 Demand

The demand for aviation commercial development land has been reported to be modest in recent years, with an average of one new airport tenant per year.

6.6.2 Supply

Sufficient land is available for aviation commercial development within the current airport property. Additional aviation commercial land parcels with airside access have been indentified for the short to long-term with the Development Concept presented in Chapter 7. All of the commercial lots are built up off Taxiway 'B' and although each belongs to a specific planning horizon, the actual preparation of the lots should be event driven.

Upgrades and expansions to roads, water supply, gas, storm and sanitary services will be required to service the development areas identified above. Specific requirements are presented in Chapter 7.

6.7 Non-Aviation Land

6.7.1 Demand

The airport does not currently have any property reserved for non-aviation commercial uses within the current boundary.

6.7.2 Supply

The airport is owned and operated by the City of Camrose, which currently has a surplus of pre-existing industrial lands located off airport site. For this reason, the development of non-aviation commercial development lots at the airport is not seen as key objective for growth at the airport.

6.8 Commercial Strategy

6.8.1 Principles and Objectives

The commercial development strategy at the Airport has to take into account the conditions facing the Airport and region. The Airport is both municipal infrastructure as well as an enabler of economic development. The approach to the commercial land development strategy is guided by the following principles:

- The triggers for development should be event driven as opposed to time driven.
- The allocation of land should be done in a manner that is scalable, thus giving the maximum flexibility to the City in how much land is designated for development purposes.
- The areas designated for commercial activity should complement the existing operation and enhance the aviation capability of the airport.
- The commercial development strategy should give preference to areas which can provide the maximum revenue generation capability for the airport for a given investment dollar.

The issue of Land Lease or Ownership is a major consideration in a development strategy. Making land available via lease or outright sale affects the decisions and the level of investment that a prospective tenant is willing to make.

While land ownership is usually preferred by established tenants, leases are another way in which commercial land may be allocated to prospective tenants.

This option has appeal as it permits a lower initial capital investment and does not necessarily require a long term commitment to the site.

Conversely, the drawbacks for prospective tenants are the external oversight of tenant activities and development as well as the exposure to lease and rental rate increases. The Airport owner derives benefit from a lease situation in the form of a stable rental income as well as increased control of activities and development.

The principal drawbacks to this arrangement can be an increased cost of infrastructure development being borne by the owner, as well as lower rates of commercial development. However, the City of Camrose has implemented a one-time connection fee for new tenant lots to help recover some or all of the required infrastructure costs.

6.8.2 Recommended Strategy

- It is recommended that the airport lease land for recreational and commercial development in a manner that enhances the core airport operation.

Specifically the development plan should be one that:

- Encourages the highest and best aeronautical use of land;
- Makes commercial land available to attract investment at Camrose Airport including recreational and commercial airside hangarage;
- Provides airside access and potential services to new development parcels and lots;
- Utilizes long term leases wherever possible; and
- Ensures that the land is leased at market rates.

7 Development Concept

7.1 Strategy

The Development Concept presented for the short, medium, and long-term is expected to meet the current and future requirements for airside facilities and improve overall operations at the airport. The Master Plan protects sufficient land to accommodate growth beyond the long-term planning horizon which is referred to as ultimate development.

The Master Plan identifies short-term improvements to the airside pavements, which will improve the capability of the airport to serve current users, tenants, and visiting aircraft. Short-term developments include: construction of a new Code B Taxiway 'F' off Taxiway 'B', providing RESA development off each runway end, rehabilitation of taxiway 'B", development of a groundside access road behind the current recreational activity north of taxiway 'A', and development lot preparation.

Medium-term developments are focused mostly on expanding commercial and recreational development opportunities and include, but are not limited to:

- developing an additional groundside access road to serve the new commercial development lot preparation; and,
- expansion of the public Apron to the east to better serve airport users.

Long-term developments focus on the further expansion of the commercial development lots by providing additional lands adjacent to Taxiway 'B' moving towards the north end of the airport.

The progressive development of utilities and services to support the development are described in section 7.3.

The Development Concept for the Camrose Airport is shown in Figure 7-1.

A detailed illustration of the development of the core area is presented in Figure 7-2.

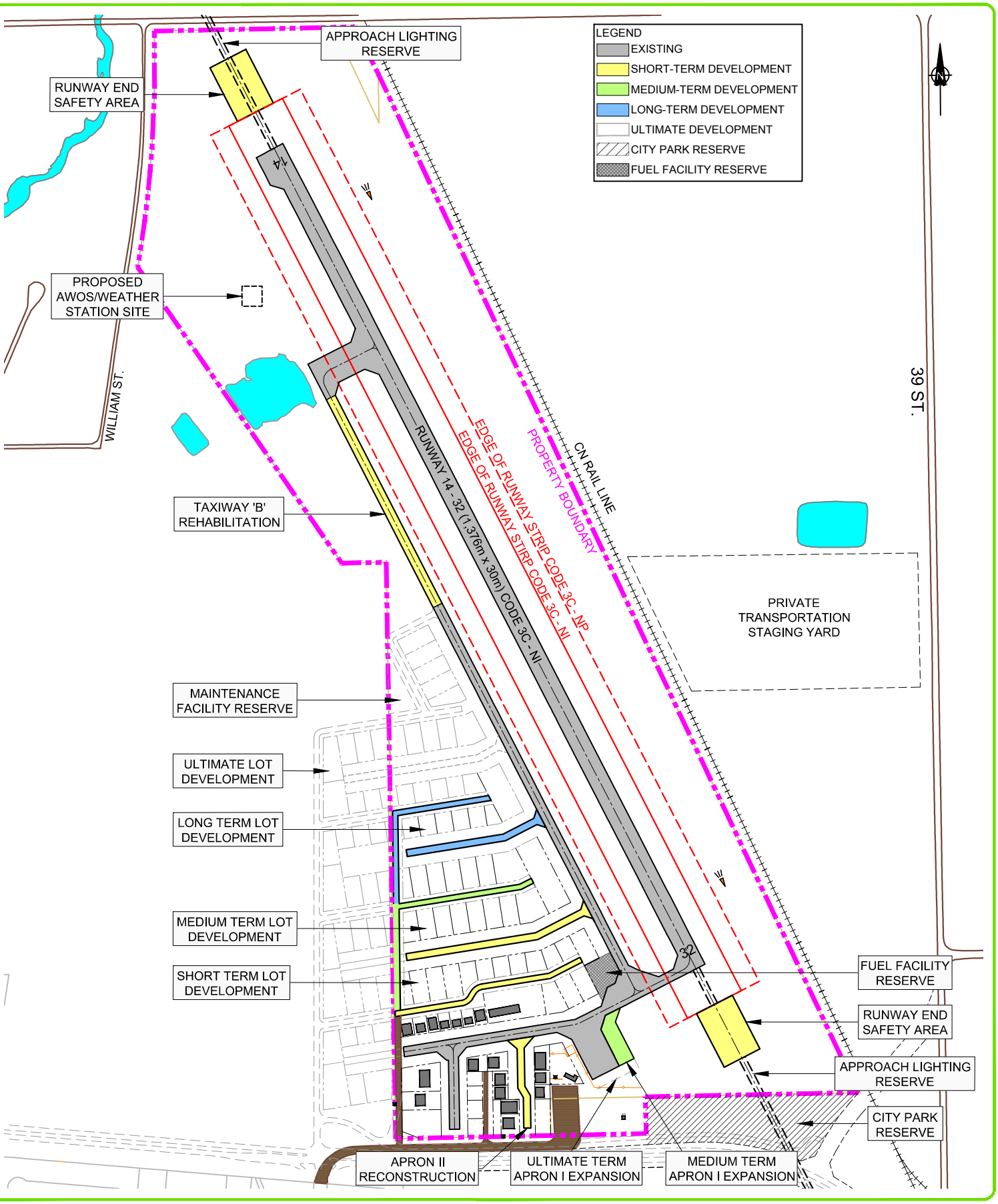
Cost estimates are provided in Appendix C.

7.2 Phased Development

Development is recommended in phases to support current activity and future growth. The airside commercial development will fall into specific planning horizons and need to occur as activity levels at the airport increase in order to maintain an efficient system.

The Phased Development Program in Table 7-1 identified airside, groundside, air terminal and other developments within the planning horizons.

The recommended configuration of airside, groundside and other airport infrastructure is provided based on highest and best use airport planning principles.



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THE CITY OF CAMROSE THE ROSE CITY

Title

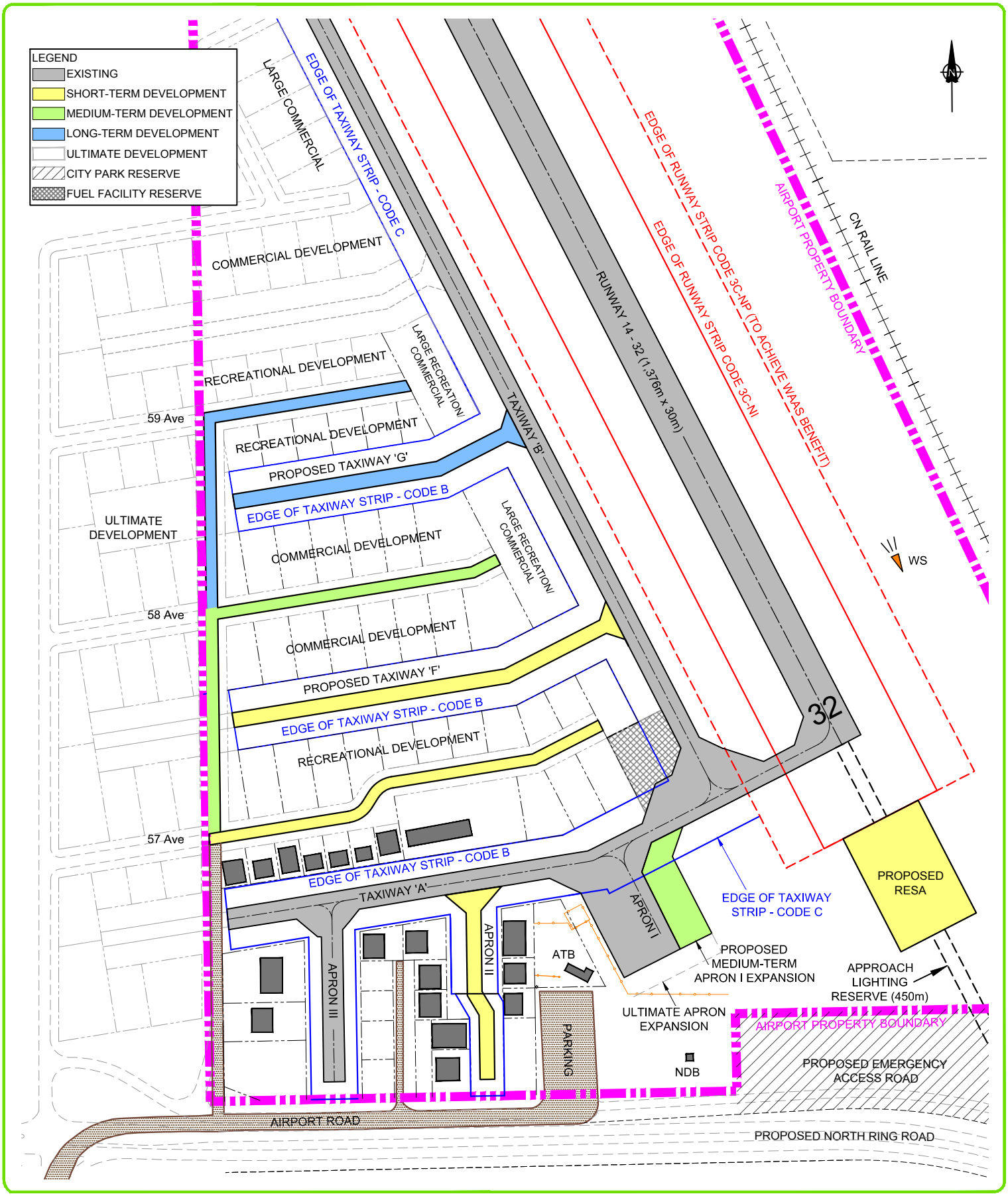
CAMROSE AIRPORT MASTER PLAN

DEVELOPMENT PLAN

Notes

1. Preliminary
2. All dimensions approximate

Figure No.	7 - 1
Drawn By	AIM
Approved By	EGL
Date	JANUARY 2013
Scale	1:7,500
Filename	CEQ3 Airport.dwg



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CAMROSE AIRPORT MASTER PLAN

CORE AREA DEVELOPMENT PLAN

Notes

1. Preliminary
2. All dimensions approximate

Figure No.	7 - 2
Drawn By	AIM
Approved By	EGL
Date	JANUARY 2013
Scale	NTS
Filename	CEQ3 Airport Dev Plan.dwg

Table 7-1 – Phased Development Program

Development Period	Airside	Groundside	ATB and Other
Short-Term (1-5 yrs)	Overlay Runway 14-32 [C] Construct Runway End Safety Area (RESA) for Runway 14 & 32 [C] Overlay Taxi 'A' in two sections to capitalize on available grants [C] Undertake a Geotechnical Investigation of Taxiway 'B' Overlay Taxiway 'B' South Reconstruct Taxiway 'B' North Re-construct Apron II (Taxiway 'C') Decommission and remove Taxiway 'E' Overlay Apron I [C] Construct Taxiway 'F' Prepare commercial/recreational development lots off Taxiway 'F' (South) Designate Taxiway 'D' as Apron II Update/Assess all Pavement Load Ratings (PLR) Prepare development lots off Taxiway 'A'.	Construct groundside access road for recreational development – North of Taxiway 'A'(57 Ave) Extend Water Distribution System Extend Waste Water Collection and Disposal Expand Storm Water Management System Commission an airport storm water management plan	Continue Air Terminal Building improvements Relocate Environment Canada Weather Station Install Automated Weather Observation System (AWOS) Continue Airport Security Fencing installation Designate lands between Airport Property Boundary and future Ring Road as City Park Reserve Develop a Special Event Parking Plan Prepare a Storm Water Management Plan Complete an Environmental Impact Assessment Conduct Hydrant Flow tests
Medium-Term (5-10 yrs)	Upgrade/replace airfield lighting system Provide Apron I with dedicated aircraft plug-ins Expand Apron I Prepare commercial/recreational development lots off Taxiway 'F' (North)	Extend 58 Ave north to service commercial development lots North of Taxiway 'F' Extend Development Lot Servicing	Revisit forecasts and Update Airport Master Plan Complete an Environmental Impact Assessment
Long-Term (10-20 yrs)	Construct New Taxiway 'G' off Taxiway 'B' Prepare commercial lots off Taxiway 'B' and 'G' Update/Assess all Pavement Load Ratings (PLR)	Extend groundside access road for long term and ultimate development (59 Ave) Extend Development Lot Servicing	Revisit forecasts Update Airport Master Plan Complete an Environmental Impact Assessment

Note: Cost estimates for the projects listed above are provided in Table C-2

[C] Projects that may impact the certification of the airport if not completed.

7.3 Utilities and Services

7.3.1 Potable Water - Future Requirements

Future commercial and recreational development at the airport will require upgrades to the existing water distribution system. The Water Master Plan Update, Associated Engineering (December 2007), provided a hydraulic model analysis of the system with recommendations for future piping and upgrades. A number of improvements were suggested:

1. Install a 600 mm diameter pipe along 46 Street with a 300 mm diameter pipe extending to the existing north hangars (lots 16-24).
2. Install a 200 mm diam. main to the west of 46 Street
3. Install a 300 mm diam. main to the east of 46 Street at the north end of the existing hangars.
4. Loop the 150mm diameter water main that services the hangars with a 200 mm diameter pipe.

The proposed airport development plan has allowed for approximately 80 additional lots (recreational/ commercial types). Using the same criteria as for the existing condition, the additional development area of 8.6 ha would have an equivalent population of 533 people. This equates to the increase in water demands presented in Table 7-2.

Similar to the existing system, the pipe sizing will be dependent on the fire flow requirements. It is anticipated that a 150 mm diameter water main will be sufficient for the water demands; however more detailed modeling should be completed at the design stages to confirm that fire flows requirements and optimum operating pressures are achieved. Typically, the minimum pipe size for commercial/industrial areas is 300 mm diameter.

The total water demand for the airport (existing plus future) is:

- Peak Day = 5.6 l/s
- Peak Hour = 8.3 l/s
- Average Day = 244 m^3

The previous recommendations made in the Water Master Plan for upgrades would likely accommodate airport expansion. Design of these upgrades should consider the proposed airport development and the demand for servicing by prospective tenants

7.3.2 Fire Protection

Fire Flow requirements should meet the Fire Underwriters Survey (FUS) and local building codes. This is dependent on the specific building sizes and uses, and to be confirmed at the building permit stage. Additional hydrants will be required for future expansion. These will be located and designed to the City's standards.

Table 7-2 – Water Demand for Future Development

Units	Criteria	Existing	Additional Demand	Total
Area (ha)		2.6	8.6	11.2
Equivalent Pop.	62 ppha	161	533	694
Average Day Demand (m3)	350 lpcd	57	187	244
Peak Day (l/s)	Peak Factor =2.0	1.3	4.3	5.6
Peak Hour (l/s)	Peak Factor =3.0	2.0	6.3	8.3

Table 7-3 – Sewage Generation

Units	Criteria	Existing	Future	Total
Gross Area (ha)		2.6	8.6	11.2
ADWF (l/s)	0.25 l/s/ha	0.65	2.15	2.8
PDWF (l/s)	Peak Factor =2.0	1.3	4.3	5.6
I/I (l/s)	0.28 l/s/ha	0.73	2.41	3.14
PWWF (l/s)	PDWF + I/I	2.03	6.71	8.74

7.3.3 Sanitary Sewer- Future Requirements

Sewage generation has been calculated for the proposed future development and is presented in Table 7-3 above.

The sewage from the proposed development areas could be accommodated by using the minimum pipe size (250 mm for Industrial/Commercial). An option to reduce the main size to 200 mm diameter could be assessed during design phases. Minimum velocity (0.61 m/s) will be critical in the design as low flows tend to result in self-cleansing inadequacy. Sanitary services should be staged and provided as demand is identified.

For the ultimate development there would be approximately 1 km of sanitary main. The existing site is relatively flat, with only 1 m to 1.5 m drop in elevation from the north (upstream) to the 55 Avenue (downstream). The depth of the sanitary main at the downstream end, assuming minimum slope, would be approximately 4.5 m. It is assumed that the proposed upgrade for the 1050 mm diameter sanitary trunk along the future north ring road would be deeper and could provide the required connection for servicing of the new development. The timing and details of this trunk upgrade are not known at this time and would impact the sanitary servicing as would failure to complete this upgrade.

While the existing 300 mm sanitary sewer can provide the capacity to service the area, the depth (assumed only 2.8 m to 3.0 m deep) could limit the distance that the sewer main can be extended to the north. Site grading design and confirmation of the depth of the existing pipe would determine how far the sanitary main could be extended while maintaining proper depths. Measures could be taken to address the issue, such as pipe insulation, which would reduce the required depth.

There is also the possibility that a lift station could be constructed to provide more flexibility in the design of site grading, or if insulating the pipe is not deemed to be a feasible option compared with the construction and maintenance of a lift station. It might be possible to service the short term development by extending the current sanitary main. Then the lift station could be built for the medium and long term/ultimate developments. This would defer the capital expenditure, and if the development is delayed or does not go ahead, the short term development area can operate without the need for a lift station. Further design and analysis would be required to compare the options.

7.3.4 Storm Drainage - Future Requirements

Areas to the east of the runway have poor drainage characteristics, and would need to be accommodated in the ultimate term if this area were to be developed, by an extension of the outfall channel, along the future Ring Road aligned along the south limits of the airport. This outfall channel could potentially accommodate some of the airport drainage as well.

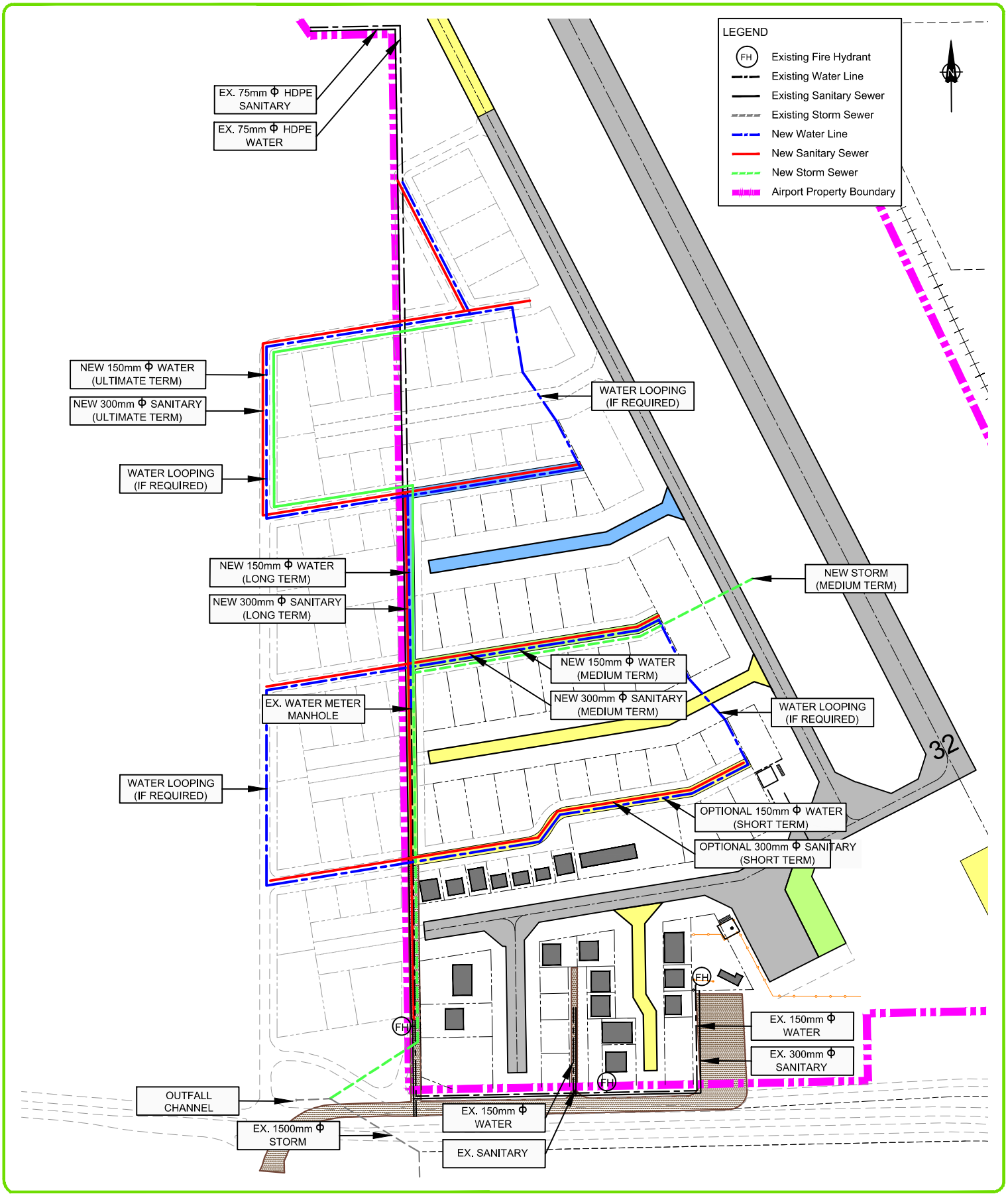
Proposed modifications and expansion will impact the storm drainage in the following ways:

- RESA development will require some local re-grading at the ends of the runway to ensure that run-off from the runway is directed to the existing drainage paths. For the north end of the runway, the grading should be such that the flows are directed towards the northwest. For the south end of the runway, the grading should be such that drainage is directed south towards the future outfall channel along the North Ring Road alignment.

At the time of RESA construction, portions of the runway drainage system at the north and south ends of the runway will require realignment as RESAs must be free of abrupt changes or sudden reversals in slope under Transport Canada recommended practices.

- The proposed emergency access road, located adjacent to the future Ring Road, would require that the grading be designed in conjunction with the North Ring Road project and outfall channel expansion.
- The proposed commercial development will require an underground storm system for the minor storm events. Ditches and swales will also be required to convey overland flows for major storm events. Catch basins can be located such that there is minimal interference to the road surface. Underground piping can be located under the road, and will discharge to the outfall channel located to the west of the development area.
- To gain the full benefit of the WAAS approach currently under development, it is necessary to reclassify the airport from Code 3-NI to Code 3-NP. This will require the widening of the runway graded area from 80m to 90m. However, it appears that this was taken into consideration during the design of the current runway storm drainage system, as the drainage ditches supporting the runway are located outside of the area required for a Code 3-NP runway graded area. As a result, the relocation or modification of the drainage ditches running parallel to the runway is not anticipated.

The proposed Servicing Plan is presented in Figure 7-3 on the following page.



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CAMROSE AIRPORT MASTER PLAN

AIRPORT SERVICING PLAN

Figure No.	7 - 3
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8 Recommended Land Use Plan

8.1 Systematic Land Assignment

The intent of the Land Use Plan is to identify and maximize the use of airport property. The Plan presented herein provides a rational and comprehensive framework for the development and use of airport lands.

The Plan is based on a systematic land assignment for airport facilities, as well as a definition for each use, as described below:

Airfield: Fixed and rotary wing manoeuvring areas, taxiways, aprons, and navigational aids at the Airport.

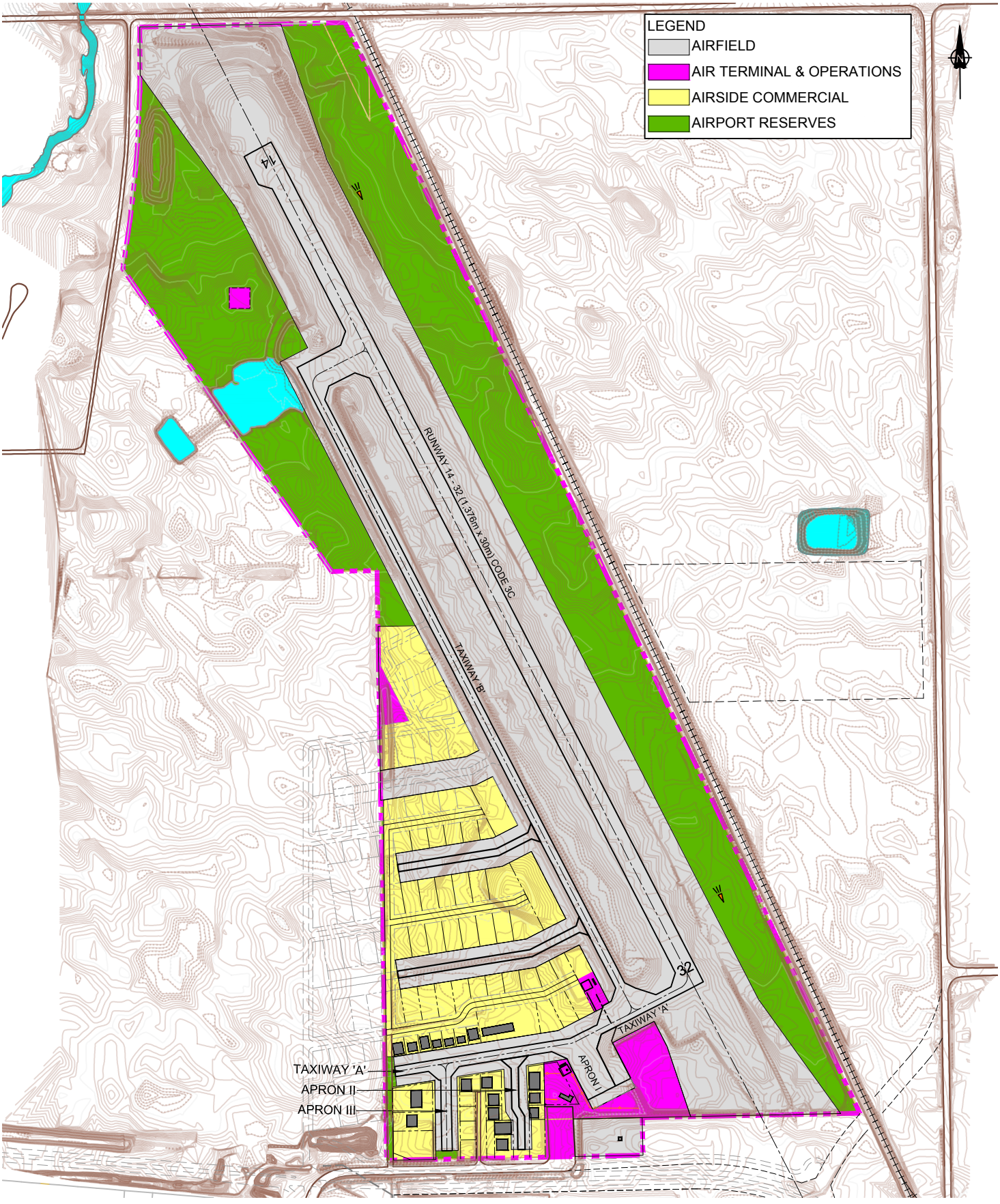
Air Terminal and Operations: Air terminal building, maintenance garage, security, fuel facilities, utilities, public facilities, terminal road system and public parking.

Airside Commercial: General aviation facilities and aviation support functions on land requiring airside access, including aircraft maintenance, and helicopter facilities.

Airport Reserve: Lands for which it is not practical to designate more specific uses at this time. The lands are held in reserve in order to meet unforeseen or possible contingency requirements within and beyond the planning horizon.

8.2 Recommended Plan

The recommended Land Use Plan for the Camrose Airport is presented as Figure 8-1 on the following page.



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CAMROSE AIRPORT MASTER PLAN

LAND USE PLAN

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1. Preliminary
2. All dimensions approximate

Figure No.	8 - 1
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9 Financial Review

9.1 Revenue Streams

9.1.1 Background

Economic sustainability is a crucial goal for an airport operator and, depending on conditions at the airport, can be achieved by generating streams of reliable and sufficient revenues. In order to accomplish this goal, airport management must carefully monitor and control revenues and expenses. Typically, airports are less dependent on non-aeronautical based revenues when there are high volumes of aviation activity. Conversely, there is more reliance on non-aeronautical revenues at airports that experience lower volumes of aviation activity and have limited growth potential for air traffic.

Ultimately, revenue at airports is generated by the practice of providing user pay services on site. The approach to imposing these fees is different at every airport. Some airport operators charge their users aggressively in a variety of different ways and tend to lose customer confidence by doing so. Airports that impose very few fees fail to collect sufficient revenues and consequently require support of additional funds to cover costs of operation and capital expenses.

The following guiding principles should be noted for the development of an effective user pay system:

- Full disclosure or transparency of charges
- Acceptable cost recovery
- Reasonable fee structure
- Efficient use of airport resources
- Flexibility

Implementation of a well-designed system of charges is important to achieve financially stable and sustainable operations.

9.1.2 Airport User Charges

Classification of airport user charges can be divided into two categories: aeronautical and non-aeronautical. Aeronautical charges are associated with services that are directly related to processing of aircraft, their passengers, and cargo. Conversely, utilization of airport facilities and amenities such as airport parking, concessions, lease revenues and development fees, all contribute to non-aeronautical charges levied at airports.

In order to develop sufficient funds for airport's continuous operations and capital growth, operators are encouraged to maximize the amount of revenues collected from both aeronautical and non-aeronautical sources.

Below is a list of potential (if not already explored) aeronautical and non-aeronautical revenue opportunities that may introduce potential growth for Camrose Airport.

Aeronautical Revenues

- Aircraft Landing Fees
- Aircraft Parking Fees
- Fuel Sales
- Land Leases
- Property Taxes

Non-Aeronautical Revenues

- Vehicle Parking Charges
- Retail and Advertising Concessions
- Development Review Fees

Site visits and stakeholder consultations have revealed that Camrose Airport only collects revenues by imposing two of the above user charges. Fuel sales and leased lots have historically accounted for the majority of revenues for the Camrose Airport.

9.2 Aeronautical Revenue

9.2.1 Aircraft Landing Fees

Landing fees are charged to airport users for the use of airside infrastructure (i.e. runways, taxiways, aprons) and are collected by the operator as revenue for the airport. The fee for each airport user will usually vary depending on the size of aircraft being operated, understanding that larger aircraft will impose greater strain on airside infrastructure. Typically, Maximum Takeoff Weight (MTOW) is used as the reference weight for calculation of aircraft landing fees. Alternately, some airports may choose to use Maximum Landing Weight (MLW) for this purpose.

Aircraft landing fee charges are currently not in place at the airport. It appears that the low levels of traffic currently experience at the airport, coupled with the lack of an aircraft movement inventory database and associated registrations, are prohibiting the implementation of landing fees at this time.

Consultations have indicated that one aspect of the Camrose Airport which is appealing to itinerant airport users is the lack of aircraft landing fees, and many airport tenants and stakeholders interviewed believe that instituting aircraft landing fees would deter itinerant aircraft operations from choosing the Camrose Airport as a destination.

Table 9-1 outlines a theoretical landing fee structure for a municipal airport like Camrose.

Table 9-1 – Typical Aircraft Landing Fees

	Jet Aircraft	Turboprop and Twin Aircraft
Minimum	$7.80	$7.80
Per 1,000 kg		
< = 21,000 kg	$2.20	$1.95
> 21,000 kg to 45,000 kg	$2.85	$2.45
> 45,000 kg	$3.35	$2.95

The revenues generated by imposing landing fees must be weighed against the cost of implementing the system (equipment and administration) in addition to the anticipated reduction in traffic volumes associated with landing fee implementation.

- It is recommended that the City evaluate the feasibility of imposing landing fees.

9.2.2 Aircraft Parking Fees

Airport facilities such as apron stands, remote parking, aircraft tie-downs (and/or plug-ins), and hangar space are all potential sources from which aircraft parking fees may be generated. These fees are normally calculated based on the weight of the aircraft and/or its dimensions.

Airports can elect to charge parking fees based on the amount of time (short-long term) an aircraft is positioned within the aircraft parking area, and the parking area's location. Currently there are no aircraft parking fees charged for the users of Camrose Airport parking facilities. Table 9-2 presents proposed aircraft parking fees.

Table 9-2 – Proposed Aircraft Parking Fees

Aircraft Parking Fees	Daily Charge ($)	Monthly Charge ($)	Annual Charge ($)
0 to 2,000kg	$5.00	$75.00	$400.00
2,001 to 5,000kg	$7.50	$90.00	$500.00
5,001 to 10,000kg	$10.00	$125.00	$600.00
10,001 to 30,000kg	$17.00	$125.00	$600.00
30,001 to 60,000kg	$25.00	$125.00	$600.00
60,001 to 100,000kg	$40.00	$125.00	$600.00
100,001 to 200,000kg	$65.00	$125.00	$600.00
All fees exclude GST unless otherwise noted			

Consultations with airport users suggest that, in general, they are not opposed to the imposition of parking fees. Additionally, the recording and administration of these fees would be less expensive than landing fees as Public Works employees could feasibly record the tail numbers of aircraft on the apron as part of their morning inspection.

- It is recommended that the City implement aircraft parking charges at Camrose Airport.

9.2.3 Fuel Concessions

The airport currently controls and operates its own fuel sales. Two surcharges are imposed on aviation fuel sales. The first is a 5% surcharge for fuel system reserves. This is collected to offset the eventual cost of replacing the AvGas facility and feasibly to purchase a new Jet A system. A 15% surcharge to help offset general revenue subsidy of the airport is also applied. To the benefit of the City, a percent surcharge is applied versus a monetary surcharge so that as the price of fuel fluctuates, the surcharge adjusts accordingly.

- It is recommended that the City maintain the current use of a fuel surcharge, although the specific surcharge percentages should be reviewed periodically.

9.2.4 Airport Land Leases

Airports generally maintain ownership of the land within the airport property boundary and lease portions of that to parties interested in operating their business at the airport. The airport owner requires that a tenant sign an agreement to lease a parcel of land for set period of time. Lease rates are established and the user is required to make payments to the airport at regular intervals, usually monthly or annually.

Airport operators typically choose to lease lands for aeronautical uses that are located adjacent to operational airside areas (i.e. taxiways and aprons). Leases for non-aeronautical areas are situated a greater distance from the airside as these tenants do not require access to airside facilities.

Camrose Airport has historically leased lots within the airport boundary specifically for aeronautical use. Stakeholder consultations have revealed that airport lands are being leased for aircraft storage and other aeronautical uses. In the 2011 Budget, it was estimated that land leases would account for approximately 16% of total revenues, with fuel sales and concession making up the remainder.

It appears that land leases are the City's best opportunity to increase airport revenue. It is assumed that 2 lease lots will be absorbed on an annual basis, with the rate per square metre increasing annually with inflation.

- It is recommended that the City expand the developable land in phases to meet demand.

9.3 Non-Aeronautical Revenue

9.3.1 Vehicle Parking Charges

Vehicle parking and car rental agencies are generally considered to be one of the largest growth sources for airports with moderate to high volumes of scheduled passenger air services. Airports that support significant volumes of passengers have identified vehicle parking charges to be one of the largest generators of non-aeronautical revenue. Stakeholder consultations disclosed that there are no charges for short or long term parking at Camrose Airport. Because it is unlikely that Camrose Airport will experience passenger service within the planning period, the imposition of vehicle parking charges is not recommended.

9.3.2 Retail and Advertising Concessions

Airport retail mainly includes shops, bars, restaurants, newsstands, gift shops, and other commercial services where revenue is collected from the operation of these concessions. Generally positioned within the air terminal building (adjacent to airport access roads), these services are situated at airports that process significant volumes of scheduled and chartered passengers.

Concession fees are charged either on a fixed rent basis for a particular space provided, or more often on a variable rent basis depending on percentage of gross sales. These fees are usually supplemented by a guarantee of a minimum annual level of revenue for the airport operator. Due to the current and projected activity levels at Camrose Airport, the addition of retail beyond the existing vending machines is not feasible.

Airport advertising contributes to airport revenues, provided that it is strategically and appropriately placed and targeted to the appropriate audience. Conventionally, advertising space within passenger terminal facilities, adjacent to entrance roads, and other high level exposure areas, is leased out by airports. Current activity levels at Camrose Airport are minute to justify large investments in advertising. Due to a lack of passenger services, revenue gained through advertising concessions would be negligible.

9.4 Revenue and Expenditure Forecasts

9.4.1 General

The Financial Forecast Table presented in *Appendix C* is considered to be rough order-of-magnitude only. Capital costs were determined based on similar projects and recent industry experience. More accurate estimates will be possible once preliminary and detailed engineering designs are undertaken. Market conditions at the time of implementation may also affect the final costs.

A number of economic factors could affect the results of the model and the success of the airport's revenue generating initiatives, such as actual rate of traffic growth, which are subject to prevailing economic conditions.

9.4.2 Model Assumptions

A number of assumptions have been made in preparing the financial forecast tables as presented in *Appendix C*:

- Financial income and expenditure for the short-term has been developed on a yearly basis. Income and expenditure for the medium and long-terms have been grouped into their banded years.
- Medium and long-term revenues and expenses are a sum of the respective annual values within the given planning horizons.
- Detailed financial planning is only relevant in the short-term with the medium and long-term projections having more uncertainty and providing an indication and outlook only.
- A 20% engineering and project management contingency should be added to all capital infrastructure projects.
- Inflation has been established at 3% across the financial forecast tables.
- Aircraft landing fees have been developed using an assumed aircraft per type of movement, along with the airport landing fees per kg, per type of aircraft.
- All rates and fees are subject to adjustment on an annual basis. These rates and fees will be increased to match the inflation rate.
- No landing fees will be collected for Local operations or piston powered aircraft.
- Twenty-five percent of itinerant aircraft are either turbine or jet powered and are subject to landing fees.
- 10% of all air traffic movements forecasted will pay one overnight parking fee at a rate of $6.00 throughout the planning horizons.
- Two annual aircraft parking fees will be applied at a rate of $400 corresponding to aircraft less than 2,000kg. This fee will grow with inflation.

- Fuel volumes required will be assumed to increase directly with the forecasted increase in aircraft movements. The cost per litre will increase annually with inflation. The 5% and 18% surcharges applied by the City will remain constant.
- Current land lease revenues are based on existing lease agreements and assume that the lease rate will increase annually to match inflation.
- Future airside leases are based on commercial land absorption suggested by the City of Camrose. Development is disbursed equally per year within each planning horizon.
- Actual staff salaries were provided by the City of Camrose. A rate of inflation of 3% for staff salaries, wages etc. has been used to indicate a level of staff retention.
- Development review fees are assumed to be collected by the airport from developers seeking official approval to construct new or significantly improve existing on-airport facilities. Fee values are based on the forecast absorption rates presented in Table 7-3 and are disbursed equally per year within each planning horizon.

9.5 Financial Sustainability

Regardless of the fees implemented, based on the forecasted revenues and capital costs, there will be a considerable gap between operational revenue and expenses. While the projected gap between revenue and expenses is an estimate, it does suggest that the airport will not be able to fund future development based on an operating surplus. Alternative sources of capital and revenue should be explored.

The ultimate goal of an airport is not necessarily to be financially profitable, but to facilitate greater economic benefit in a region. Though an airport may be perceived as a draw on municipal resources, it is crucial to understand that expenses seen at the airport are offset by economic gains in the community. These economic gains often far outweigh the expenses of the airport.

10 Conclusions and Recommendations

10.1 Conclusions

- The Camrose Airport is a certified facility owned and operated by the City of Camrose. The Airport primarily serves recreational and General Aviation (GA) activities, although occasional Medevac operations, charter services, and special events are also supported. The airfield system is in need of rehabilitation and a phased plan for commercial development.
- The City of Camrose is located in the heart of Central Alberta. The area benefits economically from well-developed agricultural, manufacturing, and resource industries. Additionally, Camrose acts as a service and retail hub to many of the nearby rural communities.
- The critical aircraft listed in the Airport Operations Manual (AOM) is the Cessna Citation I. This aircraft entered service in 1969 and was discontinued in 1985. Although it is still in use, it is not considered to be an appropriate design aircraft for the duration of the planning period.
- The City's strategic position affords many roles for the airport including acting as a potential point of service for local commuter air services, a base for charter aircraft operations and flight training activities, a base for corporate and private aircraft owners and operators, and general aviation support.
- The Camrose Airport currently provides 25 development lots available for long-term lease. Recent lease lot absorption suggests that all of these lots will be occupied in the very near future. The preparation of lots for both recreational and commercial users is required in the short-term to meet anticipated demand. In addition to lease lots, taxiways, access roads, and site servicing will be required.
- The absorption of commercial land is projected at a rate of 1.5 lots per year. Phased lease lot development has been identified and should be made available to support recreational and commercial aviation uses. All future commercial facilities should be located based on highest and best use airport planning principles.
- The airport is currently operated with significant financial support from the City of Camrose. Analysis suggests that the airport has not been collecting operational revenues to the greatest potential in recent years.

10.2 Recommendations

Based on the resulting conclusions, the following actions and infrastructure projects are recommended:

10.2.1 Airside

Runway 14-32

It is recommended that Runway 14-32 undergo full runway rehabilitation in the short-term,

It is recommended that Runway End Safety Areas be constructed for both Runway 14 and 32 to satisfy anticipated regulatory changes.

Taxiway A

It is recommended that Taxiway 'A' undergo full pavement rehabilitation in the short-term,

Taxiway B

It is recommended that a geotechnical investigation be undertaken in the short-term to determine the cause of pavement undulations.

It is recommended that the undulating sections of the northern portion of Taxiway 'B' be reconstructed progressively in the short-term to limit the risk of damage to aircraft.

It is recommended that the remaining sections of the northern portion of Taxiway 'B' be rehabilitated.

It is recommended that the southern portion of Taxiway 'B' undergo full pavement rehabilitation in the short-term as the taxiway has reached the end its service life.

Taxiway C

It is recommended that Taxiway 'C' be reconstructed and designated as an apron (Apron II) to support Code A and B aircraft.

Taxiway D

It is recommended that Taxiway 'D' be designated as an apron (Apron III) to support Code B aircraft.

Taxiway E

It is recommended that Taxiway 'E' be removed and the area that it occupies be developed for commercial use.

Taxiway F (New)

It is recommended that a new 10.5m wide taxiway be constructed in the short-term to accommodate Code B aircraft and provide improved access to the proposed commercial lots.

Taxiway G (New)

It is recommended that a new 10.5m wide taxiway be constructed in the long-term to accommodate Code B aircraft and provide improved access to the proposed commercial lots.

Taxiway H (New)

It is recommended that a new 10.5m wide taxiway be constructed in the short-term to accommodate Code B aircraft and provide access to additional commercial lots.

Apron I

It is recommended that Apron I undergo a full pavement rehabilitation in the short-term.

It is recommended that dedicated aircraft plug-ins be provided on Apron I in the short-term in coordination with the planned lighting replacement.

It is recommended that the Apron I be expanded in the medium-term and an apron taxilane be defined to support higher traffic volumes.

It is recommended that the owner of the private transportation yard be contacted and strategies for reducing glare produced by flood lights discussed.

Visual Approach and Landing Aids

It is recommended that the airfield lighting circuit continue to be monitored as the recent Megger readings suggest that the lighting systems may be approaching the end of its service life.

It is recommended that the airfield lighting system be replaced in the medium-term as allocated in the City Capital Budget.

Wide Area Augmentation System

It is recommended that the WAAS approaches be implemented upon testing and approvals.

It is recommended that Runway 14-32 be designated Code 3C-NP (Non-Precision) to accommodate WAAS approaches. This would require an amendment to the AOM and associated Transport Canada approval.

Meteorological Observations

It is recommended that the existing weather station be relocated north of the proposed development area to facilitate commercial development. The relocation of the site should be driven by the demand for commercial lots.

Automated Weather Observation System

It is recommended that an AWOS be co-located with the weather station, north of the development area.

Fuel Facilities

It is recommended that a Jet A fuel facility be provided when demand is identified. The future location of the fuel facility should consider long-term commercial development and optimal land uses.

It is recommended that an area at the intersection of Taxiways 'A' and 'B' be reserved for a future fuel facility capable of accommodating the proposed design aircraft.

10.2.2 Groundside

Vicinity Land Use

It is recommended that the City investigate the availability of a portion of the privately owned land to the west to allow for continuous lease lot development should demand warrant it.

Air Terminal Building

It is recommended that planned ATB improvements be completed by the City and include upgrade of the walkway and exterior cladding.

Access Roads

It is recommended that access roads be extended or constructed on a per phase basis

Parking

It is recommended that a Special Event Parking Plan be developed in order to reduce congestion experienced during special events.

Sanitary Sewers and Disposal

It is recommended that the City continue the annual flushing of the airport sanitary sewer main.

It is recommended that the City commission an airport storm water management plan.

Natural Gas

It is recommended as each new development lot servicing corridor is constructed, provisions be made for natural gas service.

Access Control and Security

It is recommended that the City continue with perimeter fencing installation as funds become available.

Airport Maintenance

It is recommended that an area be reserved for future onsite maintenance equipment storage.

10.2.3 Environmental Review

It is recommended that the groundside land currently used as an alternate snow dump by the City of Camrose be monitored to ensure contamination and salinity on airside manoeuvring surfaces do not exceed acceptable levels.

It is recommended that a Storm Water Management Plan be undertaken.

It is recommended that an Environmental Impact Assessment be undertaken on a per phase basis to determine the impact of development on the natural environment.

10.2.4 Financial Review

Aircraft Landing Fees

It is recommended that the City evaluate the feasibility of imposing landing fees.

Aircraft Parking Fees

It is recommended that the City implement aircraft parking charges at Camrose Airport.

Fuel Concessions

It is recommended that the City maintain the current use of a fuel surcharge, although the specific surcharge percentages should be reviewed periodically.

Airport Land Leases

It is recommended that the City expand the developable land in phases to meet demand.

Appendix A – Aviation Activity Forecasts

Table A-1 – Historical and Projected Aviation Activity at the Camrose Airport

Planning Horizon	Year	Itinerant	Local	Total
	2007	6,840	4,240	11,080
	2008	2,280	1,568	3,848
	2009	2,232	1,776	4,008
	2010	2,040	1,896	3,936
	2011	2,880	3,876	6,756
Short Term	2012	2,905	3,910	6,815
	2013	2,933	3,948	6,881
	2014	2,964	3,990	6,954
	2015	2,996	4,032	7,028
	2016	3,028	4,075	7,104
Medium Term	2017	3,062	4,121	7,183
	2018	3,096	4,167	7,263
	2019	3,131	4,214	7,345
	2020	3,166	4,261	7,428
	2021	3,202	4,309	7,511
Long Term	2022	3,238	4,357	7,595
	2023	3,274	4,406	7,680
	2024	3,310	4,454	7,764
	2025	3,346	4,503	7,849
	2026	3,382	4,551	7,933
	2027	3,417	4,599	8,016
	2028	3,453	4,647	8,099
	2029	3,488	4,694	8,181
	2030	3,522	4,740	8,263
	2031	3,557	4,787	8,343
	2032	3,591	4,832	8,423
	2008-2011	6.01%	25.39%	15.11%
	2010-2015	7.99%	16.29%	12.29%
	2015-2020	1.11%	1.11%	1.11%
	2020-2025	1.11%	1.11%	1.11%
	2025-2030	1.03%	1.03%	1.03%

Appendix B – Manoeuvring Surface Offsets

Table B-1 – Standard Pavement Widths and Centreline Offsets

Surface	Reference Code	Pavement Width	Offset from Centreline
Runways	3-NI	30 m (100 ft)	45 m (148 ft)
	3-NP	30 m (100 ft)	75 m (246 ft)
	3-P	30 m (100 ft)	150 m (492 ft)
Taxiways	A	7.5 m (25 ft)	16.25 m (53 ft)
	B	10.5 m (34 ft)	21.5 m (71 ft)
	C	15-18 m (49-59 ft)	26 m (85 ft)
	D	18-23 m (59-75 ft)	40.5 m (133 ft)
	E	23 m (75 ft)	47.5 m (156 ft)
Apron Taxilanes	A	N/A	12 m (39 ft)
	B	N/A	16.5 m (54 ft)
	C	N/A	24.5 m (80 ft)
	D	N/A	36 m (118 ft)
	E	N/A	42.5 m (139 ft)

Table B-2 – Existing Pavement Widths and Centreline Offsets

Surface	Pavement Width	Offset from Centreline	Recommended Reference Code
Runway 14-32	30 m (100 ft)	150 m (492 ft)	3-NP
Taxiway 'A'	15 m (50 ft)	26.18m (86 ft)	C Taxiway
Taxiway 'B'	15 m (50 ft)	26 m (85 ft)	C Taxiway
Taxiway 'C'	10.5 m (35 ft)	12 m (40 ft)	A Taxilane
	10.5 m (35 ft)	16.5 m (54 ft)	B Taxilane
Taxiway 'D'	15 m (50 ft)	16.5 m (54 ft)	B Taxilane

Appendix C – Financial Forecast Tables

Table C-1 - Projected Operating Revenues and Expenses

		Unit	Rate	Short-Term 2012	2013	2014	2015	2016	Medium Term 2017-2021	Long Term 2022-2032
Revenues										
Landing Fees	Local	C172	$0.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Itinerant	BE20	$11.06	$ -	$ 8,110	$ 8,443	$ 8,788	$ 9,149	$ 51,773	$ 158,322
Aircraft Parking Fees	Aircraft Parking Fees (Overnight)	per day	$6.00	$ -	$ 826	$ 860	$ 895	$ 931	$ 5,271	$ 16,118
	Aircraft Parking Fees (Annual)	per year	$400.00	$ -	$ 800	$ 824	$ 849	$ 874	$ 4,780	$ 13,369
Public Fuel Revenues	Fuel Cost Recovery	per litre	varies	$ 92,000	$ 95,802	$ 99,762	$ 103,885	$ 108,179	$ 611,771	$ 1,866,861
	AvGas General Subsidy	per litre	18%	$ 16,560	$ 17,244	$ 17,957	$ 18,699	$ 19,472	$ 110,119	$ 336,035
	Fuel Facility Reserve	per litre	5%	$ 4,600	$ 4,790	$ 4,988	$ 5,194	$ 5,409	$ 30,589	$ 93,343
Commercial Leases	Current Land Leases	per sqm	varies	$ 22,038	$ 22,699	$ 23,380	$ 24,082	$ 24,804	$ 135,638	$ 379,331
	New Land Leases	per sqm	varies	$ 4,459	$ 7,352	$ 10,814	$ 13,980	$ 16,652	$ 129,951	$ 826,316
Total Gross Income				**$ 139,657**	**$ 157,625**	**$ 167,028**	**$ 176,372**	**$ 185,471**	**$ 1,079,891**	**$ 3,689,696**
Operating Expenses										
Payroll - Salaries, Wages et al		Inflation	3%	$ 92,000	$ 94,760	$ 97,603	$ 100,531	$ 103,547	$ 566,236	$ 1,583,560
Insurance		Inflation	3%	$ 9,000	$ 9,270	$ 9,548	$ 9,835	$ 10,130	$ 55,393	$ 154,913
Equipment		Inflation	3%	$ 25,000	$ 25,750	$ 26,523	$ 27,318	$ 28,138	$ 153,869	$ 430,315
Credit Card Fees		Inflation	3%	$ 2,000	$ 2,060	$ 2,122	$ 2,185	$ 2,251	$ 12,309	$ 34,425
Utilities		Inflation	3%	$ 16,500	$ 16,995	$ 17,505	$ 18,030	$ 18,571	$ 101,553	$ 284,008
Materials		Inflation	3%	$ 30,000	$ 30,900	$ 31,827	$ 32,782	$ 33,765	$ 184,642	$ 516,378
Aviation Fuel Purchase		Movements	varies	$ 92,000	$ 95,802	$ 99,762	$ 103,885	$ 108,179	$ 611,771	$ 1,866,861
Fuel Facility Reserve		per litre	5%	$ 4,600	$ 4,790	$ 4,988	$ 5,194	$ 5,409	$ 30,589	$ 93,343
Total Operating Expenses				**$ 271,100**	**$ 280,327**	**$ 289,877**	**$ 299,760**	**$ 309,989**	**$ 1,716,362**	**$ 4,963,804**
Surplus (Deficit)				**$ (131,443)**	**$ (122,703)**	**$ (122,849)**	**$ (123,389)**	**$ (124,518)**	**$ (636,471)**	**$ (1,274,108)**

Note: Additional revenues generated by the airport but not considered by the City as direct revenue include devlopment review fees and taxes on airport lots and hangars

Table C-2 - Projected Capital Estimate

Capital Project	Short-Term 2012	2013	2014	2015	2016	Medium-Term 2017-2021	Long Term 2022-2032
Continue with Air Terminal Building Improvements	$ 25,000			$ 79,000	$ 37,000		
WAAS Approach Design	$ 12,000						
Relocate Environment Canada Weather Station		$ 52,000					
Install Automated Weather Observation System (AWOS)		$ 31,000					
Remove Taxi E		$ 3,000					
Expand Water Distribution System		$ 206,000					
Expand Wastewater Collection and Disposal		$ 242,000					
Expand Storm Water Management		$ 129,000					
Construct groundside access road for recreational development – North of Taxiway 'A'		$ 98,000					
Construct New Taxiway 'F'			$ 165,000				
Undertake a Geotechnical Investigation into Taxiway 'B' failure			$ 30,000				
Taxi 'B' overlay (South)				$ 339,000			
Taxi 'B' reconstruction (North)				$ 145,000			
Apron I overlay				$ 63,000			
Runway 14-32 overlay				$ 1,311,000			
Construct Runway End Safety Area (RESA) for Runway 14 & 32				$ 218,000			
Taxi 'A' overlay					$ 165,000		
Construct Apron II (Taxiway 'C')					$ 93,000		
Update/Assess all Pavement Load Rating's (PLR)					$ 11,000		
Investigate airfield lighting system serviceability					$ 23,000		
Total Short-Term Capital Expenses	**$ 37,000**	**$ 761,000**	**$ 195,000**	**$ 2,155,000**	**$ 329,000**		
Provide Apron I with dedicated aircraft plug-ins						$ 9,000	
Replace Airfield Lighting System with LED						$ 507,000	
Expand Apron I						$ 116,000	
Extend 46st North to access lots North of Taxiway 'F'						$ 143,000	
Expand Water Distribution System						$ 185,000	
Expand Wastewater Collection and Disposal						$ 232,000	
Expand Storm Water Management						$ 249,000	
Revisit Airport Forecasts						$ 20,000	
Update Master Plan						$ 50,000	
Total Medium-Term Capital Expenses						**$ 1,511,000**	
Construct New Taxiway 'G' off Taxiway 'B'							$ -
Prepare Commercial Lots off Taxiway 'B' and 'G'							$ -
Update/Assess all Pavement Load Ratings (PLRs)							$ -
Extend Groundside Access Road for Long Term and Ultimate Development							$ -
Extend Development Lot Servicing							$ -
Revisit Forecasts							$ -
Update Airport Master Plan							$ -
Complete an Environmental Impact Assessment							$ -
Total Long-Term Capital Expenses							**TBD**

Notes

1. Engineering and project management contingency not applied to this table
2. Please refer to Master Plan Report Section 9.4.2 for all Model Assumptions

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