LLOYDMINSTER AIRPORT MASTER PLAN

APRIL 27, 2020 **FINAL REPORT**

HM AERO AVIATION CONSULTING

LLOYDMINSTER

County of VERMILION River

LLOYDMINSTER AIRPORT MASTER PLAN

FINAL REPORT

City of Lloydminster
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April 27, 2020

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1 INTRODUCTION

HM Aero Aviation Consulting (“HM Aero”) has been retained by the City of Lloydminster (the “City”) with support from the County of Vermilion River (the “County”) to prepare a Master Plan for Lloydminster Airport (the “Airport”). The intent of the Master Plan is to act as a comprehensive guiding document from 2020 to 2045, with the goal of enabling cost-effective development across the short (1-5 year), medium (6-10 year), and long-term (11-25 year) planning horizons. The Master Plan addresses the physical infrastructure of Lloydminster Airport, describes current operational practices and the Airport’s setting within the community, and considers its socioeconomic impact, environmental impact, business development, and marketing.

The objectives of the Lloydminster Airport Master Plan are to:

- Ensure safe and efficient Airport operations;
- Guide the City of Lloydminster in the progressive development of the Airport;
- Forecast demand and provide cost-effective and defensible recommendations to support future activity levels;
- Maximize the value of Lloydminster Airport to the region as a socioeconomic asset by planning for development and revenue generation opportunities;
- Ensure that future land uses represent the highest and best use of the Airport and are compatible with the site context; and
- Gain a comprehensive understanding of stakeholder views.

Three planning horizons have been established for the purpose of the Master Plan:

1. Short Term – 2021-2025 (5 Years);
2. Medium Term – 2026-2030 (10 Years); and
3. Long Term – 2031-2045 (25 Years).

Lloydminster Airport (Google Earth)

2 REGIONAL SOCIOECONOMIC OVERVIEW

The socioeconomic profile of the region serves as a high-level overview of the characteristics that contextualize demand for aviation services at Lloydminster Airport. Summarized below is geographic, demographic, economic, and transportation-related data for Lloydminster and the surrounding region as it relates to current and future business activities at the Airport, including demand for passenger air travel.

2.1 Geography

Lloydminster Airport is located immediately northwest of Lloydminster's urban area and approximately four kilometres west of the Alberta – Saskatchewan provincial border. Lloydminster Airport is owned and operated by the City of Lloydminster, located within the City boundary, and is bordered by the County of Vermilion River.

The driving distances and times to six municipalities with air carrier services is provided in Table 2.1. Lloydminster Airport is approximately a 2h 40m drive from airports in Edmonton and Saskatoon; from stakeholder consultations, it is understood that significant numbers of passengers choose to drive to these facilities. Given the choice between alternative airports, travellers can be selective in terms of price, schedule, and airline preferences. Individuals may also drive to their destination if the perceived advantages of travelling by car outweigh the benefits of flying. Therefore, Lloydminster Airport's proximity to other airports creates competition in the attraction of passengers. However, the long driving distance to locations such as Calgary and Regina may incentivize passengers to fly from Lloydminster to save time.

Figure 2.1 – Lloydminster Airport Geographic Context

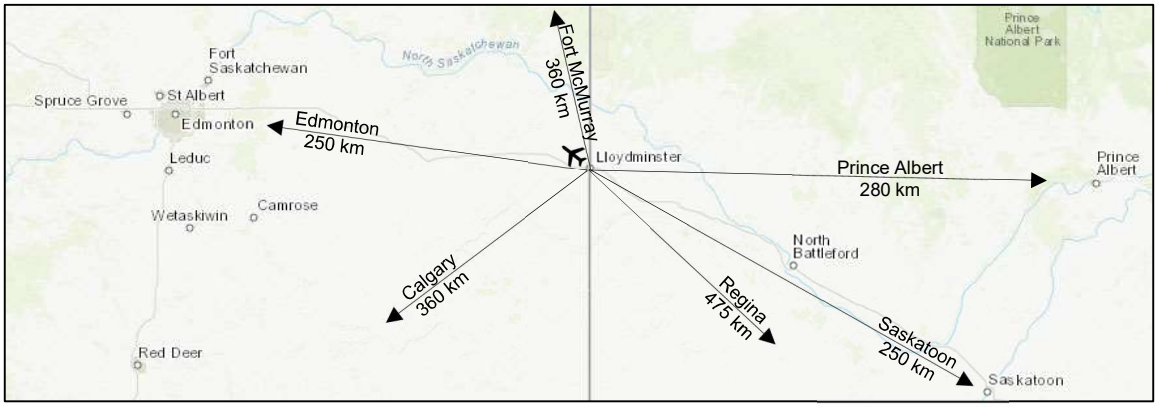


Table 2.1 – Nearby Major Municipalities

Municipality	Direction	Driving Distance	Driving Time
Edmonton, AB	West	250 km	2h 40m
Saskatoon, SK	Southeast	275 km	2h 40m
Prince Albert, SK	East	320 km	3h 30m
Regina, SK	Southeast	530 km	5h 10m
Calgary, AB	Southwest	510 km	5h 15m
Fort McMurray, AB	North	570 km	5h 40m

2.2 Demographics

An understanding of regional demographics assists in forecasting future demand at Lloydminster Airport. Statistics Canada data for the Lloydminster Population Centre was analyzed, which includes the Census Subdivisions for Lloydminster in both Alberta and Saskatchewan.

2.2.1 Catchment Area Size

The population of Lloydminster was 31,400 in 2016, a 13.1% increase from 2011. This increase outpaced the growth rates seen in Alberta (11.6%) and Saskatchewan (6.3%). A growing population is representative of an increasing pool of prospective travellers who may make use of air carrier services, and population growth rates above averages seen elsewhere are an indicator of an improving market.

A catchment area is the geographic zone within which an airport may reasonably be expected to attract users. The definition of a catchment area depends on a wide range of factors, including the distance to alternative airports (e.g. Edmonton, Calgary, and Saskatoon), competing modes of transportation, and the ability of the flights at the catchment airport to satisfy demand.

The representative catchment area for Lloydminster Airport has been approximated with a population of approximately 52,000 people, which includes the following municipalities:

- Lloydminster;
- Vermilion River County;
- Kitscoty;
- Britannia No. 502;
- Vermilion;
- Dewberry;
- Marwayne;
- Wilton No. 472; and
- Paradise Valley.

2.2.2 Population Composition

Incomes can be used as an indicator of the propensity of households and individuals to engage in discretionary travel. Households with high incomes will have increased flexibility to travel for leisure, such as a winter vacation. As shown in Table 2.2, the median individual and household incomes in the Lloydminster Population Centre is comparable to the median Albertan incomes, and significantly exceeds the Saskatchewan and Canadian medians. This is a positive indicator of potential disposable income which can be used for travel, as is the above-average employment rate.

Economic changes in Lloydminster have occurred since the most recent 2016 Statistics Canada census period. Accordingly, the demographic analysis may be subject to change and should be re-evaluated following the next census period.

Table 2.2 – Population Composition

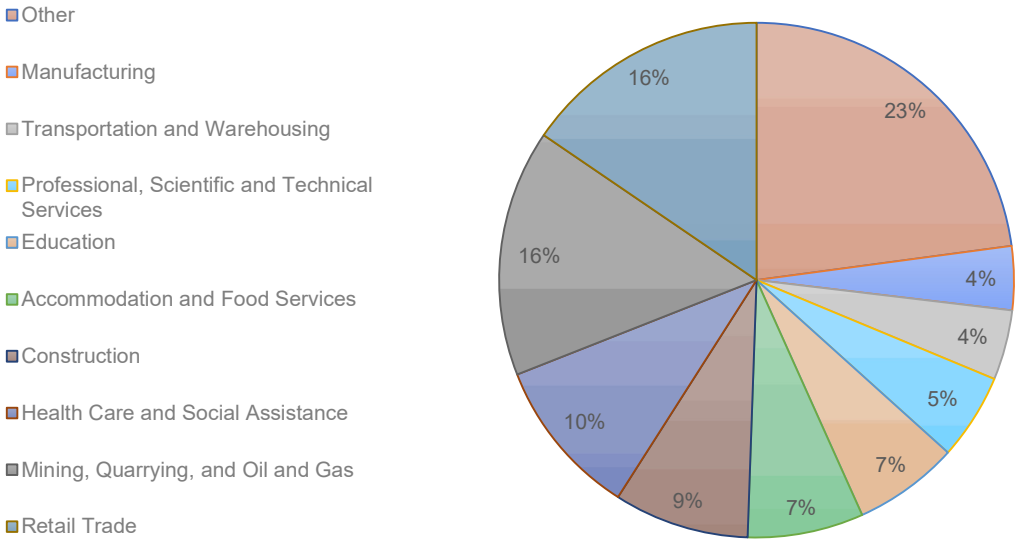
	Lloydminster Population Centre	Province of Alberta	Province of Saskatchewan
Median Total Income	$44,812	$42,717	$38,299
Median Household Income	$94,393	$93,835	$75,412
Employment Rate	67.8%	65.4%	63.5%

2.3 Economy

The health and composition of a regional economy is also an important determinant for air travel demand. The strength of the regional economy can assist in understanding the propensity of business travellers to make use of air services in the community; in periods of economic downturn for example, corporations may be less inclined to incur the costs of staff travel. Further, an understanding of the regional economic composition can assist in making long-term forecasts of airport demand as a function of expected trends in given sectors.

North America Industrial Classification System (NAICS) data was reviewed for the Lloydminster Population Centre to identify the predominant employment industries (Figure 2.2). Lloydminster's role as a regional service centre is reflected in the significant proportion of the population employed in the retail trade, health care and social assistance, accommodation and food services, and education service sectors (39%). Resource extraction is also a notable employment category, with 16% of the population engaged in the mining, quarrying, and oil and gas sector.

Figure 2.2 – 2016 NAICS Employment Codes



Per the September 2019 City of Lloydminster Community Profile, 146 businesses engaged in the resource extraction (mining, oil, and gas) sector were in Lloydminster. The significance of the resource extraction industry is underscored by Husky Energy's operation of a heavy oil upgrader and refinery in the Rural Municipality of Wilton and City of Lloydminster, respectively. Accordingly, the economic health of Lloydminster is partly explained by the broader success of the resource extraction sector. In the Alberta and Saskatchewan context, 30% and 23% of the respective provincial Gross Domestic Products are accounted for by the oil and gas sector.

The resource extraction industry has historically been characterized as one of volatility, with significant periods of economic growth and downturn as a function of matters that include, but are not limited to: global oil and gas prices, politics at all levels, and competition from other supplier nations. The interrelationship between the health of the oil and gas sector and the regional economy is identified in the Province of Alberta 2019-23 Fiscal Plan, which links the 2015-16 recession and lagging Gross Domestic Product growth to trade protectionism, geopolitics, policy uncertainty, and regulatory challenges.

Considering the foregoing information, it is expected that air travel demand at Lloydminster Airport will partly be determined by the health of the regional economy, with an emphasis on the resource extraction sector. While Lloydminster Airport benefits from the diversified nature of its catchment area as a regional service centre, instability in the oil and gas sector may have a negative impact on industry-related charter traffic, business travel, and personal travel if unemployment increases. Conversely, a rebounding resource extraction sector may have a positive impact on Lloydminster Airport.

2.4 Intercommunity Transportation

Lloydminster Airport functions as one part of the broader intercommunity transportation system, which includes the movement of people and goods by road, rail, and air. An understanding of each transportation mode is required to make informed recommendations for the Airport.

2.4.1 Road Network

Lloydminster is located at the intersection of two primary highways: Highway 16 (the Yellowhead Highway) and Highway 17. Highway 16 is an interprovincial route that connects British Columbia's west coast to Winnipeg. From Lloydminster, Highway 16 supports travel to Edmonton, Calgary, Saskatoon, and Regina. Highway 17 is aligned with the border of Alberta and Saskatchewan and provides access to southern destinations in both provinces. The driving time from Lloydminster to the nearest international airport in Edmonton or Saskatoon is approximately 2h 40m.

Intercommunity bus connections are provided by Cold Shot Bus Services, with service to Edmonton; Rider Express, with service to Regina, Saskatoon, and Edmonton; and KCTI, with service to Saskatoon and Edmonton.

Travel via personal automobiles and intercommunity bus service competes with existing scheduled passenger air services to Calgary and enables passengers to choose competitor airports over Lloydminster Airport. Stakeholder consultations identified a general willingness to drive to destinations in both provinces out of perceived financial savings.

Intercommunity freight movement primarily occurs by truck, which is generally more cost-effective for transporting goods compared to air cargo. The existing highway network enables timely connections to existing warehouse and distribution facilities in Saskatoon, Regina, Edmonton, and Calgary, and therefore serves as a competitive force for air cargo services to Lloydminster.

2.4.2 Rail Network

Canadian National (CN) and Canadian Pacific (CP) provide freight rail services to Lloydminster via the Hamlet of Blackfoot and Lloydminster Subdivisions. Lloydminster is not supported by passenger rail services from VIA Rail. The nearest stations are in Edmonton and Saskatoon which are served by VIA Rail's Great Western Way route.

2.4.3 Scheduled Passenger Air Services

Lloydminster receives scheduled services from Calgary (YYC) by WestJet, with flights operated under the company's WestJet Link regional branding. Unlike flights operated by WestJet and WestJet Encore, WestJet Link flights are operated by Pacific Coastal Airlines through a Capacity Purchase Agreement (CPA). In this arrangement, WestJet markets the flights and sells tickets as part of its comprehensive route network, while Pacific Coastal Airlines operates the flight including the provision of the aircraft, crew, and ground staff.

WestJet Link flights are operated with the 34-seat Saab 340B aircraft. Flights have occasionally been upgauged to the 78-seat Bombardier Dash 8 Q400 (De Havilland Canada Dash 8-400) operated by WestJet Encore. WestJet Link's winter 2020 schedule for the Airport is presented in Table 2.3, with one flight per day offered between Lloydminster and Calgary except for Saturdays. Frequency increases seasonally from June 1, 2020 to September 6, 2020, when a Saturday flight is operated for 14 weeks. Frequency then returns to six weekly flights.[1]

The primary advantage of these flights is the ability for passengers to connect in Calgary to other destinations in WestJet's route network, with WestJet serving over 50 seasonal and year-round destinations from this hub. In recent years, WestJet has also commenced flights to international destinations including London, Paris, and Dublin. Approximately 85% of WestJet Link customers connect through Calgary to another destination in WestJet's network. Stakeholder consultations identified concerns with the timing of Lloydminster's flight, which necessitates overnight or extended layovers for certain travel plans.

Table 2.3 – WestJet Link Schedule (Winter 2020)

	SUN	MON	TUE	WED	THU	FRI	SAT
DEP YYC	1420	1420	1420	1420	1420	1420	-
ARR YLL	1534	1534	1534	1534	1534	1534	-
DEP YLL	1610	1610	1610	1610	1610	1610	-
ARR YYC	1721	1721	1721	1721	1721	1721	-

WestJet Link Saab 340B

[1] Air carrier schedules regularly change based on market demand, operational factors, and the reallocation of airline resources. All schedule information and forecast assumptions rely on the information available as of February 10, 2020.

2.4.4 Charter Passenger Air Services

Central Mountain Air currently provides passenger charter air services on behalf of Husky Energy to Calgary International Airport. The air service is operated on a regularly scheduled basis and supports the movement of senior Husky Energy staff and management from Calgary to Lloydminster for on-site work and meetings. Three weekly roundtrips (Monday, Tuesday, and Thursday as of December 2019) are operated using 18-seat Beechcraft 1900D turboprop airliners. These flights are upgauged to 30-seat Dornier 328 and 37-seat Dash 8-100 airliners on an as-needed basis.

As Central Mountain Air's charter flights are processed through an unsecure Fixed-Base Operator (FBO) in Calgary, passengers are not required to proceed through Canadian Air Transport Security Authority (CATSA) screening in Lloydminster and do not make use of the secure holdroom.

Central Mountain Air formerly operated scheduled passenger services between Calgary and Lloydminster; however, this service was terminated in September 2018 after 17 years. Flights were offered between the two cities using the Beechcraft 1900D. From media publications and consultations with the carrier, it is understood that the entrance of WestJet Link into the market and resultant competition contributed to the cessation of the service.

Central Mountain Air Beechcraft 1900D

Central Mountain Air Dornier 328

3 AIRPORT PROFILE

3.1 History

The first airplane in Lloydminster landed in 1919 at a fair. Lloydminster's first airport was located at 62 Street and 50 Avenue. The facility opened in 1950 and included a 3,500 ft. gravel runway in a northwest-southeast alignment, a single taxiway and apron, hangars, and a small terminal. The runway was paved and lights installed in 1971. The airport's short runway limited operations by larger aircraft and necessitated a replacement facility.

The current airport was completed in 1981 by the Province of Alberta at a cost of $6.6 million. The Flight Service Station opened in 1982 and Runway 13-31 was added in 1984. Alberta Transport and Utilities operated the Airport until December 1994, when it was offered for sale as part of government cost-reduction efforts. The City assumed ownership and operations in 1995 and currently oversees the Airport through its Transportation Services department.

Flights from Lloydminster Airport to various destinations have been offered by Air Canada, Central Mountain Air, Corporate Express, Peace Air, Alberta CityLink, Time Air, AirBC, and Capital City Air over the previous decades. Flights were typically operated by regional aircraft such as the Jetstream 31 and Beechcraft 1900. During the Husky Energy upgrader project in the early 1990s, the Airport was also served by larger Dash 8 and BAe 146 airliners.

The original municipal airport (Lloydminster Historical Society)

The current Lloydminster Airport (Lloydminster Historical Society)

3.2 Current Role and Vision

The Airport Role Statement is the fundamental starting point in classifying current Airport activity and determining a future position in terms of long-term activities and development requirements at the site.

The Airport currently serves the needs of scheduled and charter air services, as well as commercial and recreational general aviation operators.

To maximize the economic capabilities of the Airport, the future role should be to provide:

- A point of entry to the national air transportation system through links with scheduled passenger air service hubs;
- A transportation hub for Lloydminster and the surrounding region;
- A tourism gateway for recreational waterfowl hunters and visitors to the region;
- A support centre for critical government air services such as air ambulance, wildfire suppression, and military activities;
- A centre for aviation business in east central Alberta and west central Saskatchewan; and
- A base for flight training and private aircraft owners and operators.

The project team has prepared a candidate vision statement that describes the future state for the Airport to achieve, and that serves as an overarching guide for planning and development. The vision statement is that:

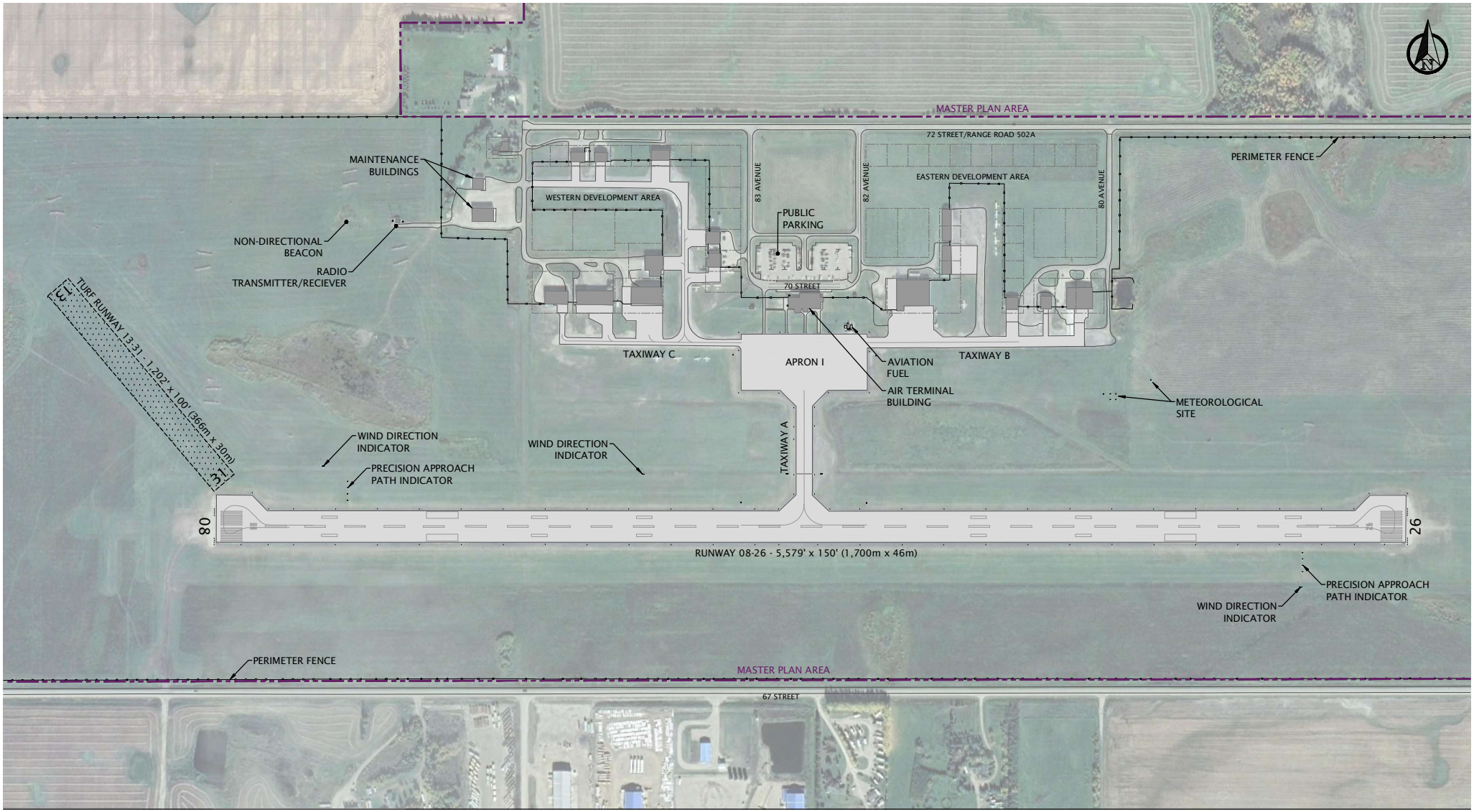
> *Lloydminster Airport shall be a transportation, economic development, and community asset through responsible growth, financial sustainability, and service excellence. The Airport will be recognized as the one of the top regional facilities in the Prairies.*

3.3 Designation

The Airport site plan is presented as Figure 3.1. The Airport's International Air Transport Association (IATA) location identifier is YLL, and International Civil Aviation Organization (ICAO) code is CYLL. Lloydminster Airport is a Certified Airport and must be operated in compliance with Part III of the *Canadian Aviation Regulations* (CARs). As the Airport is used by air carriers providing scheduled passenger services, the facility must be operated as a Certified Airport per CAR 302.01(1)(b).

As a Certified Airport, the facility must be operated in accordance with *TP312 – Aerodrome Standards and Recommended Practices* and is subject to regulatory compliance inspections by Transport Canada. Lloydminster Airport is certified to the 4th Edition of TP312 which was released in 1993. In 2015, TP312 5th Edition came into force and effect, which introduced new performance-based standards. Amendment No. 1 to 5th Edition was subsequently adopted on January 15, 2020. As the Airport's certification was granted in 1995, prior to the implementation of TP312 5th Edition, it is "grandfathered" to TP312 4th Edition per CAR 302.07.

Compliance with TP312 5th Edition will be required when any part of the Airport is replaced or improved, including reconstruction, replacement, and level of service improvement projects. Accordingly, the recommendations of this Master Plan are prepared in accordance with TP312 5th Edition (Amendment No. 1). Considering the foregoing, **it is recommended that the City of Lloydminster complete a TP312 5th Edition Gap Analysis in the short-term to identify the facility-specific implications and costs of certifying to 5th Edition.**



LLOYDMINSTER AIRPORT
MASTER PLAN

FIGURE 3.1 - AIRPORT SITE PLAN

APRIL 2020

0 125 250 METRES

*FOR PLANNING PURPOSES ONLY

3.4 Current Activity

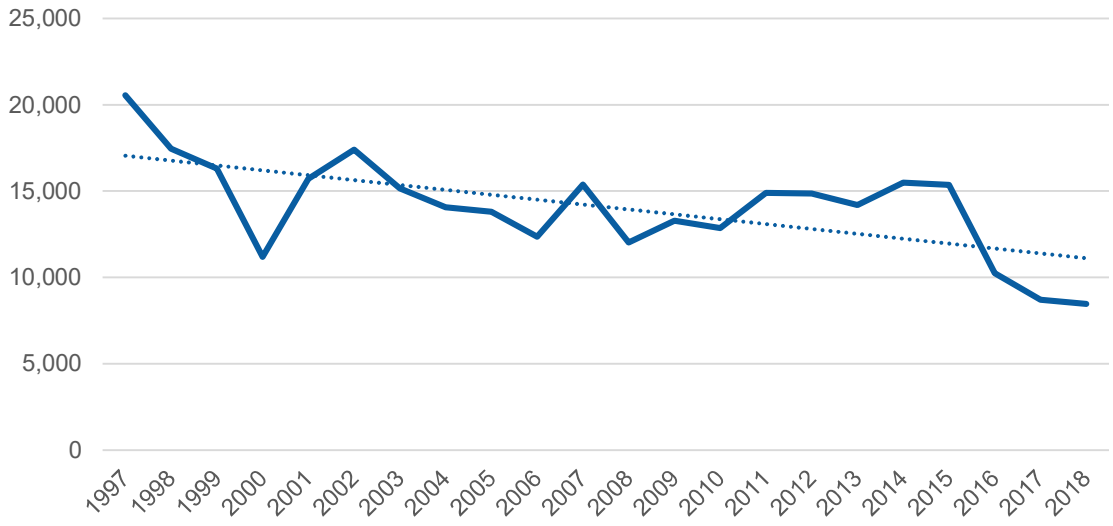
Airport activity is quantified through three metrics: aircraft movements, passenger traffic, and air cargo. Datasets for each category are analyzed to understand the existing usage of the Airport and to inform the activity forecasts.

3.4.1 Aircraft Movements

Statistics Canada aircraft movement data was retrieved for the period of 1997 to 2018 for the Airport. An aircraft movement is defined as a single landing, take-off, or touch and go. Movements are subclassified as being itinerant, in which an aircraft departs from or arrives at Lloydminster from another airport; or local, where the aircraft arrives and departs from the same airport.

Total movements have declined from approximately 20,500 in 1997 to 8,500 in 2018. Variability is evident in the annual movements, as shown in Figure 3.2. Movements have declined by 59% across the dataset for an average decrease of 2.7% per year. Aircraft movement data aligns with certain economic indicators; the changes seen in 2008 and 2015, for example, correlate with significant decreases in the price of oil and provincial Gross Domestic Product.

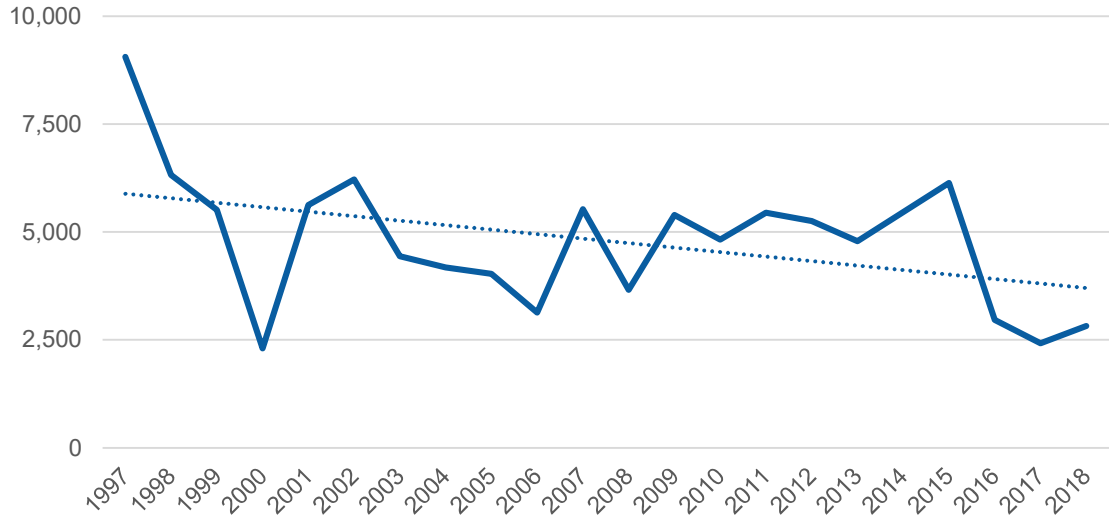
Figure 3.2 – Total Movements (Annual)



Local Movements

Local movements declined from approximately 9,000 in 1997 to 2,800 in 2018, or 69% across the data period. Considerable annual variation is evident (Figure 3.3). For example, local movements decreased by 58% between 1999 and 2000, increased by 144% between 2000 and 2001, increased by 76% between 2006 and 2007, and decreased by 52% between 2015 and 2016. Local movements are closely related to general aviation. Recreational flying is a discretionary expense that is tied to the availability of disposable income. This relationship may partially explain the significant decrease in local movements during the 2015 economic downturn. A small proportion of local movements are performed by the Royal Canadian Air Force (RCAF). Between 2016 and 2018, the RCAF averaged 74 annual local movements at the Airport.

Figure 3.3 – Local Movements (Annual)



Itinerant Movements

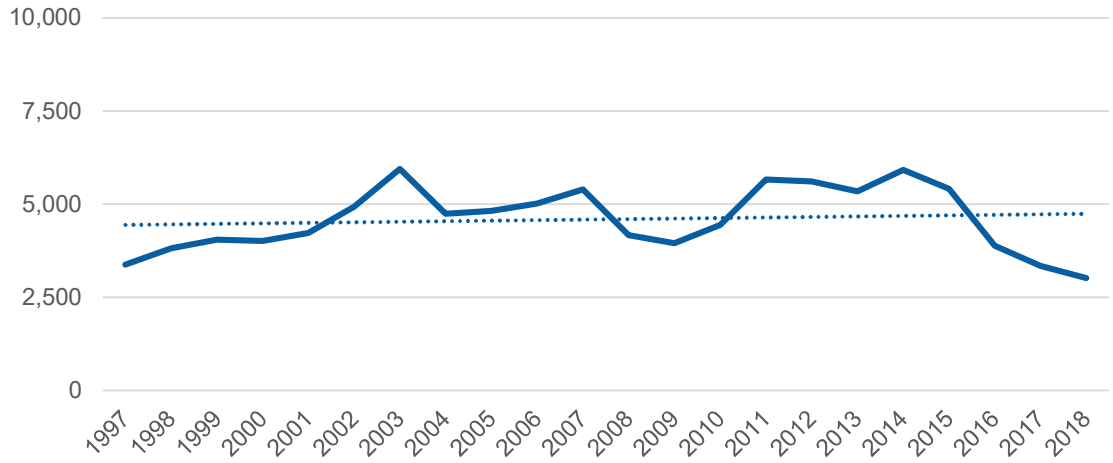
Statistics Canada classifies itinerant movements into six categories:

1. Air Carrier (Level I-III);
2. Air carrier (Level IV-VI);
3. Other Commercial;
4. Government Civil;
5. Government Military; and
6. Private.

Air Carrier Movements

Air carrier movements (Level I-VI) have declined by 11% from approximately 3,400 in 1997 to 3,000 in 2018. Maximums of 5,900 movements occurred in 2003 and 2014. Numerous carriers currently or have historically served Lloydminster, including WestJet Link, Central Mountain Air, and Peace Air. Competition between carriers, new and cancelled routes, industry charter requirements, and the health of the economy impact air carrier movements at Lloydminster. Full-year data for 2019 was unavailable at the time of the Master Plan's preparation; it is expected that movements in this category may increase as a result of WestJet Link service. Historical air carrier itinerant movements are presented in Figure 3.4.

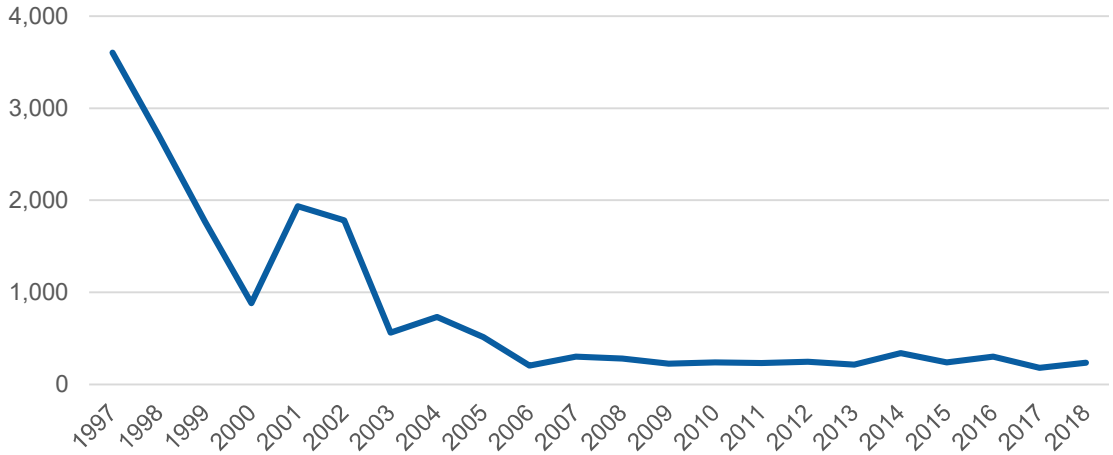
Figure 3.4 – Air Carrier Itinerant Movements (Annual)



Other Commercial Movements

Other commercial movements include flights performed by commercial operators not included in the air carrier categories. This includes flight training, aerial applicators, photography and surveyors. This category has declined significantly from approximately 3,600 movements in 1997 to 200 movements in 2018. The reasons for this decrease are unclear, and may be attributed to changes in data collection methodology. Businesses at Lloydminster Airport within this category are limited to Border City Aviation, which provides flight training, aerial photography, survey, and pipeline inspection services. Aerial application operations are limited due to competition from other facilities (e.g. Wainwright, North Battleford). Flight training involves both itinerant and local movements; the former involves students travelling between different airports as part of their cross-country training, while the latter includes pilots practicing circuit procedures and upper air work. Therefore, non-itinerant flight training movements are not reflected in these statistics. Other commercial itinerant movements are presented in Figure 3.5.

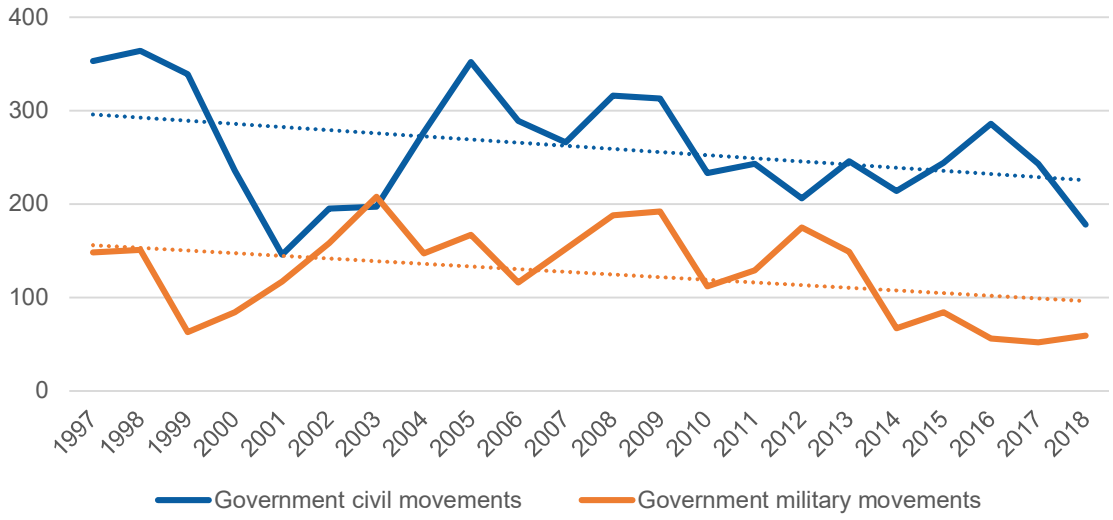
Figure 3.5 – Other Commercial Itinerant Movements (Annual)



Government Movements

Government civil movements include wildfire suppression, air ambulance, and government transport flights. There was an average of 261 annual movements in this category, with movements decreasing by 50% between 1997 and 2018. With respect to wildfire suppression and air ambulance movements, data reporting underrepresents the government civil category. In Saskatchewan, air ambulance and wildfire services are provided by the provincial government, whereas these services are provided by contracted private carriers in Alberta. Therefore, Albertan wildfire and air ambulance flights may not be reflected in these statistics. Further, both provincial governments have sold their executive transport fleets and shifted to air carrier services, further reducing government civil movements. Government military movements include flights by the RCAF. There was an annual average of 126 movements in this category, although movements have decreased by 60% since 1997 to 59 in 2019. Lloydminster Airport is approximately 120 km from Canadian Forces Base (CFB) Cold Lake, a significant RCAF facility. Given its proximity to CFB Cold Lake and the capabilities of its airside infrastructure, Lloydminster Airport is used as an alternate landing location when flights to and from Cold Lake cannot be supported. Government itinerants movements are presented in Figure 3.7.

Figure 3.6 – Government Itinerant Movements (Annual)

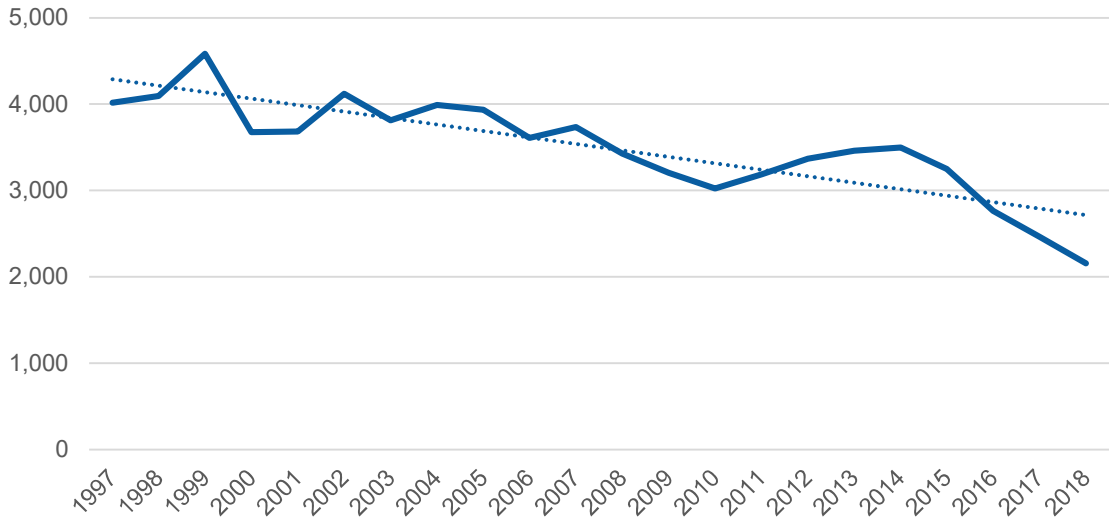


Private Movements

Private movements include flights not categorized in the preceding categories, and represent individuals flying recreationally or for non-commercial reasons. Private itinerant movements have declined from approximately 4,500 movements in 1999 to 2,200 movements in 2018; this is a decrease of 46% or 2.6% per year.

This trend is similar to that of other regional airports. During the same period, private itinerant traffic decreased by an average of 1% annually at Lethbridge and Red Deer; by 6% at Prince Albert; and Medicine Hat averaged 0%. This is also consistent with the national trend; itinerant private movements at all Canadian airports with Flight Service Stations decreased by an average of 2% per year between 1997 and 2018. Among the factors contributing to this trend is the rising cost of recreational flying, including aviation fuel prices and insurance rates. Private movements are presented in Figure 3.7.

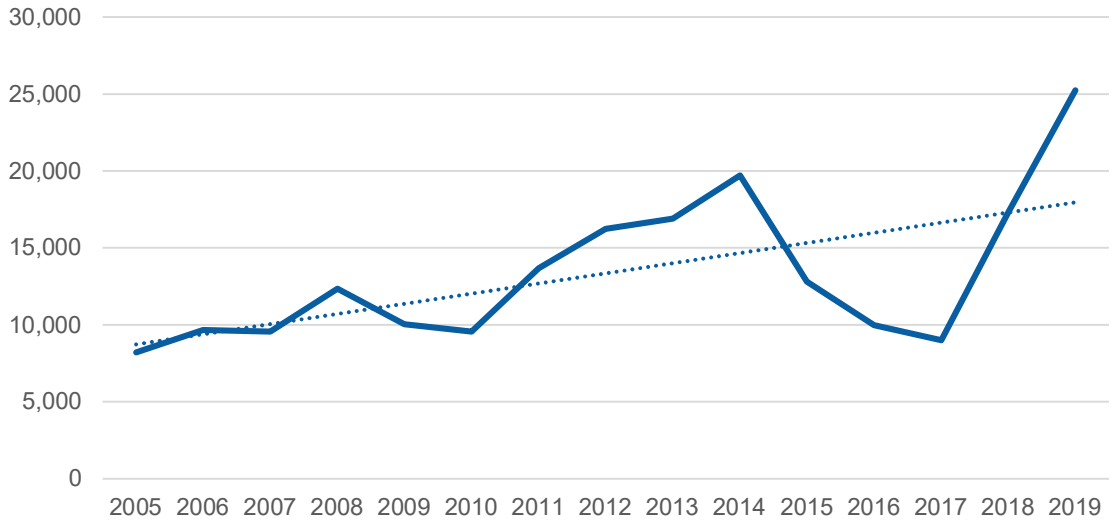
Figure 3.7 – Private Itinerant Movements (Annual)



3.4.2 Passenger Activity

Passenger activity data is available from 2005 to 2019. Passenger traffic at the Airport has increased from approximately 8,000 Enplaned and Deplaned (E/D) passengers in 2005 to 25,000 E/D passengers in 2019[2]. Passenger activity has increased by 13% annually, although variation is evident in year-over-year values as shown in Figure 3.8. The sensitivity of the regional air travel market to the Alberta and Saskatchewan economies is evident in the declines experienced from 2008 to 2010 and 2014 to 2017; both cases correspond with periods of economic downturn.

Figure 3.8 – Passenger Activity (Annual)



[2] Charter flight passenger activity is measured based on the total capacity of the aircraft and not the number of occupied seats. Therefore, charter passenger levels are over-estimated and total passenger activity will be lower.

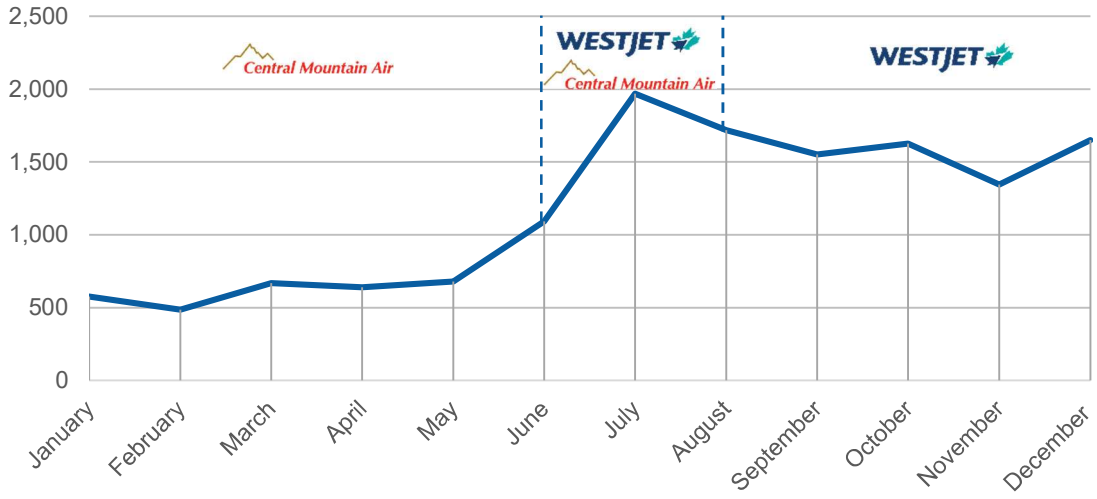
Passenger activity grew significantly in 2018 (110% increase) and 2019 (40% increase). The introduction of WestJet Link service in June 2018 and the resulting market stimulation effects can partially explain this growth. The increase in passenger activity seen in Lloydminster is consistent with that of other new WestJet Link markets (e.g. Lethbridge and Medicine Hat). WestJet service enables passengers to connect through the carrier's hub to destinations across Canada, the United States, Europe, Central America and the Caribbean. Further, the positive media coverage of new services increases public awareness of the Airport.

The resiliency and sensitivity of the regional market to the entrance of a new carrier is also a considerable factor for Lloydminster Airport. In 2018, Central Mountain Air was the only carrier providing scheduled passenger air services to Calgary until June 21 when WestJet Link began serving the same market. Traffic increased in June and July by 61% and 80%, respectively, due to market stimulation and low competitive airfares (Figure 3.9). The cessation of Central Mountain Air's flights in August resulted in decreases of 13% and 10% in August and September, respectively, before service stabilized.

In general, a review of passenger activity from 2005 to 2019 and the 2018 scenario described above demonstrates three key trends that have been considered during the development of the Master Plan:

1) Passenger activity is closely related to the strength of the regional, provincial, and national economies, and annual variation should be expected;
2) Service by WestJet Link through its hub in Calgary has stimulated the market; and
3) Air service development efforts should consider the sensitivity of the market to competition, and growth objectives should not undermine existing air services. Efforts to attract an airline that would directly compete with WestJet, such as Air Canada, may be construed negatively by the incumbent and provide capacity that exceeds what the regional market can absorb.

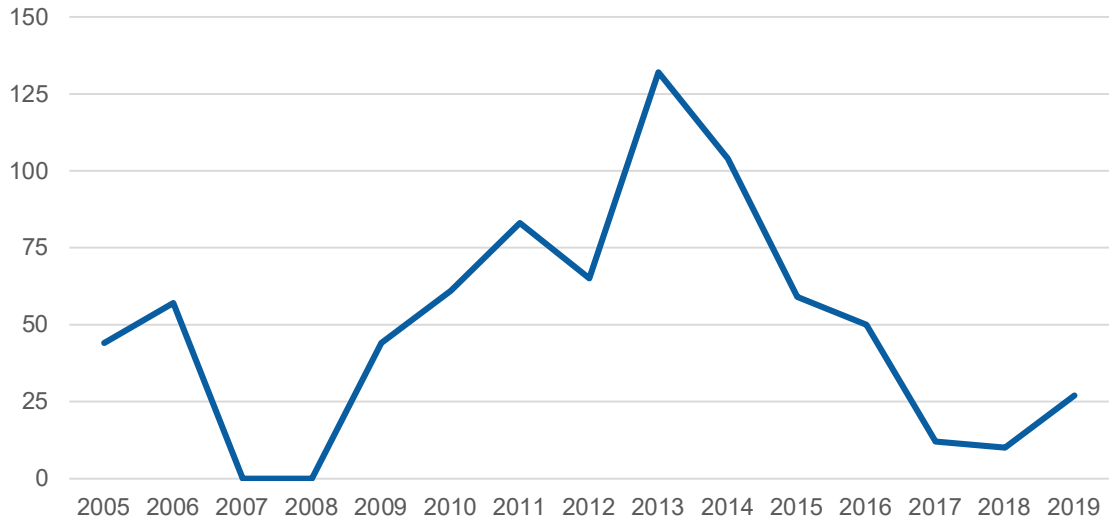
Figure 3.9 – Monthly Passenger Activity (2018)



3.4.3 Air Cargo

Air cargo operations are limited at Lloydminster Airport, and the low volume of goods can generally be accommodated in the cargo holds of airliners operating scheduled and charter passenger flights. Figure 3.10 shows the number of flights carrying cargo at the Airport as reported by the City; 27 such flights were handled in 2019, and an average of one flight per week or less occurred throughout the data period. The average annual cargo throughput was 215 kilograms between 2014 and 2017. From consultations with air carriers, cargo is not a primary consideration for the Lloydminster market. Most freight in Lloydminster is moved by road and rail, both of which have lower unit transportation costs than air.

Figure 3.10 – Air Cargo Flights (Annual)



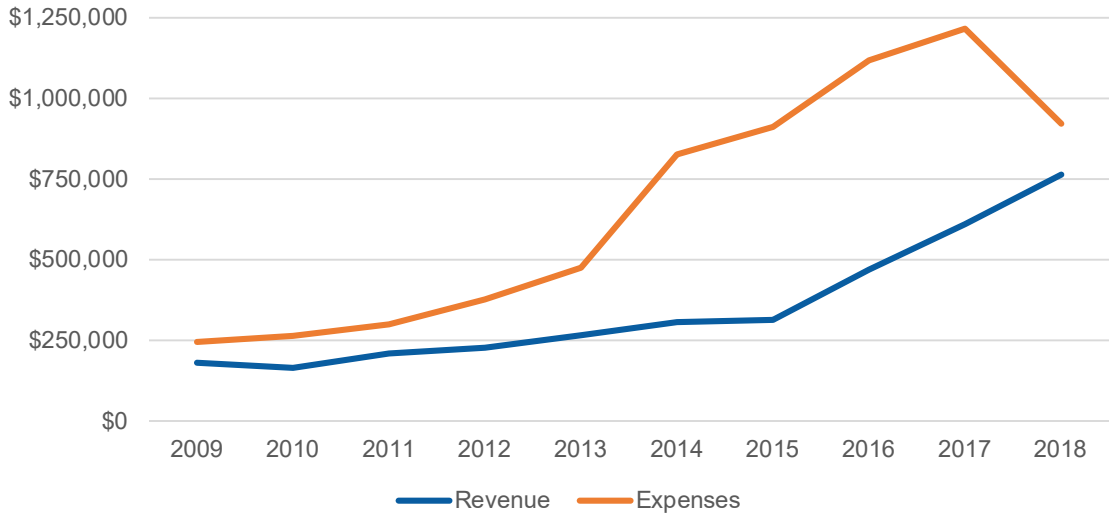
3.5 Financial Position

Lloydminster Airport is owned and operated by the City of Lloydminster. The City is responsible for funding ongoing operations and capital expenditures at the site, and any cost/revenue deficits are absorbed by the City. Financial statements for the Airport are available from 2009 to 2018 and were reviewed during the preparation of the Master Plan. Historical changes in financial recording procedures may impact the data quality and analysis.

The financial information indicates that the Airport has been operated at an annual deficit that ranges from approximately $64,000 in 2009 to $648,000 in 2016. Revenues have increased from $181,000 in 2009 to $764,000 in 2018; however, expenses have also increased from $245,000 to $921,000 in the same period.

While expenses exceeded revenues throughout the data period, the Airport deficit decreased significantly in 2018. Expenses from contracted services and wages declined from 2017 to 2018 while Airport revenues increased by 25%. The increase in revenues may be partly attributable to the launch of WestJet services and the accompanying aeronautical fees and fuel sales. However, it is understood that municipal accounting practices also changed in 2018; therefore, the decrease in expenses may be a result of reallocated cost centres. Overall, the Airport's financial position is similar to many regional airports in Canada that support a modest and growing volume of scheduled passenger air services. The Airport's annual operating revenues and expenses for 2009 through 2018 are presented in Figure 3.11.

Figure 3.11 – Airport Financial Data (Annual)



3.6 Economic Impact

The value of the Airport can partly be quantified by studying its economic impact. Despite the profit or loss of the facility itself, benefits are often generated throughout the region that are not reflected in annual Airport financial statements. Three economic impact metrics are typically used in the context of airports: Full-Time Equivalent (FTE) employment, labour income, and Gross Domestic Product (GDP). These metrics can be applied within three distinct categories:

1. **Direct:** Wages, expenses, and economic contributions of on-Airport businesses, tenants, and activities; for example, wages paid to flight instructors.
2. **Indirect:** The wages and expenses added to the region by users of the Airport. For example, this may include passengers buying meals or hotel stays in Lloydminster.
3. **Induced:** A "ripple effect" whereby the direct and indirect wages and expenditures on goods and services generate income for residents of Lloydminster. The residents spend a part of this income, thereby providing income to additional persons.

An airport's economic contribution can also include tax payments and the catalytic impacts experienced by businesses and the tourism industry through connections to the global passenger and freight air transportation network.

In the context of Lloydminster Airport, the facility's economic impact has been estimated through the contribution of on-Airport businesses and tenants, and visitor stimulation as a result of WestJet services.

3.6.1 Business and Tenant Economic Impact

A survey of Airport tenants and businesses was completed to collect economic data that included: employee totals, salaries, and goods and services expenditures in the region. Collected and analyzed data also considers temporary economic impacts from on-Airport capital projects, such as the 2019 airside surface rehabilitation program.

An input-output analysis was completed using a matrix produced by Statistics Canada and the Alberta Treasury Board that shows the value of goods and services each industry buys and sells to other industries, as well as employment and labour income multiplier values. These multiplier values are applied to the survey data to determine indirect and induced economic impact.

As shown in Table 3.1, Lloydminster Airport's annual economic impact includes the support of 56 FTE positions, labour earnings of approximately $2.9 million, and GDP contributions of $3.9 million.

Table 3.1 – Airport Business and Tenant Economic Impact (Annual)

	Direct	Indirect	Induced	Total
FTE Positions	34	15	7	56
Labour Earnings	$1,971,409	$738,635	$234,519	$2,944,562
GDP	$2,496,827	$1,021,301	$424,224	$3,942,352

3.6.2 WestJet Service Economic Impact

As part of the Master Plan process, the project team examined the economic impact of scheduled passenger air services provided by WestJet Link to Calgary by analyzing several variables, including but not limited to:

- The proportion of resident and visitor travellers;
- The number of new visitors (i.e. visitors who did not previously enter the region by road) that arrive as a result of the availability of air services; and
- The length of visitor stays in the region and their spending.

It is assumed that 40% of passengers are visitors and of that total, 20% would not have entered the region without the availability of WestJet flights. Therefore, the model assumes that an

estimated 800 new visitor trips occurred through one year of WestJet Link's service to Lloydminster. Table 3.2 provides the estimated impact of WestJet's service from November 2018 to October 2019. The data demonstrates that visitor trips support approximately 2.5 FTE positions, annual labour earnings of $190,000, and contribute $210,000 to the regional GDP.

Table 3.2 – WestJet Service Economic Impact (Annual)

	Direct	Indirect	Induced	Total
FTE Positions	2.0	0.3	0.1	2.5
Labour Earnings	$66,887	$108,472	$14,259	$189,618
GDP	$98,367	$85,719	$25,797	$209,884

The economic impacts identified herein, while interrelated, should be treated as discrete entities and not combined. Pacific Coastal Airlines staff are counted in Table 3.1 and these impacts would not occur without the throughput of visitors considered in Table 3.2. However, airline staff impacts are fixed and are separate from the variable impacts of each new visiting passenger. Further, data collection and estimation methodologies vary between the two categories, limiting the ability to make direct comparisons.

3.7 Social Impacts

In addition to the economic impacts of Lloydminster Airport, the facility has qualitative social impacts on the wellbeing of residents of Lloydminster and the surrounding region.

3.7.1 Air Ambulance Operations

Lloydminster Airport supports air ambulance flights from three organizations: Alberta Air Ambulance, Saskatchewan Air Ambulance, and the Shock Trauma Air Rescue Society (STARS). The Airport accommodated 239 air ambulance flights in 2019, with volumes trending upwards over time. Support for intercommunity critical care and patient transfer flights is a key social function of Lloydminster Airport.

Alberta Air Ambulance and Saskatchewan Air Ambulance provide fixed-wing intercommunity flights, transferring patients to facilities with higher levels of care. Both services utilize the Beechcraft King Air series of aircraft, with Alberta's services performed under contract by CanWest Air. Patients are moved from Lloydminster Hospital to the Airport, where they are transferred to the aircraft and flown to their destination. Flights typically operate to Edmonton, Calgary, Saskatoon, and Regina. Stakeholder consultations indicate that air ambulances are more efficient than ground-based ambulances for trips over 250 km, and local resources are not removed from service in the process.

STARS operates critical care missions to the Lloydminster Hospital heliport. Lloydminster Airport is used by STARS for the refuelling of their Airbus BK-117 helicopters, which have a shorter range compared to the larger AgustaWestland AW139 and Airbus H145 fleets.

Beechcraft King Air (Alberta Air Ambulance)

3.7.2 Government Air Services

Lloydminster Airport is not part of Alberta Wildfire's network of primary and secondary air tanker bases. However, the facility can support the refuelling of suppression and observation aircraft engaged in nearby operations. Additionally, the robust infrastructure of the Airport enables it to handle aircraft-based community evacuations by the RCAF. Lloydminster also supports occasional flights by the Royal Canadian Mounted Police Air Services Branch, which provides airborne law enforcement services.

3.7.3 Education and Youth Development

Lloydminster Airport supports field trips from the Lloydminster Catholic and Public School Divisions. These trips are an opportunity to teach students about concepts such as basic aeronautics and meteorology. Consultations with both school divisions indicate that the teaching staff value these trips and that they have a positive impact on student learning. Amid a nationwide aviation labour shortage, these trips are also an opportunity to stimulate interest in aviation as a career.

The Royal Canadian Air Cadets is a program that aims to develop attributes of good citizenship, leadership, physical fitness, and interest in the RCAF in youth. 186 Squadron is based in Lloydminster with approximately 90 members between the ages of 12 and 19. 186 Squadron utilizes the Airport for familiarization flights at least once per year and conducts its Annual Ceremonial Review at the Airport. In 2019, Border City Aviation was contracted to train eight Cadets through the Power Pilot Scholarship.

3.7.4 Future Community Role

Lloydminster Airport is a municipal facility that functions as part of the community. Airports across Canada consider their social responsibility in different ways, with some facilities striving to be "good neighbours" and championing outreach efforts. Exposing residents to the operations of the Airport can have several benefits, including:

- Improving local knowledge of the Airport and its air carrier services;
- Building support for the Airport which can be leveraged during municipal priority setting and budget deliberations; and
- Exposing youth to the aviation industry and associated career paths.

Toronto Pearson International Airport is one such example where the Greater Toronto Airports Authority (GTAA) invested in Danville Park to improve its connection with residents and nearby neighbourhoods.

Danville Park, a community investment near Toronto Pearson (GTAA)

3.8 Stakeholder Consultations

Consulting with a wide variety of stakeholders emphasizes local knowledge and leads to a fulsome understanding of existing conditions and opportunities at Lloydminster Airport. A comprehensive stakeholder consultation program was completed by the project team during the development of the Master Plan that included a public open house, on-site meetings, telephone interviews, and an online survey. More than of 31 organizations were consulted as shown in Table 3.3, as well as 19 individuals who attended the public open house.

The findings of the stakeholder consultation program are considered throughout the Master Plan. Common findings included, but were not limited to the following:

- Concerns with respect to the length of Runway 13-31 and the usability of Runway 08-26 in crosswind conditions;
- The strength of the Airport's management and maintenance operations;
- The functionality of the Air Terminal Building could be improved in the future;
- The availability of aviation fuel is an asset;
- A morning air carrier flight to Calgary would benefit the business community;
- A Fixed-Base Operator would be an asset for the Airport;
- Future air services to Edmonton, Saskatoon, or Regina should be pursued; and
- Competitor airports, such as Vermillion and North Battleford, impact the decision to use Lloydminster Airport.

Table 3.3 – Consulted Stakeholder Organizations

Stakeholder Type	Organizations Consulted
Air Carriers	WestJet
	Pacific Coastal Airlines
	West Wind Airlines
	CanWest Air
	Central Mountain Air
	Provincial Helicopters
Air Ambulance Providers	Alberta Health Services
	Saskatchewan Air Ambulance
	Shock Trauma Air Rescue Society (STARS)
Industry Associations	Saskatchewan Aviation Council
	Saskatchewan Aerial Applicators Association
	Alberta Airport Managers Association
Airport Tenants and Businesses	Border City Aviation
	Reinhart Group
	Musgrave Enterprises
	Fowler Financial Holdings
	NAV CANADA
	CATSA / Garda World
	Avis / Budget Car Rental
	Enterprise Rent-a-Car
Business, Education, and Economic Development	Lakeland College
	Lloydminster Chamber of Commerce
	Northeast Alberta Information Hub
	Lloydminster Health Foundation
	Husky Energy
	Lloydminster Public School Division
	Lloydminster Catholic School Division
	Royal Canadian Air Cadets – 186 Squadron
Government	City of Lloydminster
	County of Vermillion River
	Regional Municipality of Britannia

3.9 Strengths, Weaknesses, Opportunities, and Threats

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is provided herein as a high-level overview of Lloydminster Airport's internal Strengths and Weaknesses and external Opportunities and Threats - conditions that influence development recommendations within the Master Plan. The SWOT analysis includes factors within the City of Lloydminster's control and external considerations and contemplates information gathered through the Regional Socioeconomic Profile and the profile of the Airport and the activities it supports.

The SWOT analysis factors identified were determined through research, analysis, stakeholder engagement, and the project team's understanding of operations at Lloydminster Airport, and other similar facilities and markets in Canada.

3.9.1 Strengths

- The Airport is a well-managed and maintained facility leading to positive perceptions from aircraft operators.
- The Air Terminal Building provides an acceptable level of service for unsecure charter flights.
- The availability of avgas and jet fuel attracts visiting aircraft.
- The pavements of Runway 08-26, Taxiway A, and Apron I have a renewed service life.
- The community of Lloydminster functions as a regional service centre with a partially diversified economy, increasing the resiliency of air service demand.
- The Airport supports a large geographic catchment area with scheduled services.
- The local community receives social benefits from air ambulance flights, Air Cadet activities, and school field trips.

3.9.2 Weaknesses

- The movement of passengers and cargo to/from Lloydminster Airport is limited by competition from other airports in Edmonton, and Saskatoon and through surface-based forms of transportation (road, rail).
- The timing and frequency of existing air carrier services does not meet the needs of business travellers and incentivizes passengers to choose alternate airports to meet their travel schedule requirements.
- The general public's knowledge of the Airport and its air service offerings is limited, although growing since the introduction of WestJet Link.
- The functionality and capacity of the Air Terminal Building limits the growth of peak hour scheduled passenger air services.
- Airport tenants report tension with the terms of future lease agreements.
- Full municipal servicing has not been extended to the Airport.
- Landing fees are a deterrent to substantial growth in aircraft movement activity.
- The existing development process is perceived as being unclear and difficult.
- Minimal marketing has been completed for the Airport.
- Fog can periodically restrict operations.

3.9.3 Opportunities

- The lack of airspace congestion and existing airfield infrastructure is conducive to flight training.
- Land development at Lloydminster Airport has not been fully exploited which can be a source of non-aeronautical revenues.
- Additional private and corporate traffic could be attracted with a Fixed-Base Operator.
- Future passenger air service connections to Edmonton, Saskatoon and / or Regina could be pursued with an interested air carrier.
- Increased frequency and/or adjustment of flight times on existing air carrier flights to/from Lloydminster and Calgary may stimulate additional demand and activity.
- The Airport can proactively prepare for emerging technologies, such as Unmanned Aerial Vehicles.
- Public education on the Airport can be further promoted to improve demand and increase interest in the facility.
- Relationships with local businesses, organizations, and economic development groups can be leveraged to support future commercial land and air service development campaigns.

3.9.4 Threats

- Securing capital project funding from upper levels of government is a challenge.
- Scheduled air carrier services by WestJet Link could be terminated if sufficient demand and yields are not attained, or if another market is deemed more profitable for the carrier.
- Aging regional aircraft (e.g. Beechcraft 1900, Saab 340) may prompt airlines to renew their fleets with larger, more modern aircraft that may provide excess capacity for Lloydminster with current demand levels.
- Continued protection from incompatible land uses in the vicinity of the Airport will be required.
- Competition for recreational and general aviation commercial traffic among other airports in the region (e.g. Vermillion, North Battleford).

4 DEMAND ASSESSMENT

4.1 Activity Forecasts

Forecasts of aircraft movements, passenger activity, air cargo, and economic impact have been prepared for the 25-year Master Plan horizon. The activity forecasts presented herein have been developed to be rigorous and are supported by available data, although variability should be expected. Each forecast can be significantly affected by factors that cannot be accounted for such as regional population change, periods of economic growth and recession, and major external events (e.g. airline bankruptcies and mergers).

At the time of the Master Plan's preparation, considerable uncertainty exists with the air travel industry as a result of the COVID-19 pandemic, which is not modelled. A significant decrease in short-term Airport activity should be expected as a result of COVID-19.

4.1.1 Aircraft Movement Forecast

To determine future airfield infrastructure requirements within the Master Plan, local and itinerant aircraft movements are forecast separately, as well as peak hour movements.

Local Movements

The forecast methodology for local movements considers private, flight training, and RCAF movements. Three scenarios are considered throughout each of the study planning horizons:

1. **Status Quo:** Movements decline by 3% per year based on the average annual change from 1997 to 2018. RCAF local movements are maintained at the average of 2016 to 2018 (74 movements). Annual local movements decrease to 1,300 by 2045.
2. **Stabilized Decline:** Movements decrease by 1% annually. The Stabilized Decline scenario assumes a degree of weakness in local private movements, partially offset by increased flight training. Local movements decrease to 2,100 by 2045.
3. **Moderate Growth:** Movements increase by 2% annually based on the growth in local movements at four Alberta and Saskatchewan airports which have successful Flight Training Units: Regina, Saskatoon, Grande Prairie, and Medicine Hat. The Moderate Growth scenario assumes that flight training at Lloydminster is a significant driver of local movement growth. Local movements increase to 4,500 by 2045.

From consultations with industry associations, it is recognized that Lloydminster Airport has considerable flight training potential. Further, the Canadian aviation industry is experiencing a shortage in skilled aviation labour, including pilots. Therefore, the Moderate Growth scenario is selected as the preferred local movement forecast.

Itinerant Movements

Itinerant movements were forecast across five categories:

1. **Air Carrier:** Air carrier activity is forecast according to the scenario-based passenger projections. In addition to forecast growth in scheduled and charter air carrier movements, a constant of 2,000 movements is carried forward to account for the continuance of unaccounted traffic identified in historical records.
2. **Other Commercial:** There was an average of 269 annual movements in this category from 2005 to 2018. This average is held constant across the forecast period.
3. **Private:** Private movements are forecast to decrease by 1% per year; this represents a stabilized decline scenario versus the historical annual average of -2.6%.

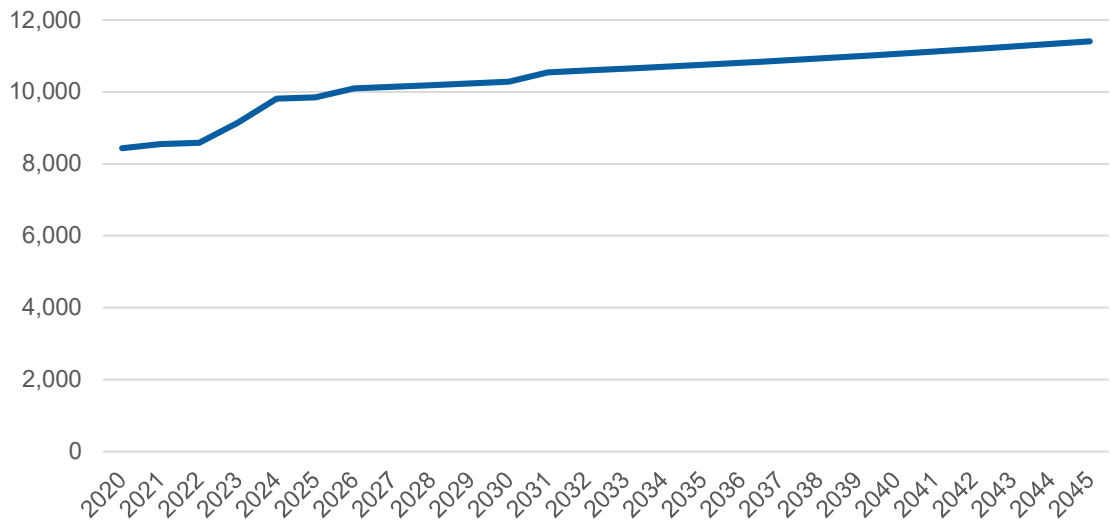
4. **Government Civil:** Movements in this category are forecast to increase by 1% per year to account for additional air ambulance activity.
5. **Government Military:** Itinerant RCAF traffic is held constant at the 2014 to 2018 average of 64 annual movements.

Combining these five forecast inputs, itinerant traffic is forecast to increase to approximately 6,900 annual movements by the end of the long-term planning horizon (2045).

Total Movements

Total movements are the sum of local and itinerant traffic and are forecast to increase to approximately 11,400 annual movements by the end of the long-term planning horizon. This represents a gradual recovery above the levels seen during the economic downturn from 2015 to 2018, but not to the peaks experienced in 1997, 2002, or 2015. The forecast total movements are presented in Figure 4.1.

Figure 4.1 – Forecast Total Movements (Annual)



Peak Hour Movements

Aircraft movements are not evenly distributed across the year or throughout the day. The prevalence of good weather and Visual Flight Rules (VFR) conditions in the summer, for example, allows for increased activity by general aviation pilots. Conversely, inclement Instrument Flight Rules (IFR) weather limits activity to appropriately equipped aircraft and pilots. The analysis of airfield capacity considers peak hour movements; the number of movements during the busiest hour of the busiest day of the year.

Based on Statistics Canada data, the 2019 peak hour[3] occurred on July 16 from 1500 to 1600; during this baseline period, 42 movements occurred. By applying the forecast change in annual movements to the peak hour movements baseline, the 2025, 2030, and 2045 peak hours are provided in Table 4.1, in addition to the increase in forecast peak hour movements compared to the baseline.

[3] Partial year data for 2019 is available from Statistics Canada, including January to November. Historically, the Peak Hour does not occur in December, therefore this dataset is a sufficient baseline.

Table 4.1 – Forecast Peak Hour Movements

Baseline (2019)	Short-Term (2025)	Medium-Term (2030)	Long-Term (2045)
42	48 (+6)	51 (+9)	57 (+15)

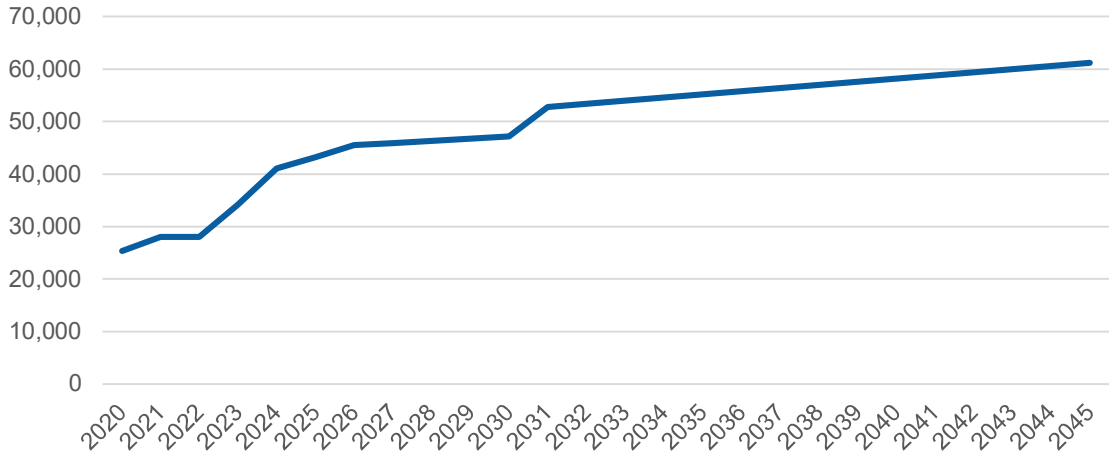
4.1.2 Passenger Activity Forecast

A scenario-based E/D passenger traffic forecast has been prepared as part of the Master Plan. This forecast is supported by industry analysis, findings from the stakeholder consultation program, and the professional experience of the project team. The passenger traffic forecast accounts for three separate services: WestJet, Central Mountain Air, and a new air carrier. The forecast assumptions are described in the following sections. As shown in Figure 4.2, passenger activity is expected to increase from 25,000 passengers per annum in 2019 to:

- Short-Term (2025): 43,000 passengers per annum;
- Medium-Term (2030): 48,000 passengers per annum; and
- Long-Term (2045): 61,000 passengers per annum.

The passenger traffic forecast was finalized prior to the commencement of the COVID-19 pandemic in Canada. A significant decrease in air carrier activity is being experienced as a result of travel restrictions and social distancing measures. The full extent of this downturn is unknown and is not accounted for in the model; therefore, variation should be expected.

Figure 4.2 – Forecast Passenger Activity (Annual)



WestJet Forecast Assumptions

WestJet accounts for the majority of annual passenger activity at the Airport. Forecast assumptions are as follows:

- **Short-Term (2021):** Summer seasonal Saturday flights are converted to a year-round service, with seven weekly flights offered.
- **Short-Term (2023):** A second daily flight is added on weekdays, increasing the weekly frequency to 12 flights. This addition is optimized to accommodate business travellers by providing improved flexibility and connectivity through Calgary.
- **Long-Term (2031):** Fleet renewal is assumed to be required to replace the Saab 340s operated by Pacific Coastal Airlines. A 50-seat representative aircraft is introduced, such as the ATR 42-600 as discussed in the design aircraft section of the Master Plan.

With each additional frequency, corresponding load factor fluctuations are modelled. It is assumed that overall load factors temporarily decrease following the addition of new flights, followed by incremental increases as the service matures. WestJet passenger traffic is forecast to increase by approximately 1.5% per year for the duration of the Master Plan horizon, except for additional growth as a result of the assumptions for 2021, 2023, and 2031.

Central Mountain Air Forecast Assumptions

From consultations with Central Mountain Air and Husky Energy, charter activity is forecast to remain stable at Lloydminster Airport throughout the planning horizons of the Master Plan. As the workforce for Husky Energy's operations in Lloydminster is locally based, charter travel is limited to the movement of senior staff and management. Accordingly, the Master Plan assumes that three roundtrip flights per week will continue to be operated using the Beechcraft 1900D (or similar) at an 80% load factor, for a total of approximately 4,500 annual passengers.

Small turboprop airliners such as the Beechcraft 1900 are expected to be removed from service and replaced with newer and more economical sub-50 seat aircraft. While this trend is likely to impact Central Mountain Air's charter services to Lloydminster Airport which may be upgauged to aircraft such as the 37-seat Dash 8-100, it is assumed that passenger volumes will continue to be similar to 2019 values.

New Carrier Assumptions

The stakeholder consultation program, meetings with air carriers, and data from the 2016 Passenger Demand Study indicate that there may be an opportunity to introduce a scheduled passenger air service from Lloydminster to Saskatoon and / or Regina. The passenger forecast assumes that a new air carrier will enter the Lloydminster market in the short-term (2024) by extending existing services between Saskatoon and Regina to the city. The representative new carrier scenario assumes that an 18-seat Beechcraft 1900 is operated at a 50% load factor on the Lloydminster to Saskatoon leg, with the remaining passengers boarding at Saskatoon. Two daily roundtrips are assumed to match the needs of business travellers, and flight frequencies increase as follows:

- 2024: Three days of service per week;
- 2026: Four days of service per week; and
- 2031: Five days of service per week.

The assumption that a new carrier will enter the Lloydminster market is subject to a wide range of factors including the state of the regional economy, competition with incumbent carrier WestJet, the availability of sufficient airline resources, and the actual versus perceived market. Route forecast assumptions may also be challenged by changes in equipment, schedule, and destination.

Peak Hour Passengers

Passenger traffic varies by time of day with the arrival and departure of air carrier flights. The baseline departing Peak Hour Passenger value is 34 passengers, which represents the arrival or departure of a WestJet Link Saab 340 at 100% load factor. This increases to 68 passengers in the long-term, representing the simultaneous operation of a 50-seat (ATR 42-600) and 18-seat (Beechcraft 1900D) airliner at 100% load factors.

4.1.3 Air Cargo Forecast

From consultations with incumbent and prospective air carriers as well as significant local employers, the requirement to support dedicated air cargo services at the Airport has not been identified withing the planning horizons of the Master Plan. The movement of time sensitive and / or high value freight can continue to be accommodated by Central Mountain Air and WestJet through the cargo holds of their passenger airliners. Further, Lloydminster is located within 2h 40m of dedicated intermodal distribution centres in Edmonton and Saskatoon. Therefore, the historical average of 50 flights carrying air cargo per year has been assumed to continue throughout the short, medium and long-term planning horizons.

While the movement of air cargo by dedicated freighters is not foreseen to be a major activity at Lloydminster Airport, emergent technologies of delivering cargo by Unmanned Aerial Vehicles (UAVs) could be a business development opportunity, although these concepts are still in early stages of development and testing.

4.1.4 Economic Impact Forecast

The future total economic impact of Lloydminster Airport has been estimated based on the growth of current passenger, business and tenant activities at the facility. The values presented in Table 4.2 consider additional staff to support increasing Airport traffic, such as rental car agency employees, NAV CANADA Flight Service Specialists, and air carrier representatives. At the end of the Master Plan horizon (2045), FTE positions are forecast to increase to 72, annual labour earnings to $3.4 million, and the GDP contribution to $4.3 million.

Table 4.2 – Forecast Business and Tenant Total Economic Impact (Annual)

Planning Horizon	FTE Positions	Labour Earnings	GDP
Baseline (2020)	56	$2,944,562	$3,942,352
Short Term (2025)	67	$3,182,087	$4,137,887
Medium Term (2030)	71	$3,333,182	$4,268,439
Long Term (2045)	76	$3,360,654	$4,292,175

Based on the passenger activity forecasts, the future economic impact of the Airport as a result of scheduled air carrier activity can be estimated. This estimate considers the number of new visitors that arrive as a result of the availability of air services, the length of visitor stays, and their spending. As air services facilitate the arrival of more travellers to the region, it is assumed that additional amenities (e.g. hotels, restaurants) and attractions will develop, further reinforcing visitor growth. Therefore, the forecast assumes that the proportion of passengers that are visitors to the region will increase from 40% in the baseline to 55% in the long-term, and that visitor stays will rise to three days in the same period.

By facilitating the entry of additional visitors to the region, the total economic impact of forecast passenger activity growth could increase to approximately 26 FTE positions, $2.0 million in labour earnings, and a GDP contribution of $2.2 million by 2045, as shown in Table 4.3.

Table 4.3 – Forecast Visitor Total Economic Impact (Annual)

Planning Horizon	FTE Positions	Labour Earnings	GDP
Baseline (2020)	2.5	$189,618	$209,884
Short-Term (2025)	8.7	$661,245	$731,919
Medium-Term (2030)	12.8	$972,620	$1,076,574
Long-Term (2045)	26.2	$1,988,041	$2,200,524

4.2 Design Aircraft Selection

The selection of the design aircraft is based on the findings of the activity forecasts and considers industry trends that will influence aircraft availability and anticipated use in the Canadian market across the planning horizons. The selected design aircraft will inform the analysis and development requirements of the airside system.

4.2.1 Current Design Aircraft

The Airport Operations Manual (AOM) for Lloydminster Airport states that the current design aircraft is the Boeing 737. The Boeing 737 is classified as Reference Code 3C in TP312 4th Edition and as Aircraft Group Number IIIB in TP312 5th Edition. The Boeing 737 has been in production since 1966 across four primary derivatives, with capacities of between 130 passengers (Boeing 737-200) and 230 passengers (Boeing 737 MAX 10). The Boeing 737 is in use with several Canadian airlines including WestJet and Flair Airlines. Lloydminster Airport does not currently support scheduled passenger air services operating with the Boeing 737.

The passenger capacity of the Boeing 737 allows air carriers to deploy the aircraft on high-volume routes over longer distances where its operating economics are optimized. Considering the forecast volume of scheduled air service passengers at the Airport within the next 25 years and the need for air service frequency, it is unlikely that an airline will utilize the Boeing 737 to serve the Lloydminster scheduled passenger market within the next 25 years. From consultations with Husky Energy, their charter needs are adequately served by small turboprop aircraft. Therefore, it is unlikely that Boeing 737 charter operations will occur on a regular basis.

The Boeing 737 is also operated by sun charter operators in Canada, such as Sunwing Airlines; however, it is not expected that these types of services will occur at Lloydminster within the short, medium, and long-term planning horizons. Sun charter vacations are expected to be marketed through WestJet's current air service to Lloydminster, and through service offerings available with other carriers from Edmonton, Calgary, and Saskatoon.

WestJet Boeing 737-700

4.2.2 Regional Airline Industry Considerations

Scheduled passenger air services at Lloydminster are provided using turboprop airliners with less than 50 seats, including the Beechcraft 1900D, Saab 340, Dornier 328, and the Dash 8-100. The capacity of these aircraft is well-suited to the passenger volumes of the Lloydminster market for scheduled passenger and charter airlines. The modest volume of potential passengers in the Lloydminster market and the need for air service frequency to provide onward passenger connections from Calgary make aircraft within the 18 to 50-seat category attractive for the Airport.

However, the continued provision of passenger air services in Canada with aircraft in the 50-seat category comes with three challenges:

1. **Fleet Age:** A significant proportion 18 to 50-seat airliners are approaching the end of their service lives. The average age of Pacific Coastal Airlines' fleet of Saab 340Bs is 25 years, and Central Mountain Air's fleet of Beechcraft 1900Ds average 23 years. Market research by Bombardier indicates that airlines make long term fleet replacement decisions as their aircraft approach 15 to 20 years in service.

   Research by Alton Aviation Consultancy indicates that 80% of turboprop aircraft remain in use after 20 years of service, with this total dropping to 40% after 30 years. Therefore, replacements for the Saab 340 and Beechcraft 1900D fleets that are commonly deployed to Lloydminster can be expected within the medium to long-term planning horizons of the Master Plan.

2. **Replacement Aircraft:** Complicating the retirement of the 18 to 50-seat airliner category is the lack of suitable, modern replacements. As shown in Table 4.4, most aircraft in this category ceased production between 1997 and 2005. This limits the supply of newer aircraft in the used market and creates challenges for finding suitable replacement airframes. The ATR 42-600 is the only aircraft in this class currently in production; however, the capital costs associated with buying factory-new aircraft are often prohibitive for Canadian regional air carriers.

3. **Operating Economics:** Fixed and operating costs of each flight are spread over a small number of revenue generating seats, hindering the financial viability of services. The fixed cost of two pilots, for example, is spread over 34 passengers with WestJet Link's Saab 340 service, whereas the same two pilots could operate a 78-seat Dash 8-400. Therefore, the Cost per Available Seat Mile (CASM) may be prohibitively high versus the potential Revenue per Available Seat Mile (RASM), favouring larger aircraft with reduced CASM.

Dash 8-100 (left) and ATR 42-320 (right)

Table 4.4 – Sub-50 Seat Aircraft Market Overview

Aircraft	Production Status	Passenger Capacity	Operated in Canada?
Beechcraft 1900	Ended in 2002	18	Yes
Jetstream 31	Ended in 1997	18	Yes
Dornier 328	Ended in 2005	30	Yes
Embraer 120	Ended in 2001	30	No
Saab 340	Ended in 1998	34	Yes
Dash 8-100	Ended in 2005	37	Yes
ATR 42-600	In Production	48	Yes (ATR42-500)
Dash 8-300	Ended in 2009	50	Yes
Saab 2000	Ended in 1999	50	No

Considering the discussion on the current state of Canada's regional aircraft fleets, it is expected that air carriers operating under Capacity Purchase Agreements (CPAs), such as Pacific Coastal Airlines on behalf of WestJet, will be directed to undertake fleet renewal programs so that appropriate capacity can be provided to the air service routes. To achieve levels of service comparable to that of their mainline offerings and to improve operating economics (CASM), a shift to larger aircraft between 40 and 80 seats may occur. This trend is already evident at two major airlines:

- Air Canada has significantly reduced its Beechcraft 1900 operations, plans to retire the Dash 8-100 in 2020, and is gradually reducing its Dash 8-300 fleet. Air Canada's 2019 revised CPA with Jazz Aviation (Air Canada Express) includes the introduction of larger aircraft such as the 76-seat Bombardier CRJ-900.
- WestJet Encore's fleet of 78-seat Dash 8-400s is also indicative of the trend towards larger regional airliners, despite the inauguration of WestJet Link services operated by Pacific Coastal Airlines.

Acknowledging that small markets may not be able to sustain the capacity of these larger aircraft, it is possible that regional CPA carriers may consider new aircraft such as the ATR 42-600, the potential shortened variant of the Dash 8-400, and Dornier 328 NEU.

With respect to air carriers such as Central Mountain Air and West Wind Airlines, it is expected that these companies will operate sub-50 seat airliners for extended periods versus regional CPA carriers. Non-CPA regional airlines generally engage in specialized charter and passenger routes with lower passenger volumes, and the capital costs associated with acquiring factory-new airliners are a challenge. It is expected that aircraft such as the Beechcraft 1900D and Saab 340 will remain in service for longer timelines serving air charter markets at these airlines, and eventually will be replaced by used aircraft such as the Dash 8-100, Dash 8-300, and Saab 2000. The retirement of these aircraft by CPA carriers may have a positive effect on their availability to non-CPA regional airlines in the coming years.

4.2.3 Recommended Design Aircraft

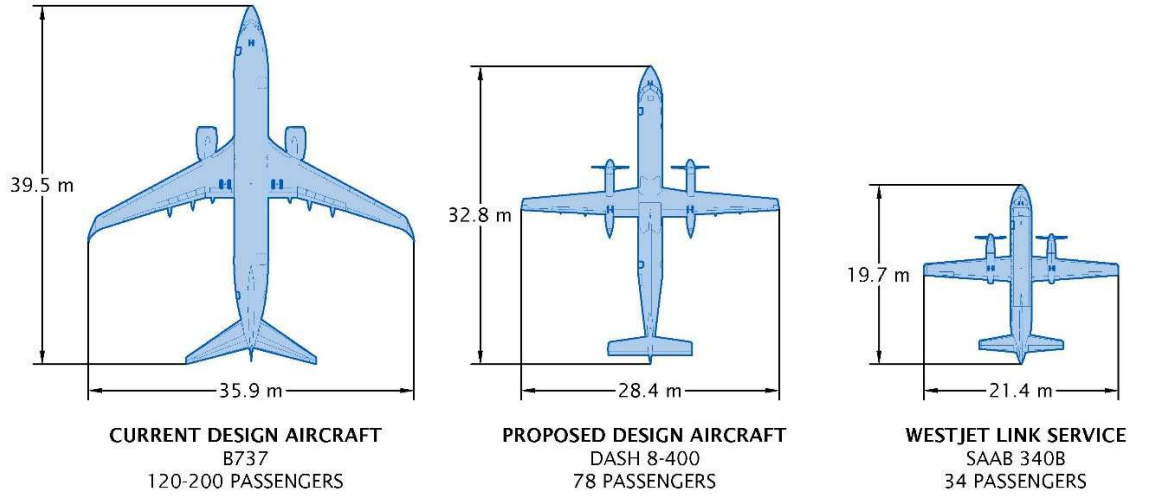
The project team has identified the most restrictive aircraft that is expected to make regular use of Lloydminster Airport across the Master Plan horizon as the 78-seat De Havilland Canada Dash 8-400. By selecting the Dash 8-400 as the design aircraft for the airside environment, the operation of other regional airliners such as the Saab 340, Saab 2000, and Dash 8-100 will be protected, and equipment swaps from the Saab 340 and the expected fleet renewal by WestJet will be accommodated. The differences between the Boeing 737, Dash 8-400, and Saab 340 are shown in Figure 4.3.

TP312 5th Edition categorizes aircraft based on their physical specifications and performance characteristics, known as Aircraft Group Numbers (AGNs). The AGN is determined for each part of the maneuvering area in accordance with the applicable design aircraft. The selected design aircraft (Dash 8-400) is designated AGN IIIA for both the runway and taxiway environments.

While the recommended design aircraft is smaller than the current Boeing 737 design aircraft, the Master Plan will protect for Boeing 737 operations where possible and practical, as well as other AGN IIIB aircraft. The Boeing 737 can operate at Lloydminster Airport on a periodic basis, despite such a scenario not having been identified through the Master Plan. Per Transport Canada's Advisory Circular No. 602-005, pilots are advised to contact the airport to ascertain that appropriate procedures are in place to handle operations by larger aircraft, such as the Boeing 737, without compromising the facility's certification.

Runways 08-26 and 13-31 will continue to be designated Non-Precision and Non-Instrument, respectively, per the AOM.

Figure 4.3 – Design Aircraft Comparison



WestJet Encore De Havilland Canada Dash 8-400 (WestJet)

5 AIRPORT INFRASTRUCTURE, DEFICIENCIES, AND REQUIREMENTS

5.1 Airside System

The Airside System includes the physical infrastructure used in support of aircraft operations, including the maneuvering areas, visual navigation aids, and lighting. A comprehensive airside surface rehabilitation program was completed in 2019 that significantly increased the lifespan of Runway 08-26, Taxiway A, and Apron I.

5.1.1 Runways

Lloydminster Airport has two runways to support aircraft arrivals and departures: Runway 08-26 and Runway 13-31. The specifications of each runway are provided in Table 5.1.

Table 5.1 – Runway Specifications

	Runway 08-26	Runway 13-31
Length	5,579 ft. (1,701 m)	1,202 ft. (366 m)
Width	150 ft. (45 m)	100 ft. (31 m)
TP312 4th Ed. Reference Code	3C Non-Precision	1A Non-Instrument
TP312 5th Ed. AGN Equivalent	AGN IIIB Non-Precision	AGN I Non-Instrument
Surface Type	Asphalt	Grass
Pavement Load Rating	7.0	-
Surface Condition	Very Good	Poor

Runway 08-26

Runway 08-26 is the primary runway and supports traffic operating under Visual Flight Rules (VFR) and Instrument Flight Rules (IFR). Runway 08-26 was rehabilitated in 2019 and is in very good condition except for longitudinal seams that have developed since construction.

Runway 26 threshold

The recommended design aircraft for Runway 08-26 has been identified as the Dash 8-400. At Maximum Takeoff Weight, flaps set at 15, and assuming an uncontaminated runway, no wind, and a 30-degree Celsius day, the takeoff field length of the Dash 8-400 is approximately 5,400 ft. At Maximum Landing Weight, flaps set at 10, and assuming an uncontaminated runway, the landing distance is approximately 4,200 ft. The Takeoff Distance Available (TODA), Accelerate Stop Distance Available (ASDA), and Landing Distance Available (LDA) for Runway 08-26 are generally sufficient for Dash 8-400 operations[4]. Therefore, the Dash 8-400 could operate from Lloydminster to destinations such as Vancouver and Winnipeg.

In addition, the Pavement Load Rating (PLR) of 7.0 for Runway 08-26 exceeds the Aircraft Load Rating (ALR) of the Dash 8-400 (6.4). Therefore, the dimensions and strength of Runway 08-26 are suitable for the requirements of the design aircraft.

It is understood that the lands to the west of the threshold of Runway 08 were previously acquired by the City to support a future extension. The project team has reviewed the 2007 Runway Extension Assessment and has considered airline industry changes that influence runway length requirements, including the introduction of higher capacity turboprop airliners (e.g. Dash 8-400) and the retirement of Boeing 737-600 and CRJ-200 fleets. Air carriers have not expressed an interest in operating transcontinental or “sun destination” flights from Lloydminster, with WestJet directing passengers into its hub-and-spoke route network through its WestJet Link connection to Calgary. The requirement to extend Runway 08-26 has not been identified within the Master Plan; however, it is recommended that the lands to the west of the Airport be held in reserve by the City to support an extension if it is required beyond the planning horizons or assumptions of this study.

Concerns were identified during the stakeholder consultation process with respect to the usability of Runway 08-26 in heavy crosswind conditions. A surface winds analysis was completed using data from 2004 to 2019 to support the Master Plan. The annual availability of Runway 08-26 for aircraft with a 35-knot crosswind limit, such as the Saab 340, was found to be 100%, meaning that these aircraft types should not experience operational restrictions at Lloydminster Airport as a result of wind speed and direction. Availability decreases to 97% for aircraft with a maximum demonstrated crosswind of 15 knots, such as the Cessna 172, meaning that general aviation aircraft could lose approximately one day of flying per month. However, this exceeds Transport Canada’s recommended availability of 95% per TP312 4th Edition.

Runway End Safety Areas (RESAs) are object-free zones implemented to reduce the severity of damage to an aircraft that overruns or undershoots the runway. TP312 4th Edition recommends that 150 m RESAs be provided for Code 3 runways, such as Runway 08-26. Proposed changes to the CARs with respect to RESAs were announced in the March 7, 2020 *Canada Gazette*. The proposed amendment will require that airports that handle over 325,000 passengers per year implement RESAs with a minimum length of 150 m. Lloydminster Airport would not be subject to the proposed amendment to the CARs due to its lower passenger volumes.

[4] Aircraft performance is subject to other factors unaccounted for in the takeoff and landing distance calculations, including but not limited to pilot technique, air carrier requirements, and surface contamination.

From the Canada Gazette, 60 m runway strips such as those provided at Lloydminster minimize the consequences of 53% of runway excursions, and 150 m RESAs contain 90% of historical excursions. While RESAs are not required at Lloydminster Airport under TP312 4th Edition, 5th Edition, or through the proposed amendments to the CARs, these facilities are valuable for aviation safety. The Transportation Safety Board identifies runway overruns as one of the key safety issues in Canada's aviation system through its 2018 Watchlist, noting that risk increases where RESAs are not provided. The International Civil Aviation Organization recommends that 300 m RESAs be provided.

It is recommended that 300 m RESAs be prepared for Runway 08-26 in the short term, to bring the Airport into consistency with ICAO's recommendation and to minimize the severity of a potential runway excursion. If it is not practical or feasible to implement 300 m RESAs, 150 m RESAs should be considered.

Runway 13-31

Runway 13-31 is comprised of a turf surface and is considered to be the secondary runway. Runway 13-31 supports general aviation, primarily during periods where wind speed and direction does not favour the use of Runway 08-26. Runway 13-31 is not maintained in the winter and was reported and observed to be in fair condition, with an irregular surface and holes caused by wildlife. The surface of Runway 13-31 can be improved to good or very good condition through continued maintenance activities.

The surface winds analysis for Runway 13-31 demonstrates that it has an annual availability of 98% for aircraft with a maximum demonstrated crosswind of 15 knots. As Runway 08-26 and 13-31 function as one system, annual Airport availability is 99.8% with a 15-knot aircraft crosswind limitation, well exceeding the Transport Canada recommended minimum of 95%. While Runway 13-31 is almost optimally aligned with the prevailing winds in its current configuration, rotating it to become Runway 14-32 would improve Airport availability to 99.9%.

Consultations with general aviation stakeholders identified concerns with the usable length of Runway 13-31. Performance calculations for two representative general aviation aircraft are shown in Table 5.2. The margin of error for aircraft taking off from Runway 13-31 is negatively impacted during warm days. Further, the calculations in Table 5.2 do not account for variability in pilot technique, wind conditions, and decreased performance relative to the manufacturer's Pilot Operating Handbook. **It is recommended that Runway 13-31 be realigned 10 to 20 degrees to the northeast and extended to 1,700 ft. in the long term.**

Table 5.2 – Runway 13-31 Performance Calculations

	Take-Off		Landing	
	Cessna 172N	Cessna 150M	Cessna 172N	Cessna 150M
20° C – Ground Roll	1,035 ft.	952 ft.	744 ft.	639 ft.
30° C – Ground Roll	1,113 ft.	1,025 ft.	770 ft.	659 ft.

- 10 knot headwind, 2,000 ft. pressure altitude
- Dry grass runway surface, short-field take-off and landing technique
- Cessna 172 weight: 2,300 lbs Cessna 150 weight: 1,600 lbs

5.1.2 Taxiways

The taxiway system facilitates the movement of aircraft and airport vehicles between Apron I, the runways, and the Eastern and Western Development Areas. Three taxiways are currently in operation at the Airport: Taxiways A, B, and C. The specifications of each taxiway are provided in Table 5.3.

Table 5.3 – Taxiway Specifications

	Taxiway A	Taxiway B	Taxiway C
Width	23 m (75 ft.)	15 m (50 ft.)	15 m (50 ft.)
TP312 4th Ed. Reference Code	C	C	C
TP312 5th Ed. AGN Equivalent	III	III	III
Surface	Asphalt	Asphalt	Asphalt
Pavement Load Rating	7.0	Unknown	Unknown
Surface Condition	Very Good	Good	Good

Taxiway A

Taxiway A is the primary taxiway and connects the midpoint of Runway 08-26 to Apron I. The taxiway was rehabilitated in 2019 and is in very good condition. Taxiway A is adequate to support the design aircraft and no deficiencies have been reported.

Taxiway A facing south

Taxiway B

Taxiway B extends from Apron I to serve the hangars and development lots east of Apron I. Taxiway B is paved with an asphalt surface and rehabilitation and improvement projects have been completed annually since 2017. Taxiway B is adequate to support the design aircraft, however, access conflicts have been observed with Taxiway B and Apron I. Specifically, the aircraft fuel system is located immediately west of the entrance to Taxiway B, which can limit aircraft movements when fuelling operations are underway. **It is recommended that the entrance to Taxiway B from Apron I be terminated, and that a new access be provided at the southeast corner of Apron I in the medium term.**

Taxiway C

Taxiway C serves the hangars and development lots west of Apron I. Taxiway C is paved with an asphalt surface has undergone annual improvement projects since 2017. Like Taxiway B, **it is recommended that the entrance to Taxiway C from Apron I be terminated in the medium term and a new access provided at the southwest corner of Apron I.**

Taxiway B facing northeast

Taxiway C facing southwest

5.1.3 Apron I

Apron I is located south of the Air Terminal Building and north of Taxiway A; its specifications are provided in Table 5.4. Apron I supports a range of aircraft activity including scheduled and charter passenger aircraft requiring access to the Air Terminal Building, air ambulance operations, itinerant aircraft parking, and aircraft fuelling. Apron I was rehabilitated in 2019 and is in very good condition.

Table 5.4 – Apron I Specifications

Feature	Specification
Length	80 m (262 ft.)
Width	180 m (590 ft.)
Area	14,400 m^2 (154,580 ft^2)
Surface	Asphalt
Pavement Load Rating	7.0
Surface Condition	Very Good

Apron I is large enough to accommodate the current and forecast frequency and mix of aircraft operated at Lloydminster Airport. It is noted that there are no aircraft stand markings or parking positions designated on the Apron. A Recommended Apron Management Plan has been prepared as part of the Master Plan that illustrates aircraft parking requirements during the identified peak period and accounting for a reasonable level of delay within the medium-term planning horizon. **It is recommended that the Recommend Apron Management Plan be implemented in the medium term** in consultation with air carriers, Airport Staff, and Airport businesses. An Apron Management Plan will ensure that safe clearances between aircraft are maintained, available space is optimally used, and that occasional operations by larger aircraft can occur.

The northeast corner of Apron I is used for aircraft fuelling. To protect the integrity of the pavement surface, **it is recommended that a slurry seal be applied to the area adjacent to the fuel tanks in the short term to extend the service life of the pavement surface.**

Air carrier operations on Apron I restricting access to Taxiway B

5.1.4 Airfield Capacity

Airfield capacity is defined by the number of aircraft movements that can be safely accommodated in a given period, based on the configuration of the runway, taxiway, and apron environment. A simplified airfield capacity analysis was completed for VFR operations. General aviation movements were identified using the Cessna 172 as the representative aircraft, and it was assumed that 25% of the movements were departures, 50% were touch & go's, and 25% were arrivals. In this model, the capacity of Runway 08-26 is approximately 51 movements per hour. However, capacity is likely less than this representative value as:

- Capacity decreases in IFR conditions when increased separation is required;
- The analysis did not account for movements by larger aircraft that are unable to exit Runway 08-26 at Taxiway A, and instead must backtrack. The assumed occupancy time for the design aircraft (Dash 8-400) is 150 seconds, significantly higher than that modelled for general aviation aircraft;
- Movements decrease when increased separation is required between small and large aircraft due to wake turbulence; and
- The model does not account for conflicts between arriving and departing aircraft at Taxiway A.

The U.S. Airport Cooperative Research Program (ACRP) Prototype Airfield Capacity Model (PACM) was used to validate the findings of the simplified airfield capacity analysis. Using similar assumptions, the PACM generated a capacity of 46 movements. This is similar to the findings of the simplified airfield capacity analysis; therefore, it can be stated that the current capacity of the Airport is between 46 and 51 movements per hour.

Based on the simplified airfield capacity and PACM analyses, there is currently residual capacity relative to the Baseline Peak Hour of 42 movements. The availability of residual capacity was confirmed through stakeholder consultations. The airside system meets the baseline Peak Hour Movement requirements and is expected to do so in the short term.

Based on the medium and long term forecast Peak Hour Movements (51 and 57 movements, respectively), airfield capacity may be reached in the medium term and delays may result. Using the same assumptions applied in the baseline analysis, the construction of a partial-length parallel taxiway from Apron I to the threshold of Runway 26 would increase airfield capacity to approximately 59 movements per hour, exceeding the long-term Peak Hour Movement forecast. **It is recommended that a partial-length parallel taxiway be constructed in the medium term.** This taxiway would connect Apron I to the threshold of Runway 26, and improve access to the Airport development lots.

5.1.5 Infield

A significant portion of the total airside land assembly of Lloydminster Airport (480 acres) is unused for aeronautical purposes, with this undeveloped residual area referred to as the infield. The infield is subject to a range of development limitations, including TP312 Obstacle Limitation Surfaces.

Approximately 337 acres of the infield are leased for hay cropping, with two harvests expected in a good season. After baling, hay bales are removed from the infield and transported for their agricultural use. The infield is also part of the stormwater management system. Based on observations made from a review of aerial imagery and while on-site, several low elevation areas appear to be collecting stormwater on-site, including to the east and west of Runway 13-31, and at the southeastern corner of the Airport property.

Consultations with Airport Staff did not identify concerns with respect to the drainage or stormwater management functions of the airfield. The future development of portions of the infield with buildings and pavement will change the natural stormwater flows at the Airport, and stormwater implications should be examined through the project approval process. The existing hay cropping lease contributes to the non-aeronautical revenues of the Airport and should be continued until a competing highest and best use can be realized.

5.1.6 Visual Aids

The Airport is equipped with three illuminated Wind Direction Indicators (WDIs) located south of the threshold of Runway 26, in the midfield, and north of the threshold of Runway 08. All WDIs were observed to be in good condition.

Airside guidance signs are provided throughout the airfield. Two illuminated mandatory instruction signs are provided at the Runway 08-26 holding position on Taxiway A. Two illuminated runway exit signs are provided on the northern side of Runway 08-26 to the west and east of Taxiway A. Non-illuminated location signage is provided at the entrances to Taxiways B and C. The project team identified possible regulatory non-conformities with the faces of the airside guidance signs supporting Taxiway A. **It is recommended that a regulatory compliance review of all airfield signage and markings be completed in the short term,** potentially as part of a regular Quality Assurance Audit.

Pavement markings are provided per TP312 4th Edition standards on Runway 08-26, Taxiway A, and a portion of Taxiway C. Taxiway B and the northern portion of Taxiway C are unmarked. The perimeter of Runway 13-31 is delineated by red conical markers. **It is recommended that taxiway centrelines be applied on all unpainted portions of Taxiways B and C in the short term**. Additionally, **it is recommended that retroreflective markers be installed on Taxiways B and C in the short term.** Taxiway markings and retroreflective markers will improve aircraft safety during low visibility operations, while being a more cost-effective option than the installation of lighting.

Runway 08-26 is used by aircraft taxiing to depart Runway 13-31; however, a holding position has not been identified. TP312 4th and 5th Edition requires that a holding position be established at all runway/runway intersections, therefore **it is recommended that holding position markings and a non-illuminated mandatory instruction sign be installed on Runway 08-26 in the short term.**

Runway 08-26 mandatory instruction sign (left) and pavement markings (right)

5.1.7 Airfield Lighting

Airfield lighting facilitates nighttime and low visibility aircraft operations. Airfield lighting systems are controlled by NAV CANADA Flight Service Specialists during the operating hours of the Flight Service Station. During unstaffed hours, an Aircraft Radio Control of Aerodrome Lighting (ARCAL) system is available, providing aircraft operators with the ability to activate the lighting via VHF radio on the frequency of 122.2 MHz. The different components of the airfield lighting system are summarized in Table 5.5.

Table 5.5 – Airfield Lighting System

Category	Lighting Type	Notes
Aerodrome	Aerodrome Beacon	Air Terminal Building Roof
Runway 08-26	Edge Lights	Medium intensity
	Threshold Lights	
	End Lights	
	Precision Approach Path Indicators (PAPIs)	P1 – Suitable for aircraft with an eye-to-wheel height up to 10 ft.
Taxiway A	Edge Lights	
	Taxiway / Runway Intersection Lights	
	Taxiway / Apron Intersection Lights	
Apron I	Edge Lights	
	Flood Lighting	

Runway end lights

The Aerodrome Beacon and the Runway 08-26 edge lighting system were rehabilitated in 2014, and both are reported to be in good condition. At that time, the supporting control system for future Omni-Directional Approach Lights (ODALS) was installed, although ODALS have not been implemented.

Consultations with air carriers and Airport Staff did not identify the need to improve the level of service at Lloydminster Airport to provider higher levels of availability during Instrument Meteorological Conditions (IMC). In the absence of a detailed meteorological study identifying current and potential levels of availability based on airport lighting and other improvements, research and site observations suggest that the current Non Precision level of service provided at the Airport is adequate to support current and projected growth as identified within the Master Plan. Therefore, approach lighting systems are not recommended.

The Runway 08-26 P1 PAPIs are calibrated for aircraft with an eye-to-wheel height (EWH) of up to 10 ft. Both the Saab 340B currently used by Pacific Coastal Airlines and the Dash 8-400 design aircraft are estimated to have EWHs greater than 10 ft. The similarly dimensioned Dash 8-300, for example, has an EWH of 10.4 ft per the Transportation Safety Board. An aircraft with an EWH that exceeds that of the PAPI calibration will have less clearance between the landing gear and runway threshold. **It is recommended that the Runway 08-26 PAPIs be recalibrated from P1 to P2 in the short term** to support aircraft with an EWH of up to 25 ft.

5.2 Airport Support Services

5.2.1 NAV CANADA Flight Service Station

NAV CANADA is the private entity responsible for Canada's civil air navigation system. NAV CANADA operates a Flight Service Station (FSS) based in the Air Terminal Building. Flight Service Specialists provide advisory services to pilots, including information on other aircraft, Airport conditions, and weather. NAV CANADA does not provide Air Traffic Control services at Lloydminster Airport, and provides advisory information to pilots, supporting them in making their own decisions to maintain safe operating distances from other aircraft. The FSS is staffed by Flight Service Specialists daily from 0700 to 2200. Deficiencies have not been reported with NAV CANADA's FSS at Lloydminster Airport.

Flight Service Station (left) and Meteorological Observation Site (right)

5.2.2 Weather Observations and Forecasting

NAV CANADA is responsible for weather observation and forecasting services at Lloydminster Airport. Aerodrome Routine Meteorological Reports (METARs) are issued every hour or as conditions change, which provide an overview of the current weather. METARs are issued by Flight Service Specialists and automatically when the facility is unstaffed. Digital cameras supplement the METARs by displaying conditions at the Airport. Aerodrome Forecasts (TAFs) are issued four times per day, providing a 24-hour localized forecast.

NAV CANADA maintains an Automated Weather Observation System (AWOS) and meteorological observation site located east of Apron I. The AWOS has a sensor suite that measures a range of weather conditions including cloud base, sky cover, visibility, temperature, and wind.

METARs, weather camera footage, TAFs, and other resources are published on NAV CANADA's Aviation Weather Website. AWOS data is also reported by radio on 128.55 MHz. Deficiencies have not been identified with NAV CANADA's weather observation and forecasting services at the Airport. The current level of service is anticipated to be adequate to support current and anticipated operations.

5.2.3 Electronic Navigation Aids and Instrument Flight Procedures

Lloydminster Airport is served by one terrestrial-based electronic navigation aid: a Non-Directional Beacon (NDB) located east of the threshold of Runway 13. NAV CANADA is undertaking a multi-year modernization program of its electronic navigation aids. Most NDB stations are being decommissioned and a transition is being made to a satellite-based air navigation system, including RNAV (GNSS) procedures. The Lloydminster NDB is not scheduled for decommissioning through this program, and instead will be retained to permit Lloydminster to function as an alternate airport in the event of a satellite failure.

Three Instrument Flight Procedures (IFPs) are available at Lloydminster Airport: RNAV (GNSS) Runway 08, RNAV (GNSS) Runway 26, and NDB Runway 26. The lowest landing minima is 250 ft. Above Ground Level and 1 Statute Mile visibility. The lowest authorized takeoff is ½ Statue Mile visibility.

While 100% annual availability is not achieved (e.g. in periods of severe fog), the existing IFPs were identified as a significant strength during the stakeholder consultation program. Requirements for new electronic navigation aids or improved IFPs have been not been identified to support current or future business at Lloydminster Airport within the planning horizons of the Master Plan.

5.2.4 Communications

Lloydminster Airport has a Mandatory Frequency of 122.2 MHz for a 5 Nautical Mile radius around the Airport up to 5,200 ft. Above Sea Level. The Lloydminster FSS also broadcasts on this frequency during its operational hours. Pilots must establish contact with the FSS or broadcast on the Mandatory Frequency prior to entering the zone.

A Remote Communications Outlet enables the Edmonton Flight Information Centre to provide flight information services to en route aircraft on 123.55 MHz. A Peripheral Air-to-Ground Link (PAL) frequency of 133.45 MHz facilitates communications with the Edmonton Area Control Centre. Airport communication systems were reported to be adequate and without any deficiencies.

5.2.5 Ground Support Services

Ground support services are provided by Border City Aviation, including the handling of scheduled and charter flights by WestJet Link and Central Mountain Air. Services provided by Border City Aviation include aircraft marshalling, grooming and detailing, towing, pre-heating, and ground power. Both Type I and Type IV de-icing fluids are available, which are dispensed from a lift cart with a maximum dispersion height of 10.7 m. This cart exceeds the 8.4 m tail height of the design aircraft. A mobile ramp is available for passenger enplaning and deplaning, including passengers with mobility challenges. Checked and valet baggage handling is also provided.

Both 100 Low Lead (“avgas”) and Jet A-1 fuel are sold at Lloydminster Airport. Fuel is purchased by the City and sold on contract by Border City Aviation, which enables the City to retain oversight on quality control. Fuelling is conducted from City-owned above-ground tanks at the northeast edge of Apron I. The City conducts regular rate reviews versus neighboring airports and sets their fuel prices competitively.

Stakeholder consultations identified no deficiencies with the existing ground support services at the Airport. The introduction of flights with larger aircraft may require specialized equipment; however, this would be the air carrier’s responsibility to arrange, either in-house or in cooperation with an Airport business such as Border City Aviation.

The future implementation of the Recommended Apron Management Plan may cause conflicts between the above-ground fuel tanks and the movement of passengers and ground support equipment. **It is recommended that a mobile aircraft fuel bowser be procured in the medium term.**

A Pre-Conditioned Air Unit (left) and Ground Power Unit (right)

5.2.6 Airport Maintenance Buildings and Equipment

Airport maintenance is completed by Airport-dedicated City employees. Operational staff are available from 0700 to 1830, five days per week. Call-out procedures are established for services outside of normal working hours. Regular maintenance duties include, but are not limited to:

- Daily visual inspections of the Airport;
- Wildlife management and control;
- Snow and ice removal;
- Sweeping and grass cutting; and
- Runway Surface Condition measurement and reporting.

A fleet of maintenance equipment is based at the Airport, which includes a tractor, loader, line painting unit, snow blower, sweeper, portable sander, de-icing trailer, grader, dump truck, two mowers, three pickup trucks, and various attachments. Maintenance equipment is housed and maintained within two facilities to the west of the Western Development Area. Fuel for the maintenance equipment is also available adjacent to the garages.

Stakeholder consultations and on-site observations indicate that the ongoing maintenance and operations of Lloydminster Airport is well-executed, and no major deficiencies were reported. Consultations with the Airport Manager did not identify the need for additional equipment or facilities beyond those previously described, although regular fleet upkeep and renewal is required to ensure that Airport maintenance can continue to be performed at a high standard. The mobile assets described above generally have a lifecycle of between 20 and 30 years; **it is recommended that each mobile asset be replaced on an as needed basis**. The replacement of the existing maintenance buildings or the requirement for additional buildings is not anticipated in the planning horizon of the Master Plan.

Maintenance garage (left) and a truck with an attached plow (right)

5.2.7 Emergency Response Services

Lloydminster Airport is not required to maintain an on-site Aircraft Rescue and Fire Fighting presence per Section 303 of the CARs, as its annual activity is less than 180,000 passengers. Emergency Response Services are provided by the City of Lloydminster Fire Department, Royal Canadian Mounted Police, and contracted ambulance services. In accordance with Transport Canada's requirements for a Certified Airport, Lloydminster Airport maintains an Emergency Response Plan. The existing Emergency Response Services arrangement was not identified as an area of concern through consultations.

The City of Lloydminster has positioned a repurposed school bus at the Airport as a mobile emergency response centre. This vehicle is equipped with generators, radios, maps, a rooftop observation platform, and a Wind Direction Indicator.

An emerging threat to airport safety is the proliferation of Unmanned Aerial Vehicles. Recent large-scale disruptions have been caused by deliberate UAV airspace incursions, including the two-day closure of London Gatwick Airport in December 2018. The Blue Ribbon Task Force was commissioned in 2019 to address UAV incursions at airports. Consistent with the Task Force's October 2019 Final Report, **it is recommended that the City of Lloydminster study the risk and implications of a UAV incursion at Lloydminster Airport in the medium term.** This process should be collaborative and involve stakeholders that include NAV CANADA, Transport Canada, and the Royal Canadian Mountain Police. From this study, a UAV response plan may be prepared that will guide actions following an incursion.

5.2.8 Field Electric Centre

The Field Electric Centre (FEC) is collocated with the Air Terminal Building. The FEC includes the infrastructure required to transform electrical power to the correct voltage and distribute it for the various applications of the visual aids and lighting systems. The FEC was installed in 2012 and is reportedly in good condition. A spare regulator was also installed at this time, providing additional capacity for future growth. The FEC is expected to meet the requirements of the Master Plan horizon.

5.3 Air Terminal Building

The Air Terminal Building (ATB) was constructed in 1981 and the facility supports air carrier activities, NAV CANADA's FSS, and administrative functions for Airport Staff and third parties. The current ATB ground floor plan is shown in Figure 5.1. This configuration is currently used for scheduled and charter flights by WestJet and Central Mountain Air.

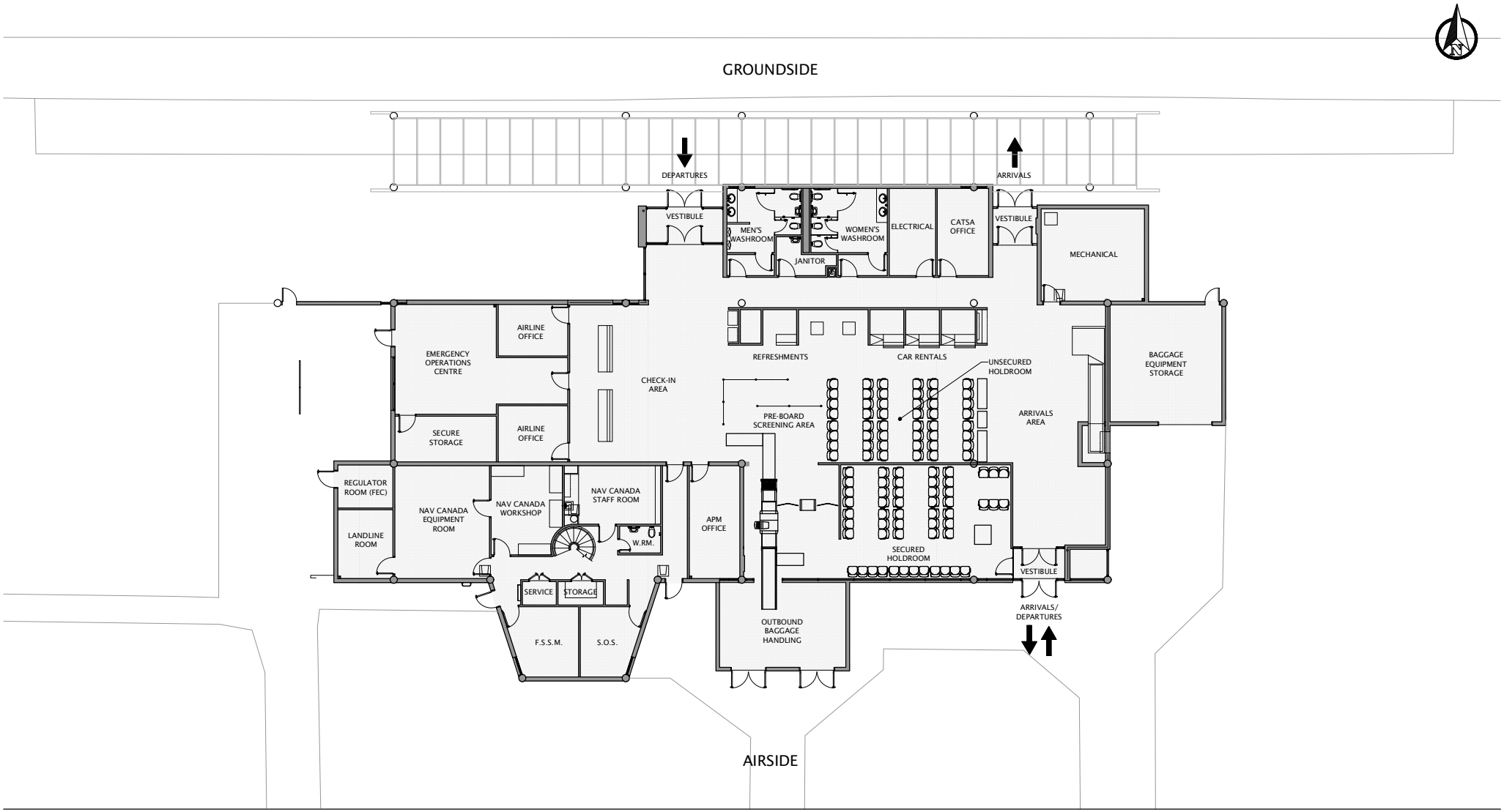
5.3.1 Assessment Methodology

Several information sources were reviewed to assess the functionality and space requirements of the ground floor of the ATB. The assessment methodology used as part of this Master Plan compares space and functionality requirements published by Transport Canada through their Systemized Terminal Expansion Program (STEP), the International Air Transport Association, and other industry sources.

ATB space and functionality requirements are determined using two industry metrics for regional airports: Peak Departing Load (PDL) and Peak Arriving Passenger (PAP). PDL and PAP are defined as the number of departing or arriving aircraft seats, respectively, provided within the busiest hour of the average peak day of the peak month. These values are used in conjunction with IATA Level of Service (LoS) standards to determine space requirements within the ATB: Sub-Optimum, Optimum, and Over-Design LoS. The Optimum LoS balances the passenger experience with responsible capital investment and operational costs.

The current PDL and PAP for the ATB has been calculated as 34, representing the departure or arrival of a Saab 340. In the long term, the PDL and PAP are anticipated to increase to 68 to coincide with forecast air carrier activity and fleet renewal plans. While there may be occasions where a busier peak hour is experienced, such as a flight being upgauged to a 78-seat Dash 8-400, this is considered the exception and not the primary planning consideration.

Table 5.6 presents the ATB space program that has been developed to estimate the requirements for each functional area based on the current and forecast PDL and PAP values. The findings of each ATB area functional assessment are integrated in the Recommended Air Terminal Building Development Plan. The Recommended ATB Development Plan considers all deficiencies and future requirements in a holistic building expansion and renewal strategy to meet long term space requirements at an Optimum LoS. **It is recommended that the ATB be expanded and reconfigured in the medium term** to address identified deficiencies and to provide additional passenger processing capacity as identified in the following sections of the Master Plan.



LLOYDMINSTER AIRPORT
MASTER PLAN

FIGURE 5.1 - AIR TERMINAL BUILDING EXISTING FLOOR PLAN

APRIL 2020

0 5 10 METRES

*FOR PLANNING PURPOSES ONLY

Table 5.6 – Air Terminal Building Floor Space Program

Terminal Element	Assessment Notes	Existing Area	Required Area	Surplus (+) Deficit (-)	Action Required
		m^2	m^2	m^2	
Check-In Counters	Based on existing	21	21	0	
Check-In Queuing	IATA PDL	26	28	-2	
Concessions	Based on existing	14	7	+7	Relocated adjacent to Pre-Board Screening queue
Air Carrier Offices	Transport Canada STEP	24	36	-12	Air carrier offices to be expanded
Outgoing Baggage Assembly	Based on existing	34	34	0	
Pre-Board Screening Area	Based on existing	39	39	0	
Pre-Board Screening Queue	IATA PDL	22	37	-14	To be expanded and reconfigured
Secure Holdroom	IATA PDL	62	80	-18	To be expanded and reconfigured
Public Waiting Area	Based on the departure of a 30-seat unsecure aircraft	44	35	+9	To be reconfigured
Washrooms	Based on consultations	36	91	-55	New washrooms in the secure holdroom and arrivals area
Baggage Claim Device and Inbound Baggage Room	IATA PAP	11	100	-89	To be expanded and reconfigured
Baggage Claim Area	IATA PAP	19	37	-19	To be expanded and reconfigured
Arrivals Area	IATA PAP	12	70	-58	To be expanded and reconfigured
Car Rental Counters	Based on existing	13	9	+4	To be relocated
Janitor	Based on existing	5	5	0	
Mechanical	Based on existing	30	30	0	
Electrical	Based on existing	13	13	0	

Terminal Element	Assessment Notes	Existing Area	Required Area	Surplus (+) Deficit (-)	Action Required
		m^2	m^2	m^2	
Emergency Operations Centre	Based on existing	45	57	-12	Expanded and modified to accommodate air carrier offices
Airport Manager Office	Based on existing	18	18	0	
CATSA Office	Based on existing	14	14	0	
Exterior Equipment Storage	Based on existing	41	0	+41	Space integrated in the inbound baggage room
Secure Storage	Based on existing	15	17	-2	Modified to accommodate air carrier offices
NAV CANADA	Based on existing	166	166	0	
Other Building Areas	Based on existing	230	249	-19	
	Total	952	1192	-240	

5.3.2 Groundside Interface

The ATB has two entry / exit points, with the western and eastern doors used for departing and arriving passengers, respectively. The curbside area is protected from inclement weather by an overhead canopy. The ATB entryways have not been identified as a constraint to the flow of passengers into and out of the building and their existing configuration and position is expected to be adequate.

Groundside Interface

5.3.3 Check-In Area

The check-in area is located on the western side of the ATB. Passengers departing on air carrier flights that have not checked in online, who have checked baggage, or who have questions about their booking are processed by an air carrier check-in agent. Due to the need to retrofit the ATB to accommodate the screening of checked baggage following the creation of CATSA, passengers do not deposit their bags with a check-in agent; instead, their baggage is inspected as they are screened prior to entering the secure holdroom.

Two check-in counters are available for lease to air carriers, each of which can accommodate two check-in stations. One counter is leased for WestJet Link flights, while the second counter, formerly occupied by Central Mountain Air, is vacant. Air carriers are responsible for the provision of all required systems including computers, scanners, scales, and branding.

Approximately 47 m^2 is allocated to the check-in counters and queuing area. Assuming a passenger processing time of 2.0 minutes and both counter stations in operation, each check-in counter can process 60 passengers per hour.

Check-in Area

Air carriers and Airport Staff did not identify deficiencies with respect to the check-in area. There is an over-provision of space for the current PDL, with 27 m^2 required for check-in and queuing. The long-term PDL check-in and queuing area requirement is 49 m^2; therefore, no additional space is needed.

5.3.4 Pre-Board Screening Area

Pre-Board Screening (PBS) is required for secure air carrier flights and is provided by GardaWorld employees on contract to CATSA. Both passengers and their carry-on baggage must be screened; in the case of Lloydminster Airport, checked baggage is also processed through the combined-services facility. Space for private secondary screening is also available.

The PBS area is located east of the check-in area, with 39 m^2 allocated for screening and 22 m^2 for queuing. Passenger queuing is organized with movable stanchions prior to the PBS checkpoint. A roll-down metal gate limits access to the secure holdroom when CATSA staff are not present. Throughput has been estimated at 48 passengers per hour (1.25 minutes per passenger).

The PBS area is adequately sized and no deficiencies have been reported from consultations with CATSA. An upgrade from a combined-services screening unit to dedicated checked baggage and passenger facilities has not been anticipated within the Master Plan horizon, given the long term PDL and external funding commitment from CATSA that this would require.

Future PBS requirements can be identified through continued proactive outreach with CATSA. The PBS queuing area requires 25 m^2 and 37 m^2 for the current and long term PDL, respectively. Therefore, queuing space is currently under-provided. Additional space has been identified in the Recommended ATB Development Plan.

PBS queuing space (left) and screening equipment (right)

5.3.5 Outbound Baggage Screening and Handling

Outbound checked baggage is subject to CATSA screening, with this function accommodated at the combined-services PBS facility. Once screened, checked baggage is conveyed to the baggage handling room. The outbound baggage handling room is a 34 m^2 addition to the ATB with two overhead doors that permit pull-through operations by ground support equipment.

The outbound baggage screening facility, handling and assembly room was reported to be adequate. As outbound baggage is separated from inbound baggage and the need for an integrated system to sort connecting baggage is not expected in the future, no improvements are planned for this facility.

5.3.6 Secure Holdroom

The secure holdroom is a waiting area for departing passengers that is located after the PBS checkpoint. The secure holdroom has an approximate area of 62 m^2 and provides seating for 53 passengers, including accommodations for wheelchair passengers. Passengers are processed at a single-position gate counter and exit the secure holdroom to Apron I via the departures vestibule. Secure holdroom seating requirements are determined assuming a ratio of 80% seated passengers and 20% standing. Based on the current PDL of 34 passengers, a total of 27 seats is required. Seating availability in the secure holdroom well exceeds this requirement.

Washrooms and passenger amenities, aside from a water cooler, are not provided in the secure holdroom. Passengers must return to the unsecure area and be rescreened if they require use of the washroom prior to departure.

The floor area of the secure holdroom exceeds the current PDL requirement of 40 m^2. An expansion to 80 m^2 is required to accommodate the long-term PDL of 68 passengers, with 54 seats required. The lack of washroom facilities in the secure holdroom detracts from the passenger experience, and the issue can be accentuated during flight delays. Passengers exiting the holdroom and having to proceed through PBS again negatively impacts the PBS LoS. A barrier-free washroom is included in the Recommended ATB Development Plan.

Secure holdroom seating (left) and departures gate (right)

5.3.7 Public Waiting Area

The public waiting area accommodates travellers waiting to proceed through PBS, passengers departing on unsecure flights, and meeters and greeters. Seating for 48 persons is provided, with a total floor area of 44 m^2. Unsecure passengers access Apron I through the arrivals vestibule, with the secure holdroom departures door secured during such operations. Issues were not reported or observed with the public waiting area. The relocation of the public waiting area as part of the Recommended ATB Development Plan will allow for this space to be repurposed for PBS queuing and an expanded secure holdroom. Seating is provided for the departure of a 40-seat unsecure aircraft, such as the Dash 8-100.

5.3.8 Arrivals Area and Inbound Baggage Handling

Arriving passengers enter the ATB from Apron I through the vestibule at the southeast building corner. The total area of the arrivals hall is 12 m^2. Inbound baggage is offloaded outside the ATB onto a baggage conveyor with a frontage of 5.4 m. Unlike traditional baggage carousels, the conveyor does not continuously cycle bags until claimed by passengers. Instead, bags are deposited in an inclined chute at the end of the conveyor.

The short frontage of the baggage conveyor and the inability to cycle unclaimed bags limits the overall capacity of the inbound baggage handling system. The result is that passengers actively claiming bags can crowd the carousel, lowering the facility LoS to sub-optimum levels.

The baggage conveyor is under-sized relative to the current PAP, which requires a claim frontage of 8 m. In the long term, this increases to 12 m. The arrivals hall is also under-sized; to accommodate the current and future PAP, areas of 34 m^2 and 70 m^2 are required, respectively. An expanded arrivals hall and baggage claim device are included in the Recommended ATB Development Plan.

The lack of public washroom facilities was identified during the ATB assessment. Additional washrooms are provided in the arrivals hall within the Recommended ATB Development Plan.

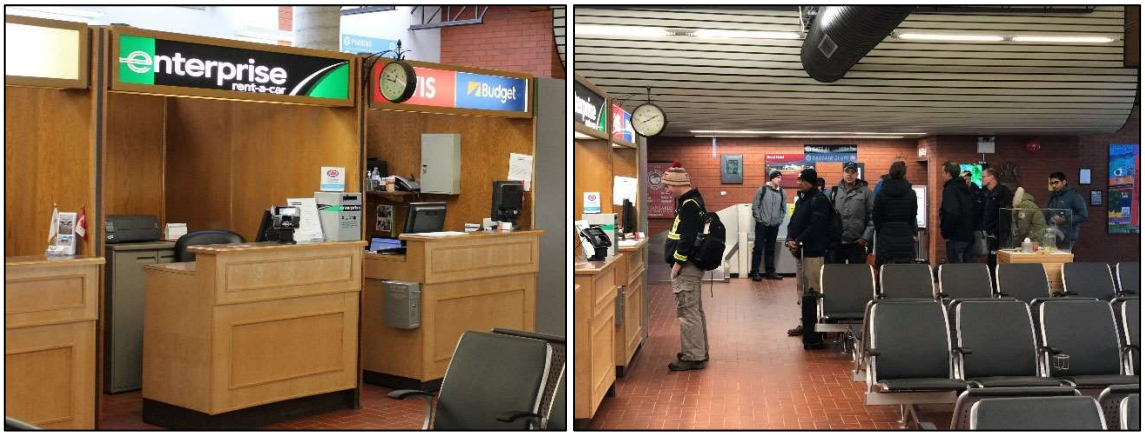
Public waiting area (left) and baggage claim device (right)

5.3.9 Car Rental Facilities

Two car rental companies have a presence at Lloydminster Airport: Enterprise and Avis/Budget. Car rental counters are located adjacent to the arrivals area, with a total of three positions available for lease, encompassing an area of 13 m^2. The third counter is unoccupied.

Demand for car rentals can be significant, with corporate travellers visiting the region frequently renting vehicles for business use. This can lead to periods of queuing in the arrivals area and public waiting area.

The car rental counters are relocated as part of the Recommended ATB Development Plan to support capacity and LoS improvements. By shifting the car rental lease areas away from the ATB core, the availability and perception of space will be improved. Customer queuing can be relocated away from other functional areas and conflicting passenger flows can be minimized.



Car rental counters (left) and queuing (right)

5.3.10 Building Amenities, Aesthetics, and Accessibility

While the ATB is primarily a functional asset for the processing of arriving and departing passengers, the provision of amenities and appearance of the building can improve guest experiences and the public's perception of the Airport. Positive views and customer experiences can provide increased local support for investing in the Airport from a political standpoint.

The following amenities are provided for passengers, Airport Staff, and the general public.

- Washrooms: Two washrooms are in the public waiting area.
- Food and Beverage: Two vending machines are in the check-in area, several candy dispensers are placed throughout the building, and a kiosk with free coffee, tea, and water is adjacent to the car rental area. A water cooler is available in the secure holdroom.
- Electrical Outlets: New seating has been installed with integrated electrical outlets, including standard sockets and USB plugs.
- Internet: Wireless internet (wi-fi) is available free of charge.
- Entertainment/Information: A television screen is mounted by the departure gate in the secure holdroom.

The overall aesthetic value and appearance of the ATB interior is a subjective consideration. A mix of complementary materials are currently used throughout the building, including red brick and tile, wood, and exposed concrete. The building benefits from the natural light of the skylights, doorways, and secure holdroom windows, which creates a sense of openness. This is further supported by the building's LED lighting.

The building ceilings use a mix of wood and panelling, with exposed metal beams and HVAC systems providing visual interest and rhythm to improve the character of the facility. Artwork and small exhibits are installed at select locations. However, the wood panelled car rental and refreshment kiosks in the unsecure holdroom detracts from the look and feel of the ATB.

Accessibility involves the removal of barriers to anyone who experiences a disability. The City of Lloydminster, through its *Inclusion and Diversity Policy*, aims to demonstrate leadership in the removal of barriers to accessing services. Accessibility features at Lloydminster Airport include door activation switches, a wheelchair aircraft boarding ramp, wayfinding signage, and circulation space sufficiently wide for wheelchair users.

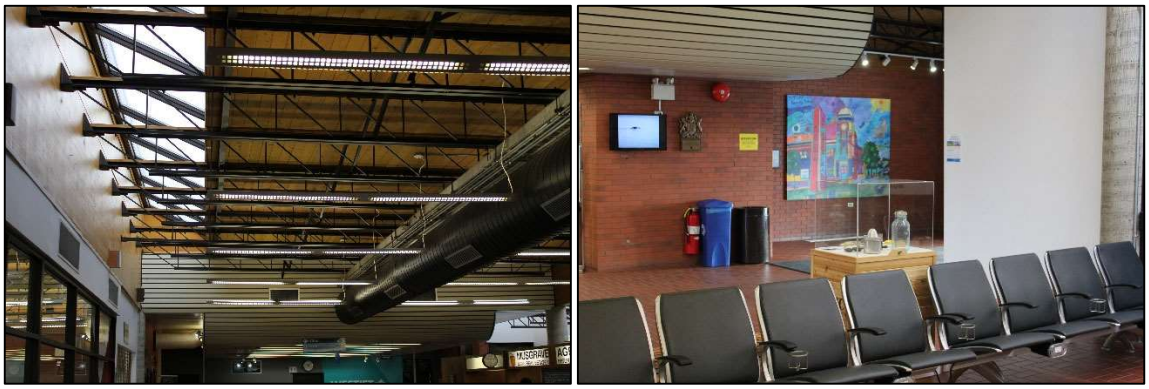
The existing passenger amenities are a strength of the ATB and are comparable to or exceed those of other Canadian regional airports. The following actions are included as part of the Recommended ATB Development Plan:

- Addition of single-unit water fountain and water bottle refilling stations in the public waiting area and secure holdroom;
- Inclusion of vending machines in the secure holdroom;
- Installation of Flight Information Display Systems in the arrivals area, public waiting area, and secure holdroom;
- Construction of a barrier free washroom in the secure holdroom; and
- The relocation of the refreshment kiosk.

Lloydminster Airport is not part of the National Airports System, and therefore is not required to meet the Canadian Transportation Agency *Passenger Terminal Accessibility Code of Practice*. However, the minimum accessibility standards of the Code can assist the Airport in meeting the *Inclusion and Diversity Policy*. **It is recommended that an ATB accessibility audit be completed in the short term and that identified improvements be implemented.** This may include:

- Improved washroom access;
- Enhanced wayfinding and the use of braille at person-level signs; and
- Relieving areas for service animals.

Refreshment kiosk (left) and vending machines (right)



Skylights and light fixtures (left) and artwork (right)

5.3.11 Administrative Space

The ATB supports five administrative offices which are allocated to the Airport Manager (18 m^2), Emergency Operations Centre (EOC) (45 m^2), Pacific Coastal Airlines (12 m^2), and GardaWorld (14 m^2). A second unoccupied airline office is also provided (12 m^2).

Consultations with Pacific Coastal Airlines identified a requirement for additional administrative space to conduct staff training and emergency response efforts. Both air carrier offices are undersized relative to the 18 m^2 recommended by the Transport Canada Systemized Terminal Expansion Program. The Recommended ATB Development Plan includes the reconfiguration of the EOC and airline offices to provide additional administrative space.

5.3.12 NAV CANADA Facilities

NAV CANADA's facilities are in a secure part of the ATB that is accessed from a locked door adjacent to the check-in area. On the ground floor, NAV CANADA has a dedicated equipment room, workshop, staff room, washroom, and storage areas. The FSS is located on the second floor, with a cab that offers 360° views of the Airport.

Consultations with NAV CANADA did not reveal any deficiencies with their current space within the ATB. The Recommended ATB Development Plan preserves NAV CANADA's existing facilities to minimize operational disruptions that would result from construction.

5.3.13 Functional Systems

An ATB Condition Assessment Report was completed in 2015. This Report assessed the building envelope; plumbing; water; Heating, Ventilation, and Air Conditioning (HVAC); and electrical systems. Recent projects with respect to the ATB functional systems include:

- Various mechanical systems were upgraded in 2008 and 2009;
- New interior lighting was installed in 2010;
- The roof was replaced in 2013; and
- A 150 KW back-up generator was installed in 2020.

It is recommended that the rehabilitation measures outlined in the 2015 Building Condition Assessment Report that do not conflict with future capital projects be completed in the short term. Outstanding items from the 2015 Report include projects to address:

- Damaged wall boards and finishes;
- The acoustic ceiling tile system;
- The building envelope;
- Site grading;
- The curbside sidewalk;
- Mechanical systems; and
- Electrical systems.

5.4 Groundside System

5.4.1 Air Terminal Building Road

The ATB is served by an unlit unidirectional ring road, with traffic entering the Airport from the west and exiting to the east onto Township Road 502A. The ATB road is municipally known as 83 Avenue, 70 Street, and 82 Avenue.

The road has a two-lane cross-section with a width of approximately 7.0 m prior to the parking lot access. After this point, it transitions to a 4.0 m one-lane cross-section where it joins with the ATB curbside. The road transitions back to a two-lane cross-section after the parking lot exit.

In the short term, it is recommended that improved wayfinding signage be installed, including:

- New directional signage at the intersection of Township Road 502A and Range Road 12, and along Township Road 502A indicating the route to the Airport;
- A new lit and landscaped gateway sign at the Airport entrance; and
- Directional signage for the parking lot access and ATB curbside.

The width of the ATB road and its lane transitions near the parking lot have reportedly caused safety issues, with vehicles exiting the roadway. **It is recommended that the ATB road and parking lot access be reconfigured in the medium-term** using City of Lloydminster industrial / commercial roadway design standards. **It is recommended that street lighting be installed on the ATB road in the medium-term,** in conjunction with the above-noted works. ATB road improvements are shown in the Recommended Groundside Development Plan.

ATB road (left) and parking lot interface (right)

5.4.2 Air Terminal Building Curbside

The curbside is the interface between the ATB and the groundside system. The curbside extends for 80 m immediately to the north of the ATB and is divided into three lanes:

1. North (adjacent to parking lot): Vehicle loading and unloading, up to 10 minutes.
2. Centre: Through traffic.
3. South (adjacent to ATB): Fire lane.

With an 80 m curbside length and a vehicle occupancy area of 7 m, approximately 11 vehicles can simultaneously load or unload. Assuming each vehicle is idle for 5 minutes, the curbside loading and unloading area can accommodate approximately 130 vehicles per hour.[5]

As identified in the 2015 Building Condition Assessment, the concrete sidewalk adjacent to the ATB is in poor condition with cracking occurring around the concrete columns of the awning, as well as settlement, shifting, and negative drainage.

In the short-term, the following actions are recommended to improve the curbside:

- Reassign the northern lane for through traffic, the centre as the fire lane with no stopping permitted, and the southern lane for passenger loading and unloading;
- Prepare a depressed curb at the ATB departures entrance with an accompanying depressed curb at the parking lot sidewalk;
- Apply crosswalk markings between the parking lot and the arrivals and departures depressed curbs;
- Provide improved roadway markings, including a demarcated fire lane and lane description markings;
- Install higher visibility signage on lane uses at the start of the curbside; and
- Rehabilitate the ATB curbside sidewalk.

These improvements are shown in the Recommended Groundside Development Plan.

[5] This estimate is subject to a wide range of factors, including traffic weaving with the thru lane, vehicle sizes, and an assumed optimal use of space.

Curbside facing east

5.4.3 Service Roads

The service roads include all on-Airport roads except for the ATB road and curbside. These roads provide access to the Western and Eastern Development Areas and include 85 Avenue, 70 Street, 84 Avenue, 81 Avenue, and 80 Avenue. The service roads are gravel surfaced, bidirectional, and have cross sections of 7.0 m to 8.0 m.

All occupied development lots have vehicular access via a service road. Lots that abut Township Road 502A have generally not been developed, except for three hangars in the Western Development Area accessed via driveways over culverts. **It is recommended that service roads be prepared for the lots in the Western and Eastern Development Areas abutting Township Road 502A in the medium-term.** Limiting the number of accesses onto Township Road 502A will decrease vehicle conflicts and turning movements, thereby improving safety in a manner that is consistent with Alberta Transportation guidance. Access roads prepared by the City can also enhance the facility's image by resulting in a less cluttered view along the entry to the Airport.

The proposed service roads should be paved to improve snow clearing, year-round access, and the overall image of the Airport. These roads should be designed to City of Lloydminster commercial / industrial roadway design standards. **Additionally, it is recommended that all service roads be rehabilitated in the long-term.**

5.4.4 Parking Lot

A 7,000 m^2 paved parking lot is located north of the ATB. Access is provided from the ATB road, entering from the west and exiting to the east. A total of 154 parking spaces are provided for the following uses:

- Meeters and greeters;
- Airline passengers;
- Airport employees; and
- Car rentals.

Parking is provided free of charge for up to 30 days, which is a competitive advantage for attracting travellers to Lloydminster Airport versus Saskatoon and Edmonton. Parking spaces are not demarcated according to the intended user, except for the row of parking closest to the ATB which is reserved for rental cars.

Parking data is available for 2018 and 2019, with daily car counts completed in the mid-afternoon. From the dataset:

- Average daily occupancy has increased from 14% (21 vehicles) in January 2018 to 50% (77 vehicles) in November 2019;
- The commencement of WestJet Link service in June 2018 had a significant impact on parking activity, with average occupancy increasing from 17% in May 2018 to 43% in July 2018;
- Maximum occupancy has reached 66% (102 vehicles in September 2019), with a residual availability of 52 spaces; and
- Parking lot activity is strongly correlated with passenger levels.

Parking lot facing south

Consultations with Airport Staff, car rental agencies and Airport users did not reveal any deficiencies with the existing parking lot. Except for WestJet Link's inaugural flight in June 2018, parking lot capacity has not been reached.

A parking lot demand forecast has been prepared using passenger traffic as the explanatory variable[6], with the forecast outputs provided in Table 5.7. Changes in passenger behaviour may influence parking demand and result in deviations from the forecast. The imposition of parking fees or the entry of a ride-hailing provider (e.g. Uber, Lyft) into the local market may decrease demand, for example.

The parking lot is expected to have adequate capacity to the end of 2030. Average daily vehicle counts are expected to exceed capacity by 33 vehicles in the long-term (Table 5.7). However, capacity is expected to be reached during occasional peak days in the short-term and exceeded in the medium-term. **It is recommended that the parking lot be expanded to 220 spaces in the medium-term.** As part of this project, the existing lot configuration should be reviewed and reconfigured if improved space utilization can be achieved.

Table 5.7 – Parking Lot Demand Forecast

	Annual Passenger Traffic	Average Daily Vehicle Count	Maximum Daily Vehicle Count
Short-Term (2025)	40,448	125 (-29)	150 (-4)
Medium-Term (2030)	47,199	145 (-9)	172 (+18)
Long-Term (2045)	61,177	187 (+33)	217 (+63)

[6] June 2018 maximum occupancy data has been omitted from the analysis, as the traffic generated from WestJet's inaugural flight is an outlier.

Electric Vehicles (EVs) are an emergent transportation planning consideration. EV charging stations are being implemented in municipalities across Canada and have been installed at airports in Victoria, Vancouver, and Toronto. EV charging stations are an opportunity to improve the image of Lloydminster Airport as a progressive, forward thinking facility while also incentivizing sustainable transportation. **It is recommended that the feasibility, costs, and benefits associated with installing EV charging stations be studied in the medium-term**. Pending the findings of this study, EV charging stations could be implemented as part of the medium-term parking lot expansion project.

5.4.5 Airside Access Control and Security

Access to the airfield is restricted by a network of perimeter fencing which was installed in 2016 and was observed and reported to be in good condition. Vehicle and person gates provide access to the airfield and are equipped with appropriate locking mechanisms. Airside fencing and access control points are inspected on a daily, monthly, and annual basis by Airport Staff. Video surveillance is provided at key points on the Airport property.

Deficiencies have not been reported with respect to the Airport perimeter fencing and access control gates. It is expected that the existing access control and security system will continue to meet the needs of the Airport for the duration of the Master Plan horizon, with ongoing routine maintenance and repairs. The expansion or reconfiguration of the perimeter fence should be completed on an as-needed basis in coordination with new development.

Airfield access gate (left) and perimeter fencing (right)

5.5 Utilities and Servicing

5.5.1 Natural Gas

Natural gas is distributed to the Airport by ATCO Gas. Gas lines are installed throughout the Airport to the airside development lots, with servicing extended to the lot line. It is the responsibility of the tenant to arrange a connection to the natural gas system. Consultations with ATCO Gas did not result in the identification of any deficiencies with respect to natural gas servicing. As natural gas servicing is already in place, future development should be adequately served.

5.5.2 Potable Water

Lloydminster Airport is not connected to the municipal potable water system. The ATB potable water supply is located immediately to the east, with a 6,000-gallon cistern in place. Tenants are responsible for the delivery and storage of potable water to their respective leasehold lot.

The City of Lloydminster 2016 Water Master Plan identifies the proposed annexation areas south and east of the Airport as future water demand areas in the 40-year horizon (2056). The industrial park to the southeast of the Airport is identified as a water demand area within the 3 to 10-year horizon. The Airport is not identified as a future water demand area. A 300 mm water line is located 300 m south of the intersection of 67 Street and 75 Avenue.

The development of leasehold lots and the continued operation of the ATB has occurred despite the lack of municipal potable water servicing. However, this is a competitive disadvantage when attracting new development to the Airport, including larger format uses (e.g. Fixed-Base Operators, industrial development). **It is recommended that the City extend potable water servicing to the Airport in the short-term.**

5.5.3 Sanitary Sewer

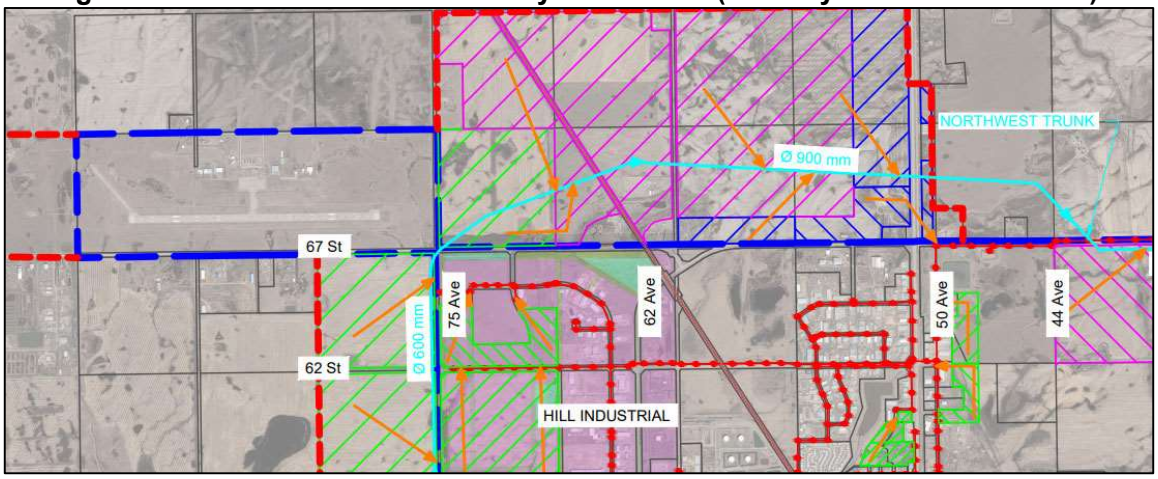
Lloydminster Airport is not connected to the municipal sanitary sewer system. Sewage from the ATB is directed to two septic tanks west of the building, before it is routed to a sanitary drain field south of Apron I and west of Taxiway A. Tenants are responsible for the storage and pumping of septic waste for their respective leasehold lots.

The nearest sanitary sewer line is 300 m south of the intersection of 67 Street and 75 Avenue, serving the 62 Street Trunk Collection Area. This 450 mm line was installed in 2011 as part of the larger servicing network for the industrial properties in the area and is routed southwards to 62 Street and 66 Street.

The extension of sanitary sewer services to the Airport is not identified as a capital priority in the 2016 Sanitary Sewer Master Plan. The 40-year growth horizon includes the development of a new Northwest Trunk. The future Northwest Trunk is planned to pass immediately southeast of the Airport at the intersection of 75 Avenue and 67 Street, as shown in Figure 5.2.

Similar to municipal potable water, the lack of sanitary sewer services is a disadvantage in attracting new larger-scale development. Future development can be accommodated through septic tanks; however, the large-scale development of employment and industrial uses may require full sanitary sewer servicing. **It is recommended that the City extend sanitary sewer servicing to the Airport in the short-term.**

Figure 5.2 – Northwest Trunk Sanitary Sewer Plan (Sanitary Sewer Master Plan)



5.5.4 Stormwater Management

An Airport stormwater management plan has not been prepared. Per the 2015 City of Lloydminster Stormwater Management Master Plan, Lloydminster Airport is located within two drainage basins. North of Runway 08-26, overland flows are directed northwards towards a tributary that drains into Neale Lake West. Lands south of Runway 08-26 drain south and east. It is understood that a significant portion of Airport overland flows collect in a dry pond at the southeast corner of the property, adjacent to Township Road 502 and Range Road 12.

Lloydminster Airport is not connected to the municipal stormwater sewer system, with the nearest stormwater main located 800 m south at the intersection of 75 Avenue and 62 Street. The conveyance of overland flows is accommodated through a network of ditches, swales, and culverts.

The existing stormwater management system is reported to be adequate for the Airport. It is expected that the stormwater management requirements of future development will be accommodated through on-site controls without the extension of a municipal stormwater main to the Airport.

5.5.5 Telecommunications

Telus Communications and Xplornet provide internet services to Lloydminster Airport. Telus has announced its commitment to lay fibreoptic internet throughout Lloydminster and fibre has been installed to the ATB, which is used by NAV CANADA and CATSA. The ATB is the fibreoptic hub for the surrounding area, and lines can be extended to service new development through conduits. Telephone services are provided by Telus Communications.

The availability of fibreoptic internet is an advantage for the attraction of new tenants and businesses and no deficiencies have been reported. As fibreoptic can be extended as needed in coordination with the service provider, future requirements can be met.

5.5.6 Electricity

The electricity lines to the Airport are owned by ATCO and services are retailed through several vendors. Power is extended to the leasehold lots, with the responsibility for connecting to the electrical system being that of the tenants. The availability of three-phase power is a strength of the Airport, and it is expected that future development will connect to the existing electrical system at the proponent's expense, through coordination with the supplier.

6 DEVELOPMENT LOTS AND REQUIREMENTS

6.1 Current Development Activity

A total of 49 lots with sizes between 750 m^2 to 3,600 m^2 have been prepared at the Airport, of which 30 are available for lease as of 2020 (Table 6.1). Three types of lots are available to the west of the ATB (the Western Development Area) and in the Eastern Development Area:

- Small lots that are suitable for single aircraft hangars (750 to 1,000 m^2);
- Medium lots that can support hangars for multiple aircraft and small aviation businesses (1,000 to 2,000 m^2); and
- Large lots for businesses such as Fixed-Base Operators, Aircraft Maintenance and Repair Organizations, and air carriers (over 2,000 m^2).

All lots in the Western Development Area have airside access from Taxiway C and groundside access from Township Road 502A, 70 Street, and 84 Avenue. Approximately half of the lots in the Eastern Development Area are not provided with airside access from Taxiway B, which requires extension before the remaining lots can be developed. All lots in the Eastern Development Area have groundside access from 70 Street, 80 Avenue, and 81 Avenue.

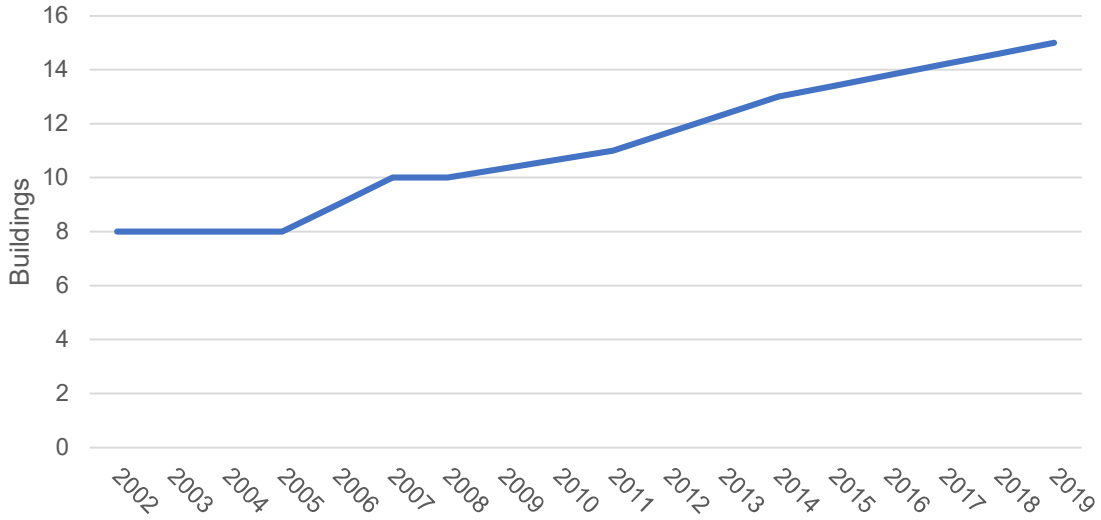
Table 6.1 – Airside Development Lot Inventory

Lot Type	Size (m^2)	Occupied	Available	Total
Small	750 - 1,000	6	19	25
Medium	1,000 - 2,000	8	3	11
Large	> 2,000	5	8	13
	TOTAL	**19**	**30**	**49**

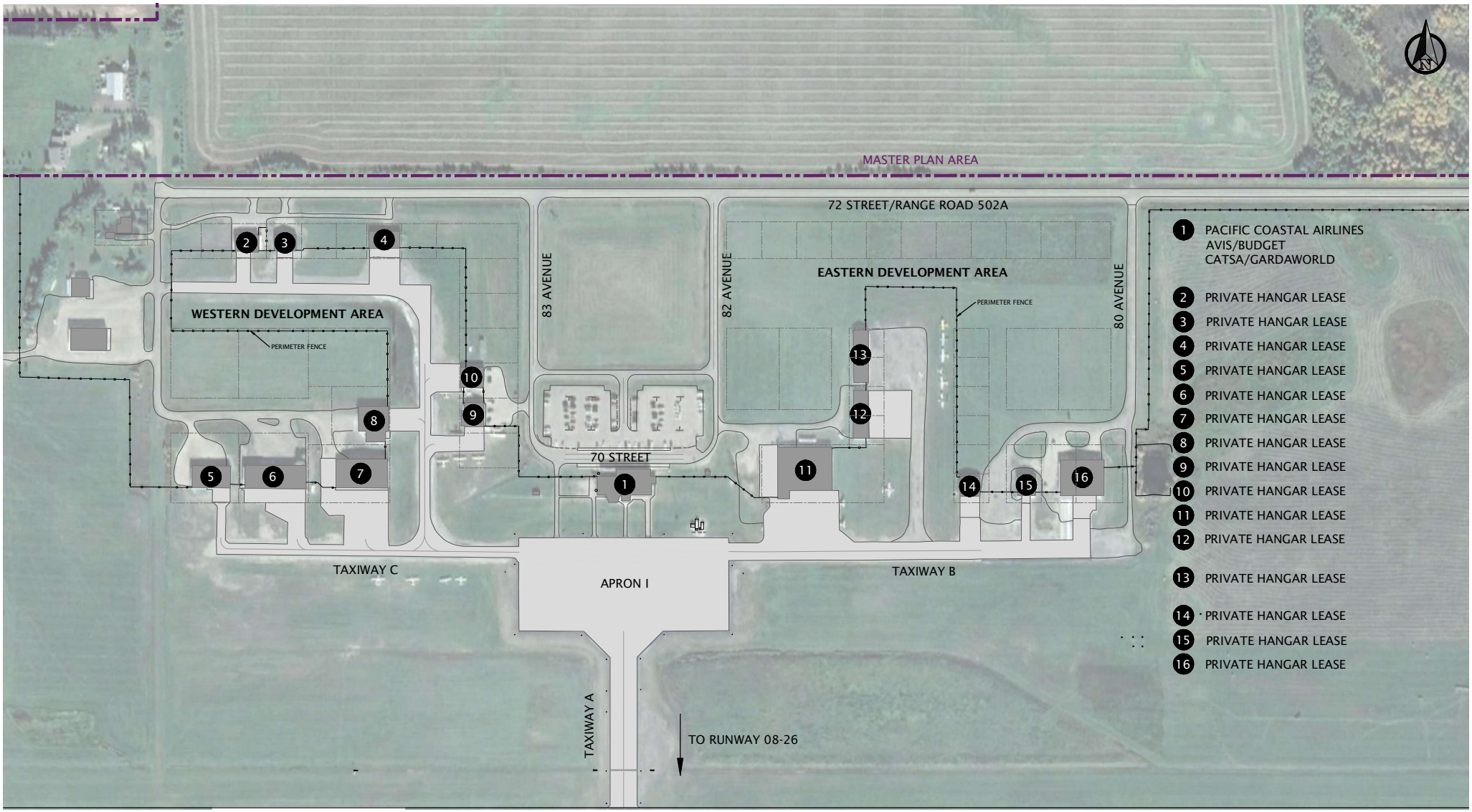
Development at Lloydminster Airport has occurred steadily, with seven new hangars developed since 2005, as shown in Figure 6.1. Based on data from 2005 to 2019, a new facility is developed on average once every two years.

The Airport supports 12 private and corporate aircraft hangars, as well as two aviation businesses. Border City Aviation occupies two hangars and provides flight training, aircraft rentals, and charter flights with its fleet of single and twin-engine general aviation aircraft. Border City Aviation also provides ground handling services for air carriers and is an Aircraft Maintenance and Repair Organization. Fowler Financial Holdings occupies one hangar and is an aviation asset management firm engaged in the sale of used regional airliners. The existing tenant plan is shown in Figure 6.2.

Figure 6.1 – Airport Development Activity



Border City Aviation (top) and locally based corporate aircraft (bottom)



LLOYDMINSTER AIRPORT
MASTER PLAN

FIGURE 6.2 - EXISTING TENANT PLAN

APRIL 2020

0 75 150 METRES

*FOR PLANNING PURPOSES ONLY

6.2 Development Lot Absorption Forecast

Three scenarios have been prepared to forecast the absorption of development lots as presented in Table 6.2. Between 8 and 25 development lots are forecast to be absorbed by 2045 based on the three growth scenarios. The absorption of airside development lots will be affected by a variety of interrelated considerations:

- Development will be tied to the strength of the regional economy and absorption rates may increase and decrease with economic fluctuations;
- Demand for airside development lots is influenced by competition from nearby facilities, such as Vermilion Airport;
- Absorption can be stimulated through factors within the City's control, such as land lease rates, the availability of servicing, and proactive marketing efforts;
- Given national trends in general aviation, recreational aircraft hangar development activity may slow and stabilize; and
- A single project may necessitate the consolidation of two or more lots if the land assembly exceeds that which is available with a single lot.

The specific tenant and business types that could foreseeably occupy these lots are discussed in the Recommended Business Development Plan.

Table 6.2 – Forecast Development Lot Absorption

Scenario	Baseline (2020)	Short-Term (2025)	Medium-Term (2030)	Long-Term (2045)
Low: 1 lot per 3 years	19	21	22	27
Status Quo: 1 lot per 2 years		22	24	32
High: 1 lot per year		24	29	44

6.3 Deficiencies and Future Requirements

The development lot absorption forecast foresees the occupancy of between 8 and 25 additional lots by 2045. Therefore, between 22 and 5 development lots may be available at the end of the Master Plan horizon. The existing airside development lot inventory is expected to meet the requirements of the Master Plan horizon. The order in which lots are absorbed will depend on a variety of factors including size requirements and proximity to the runway environment. While small development lots have the largest supply available, future developments may require that two or more lots be consolidated to provide the required land assembly.

It is recommended that Taxiway B be extended to serve the Eastern Development Area in the medium-term. This will proactively ready a significant proportion of the Airport's land supply for future airside commercial development.

While demand for airside development lots is not expected to exceed supply by the end of the Master Plan horizon, the Recommended Airport Development Plan shows a conceptual development area adjacent to the Eastern Development Area for potential land needs in the ultimate term.

7 Recommended Airport Development Plan

The Recommended Airport Development Plan takes the capital and operational improvements recommended throughout the Master Plan and presents a strategy for their implementation. Furthermore, the Plan is informed by applicable aeronautical constraints and is accompanied by a 25-year Capital Plan.

7.1 Aeronautical Constraints

The compatibility of on-Airport land uses with aircraft operations includes the consideration of obstacle heights, electronic zoning, and compatible land uses. Each of these considerations are discussed in the following sections.

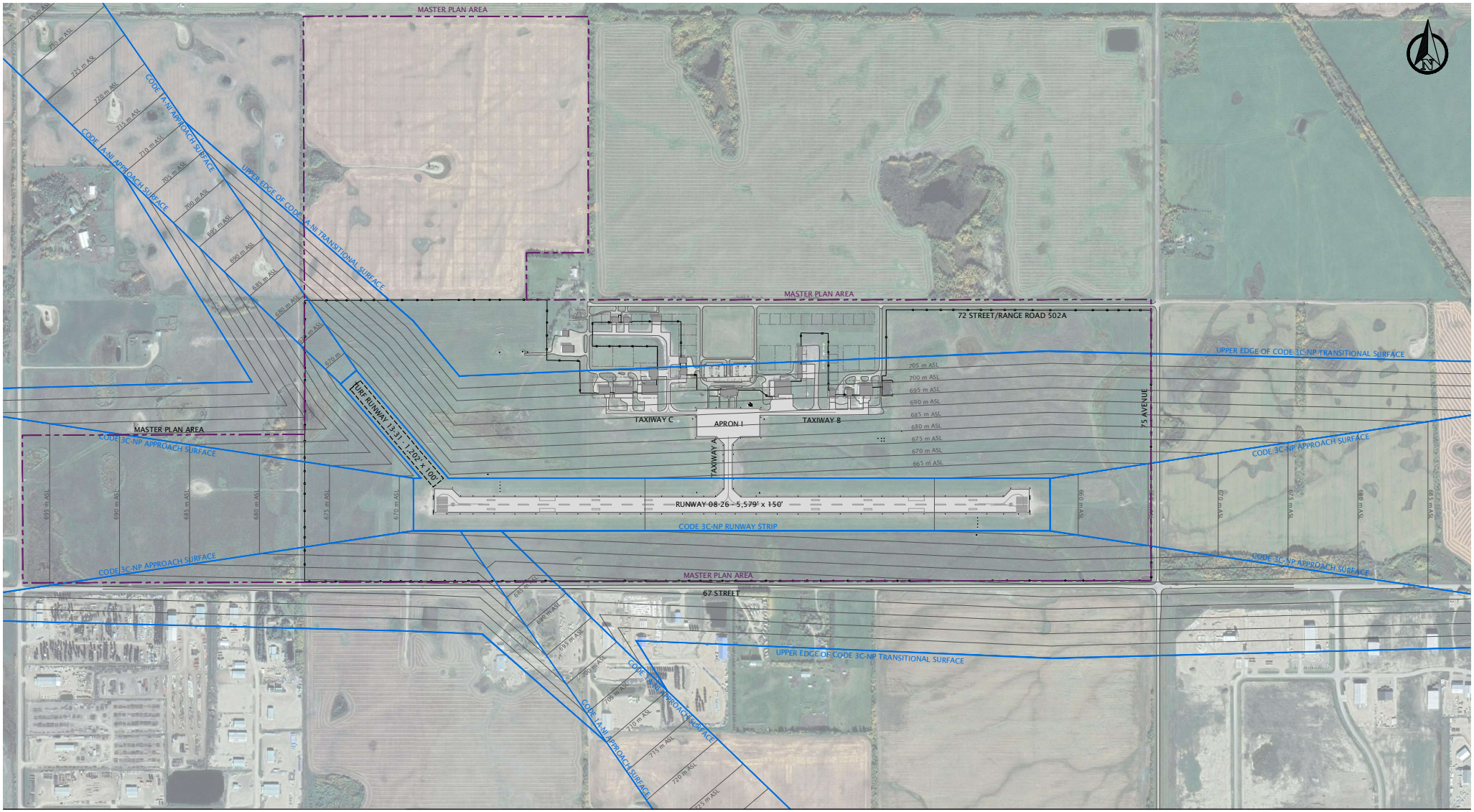
7.1.1 Obstacle Limitation Surfaces

Obstacle Limitation Surfaces (OLS) are three-dimensional planes that limit the height of structures, buildings, vegetation, and other items to protect the safety of arriving and departing aircraft. The standards for OLS are prescribed by Transport Canada in *TP312 – Aerodrome Standards and Recommended Practices*. Lloydminster Airport's OLS are currently certified under TP312 4th Edition, and include:

- Approach Surfaces: An inclined plane that begins at the runway threshold and extends along the runway centreline while diverging outwards.
- Transitional Surfaces: A complex surface along the edge of the Runway Strip which slopes upwards and outwards towards the Outer Surface and Approach Surface.
- Outer Surface: A common plane established at 45 m above the Aerodrome Reference Point with a radius of 4,000 m.

The Airport may elect to pursue OLS certification to TP312 5th Edition in the future, or 5th Edition certification may be required when a significant change occurs, such as an increased level of service or the replacement or improvement of runway facilities.

If TP312 5th Edition standards were employed at Lloydminster, the OLS would take a different form and include Approach Surfaces, Transitional Surfaces, and Inner Transitional Surfaces. The Outer Surface prescribed in 4th Edition would be replaced with an Outer Obstacle Identification Surface (OIS) in TP312 5th Edition. To provide the highest level of obstacle protection at the Airport, **it is recommended that all future development be assessed to comply with the OLS requirements of either TP312 4th Edition or 5th Edition, whichever is more prescriptive.** Lloydminster Airport's existing TP312 4th Edition OLS are shown in Figure 7.1, and 5th Edition OLS are shown in Figure 7.2.



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MASTER PLAN

FIGURE 7.1 - OBSTACLE LIMITATION SURFACES, TP312 4TH EDITION

APRIL 2020

0 250 500
METRES

*FOR PLANNING PURPOSES ONLY

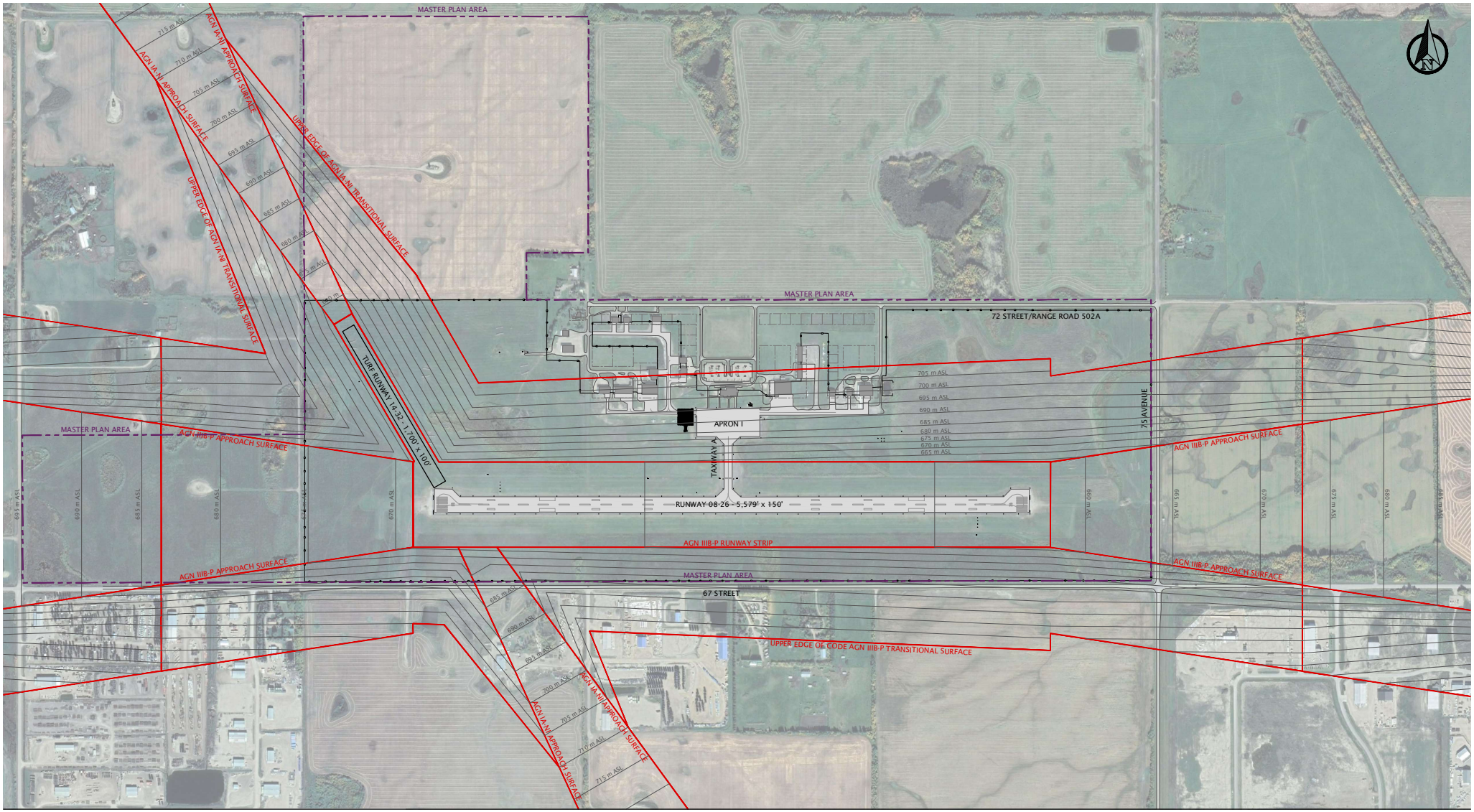

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FIGURE 7.2 - OBSTACLE LIMITATION SURFACES, TP312 5TH EDITION

APRIL 2020

0 250 500 METRES

*FOR PLANNING PURPOSES ONLY

7.1.2 Electronic Zoning

Electronic navigation aids and communication systems can be negatively impacted by nearby structures that interfere with their signals. Transport Canada has established guidelines for the protection of navigation aids and communication systems in *TP1247 – Land Use in the Vicinity of Aerodromes (9th Edition)*. These guidelines are complemented by ICAO's *EUR DOC 015 – European Guidance Material on Managing Building Restricted Areas (2nd Edition)*.

Building Restricted Areas provide protection from unwanted interference to radio and navigational aids and are established zones where construction activities should be referred to NAV CANADA for detailed analysis on potential impacts and required mitigation measures prior to construction. This is completed by submitting a Land Use Application to NAV CANADA. Three systems have Building Restricted Areas at Lloydminster Airport:

- A Non-Directional Beacon (NDB) located at the northwest portion of the Airport property;
- The VHF Transmitters / Receivers east of the NDB and collocated with NAV CANADA's FSS; and
- The Peripheral Air-to-Ground Link east of the NDB.

The electronic zoning for Lloydminster Airport is shown in Figure 7.3. The addition of new electronic navigation aids or communication systems is not foreseen throughout the Master Plan horizon.

7.1.3 Bird and Wildlife Hazards

Birds and wildlife can threaten the safety of aircraft operating at Lloydminster Airport. Aircraft are especially vulnerable to bird strikes while operating in the vicinity of the Airport, given their low altitudes, slow speeds, and critical phases of flight (e.g. on climb-out with limited visibility). Furthermore, airports are attractive areas for the nesting of birds given their large open spaces, short grassed vegetation, and open bodies of water (e.g. stormwater management facilities).

The entirety of Lloydminster Airport is located with the Primary Bird Hazard Zone described in Transport Canada's *TP8240 – Airport Wildlife Management Bulletin (No. 38)*, which is defined as the area within which aircraft generally operate at less than 1,500 ft. Above Ground Level. TP1247 provides a high-level overview of land use acceptability in the Primary Bird Hazard Zone; these considerations are reflected in the Recommended Development Plan and Recommended Land Use Plan. All proposed developments within the Primary Bird Hazard Zone should be assessed against TP1247 and mitigation measures should be implemented, where appropriate.

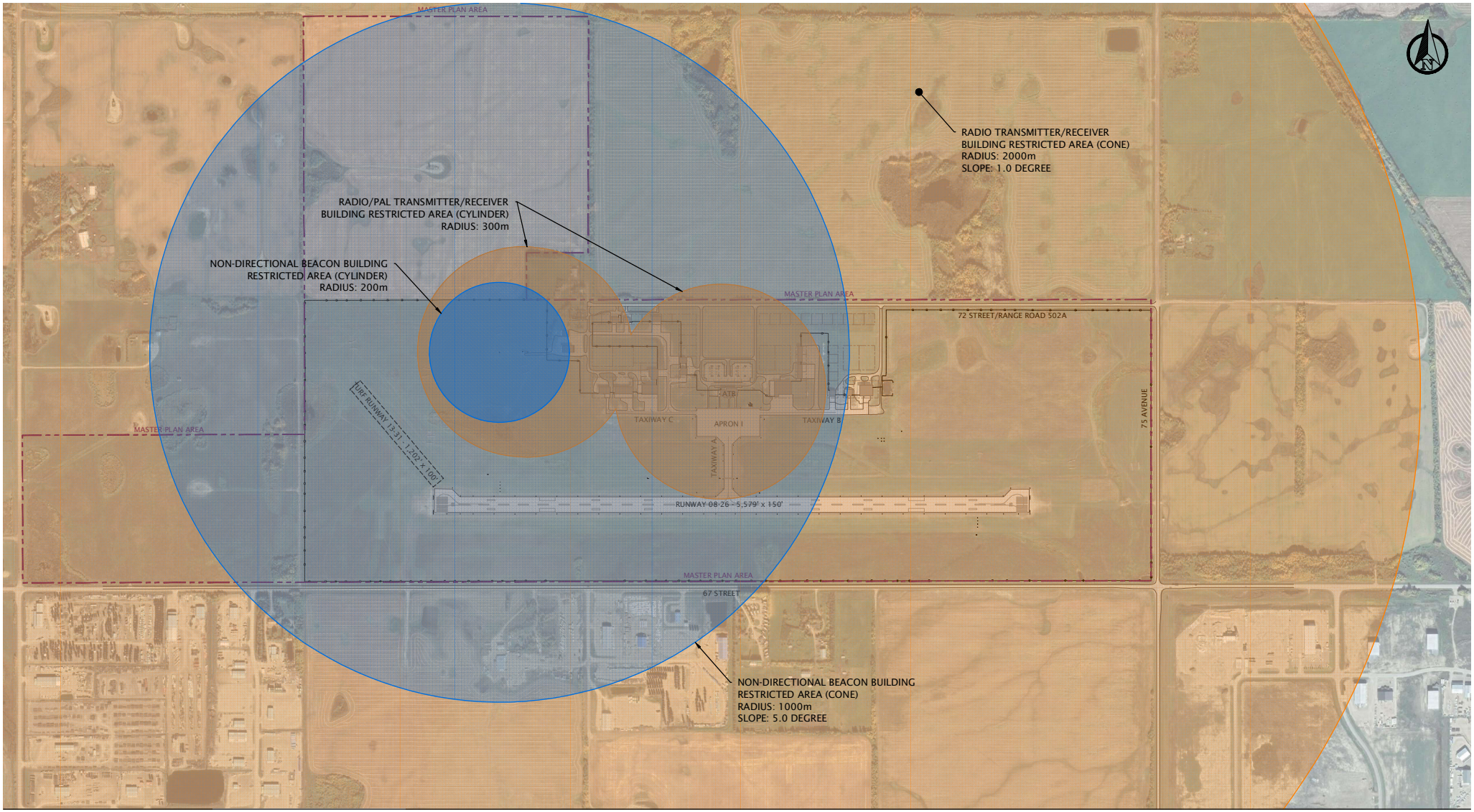

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FIGURE 7.3 - ELECTRONIC ZONING

APRIL 2020

0 250 500
METRES

*FOR PLANNING PURPOSES ONLY

7.2 Recommended Development Plan

The Recommended Development Plan incorporates all capital projects identified throughout the preceding sections. The phasing of each project is systematic, with interdependent projects such as the parking lot and ATB road improvements being aligned in their planning horizons. The timing of each project is distributed to decrease single-year capital budget loads where possible.

7.2.1 Recommended Airport Development Plan

Figure 7.4 illustrates the Recommended Airport Development Plan, which includes the Airside System and Development Lots.

Airside System

The phased development of the Airside System prioritizes the correction of existing deficiencies in the short-term, including the implementation of Runway End Safety Areas for Runway 08-26, the reconfiguration of the PAPI units, application of a slurry seal to the Apron I fuel area, and visual navigation aid upgrades. The focus in the medium-term transitions to the reconfiguration and extension of Taxiways B and C, the development of the partial-length parallel taxiway, and the implementation of the Recommended Apron Management Plan. Long-term airside projects include the realignment and extension of Runway 13-31 and the rehabilitation of all airfield pavements.

Development Lots

Forecast development lot absorption over the Master Plan horizon is not expected to exceed the existing inventory in the Western and Eastern Development Areas. If demand significantly exceeds the forecast absorption rate, an ultimate-term development area is shown with 23 additional lots, served by the Runway 08-26 parallel taxiway.

7.2.2 Recommended Apron Management Plan

The Recommended Apron Management Plan provided in Figure 7.5 is proposed to be implemented in the medium-term. The Apron Management Plan provides space for the simultaneous loading of one Dash 8-400 and two Dash 8-300s, with each aircraft oriented into the prevailing wind. Aircraft can enter and exit each stand under their own power, reducing the need for pushback tractors. This configuration also permits the fuelling of smaller aircraft, such as the Beechcraft King Air 350, at the existing fuel tanks. The fuelling of the three parked aircraft assumes that the medium-term recommendation to procure a mobile fuel bowser is followed.

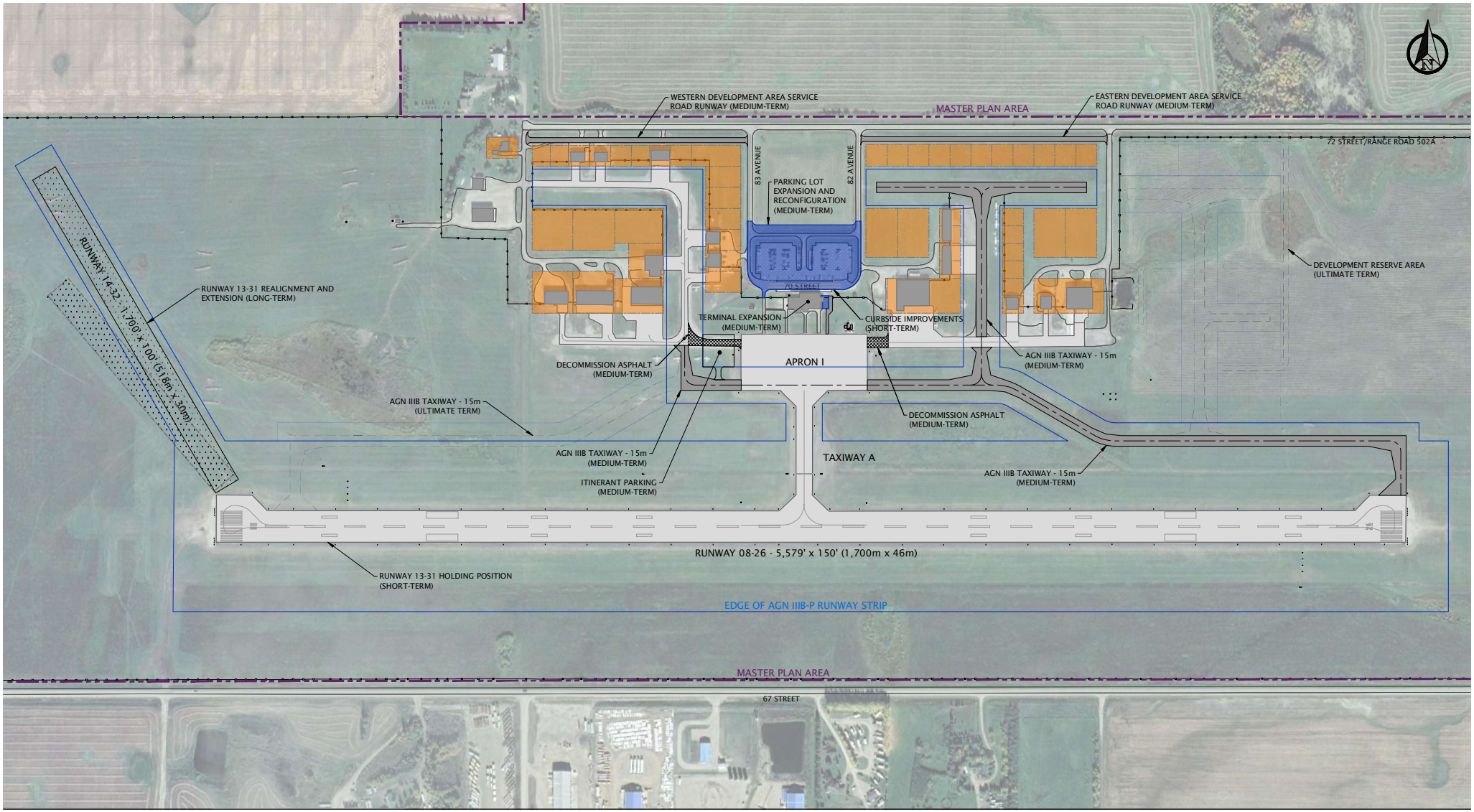

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FIGURE 7.4 - RECOMMENDED AIRPORT DEVELOPMENT PLAN

APRIL 2020

0 125 250 METRES

*FOR PLANNING PURPOSES ONLY

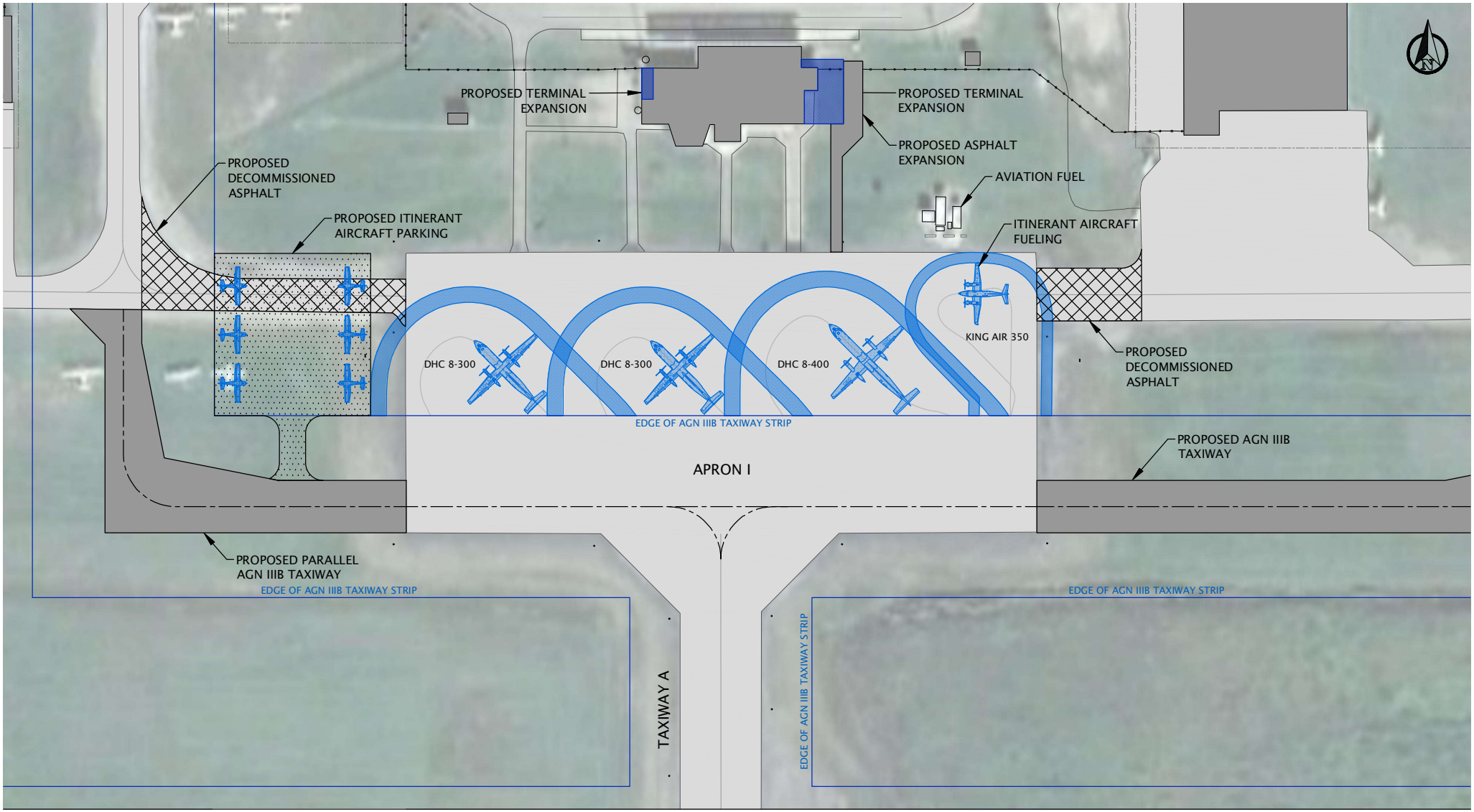

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FIGURE 7.5 - RECOMMENDED APRON MANAGEMENT PLAN

APRIL 2020

0 25 50 METRES

*FOR PLANNING PURPOSES ONLY

7.2.3 Recommended Air Terminal Building Development Plan

The development of the ATB is anticipated to occur in two phases. In the short-term, select existing structural, mechanical, and electrical deficiencies identified through the 2015 Building Condition Assessment are to be actioned to extend the lifespan of the facility.

A redevelopment and expansion plan is proposed to be implemented in the medium-term to support forecast long-term passenger activity and improve the facility's overall level of service, as shown in Figure 7.6.

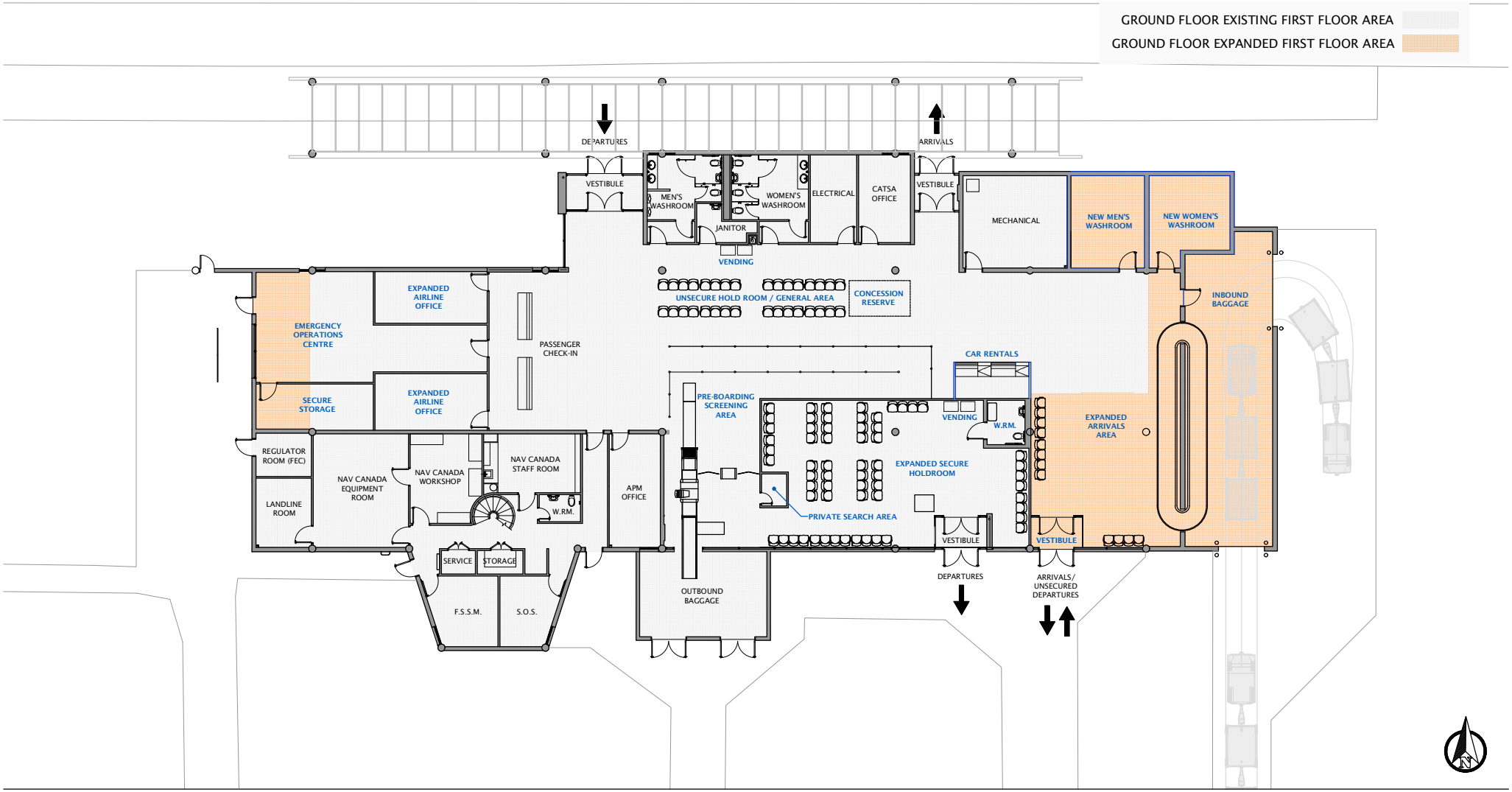
In the western portion of the building, the building footprint is recommended to be expanded into the existing staff parking area to permit the enlargement of the Emergency Operations Centre and air carrier offices. The kiosks supporting the car rental counters and hospitality area that currently occupy the centre of the ATB's public space are recommended to be removed to improve circulation and aesthetics. Two car rental positions are relocated adjacent to the PBS queue.

The secure holdroom is expanded to the north and east to provide seating for over 60 passengers, as well as an accessible washroom and less restricted queuing at the departures gate. The building footprint is expanded to the east to permit the development of a new arrivals and unsecure departures vestibule and baggage claim area. This also permits the development of an improved and covered inbound baggage handling system and two new public washrooms. The ground floor area is increased by 240 m^2 through the western and eastern expansions.

7.2.4 Recommended Groundside Development Plan

The Groundside System short-term projects include the reconfiguration of the curbside and the implementation of improved ATB road wayfinding and signage. In the medium-term, the reconfiguration, upgrading, and lighting of the ATB road is planned to occur in conjunction with the expansion of the parking lot to 220 spaces. The parking lot conceptual design shown in Figure 7.7 is consistent with the Lloydminster Land Use Bylaw, provides improved circulation, creates flexibility for future expansion to the north, and provides secondary points of vehicular access and egress. The development of new roads to serve the northern lots of the Western and Eastern Development Areas is also planned in the medium-term. In the long-term, the rehabilitation of all service roads is recommended.

The short-term provision of water and sanitary sewer servicing assumes that the City will extend existing lines to the corner of Township Road 502A and Range Road 12. From there, it is assumed that water and sanitary sewer lines will be extended to the Eastern Development Area and ATB.



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MASTER PLAN

FIGURE 7.6 - RECOMMENDED TERMINAL BUILDING DEVELOPMENT PLAN

APRIL 2020

0 5 10 METRES

*FOR PLANNING PURPOSES ONLY

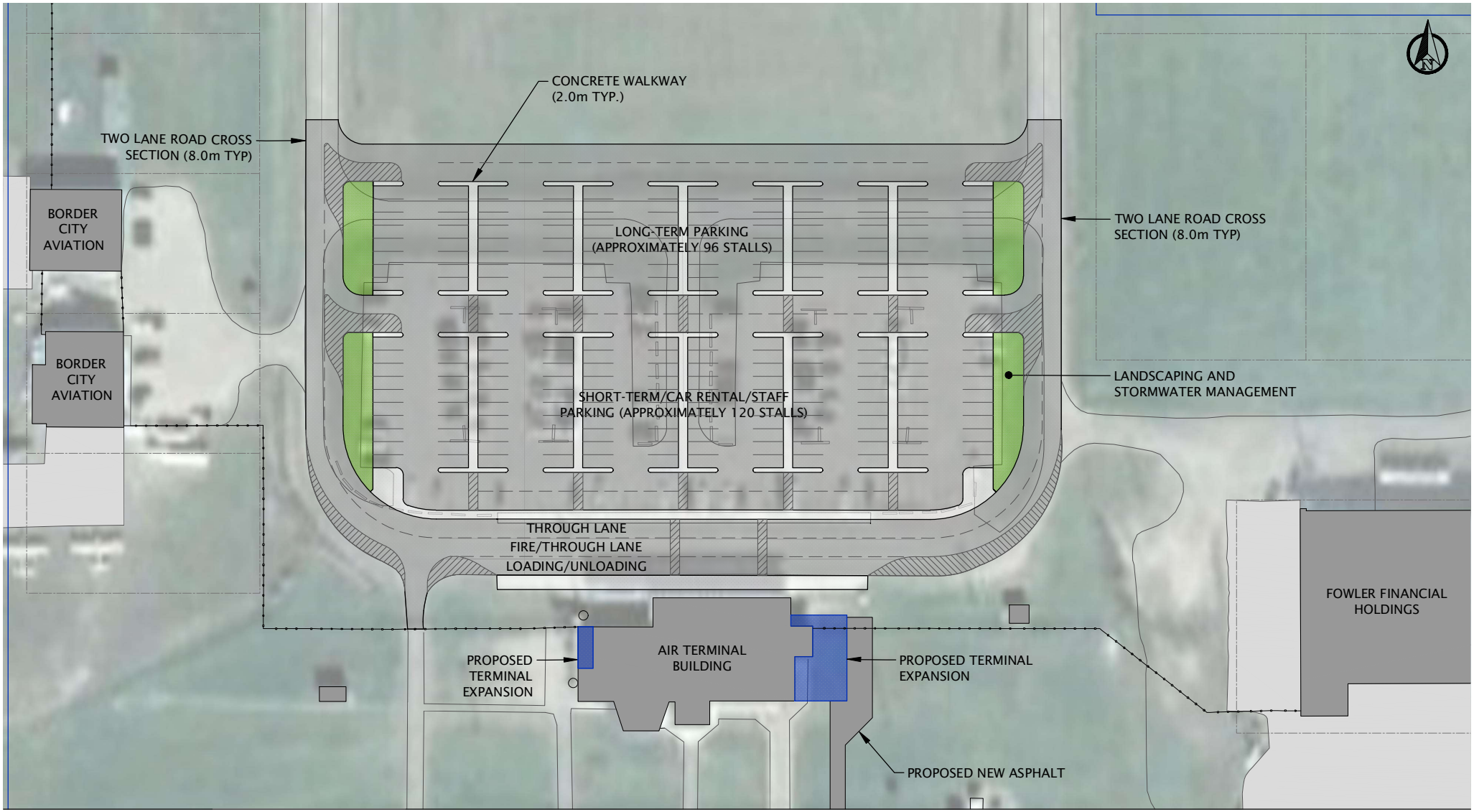

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FIGURE 7.7 - RECOMMENDED GROUNDSIDE DEVELOPMENT PLAN

APRIL 2020

0 20 40 METRES

*FOR PLANNING PURPOSES ONLY

7.3 25-Year Capital Plan

Table 7.1 presents the 25-Year Capital Plan that considers all projects and mobile asset replacements recommended throughout this Master Plan. Rough Order-of-Magnitude (ROM) cost estimates are provided for each item to assist the City with its annual capital budget preparation process. The majority of the cost estimates were sourced from local construction unit rates and research completed by the project team. Several cost estimates have been included from other sources, including the:

- 2015 ATB Assessment Report (S2 Architecture, RJC Consulting Engineers, Reinbold Engineering, & SMP Electrical Engineers);
- Municipal 2020 Capital Plan (City of Lloydminster); and
- Lloydminster Airport 10-Year Capital Plan (Airport Staff).

The following assumptions apply throughout the 25-Year Capital Plan:

- Cost estimates are shown in 2020 Canadian Dollars and are adjusted for inflation in the respective project year;
- An annual inflation rate of 2% has been assumed;
- Year 1 is assumed to be 2021 as the City of Lloydminster 2020 Capital Budget has already been approved.
- A 10% engineering and project management contingency should be added to all capital infrastructure projects, including new pavements, rehabilitated pavements, and building expansion costs; and
- The cost estimate assumes a competitive bidding process for all projects.

The 25-Year Capital Plan does not include:

- The cost of extending water and sewer servicing connection to Township Road 502A and Range Road 12;
- Costs associated with marketing, business development, and additional studies recommended as part of the Master Plan;
- Costs associated with financing the projects and mobile assets; and
- Legal or regulatory permitting fees necessary for the completion of the projects.

Table 7.1 – 25-Year Capital Plan

	Planning Horizon	Short Term				Medium Term			Long Term			
	Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031-2045
Infrastructure	Runway 08-26 Runway End Safety Areas	$184,000										
	Runway 08-26 Precision Approach Path Indicators	$51,000										
	Apron I Slurry Seal	$6,000										
	Runway 08-26 / Runway 13-31 Hold Position Marking		$26,000									
	Taxiway B and C Centreline Markings		$2,000									
	Taxiway B and C Retroreflective Markings		$3,000									
	Curbside Reconfiguration and Improvements			$11,000								
	ATB Road Wayfinding and Signage			$159,000								
	ATB Building Condition Assessment Report Rehabilitation Items				$543,000							
	Water and Sewer Servicing to Terminal Building & Large Commercial Lots					$365,000						
	ATB Reconfiguration and Expansion						$1,154,000					
	Western and Eastern Development Area Northern Service Roads							$400,000				
	ATB Road Lighting							$94,000				
	ATB Road Reconfiguration and Upgrades							$179,000				
	Parking Lot Reconfiguration and Expansion							$1,436,000				
	Aircraft Fuel Bowser Procurement								$293,000			
	Runway 08-26 Partial Length Parallel Taxiway									$2,414,000		
	Implementation of Recommended Apron Management Plan										$18,000	
	Taxiway B Reconfiguration and Extension to Eastern Development Area										$1,536,000	
	Taxiway C Reconfiguration										$369,000	
	Rehabilitation of Service Roads											$194,000
	Runway 13-31 Realignment and Extension											$61,000
	Rehabilitation of Airfield Pavements											$9,659,000

	Planning Horizon	Short Term				Medium Term			Long Term			
	Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031-2045
Mobile Assets	Snow Plow Truck	$253,000										
	De-icing Trailer	$184,000										
	Motor Grader	$336,000										
	Lawn Mower						$130,000					
	Portable Sander									$24,000		
	Towed Mower Deck										$37,000	
	Large Pick-up Truck										$61,000	
	Mid-sized Pick-up Truck										$61,000	
	Mid-sized Pick-up Truck										$61,000	
	Wheel Loader											$194,000
	Loader-mounted Snow Blower											$129,000
	Tractor											$106,000
	Towed Sweeper											$211,000
	Split Fuel Tank											$29,000
	TOTAL	**$1,014,000**	**$31,000**	**$170,000**	**$543,000**	**$365,000**	**$1,284,000**	**$2,109,000**	**$293,000**	**$2,438,000**	**$2,143,000**	**$10,583,000**

7.4 Natural Environment Review

The sustainability of Lloydminster Airport is an important consideration which includes both social and environmental impacts. The project team has completed a preliminary desktop review of the impacts of eight forecast conditions and projects recommended in the Master Plan, as shown in Table 7.2. Consultations with the City and Airport Staff did not identify the existence of previous environmental studies or specific environmental issues or concerns at the site.

The natural environment review is intended to guide decision-making with respect to capital projects and Airport operations. All capital projects should be evaluated to determine specific assessment requirements and applicable regulations, which may include the:

- **Impact Assessment Act** (S.C. 2019, c. 28, s. 1): A Federal Impact Assessment is unlikely to be required, as the projects described are not included within the *Physical Activities Regulations (SOR/2019-285)* and the Airport is not on federal lands;
- **Species at Risk Act** (S.C. 2002, c. 29): The presence of a federal Species at Risk may trigger an assessment; however, consultations with Airport Staff did not result in the identification of any potential species; and
- **Environmental Protection and Enhancement Act** (R.S.A. 2000, E-12): A Provincial Environmental Impact Assessment is unlikely to be required, as on-Airport projects are not included within the *Environmental Assessment (Mandatory and Exempted Activities) Regulation (A. Reg. 111/1993).*

Table 7.2 – Preliminary Desktop Environmental Screening

Existing Condition	Future Condition	Externalities	Recommended Mitigation
Increased Aircraft Movements			
Approximately 8,500 movements	Forecast 11,400 movements (2045)	Increased aircraft noise Increased carbon emissions with accompanying climate change impacts Potential for increased bird strikes and wildlife collisions	Limit sensitive residential land uses in the vicinity of the Airport Encourage pilots to limit overflights of the urban area Record and track noise complaints to identify trends Develop partial parallel taxiway to limit emissions from aircraft waiting as a result of airfield congestion Continue to apply and update the Wildlife Control Plan
Increased Vehicular Traffic			
Unknown	Increased traffic expected	Increased vehicle noise along Township Road 502A, Range Road 12 Possible congestion at peak periods and degraded intersection level of service Increased carbon emissions with accompanying climate change impacts	Monitor vehicular traffic at the Airport and along key roads and intersections Limit vehicle idling Study the feasibility of installing EV charging stations
Airport Land Development			
Development lots are generally grassed or are being used for crop production with no significant environmental features (e.g. trees)	Buildings (e.g. hangars) and associated parking lots, aprons, and supporting infrastructure	Increased impervious surfaces leading to decreased groundwater infiltration and changed overland flows Decreased biomass for carbon sequestration Increased usage of electricity, natural gas, and potable water	Encourage proponents to implement sustainable development strategies and building materials, including on-site solar power generation, stormwater detention and reuse measures, and permeable surfaces Retain as much of the development lot in its natural state as possible, and reinstate areas disrupted during construction to their pre-development condition Plant new trees and vegetation on-site to improve carbon sequestration in accordance with the Airport Wildlife Management Plan Prioritize sustainable development opportunities such as large-scale photovoltaic power generation
Realignment and Extension of Runway 13-31			
1,200 ft. grass runway with surrounding area used for crop production	Realigned and extended (1,700 ft.) grass runway with surrounding area used for crop production	No significant negative externalities anticipated	Consult with residents on potential noise impacts from changed arrival and departure paths Update OLS and Noise Exposure Forecast contours

Existing Condition	Future Condition	Externalities	Recommended Mitigation
Runway 08-26 Partial Parallel Taxiway			
Infield in a grassed state, partially used for crop production	Paved taxiway with supporting infrastructure	Increased impervious surfaces leading to decreased groundwater infiltration and changed overland flows Decreased biomass for carbon sequestration Reduced airfield congestion and emissions from idling aircraft	Prepare stormwater management strategy Plant new trees and vegetation on-site to improve carbon sequestration
Increased Activity by Airport Maintenance Vehicles and Ground Support Equipment			
Unknown	Increased use of Airport maintenance vehicles and Ground Support Equipment to handle forecast increase in aircraft traffic	Increased carbon emissions with accompanying climate change impacts	Regular maintenance and upkeep of all vehicles and equipment Possible implementation of electric maintenance vehicles and equipment
Expansion of Air Terminal Building			
Single storey building with a floor area of approximately 952 m^2	Single storey building with a floor area of approximately 1,192 m^2	Increased impervious surfaces leading to decreased groundwater infiltration and changed overland flows Generation of construction waste and debris Increased electricity, water, and natural gas demands	Implement stormwater Best Management Practices (BMPs) Integrate sustainable design features, including energy efficient lighting and fixtures, low-flow toilets and sinks, and rooftop solar panels Use glazing to optimize natural lighting Choose regionally sourced building materials and encourage the reuse or recycling of construction debris and demolition materials
Expansion of Parking Lot			
Paved parking lot with 154 spaces	Paved parking lot with 220 spaces	Increased impervious surfaces leading to decreased groundwater infiltration and changed overland flows Decreased biomass for carbon sequestration	Implement stormwater best management practices (BMPs) and utilize permeable surfaces Plant native vegetation around the parking lot

7.5 Noise Exposure

Aircraft operations at Lloydminster Airport generate a range of externalities that extend beyond the boundary of the facility, including noise exposure. Aircraft noise can sometimes be a disturbance to residents and other sensitive land uses in the vicinity of the Airport. This includes the disturbance from a single overflight and the cumulative impact of aircraft movements throughout the day and night. The analysis of aircraft noise includes factors such as the types of aircraft being operated, the number of movements, and the distribution of these movements throughout the day.

Baseline and future noise exposure contours have been prepared as part of the Master Plan using Transport Canada's Noise Exposure Forecast (NEF) and Noise Exposure Projection (NEP) system[7]. Each scenario includes three contours (25 NEF, 30 NEF and 35 NEF) that estimate the potential level of annoyance and predicted resident responses. The generalized response predictions for each of the three contours is presented in Table 7.3, as provided by Transport Canada.

Table 7.3 – Noise Exposure Response Predictions

Noise Contour	Generalized Response Prediction
Over 35	Individual complaints are likely. Possible group and legal action and appeals to authorities might be expected.
30 to 35	Sporadic to repeated individual complaints may be expected. Group action is possible.
25 to 30	Sporadic complaints may occur. Noise may interfere occasionally with certain activities of the resident.

7.5.1 Baseline Noise Exposure

Baseline NEF contours have been prepared using aircraft movement data from 2019. This model accounts for aircraft arrivals, departures, and circuits on Runways 08-26 and 13-31, with informed inputs on runway usage, circuit procedures, and the distribution of flights throughout the day.

As shown in Figure 7.8, the baseline NEF 30 and 35 contours are almost entirely within the Airport property. The NEF 25 contour extends over six off-Airport properties, as shown in Table 7.4. Land uses within the NEF 25 contour are either agricultural or light industrial and therefore pose minimal compatibility constraints as per the guidelines of TP1247. The limited geographic extent of the baseline contours is consistent with the lack of resident complaints reported by Airport and City Staff.

7.5.2 Future Noise Exposure

Sound land use planning ensures that noise exposure surrounding airports can be mitigated. Transport Canada's Noise Exposure Projection system predicts levels of potential annoyance from aircraft noise beyond the ten-year planning horizon. A long-term NEP has been prepared based on the movement forecast. The NEP model accounts for the proposed extension and realignment of Runway 13-31, changing aircraft type mixes, and forecast growth.

[7] While Noise Exposure Forecasts are future-oriented and consider noise over a five-year period, the methodology is transferable to the analysis of baseline impacts.

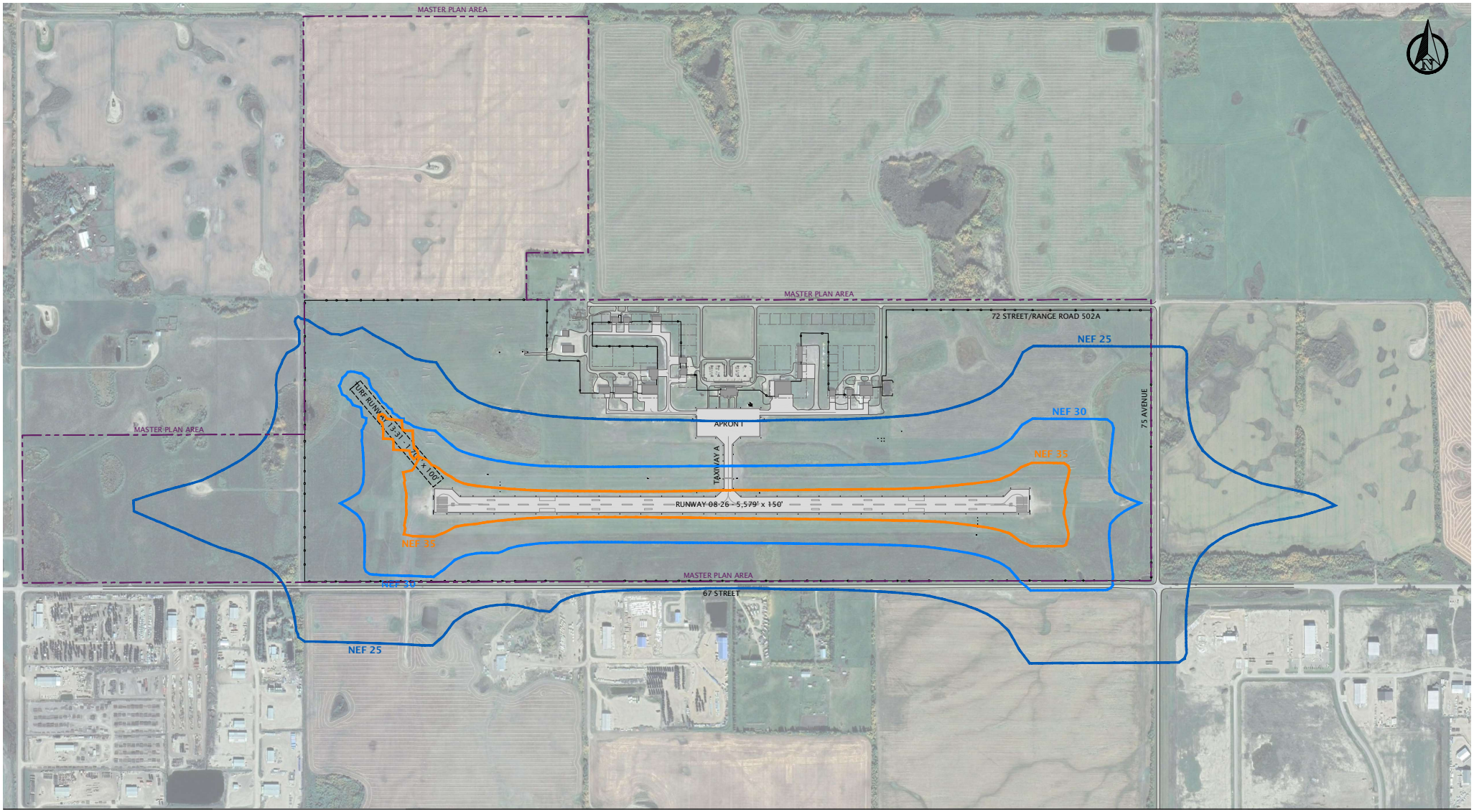
Table 7.4 – Noise Contour Impacted Properties

Direction	Legal Description	Land Use	NEF Contour	NEP Contour
West	SW-16-50-1-4	Agricultural	25	25
Southwest	NW-9-50-1-4	Light Industrial	25	25
South	NE-9-50-1-4	Agricultural	25	25, 30
South	NW-10-50-1-4	Light Industrial Residential Campground	-	25
Southeast	NE-10-50-1-4	Agricultural	25, 30	25, 30
Southeast	Lot 7 Block 4 Plan 142 2629	Light Industrial	25	25
Southeast	Lot 8 Block 4 Plan 142 2629	Vacant	-	25
East	SW-14-50-1-4	Agricultural	25	25, 30
East	SE-14-50-1-4	Agricultural	-	25

The NEP contours increase in size versus the baseline contours as a result of traffic growth, as shown in Figure 7.9. The most restrictive NEP 35 contour is entirely within the Airport property. Limited portions of the NEP 30 contour impact three neighbouring properties, and the NEP 25 contour affects nine properties. The residential and campground uses to the south that are affected by the NEP 25 contour may experience occasional interference as a result of aircraft noise. Such uses, if newly proposed, would be discouraged from locating within the NEP 25 contour.

The affected properties to the southeast and east are designated Urban Expansion and Limited Non-Residential Development in the City-County Intermunicipal Development Plan (IDP) and North Urban Expansion Area Structure Plan. The properties to the south and southwest are designated Rural Commercial / Industrial in the IDP. It is expected that the future development of these properties will not include sensitive land uses and instead will be focussed on commercial and industrial uses. Compatibility as a function of Airport noise should be considered in the future development of all nearby properties, and noise mitigation measures may be required.

Noise complaints were not identified as an issue during stakeholder engagement. However, it is recommended that aircraft noise complaints continue to be tracked at the Airport. The tracking of complaints enables data-based decision making with respect to the externalities of aircraft operations (e.g. modified circuit and nighttime procedures). Further, providing residents with a platform to voice their concerns better positions the Airport as a responsible member of the community. However, repeated complaints by a subset of residents who may not support the Airport can skew the data and misrepresent the externalities of the Airport. **It is recommended that a system for the tracking of noise complaints be implemented in the short-term.**



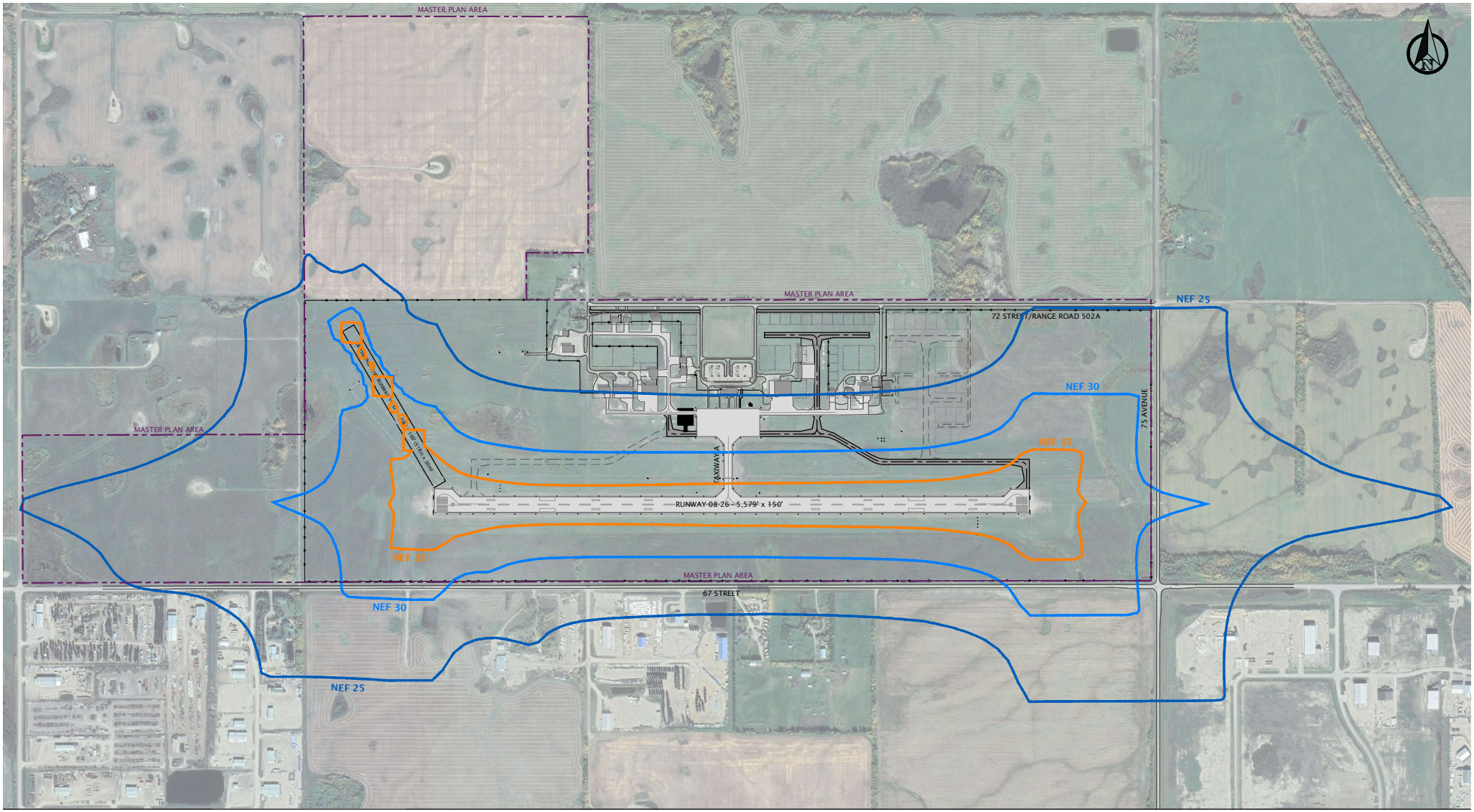
LLOYDMINSTER AIRPORT
MASTER PLAN

FIGURE 7.8 - BASELINE NOISE EXPOSURE FORECAST CONTOURS (2020)

APRIL 2020

0 250 500 METRES

*FOR PLANNING PURPOSES ONLY



LLOYDMINSTER AIRPORT
MASTER PLAN

FIGURE 7.9 - NOISE EXPOSURE PROJECTION CONTOURS (2045)

APRIL 2020

0 250 500 METRES

*FOR PLANNING PURPOSES ONLY

8 Recommended Land Use Plan

8.1 Recommended Airport Land Use Plan

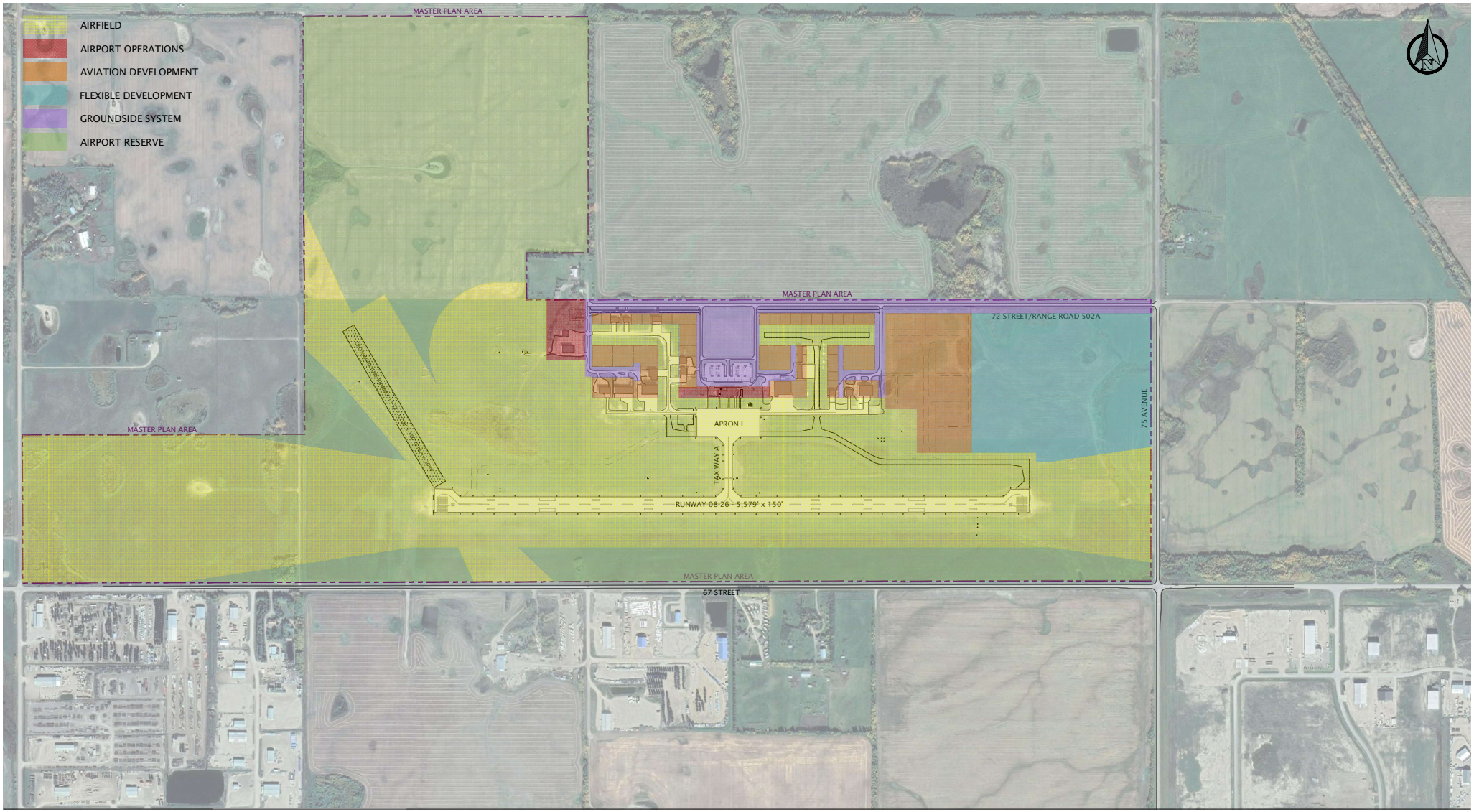
The Recommended Airport Land Use Plan is consistent with the Recommended Airport Development Plan and protects for all anticipated developments within each of the planning horizons of the Master Plan, and beyond. The Recommended Airport Land Use Plan has five purposes:

1. Protect for safe and efficient Airport operations;
2. Provide sufficient land for recommended Airport projects;
3. Maximize opportunities for land development;
4. Minimize adverse impacts to off-Airport land uses; and
5. Ensure that all development occurs in a logical and orderly manner.

Future development is expected to occur in a manner that is consistent with the Recommended Airport Land Use Plan. Six land use designations are applied to the Airport property, as described below and shown in Figure 8.1:

- **Airfield:** The lands reserved for the current and proposed runways, taxiways, and aprons, as well as their associated regulatory setbacks and constraints. This designation also includes the meteorological observation site and electronic navigation aids.
- **Airport Operations:** Facilities that support the operation and maintenance of the Airport, including the ATB, maintenance facility, and utilities.
- **Aviation Development:** Lots with airside access that are reserved for tenants that require access to the Airfield or that support the core aviation functions of the Airport. Acceptable land uses include aircraft hangars, Fixed-Base Operators, Aircraft Maintenance Organizations, Flight Training Units, air cargo facilities, and aircraft support services. Non-aviation uses are discouraged in this designation.
- **Flexible Development:** Parts of the Airport which may accommodate aviation or compatible non-aviation (commercial and industrial) development, depending on the highest and best use of the lands.
- **Groundside System:** Areas of the Airport used for groundside access and circulation, including the ATB road and curbside, parking lot, and service roads.
- **Airport Reserve:** Lands for which a specific use has not been identified through the Master Plan process, and that are reserved to meet unforeseen requirements. Acceptable land uses in the Airport Reserve designation include agricultural cropping and photovoltaic power generation. All other uses shall require an amendment to the Recommended Land use Plan.

On-Airport land use is also addressed in the City of Lloydminster Land Use Bylaw (No. 5-2016, as amended) through the MA1 – Municipal Airport Airside and MA2 – Municipal Airport Groundside districts. The Land Use Bylaw designations applicable to the Airport should be reviewed and amended, where necessary, to ensure consistency with the Recommended Airport Land Use Plan.



LLOYDMINSTER AIRPORT
MASTER PLAN

FIGURE 8.1 - RECOMMENDED AIRPORT LAND USE PLAN

APRIL 2020

0 250 500
METRES

*FOR PLANNING PURPOSES ONLY

8.2 Recommended Off-Airport Land Use Plan

The relationship between the Airport and surrounding properties is an important consideration. The Recommended Off-Airport Land Use Plan has been prepared with three purposes:

1. Protect for safe and efficient Airport operations;
2. Promote development that supports and / or is supported by aviation activities; and
3. Limit sensitive land uses that would be negatively impacted by Airport operations.

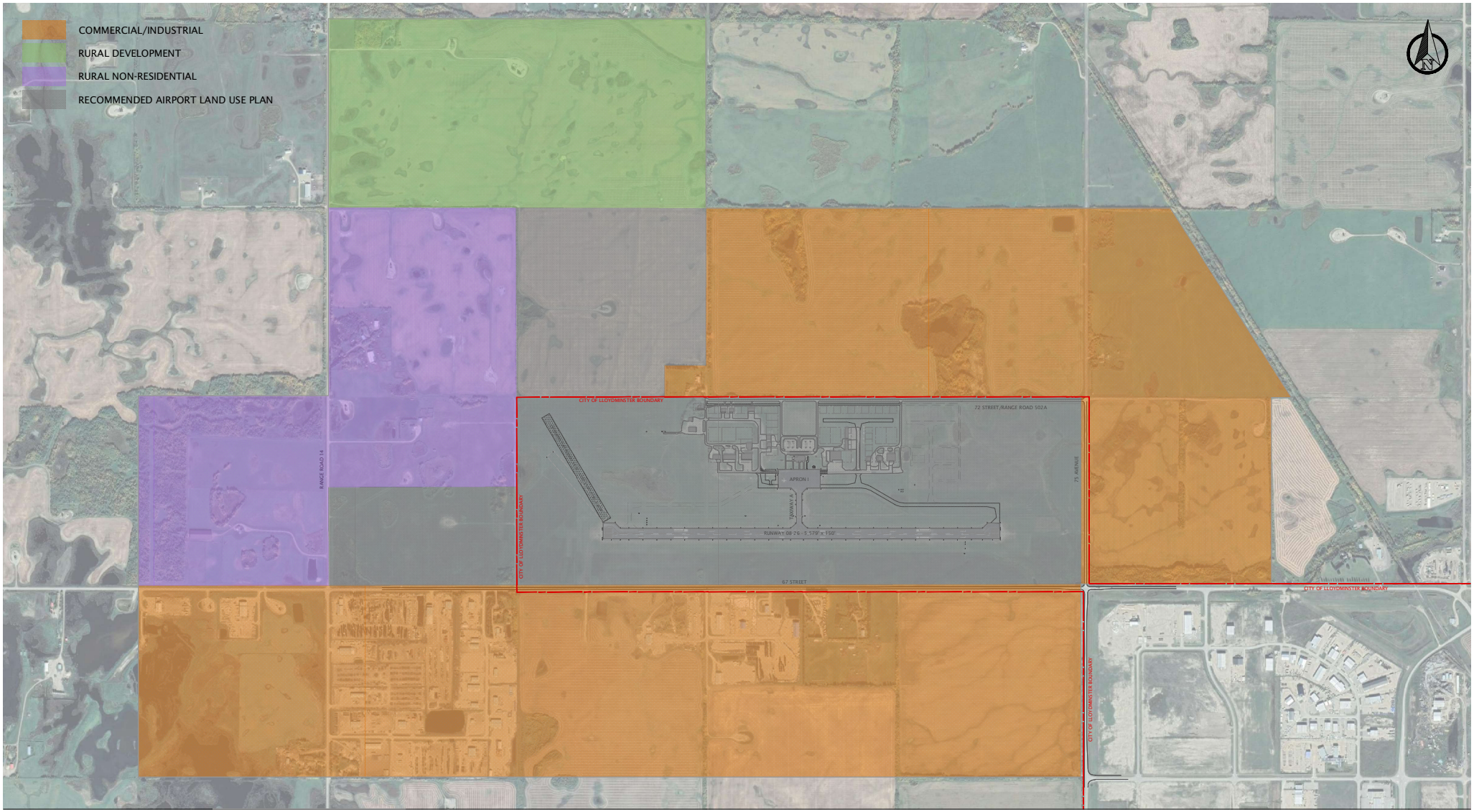
Based on consultations with the City and County, the Recommended Off-Airport Land Use Plan foresees the development of compatible employment uses in the vicinity of Lloydminster Airport to create an economic cluster with synergistic opportunities for new businesses. Three land use designations are proposed, as described below and shown in Figure 8.2:

- **Commercial / Industrial:** The intent of this designation is to permit a full range of compatible employment uses that will not be negatively impacted by the operations of the Airport. The development of these lands for commercial and light industrial purposes may include uses such as: retail sales, restaurants, gasoline and service stations, car dealerships, warehouses, distribution centres, outdoor sales, municipal utilities, factories, photovoltaic power generation, and other similar uses. Noise sensitive land uses, such as residential dwellings and camping grounds, should not be permitted in these areas.
- **Rural Development, Non-Residential:** This designation is intended to permit a limited range of compatible rural uses such as agricultural cropping, market gardens, plant nurseries, rural recreational activities, golf courses, and photovoltaic power generation. Residential development and other noise sensitive land uses should not be permitted in the Rural, Non-Residential designation.
- **Rural Development:** The Rural Development designation is applied to lands sufficiently far from the Airport that may be appropriate for limited residential development, with the provision of noise mitigation measures. Limited residential uses, such as single-detached dwellings and secondary dwellings, may be permitted, as well as the uses described in the Rural Development, Non-Residential designation.

Uses beyond the Airport boundary are subject to municipal plans and bylaws. The City of Lloydminster and County of Vermilion River No. 24 should review and amend, where necessary, the following documents to ensure that the direction provided herein is appropriately addressed in the municipal planning system:

- County of Vermilion River and City of Lloydminster Intermunicipal Development Plan (2008, as amended);
- County of Vermilion River Municipal Development Plan (Bylaw No. 19-03, as amended);
- County of Vermilion River North Urban Expansion Area Structure Plan (Bylaw No. 08-15, as amended); and
- County of Vermilion River Land Use Bylaw (Bylaw No. 19-02, as amended).

The County and City Land Use Bylaws contain overlays for the protection of Lloydminster Airport; **it is recommended that both bylaws be amended to reflect the updated guidance of this Master Plan.** The Airport Vicinity Area Overlay in the County Land Use Bylaw, for example, does not implement height limits for Runway 13-31, whereas the City Land Use Bylaw does. Both Bylaws must also be corrected to reflect the roles of Transport Canada and NAV CANADA in the development review process.



LLOYDMINSTER AIRPORT
MASTER PLAN

FIGURE 8.2 - RECOMMENDED OFF-AIRPORT LAND USE PLAN

APRIL 2020

0 400 800
METRES

*FOR PLANNING PURPOSES ONLY

9 Recommended Business Development Plan

9.1 Revenue Generation and Development Opportunities

The financial sustainability of the Airport is dependent on the growth of aviation and non-aviation revenue sources. By increasing Airport revenues, annual operating deficits can be reduced. As a municipally operated facility, this could be viewed as a significant benefit to the taxpayers of Lloydminster.

The potential of each of the revenue generation and development scenarios presented in Table 9.1 and described below has been evaluated based on the professional experience of the project team and their understanding of relevant industry trends. An accompanying planning horizon has also been assigned that indicates the anticipated timeframe in which the opportunity may be realized.

Table 9.1 – Revenue Generation and Development Opportunities

Aeronautical Opportunities			Non-Aeronautical Opportunities		
Opportunity	Potential	Planning Horizon	Opportunity	Potential	Planning Horizon
Air Service Development	High	Short	Industrial Development	Medium	Long
Airside Development Lots	High	Short	Photovoltaic Power	Medium	Medium
Aeronautical Fees	High	Short	Agriculture	Low	Medium
Flight Training	Medium	Short			
Fixed-Base Operator	Medium	Medium			
Unmanned Aerial Vehicles	Low	Medium			

9.1.1 Aeronautical Opportunities

Several aeronautical opportunities have been identified for Lloydminster Airport that are considered complementary to the core aviation function of the facility. The goal of identifying additional business opportunities is to support building a stronger economic engine for the regional economy and to provide additional revenues.

Air Service Development

Air service development generally follows a three-step process:

1. Attracting additional passengers to make use of existing flights and demonstrate the viability of the market to air carriers;
2. Developing additional frequencies, better-timed services, and / or larger aircraft; and
3. Launching new routes with incumbent or prospective air carriers.

As evidenced by historical air services at Lloydminster, airlines flexibly deploy their aircraft fleets to operate financially viable routes. As businesses that operate in a competitive and economically tumultuous industry, airlines generally do not exhibit "loyalty" to a given market. While airlines are responsible for marketing their flights, regional airports across Canada also advertise the availability of services from their facility. This recognizes that national air carriers may not have the resources to directly market air services at smaller airports such as Lloydminster as they do not represent high yield markets when compared to destinations such as Toronto, Vancouver, and Calgary.

In the short term, the primary focus for Lloydminster Airport should be attracting additional passengers to utilize existing WestJet flights, with the secondary focus being the addition of new frequencies. As demonstrated in the 2018 loss of Central Mountain Air services, there may be insufficient demand to support a new air carrier (e.g. Air Canada) connecting to a western Canada hub such as Calgary. Further, proactive outreach efforts by the City to WestJet's competitors may be construed in bad faith by the airline, damaging this new and developing relationship.

The passenger activity forecast contemplates service from a regional air carrier to a Saskatchewan destination such as Saskatoon or Regina. The introduction of a commuter service would primarily capture latent demand of individuals driving to these destinations, and not directly compete with WestJet's hub-and-spoke network model.

The City's air service development focusses should be as follows:

- The implementation of the Marketing Plan;
- Continued outreach with WestJet on the performance of its route to Lloydminster and possibility of securing additional service, including a morning flight to Calgary; and
- The initiation of discussions with prospective air carriers (e.g. West Wind Aviation) on the viability of a route to Saskatoon and / or Regina.

Airside Development Lots

Historical development activity suggests that the absorption of airside development lots will likely continue. Leases for development lots are a source of stable revenue for the City. The existing development lot inventory can support a range of aviation businesses, including but not limited to:

- Avionics suppliers;
- Aircraft Maintenance Organizations;
- Passenger and cargo air carriers;
- Private and corporate aircraft hangars; and
- Specialty aviation operators, such as helicopter and aerial application firms.

Aeronautical Fees

Table 9.2 describes the aeronautical rates and fees structure at the Airport as of 2020. Aeronautical fees are levied related to a core function of the Airport (e.g. aircraft movements, passenger activity, and operations). The City undertakes regular reviews of its fee structure against comparator airports in Alberta and Saskatchewan to ensure competitiveness and optimized revenue realization.

In addition to the fees described below, advertising in the form of billboards, posters, etc. is positioned at key points in the ATB. Advertising is the responsibility of the City's Sales and Sponsorship team.

Table 9.2 – Aeronautical Fee Structure (2019-2020)

Fee	Category	Cost	Application
Landing Fee (Excluding scheduled air carrier flights)	2,000 kg or less	$0.00	
	2,001 to 21,000 kg	$3.90	Per 1,000 kg
	21,000 kg +	$4.55	Per 1,000 kg
	Minimum Fee	$14.20	Per landing
	Flight Training Reduced Fee	$14.20	Per aircraft per day
Terminal Fee (Excluding scheduled air carrier flights)	0 to 5 seats	$0.00	
	6 to 12 seats	$25.00	Per aircraft
	13 to 20 seats	$35.00	Per aircraft
	21 or more seats	$65.00	Per aircraft
Passenger Fee (Scheduled air carrier flights)		$5.00	Per passenger
Parking Fee	First 48 hours	$0.00	
	Daily	$7.00	Per aircraft
	Monthly	$70.00	Per aircraft
	Annual	$350.00	Per aircraft
Airside Development Lot Lease	Annual	$1.55	Per m^2
Air Terminal Building Floor Space Lease	Annual	$325.00	Per m^2

The City's aeronautical fee structure is comprehensive, with most traditional opportunities for revenue generation identified and exploited. Three additional opportunities may be considered:

- **Vehicle Parking Fees:** Vehicle parking is provided free of charge up to 30 days. This is recognized among passengers as being an advantage of flying from the Airport; Edmonton International Airport, for example, charges approximately $75.00 per week for passenger parking in their value lot.

  The imposition of a modest parking fee could generate significant revenue for the Airport. However, vehicle parking would have to be priced in a competitive manner that balances revenue generation without dissuading travellers from choosing Lloydminster Airport. Further, the installation of revenue collection infrastructure (e.g. self-service terminals) would have capital and operating costs.

  The implementation of vehicle parking fees and the required revenue collection infrastructure and access controls could be implemented in the medium-term in conjunction with the recommended expansion of the parking lot, or as parking demand approaches capacity.

- **Airport Improvement Fees (AIFs):** AIFs are collected for arriving and departing passengers in addition to the air carrier's fare. AIFs are implemented at airports across Canada to fund major capital projects such as ATB expansions, and generally range between $10.00 and $20.00 per passenger for regional airports. The replacement of the Passenger Fee with an increased AIF would have an immediate revenue impact, with AIFs charged through the air carrier's ticket price as a non-optional fee.
- **ATB Boardroom Rental Fee:** Consultations with air carriers identified a desire to conduct staff training and meetings at the ATB, but that there is insufficient space in the leased air carrier offices. The rental of the ATB boardroom / EOC may be considered to generate revenue from such occasions. The implementation of an ATB Boardroom Rental Fee would be straightforward; however, its revenue generation potential is limited given the expected infrequency of its use.

Flight Training

Lloydminster Airport has been identified as a suitable location for increased flight training activities. The Air Transport Association of Canada estimates that there could be a shortage of 6,000 professional pilots over the next 20 years, increasing the need for flight training and the facility benefits from its good weather and VFR conditions, nighttime availability, published IFPs, adequate runway length, and on-site support services. The expansion of operations by the existing Flight Training Unit (FTU), Border City Aviation, is included in the aircraft movements forecast, including continued support for the Royal Canadian Air Cadets. Cross-country movements from FTUs based in locations such as Saskatoon and Edmonton / Villeneuve would also increase Airport activity, as would the development of a new FTU on-site.

A partnership between a post-secondary institution and an existing or new FTU to create an integrated professional pilot program could significantly benefit the Airport. Post-secondary aviation programs are becoming common in the Canadian context, with examples including:

- Red Deer College and Sky Wings Aviation;
- Saskatchewan Polytechnic and Mitchinson Flight Centre;
- Conestoga College and Waterloo Wellington Flight Centre; and
- Algonquin College and Rockcliffe Flying Club.

Building on this concept, air carriers have begun to develop career "pathway programs". In this system, new pilots proceed through an integrated flight training curriculum at partner institutions and join the respective pathway air carrier upon completion of their training. Jazz Aviation (a CPA partner of Air Canada) is one such carrier using this approach.

A hangar under construction (left) and flight training aircraft (right)

Fixed-Base Operator

As annual aircraft movements continue to increase, there is additional potential for new or expanded aircraft support businesses at the Airport. Consultations with aircraft operators noted the lack of a Fixed-Base Operator (FBO) as being a limitation of the Airport. FBOs are specialized businesses that provide services to aircraft and pilots that include ground handling and marshalling, fuel sales, aircraft storage, transportation, catering, and passenger and crew waiting areas. Some of these services are currently provided by Border City Aviation; however, the presence of a larger-scale and dedicated FBO at the Airport is a competitive advantage in the attraction of itinerant aircraft movements, especially for corporate and charter aircraft. The development of an FBO generally occurs in one of two ways:

1. A business establishes itself at the Airport following marketing by the City, including the attendance of trade shows and industry word-of-mouth. The business assumes all expenses and revenues in developing and operating the facility; or
2. The City could develop a new facility or purchase an existing hangar and tender out the operation of the FBO to businesses such as Border City Aviation, Tucana Aviation, Signature Flight Support, or Executive Flight Centre. This may stimulate the development of an FBO but has associated risks for the City through the ownership of capital assets.

Unmanned Aerial Vehicles

Unmanned Aerial Vehicles (UAVs) are being developed for a range of uses such as military applications, surveillance and inspection, cargo delivery, emergency services, and surveying. The UAV industry presents several opportunities for Lloydminster Airport, including research, development, and testing.

Lakeland College has been engaged in UAV-based research since it received federal funding in 2015 to purchase a unit. The different economic sectors of Lloydminster present opportunities for UAV application research, including the inspection of pipelines and industrial facilities, crop monitoring, and precision agricultural applications. A strategic partnership between the City of Lloydminster, Lakeland College, and private-sector businesses could position the Airport as a hub for UAV research.

Lloydminster may be well-positioned to support a UAV testing range for Beyond Visual Line of Sight operations. The uncongested airspace of the region, favourable weather conditions, and well-developed Airport infrastructure could support the testing of UAVs through the designation of an airspace Restricted Area (CYR). The generally flat topography and rural nature of the region is favourable for safety in the event of a forced UAV landing and the subsequent recovery of the unit. A similar concept has been implemented adjacent to Foremost Airport in southern Alberta with the Foremost Unmanned Aerial System Test Range.

The Department of National Defence is pursuing a Remotely Piloted Aircraft Systems (RPAS) project with the intention of procuring a fleet of UAVs for the RCAF. This project is in the definition phase; when underway, it is possible that drone testing could occur at CFB Cold Lake and the Cold Lake Air Weapons Range. Lloydminster Airport is approximately 25 km from the southern Air Weapons Range, and as such could be a favourable secondary testing and UAV recovery base. The RPAS project approval is expected in 2022 or 2023 with initial operational capability attained by 2025 or 2026.

Future UAV operations at Lloydminster Airport are also an opportunity for the Airport to study the integration of UAVs with normal aircraft movements, and for closer collaboration with NAV CANADA and Transport Canada.

In the short-term, it is recommended that the City:

- Consult with Lakeland College on the current and future state of their UAV research;
- Study the business case of establishing a UAV testing range at the Airport; and
- Conduct outreach with CFB Cold Lake on potential opportunities from the RCAF RPAS project.

9.1.2 Non-Aeronautical Opportunities

Non-aviation uses can be an opportunity to diversify the revenue base of the Airport, decreasing the reliance on aeronautical fees and improving the economic contribution of the facility to the region. Such uses should only be permitted when compatible with Airport operations.

Industrial Development

Per the 2013-2032 Municipal Development Plan (MDP), Lloydminster has consumed approximately 10-ha of commercial and industrial land annually. Industrial development is to be sited where the uses will not have an adverse impact on residential areas. Industrial growth is also to occur in a clustered manner, where synergies and partnerships between uses can develop.

Given its proximity to the northwest industrial growth area (Figure 9.1), the Airport may support limited light industrial development that is compatible with the core aviation function of the facility. Appropriate uses could include warehousing and storage / distribution facilities. However, the Airport is at a competitive disadvantage given its lack of municipal servicing. Given the visibility of the Airport to the travelling public and its role as a gateway to Lloydminster, future industrial development should enhance the overall image of the facility.

Commercial development has historically occurred along the Highway 16 and Highway 17 corridors, with the MDP directing future growth to commercial nodes supported by mixed-use neighbourhoods. Therefore, commercial development at the Airport would generally be inconsistent with the land use direction of the MDP.

Figure 9.1 – Municipal Development Plan Land Use Concept

Photovoltaic Power Generation

An increasing trend at airports across Canada is for land assemblies not required for operational or development purposes to be used for photovoltaic (solar) power generation. Thunder Bay Airport completed an 8.5-megawatt (MW) project in 2011, Windsor Airport commenced work on a 50 MW project in 2016, and Red Deer Regional Airport is set to commence work on a 5 MW project in the coming years. Airports can be favourable locations for solar projects given their large land assemblies and lack of incompatible nearby uses.

The solar energy resource potential of Lloydminster is between 1,251 and 1,300 kilowatt hours per m^2 per year. The lands north of Runway 13-31 could be developed for solar power generation. Glint and glare from solar panels is generally limited and is compatible with aircraft operations, pending a detailed assessment.

The leasing of Airport lands to a solar power developer shifts the capital burden from the City to the private sector, while creating a stable source of long-term land lease revenues. Further, this would improve the Airport's corporate social responsibility by facilitating sustainable power generation and position the City as an environmental leader in the Canadian context.

It is recommended that the City consult with photovoltaic power developers in the short-term on generation opportunities at Lloydminster Airport.

Photovoltaic arrays at Thunder Bay Airport (Google Earth)

Agriculture

The agriculture industry is a contributor to the economic strength of Lloydminster. Agricultural producers in the region are becoming leaders in the production, processing, and manufacturing of industrial hemp products, including cannabidiol (CBD). Processing facilities for hemp straw and fibre need to be near the source of feed stock, generally within 100 to 150 km. The Airport is also located near Lakeland College's innovation-based applied crop research program. The Airport has competitive strengths as a potential location for hemp processing or Research & Development, including market access through daily air carrier flights, the available land supply, and proximity to existing hemp facilities.

It is recommended that the City consult with Alberta HUB in the medium-term to better understand the potential synergies between the agricultural industry and Lloydminster Airport.

9.2 Marketing Plan

Several of the opportunities described in the preceding sections will require proactive marketing and outreach efforts by the City of Lloydminster and key partners in order to be realized. Based on the professional experience of the project team, consultations with comparator airports, and a review of existing materials (e.g. ACRP Marketing Guidebook for Small Airports), a Marketing Plan has been prepared for the Airport.

9.2.1 Goals and Objectives

The Marketing Plan considers short-term, high and medium potential opportunities. The preparation of marketing plans for the medium and long-term planning horizons should incorporate the lessons learned from the short-term Marketing Plan. The implementation of new aeronautical fees is not reliant on marketing, and accordingly is omitted from this Plan.

Goals are high-level statements of the City's desires for the future, while objectives are measurable targets to evaluate the progress towards these goals.

Air Service Development

Goal: The continued provision and growth of scheduled passenger services that connect Lloydminster to an airline hub airport.

Objectives:

- Improve public awareness of the Airport and its services;
- Increase passenger volumes on existing WestJet flights to Calgary;
- Secure a second daily weekday flight to Calgary; and
- Develop a new route to Saskatoon and / or Regina.

Airside Development Lots

Goal: Support and promote continued airside development to increase Airport activity and revenues.

Objectives:

- Attract at least one new tenant to the Airport every two years; and
- Ensure existing tenants renew their leases at the Airport.

Flight Training

Goal: Increase aircraft movements and improve the Airport's role as a centre for flight training.

Objectives:

- Support increased flight training by Border City Aviation; and
- Promote the Airport to other FTUs as a destination for cross-country flights.

9.2.2 Marketing Partners

Marketing efforts can be improved through the identification of partners that can leverage their knowledge, network, and expertise to spread the key messaging of the Airport. It is recommended that the following parties be engaged to discuss ways that they could support future marketing efforts. Each organization will have unique strengths that can be leveraged in a unified marketing strategy; Alberta Hub, for example, has strong macro-level regional economic knowledge to contextualize the Airport's opportunities. The Chamber of Commerce typically offers more detailed insights on the strengths of the local market and can spread messaging to businesses in the area.

A partnership workshop prior to the implementation of the Marketing Plan can bring select parties together, identify synergies, build relationships, and unify the future strategy.

Air Service Development

- City of Lloydminster Economic Development;
- County of Vermilion River;
- Alberta Hub; and
- Lloydminster Chamber of Commerce.

Airside Development Lots

- City of Lloydminster Economic Development;
- Lloydminster Chamber of Commerce;
- Canadian Owners and Pilots Association (COPA) / Lloydminster Flying Club;
- Saskatchewan Aviation Council; and
- Alberta Aviation Council.

Flight Training

- Border City Aviation
- Canadian Council for Aviation and Aerospace;
- Canadian Owners and Pilots Association;
- Air Transport Association of Canada;
- Saskatchewan Aviation Council; and
- Alberta Aviation Council.

9.2.3 Target Audiences and Key Messaging

To maximize the effectiveness and cost-efficiency of marketing efforts, one or more target audiences should be identified for each marketing goal and objective. By adopting a focussed approach to audience outreach, the City can prepare messaging that addresses the specific concerns of the given party. This negates a "one size fits all" approach to marketing, where the message can be overly general in nature.

The key messaging for each audience is informed by the SWOT analysis, tailored to the unique needs of each group, and should clearly communicate the Airport's competitive advantage and Unique Selling Points (USPs). When the key messaging and USPs for each audience are determined, they should be communicated consistently by all partners to create a unified brand message for the Airport. Target audiences and key messaging is presented in Table 9.3.

Table 9.3 – Target Audiences and Key Messaging

Target Audience	Key Messaging
Air Service Development	
Catchment Area Population	• "Use it or lose it" nature of local airline services • Competitiveness of fares from Lloydminster versus Saskatoon and Edmonton when accounting for the total costs of travel (e.g. fuel, parking, value of time) • Convenience of Lloydminster Airport in terms of access, passenger processing times, and free parking for 30 days • Less time and vehicle wear from driving • Ability to connect in Calgary to WestJet's network of almost 70 domestic, U.S., and international destinations
Air Carriers (Incumbent and prospective)	• The competitiveness of the Airport's aeronautical fees • Infrastructure improvements being undertaken • Status of municipal air service promotion efforts • Availability of detailed market information (e.g. leakage studies, local business trends, major tourism events) • Information on aircraft support services (e.g. fuel, aircraft de-icing, baggage handling, ATB capabilities)
Airside Development Lots	
Catchment Area Aircraft Operators	• Competitiveness of land lease rates • Year-round Airport maintenance, night operations, IFPs, and NAV CANADA FSS • On-site fuel, FTU, and Aircraft Maintenance Organization • Availability of primary and secondary crosswind runways • Lot sizes, locations, servicing, and availability
Flight Training	
Alberta and Saskatchewan FTUs (see list below)	• Year-round Airport maintenance, night operations, IFPs, and NAV CANADA FSS • Competitively priced on-site fuel • Optimal distance for Private Pilot and Commercial Pilot License cross-country training from North Battleford, Edmonton, Saskatoon, Calgary, Regina, etc.
FTUs include, but are not limited to: Battlefords Airspray (North Battleford); Mitchinson Flight Centre and Millennium Aviation (Saskatoon); Regina Flying Club (Regina); Leading Edge Aviation (Yorkton); Edmonton Flying Club, Centennial Flight Centre, Cooking Lake Aviation, and Namao Flying Club (Edmonton); Calgary Flying Club and Springbank Air Training College (Calgary)	

9.2.4 Methods

The communication of the Airport's key messaging and USPs to each target audience can be executed through a variety of methods, each with varying levels of effectiveness and resources required. The generalized costs of a variety of marketing techniques, as adapted from ACRP research, is provided in Table 9.4.

Table 9.4 – Generalized Marketing Costs

Minimal Cost	Low Cost	Moderate Cost	High Cost
Direct Outreach Press Releases Editorials Email Newsletter Speeches and Networking	Airport Website Social Media Advertising Industry Publications Promotional Events	Targeted Online Ads Radio Ads Newspaper Ads Billboard Ads Conference Attendance Specialist Marketing Consultant	Television Advertising

Marketing methods to communicate the key messaging to the identified target audiences have been provided in Table 9.5. The techniques selected by the City and its marketing partners will depend on the resources available. More advanced marketing methods, such as Targeted Online Advertising and Billboard Advertising, may benefit from the retention of a qualified advertising agency. However, updates to the Airport's website to communicate the facility's strategic position, business opportunities, and available development lands and services could be completed at relatively low cost.

Table 9.5 – Marketing Methods

Target Audience	Marketing Methods
Air Service Development	
Catchment Area Population	• Press Releases: Published following key air service developments (e.g. additional frequencies added, release of year-end passenger traffic figures) • Editorials: Written by elected representatives to communicate the advantages of the Airport • Speeches and Networking: The articulation of key messaging by City Staff and politicians at regional events (e.g. Colonial Days) • Airport Website: The Airport website can be updated to provide improved information about air carrier services, including travel information and a trip calculator that compares the cost of travelling from Lloydminster versus competitor airports. • Social Media Advertising: The City Facebook, Twitter, and YouTube pages can be leveraged to communicate news about the Airport. A dedicated Airport social media account could also be created. • Promotional Events: In cooperation with the incumbent air carrier, or in conjunction with the commencement of service by a new carrier, the City could run promotional events such as a ticket giveaway. • Targeted Online Advertising: This is a form of focussed advertising where Airport messaging is selectively shown to certain groups or demographics based on predefined criteria (e.g. individuals who have searched for flights). • Billboard Advertising: Key messaging can be applied to billboards along driving routes to competitor airports, such as Highway 16 to Edmonton and Saskatoon. This is an opportunity to communicate the advantages of flying over driving.
Air Carriers (Incumbent and prospective)	• Direct Outreach: The City should maintain a dialogue with the incumbent airline and reach out to select prospective carriers to communicate the market opportunity
Airside Development Lots	

Target Audience	Marketing Methods
Catchment Area Aircraft Operators	• Direct Outreach: Following up with individuals who have previously expressed interest in developing at the Airport. Open lines of communication with existing tenants should be maintained to identify issues and opportunities. • Press Releases: Announcing the preparation of new development lots. • Airport Website: Updating the website with development information, including lot availability, costs, and a point of contact • Industry Publications: Advertising development opportunities through COPA, Alberta Aviation Council, and Saskatchewan Aviation Council materials
Flight Training	
Alberta and Saskatchewan FTUs	• Direct Outreach: Contacting potential FTUs to discuss the possibility of expanding operations at the Airport and utilizing the facility as a preferred cross-country flight training destination

9.2.5 Plan Implementation and Monitoring

The Marketing Plan establishes a short-term approach to addressing three air service development, lot absorption, and flight training goals. **It is recommended that the Marketing Plan be implemented throughout the short-term planning horizon.** Next steps include:

1. Engaging the City of Lloydminster's Economic Development Officer to assemble and lead a team that will be responsible for the Airport marketing campaign;
2. Ratifying the short-term marketing goals and objectives;
3. Securing commitments from marketing partners and convening a strategy workshop;
4. Selecting marketing methods based on available City and partner resources;
5. Preparing annual action plans and individual responsibilities; and
6. Monitoring the success of marketing efforts and adjusting the plan.

It is intended that this six-step process will occur as a cycle on an annual basis, except for Step 1. By continually monitoring and refining the marketing efforts of the Airport, the City will be well-positioned to maximize the benefits it realizes from its efforts.

The following additional marketing actions are recommended in the short-term:

- A Lloydminster Airport logo and brand should be created that is distinct from the City of Lloydminster branding currently used. An effective logo and branding can quickly communicate the Airport's advantages and build recognition among travellers. Saskatoon International Airport's *SKYXE* brand, for example, acknowledges the facility's location (SK), geography as the "land of the living skies" (sky), and the airport itself (YXE). Similarly, Windsor International Airport uses its code (YQG) within its branding to communicate its advantage as "Your Quick Gateway."
- A media kit should be prepared, hosted on the Airport website, and distributed to regional news outlets. This could include City media contacts, logos and branding, stock photos and footage, and facts and figures. A comprehensive media kit will assist with the factual reporting of the Airport when news stories are being prepared and ensure that facility information is being communicated consistently and clearly. This kit should be updated periodically as information changes.

- The Airport webpage should be redesigned. While functional, the current webpage does not clearly communicate key details such as air carrier information, the Airport's USPs, and development lot availability. Redesigning the webpage is an opportunity to integrate the target audience key messaging described above, furthering the air service development and lot absorption goals.

Canadian airport branding examples

9.3 Key Performance Indicators

Key Performance Indicators (KPIs) are quantifiable metrics that the City can use to track progress on its Airport goals and objectives. KPIs should be designed using the "SMART" model: Specific, Measurable, Attainable, Relevant, and Time-Limited.

KPIs have been prepared for the three short-term marketing goals, as well as for the Airport more generally in how it meets its vision statement, as shown in Table 9.6. The intent is that progress on each KPI will be tracked, which can be analyzed to determine how the vision and goals for the Airport are being addressed. As the City progresses through the Master Plan horizon, each KPI may be evaluated and changed as required to reflect the evolving circumstances of the Airport.

Table 9.6 – Key Performance Indicators

Vision Statement	Key Performance Indicator	Dataset	Review Period
Financial Sustainability	Annual decreases in the Airport operations deficit towards $0	Airport financial statements	Annually
	Annual increases in aeronautical and non-aeronautical revenue	Airport financial statements	Annually
Responsible Growth	1.5% annual growth in aircraft movements	Aircraft movement reports	Annually
	6.0% annual growth in passenger traffic	Passenger activity reports	Annually
	1 new development lot tenant per year	Signed land leases	Annually
Service Excellence	≥ 80% of holdroom passengers seated	Airport Staff observations	Weekly
	CATSA wait time < 5 minutes	Airport Staff observations	Weekly
	Checked baggage delivery < 10 minutes after aircraft arrival	Airport Staff observations	Weekly

10 Future Financial Performance

Financial forecasts for Lloydminster Airport have been prepared for the 25-year Master Plan Horizon, as presented in Table 10.1. This includes projected revenues and expenditures, including the cost estimates of the Capital Plan. Rough Order of Magnitude estimates were determined based on recent Airport projects, local unit rates where available, and the professional experience of the project team.

Similar to other forecasts prepared through this Master Plan (e.g. aircraft movements, passenger activity), several factors could impact the financial forecasts and the success of future revenue generation initiatives. These factors include, but are not limited to, the actual rate of Airport traffic growth and development lot absorption. Detailed financial planning is most relevant in the short and medium-term planning horizons; long term projections are more uncertain and should be interpreted as an outlook only.

10.1 Model Assumptions

The following assumptions have been made in support of the Airport financial forecast, in addition to those previously described for the capital plan:

- Revenues and expenditures for the short and medium-term planning horizons are developed on an annual basis. Revenues and expenditures for the long-term planning horizon have been banded within a fifteen-year period;
- Capital expenditures include studies recommended through the Master Plan;
- An annual inflation rate of 2% has been assumed;
- Fee revenues are correlated with the forecast increases in passenger activity and aircraft movements. Terminal, landing, and parking fees will increase with inflation;
- An Airport Improvement Fee of $15.00 per scheduled departing passenger will be established in 2021 and will replace the passenger fee. The revenues from the AIF will be dedicated to the improvement of the Airport and are not intended to be used for other City projects;
- Land lease revenues assume an annual rate of $1.55 per m^2 in 2021, increasing with inflation in subsequent years. It is assumed that one lot is absorbed every two years;
- The Other User Fees and Sale of Goods revenue categories have been carried forward and increase with inflation. These include ATB floor space leases, call out fees, advertising, etc.;
- The quantity of aviation fuel purchased and sold is correlated with the forecast increase in aircraft movements. The cost to purchase fuel from the supplier as well as the price of fuel sold will increase with inflation; and
- Other expense categories have been carried forward and increase with inflation. These include Contract Services; Goods, Materials, and Repair; Salaries, Wages, and Benefits; and Utilities. It is assumed that the current number of Airport Staff is adequate to operate and maintain the facility throughout the Master Plan horizon.

10.2 Financial Outlook

The projected pro forma financial statement anticipates a consistent increase in operating revenues over the Master Plan horizon, while operating expenditures remain relatively constant. An operating deficit of approximately $90,000 is projected to be incurred in 2021, similar to the deficits historically experienced with the Airport and consistent with the operating deficits experienced at similar Canadian regional airports.

The deficit reduces annually and is eliminated approximately 4 years (2024) into the pro forma period as revenues increase relative to expenses. After the 2024 surplus, the Airport is projected to realize annual operating surpluses for the remainder of the Master Plan horizon, reaching approximately $70,000 by 2045. However, these surpluses will be insufficient to fund the capital projects recommended throughout the Master Plan, and external funding will be required.

Table 10.1 – 25-Year Projected Pro Forma Financial Statement

Planning Horizon	Short Term					Medium Term					Long Term
Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031-2045
Operating Revenues											
Airport Improvement Fee	$179,885	$183,483	$236,403	$297,057	$320,567	$346,373	$356,956	$367,824	$378,984	$390,443	$8,500,674
Terminal Fees	$5,569	$5,681	$5,794	$5,910	$6,028	$6,149	$6,272	$6,397	$6,525	$6,656	$117,402
Landing Fees	$30,569	$31,197	$46,043	$46,982	$47,941	$48,920	$49,920	$50,940	$51,982	$53,046	$1,243,314
Parking Fees	$4,284	$4,370	$4,457	$4,546	$4,637	$4,730	$4,824	$4,921	$5,019	$5,120	$90,309
Land Leases	$54,133	$55,216	$58,722	$59,896	$63,593	$64,865	$68,761	$70,137	$74,244	$75,729	$1,552,402
User Fees and Sale of Goods	$117,300	$119,646	$122,039	$124,480	$126,969	$129,509	$132,099	$134,741	$137,436	$140,184	$2,472,752
Fuel Sales	$465,034	$472,776	$524,753	$587,636	$597,796	$626,865	$637,787	$648,917	$660,257	$671,814	$11,982,231
Total	**$856,775**	**$872,368**	**$998,212**	**$1,126,508**	**$1,167,532**	**$1,227,410**	**$1,256,620**	**$1,283,877**	**$1,314,448**	**$1,342,992**	**$25,959,085**
Operating Expenses											
Contract Services	$100,780	$102,795	$104,851	$106,948	$109,087	$111,269	$113,494	$115,764	$118,080	$120,441	$2,124,495
Goods, Materials, & Repairs	$145,233	$148,137	$151,100	$154,122	$157,205	$160,349	$163,556	$166,827	$170,163	$173,566	$3,061,589
Salaries, Wages & Benefits	$233,824	$238,501	$243,271	$248,136	$253,099	$258,161	$263,324	$268,591	$273,963	$279,442	$4,929,155
Utilities	$91,070	$92,891	$94,749	$96,644	$98,577	$100,548	$102,559	$104,610	$106,703	$108,837	$1,919,802
Aviation Fuel Purchase	$378,789	$385,095	$427,433	$478,653	$486,929	$510,606	$519,503	$528,568	$537,806	$547,219	$9,760,003
Total	**$949,695**	**$967,419**	**$1,021,404**	**$1,084,504**	**$1,104,896**	**$1,140,933**	**$1,162,436**	**$1,184,360**	**$1,206,714**	**$1,229,505**	**$21,795,043**
Financial Performance											
Operating Surplus / Deficit	**-$92,920**	**-$95,051**	**-$23,192**	**$42,005**	**$62,635**	**$86,477**	**$94,183**	**$99,516**	**$107,734**	**$113,486**	**$4,164,041**
Capital Expenditures	**$1,027,248**	**$31,108**	**$199,793**	**$558,381**	**$364,788**	**$1,308,825**	**$2,138,700**	**$292,915**	**$2,437,989**	**$2,142,992**	**$10,666,830**
Net Surplus / Deficit	**-$1,120,168**	**-$126,159**	**-$222,985**	**-$516,376**	**-$302,153**	**-$1,222,348**	**-$2,044,516**	**-$193,399**	**-$2,330,255**	**-$2,029,506**	**-$6,502,789**

11 Master Plan Implementation

The Master Plan has been prepared using all available information to make informed recommendations as to the future of Lloydminster Airport. As a static document, unforeseen changes will inevitably occur that may challenge the analysis and recommendations of this Plan. Therefore, the City should regularly review the Master Plan and complete required updates; at a minimum, the Plan should be updated within the next ten years.

The recommendations made throughout this Master Plan are summarized in Table 11.1, according to the type of recommendation and planning horizon in which execution is recommended. This encompasses capital and operational projects, future studies required to provide in-depth analysis beyond the scope of this Plan, and marketing and business development.

Table 11.1 – Master Plan Recommendations

Planning Horizon	Capital and Operational Projects	Studies	Marketing and Business Development
Short Term 2021-2025	• Runway 08-26 Runway End Safety Areas • Runway 08-26 Precision Approach Path Indicator Reconfiguration • Apron I Slurry Seal Application • Runway 08-26 / Runway 13-31 Holding Position • Taxiways B and C Centreline Markings • Taxiways B and C Retroreflective Markers • Curbside Reconfiguration and Improvements • ATB Road Wayfinding and Signage • ATB Condition Assessment Report - Rehabilitation Projects • Noise Complaint Tracking System • Extension of Potable Water/Sanitary Sewer Servicing • Mobile Equipment Acquisition: Snow Plow Truck, De-icing Trailer, and Grader	• TP312 5th Edition Gap Analysis • Airfield Signage and Markings Regulatory Compliance Review • ATB Accessibility Audit • City and County Land Use Bylaw Amendments	• Marketing Plan Implementation • Unmanned Aerial Vehicle Business Development Efforts • Photovoltaic Power Generation Business Development Efforts • Airport Logo and Branding, Webpage Upgrades, and Media Kit
Medium Term 2026-2030	• ATB Reconfiguration and Expansion • Western and Eastern Development Area Northern Service Roads • ATB Road Lighting • ATB Road Reconfiguration and Upgrades • Parking Lot Reconfiguration and Expansion • Aircraft Fuel Bowser Procurement • Runway 08-26 Partial Length Parallel Taxiway • Implementation of Recommended Apron Management Plan • Taxiway B Reconfiguration and Extension to Eastern Development Area • Taxiway C Reconfiguration • Mobile Equipment Acquisition: Lawn Mower, Portable Sander, Towed Mower Deck, Pick-up Trucks (3)	• Electric Vehicle Charging Station Business Case and Feasibility Study • Unmanned Aerial Vehicle Incursion Study	• Agriculture Business Development Efforts

Planning Horizon	Capital and Operational Projects	Studies	Marketing and Business Development
Long Term 2031-2045	• Rehabilitation of Service Roads • Runway 13-31 Realignment and Extension • Rehabilitation of Airfield Pavements • Mobile Equipment Acquisition: Loader-Mounted Snow Blower, Loader, Tractor, Sweeper, Split-Fuel Tank	• Airport Master Plan Update	

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