

Master Plan 2037

Final Report (DRAFT)

Regina International Airport

Prepared for

YQR REGINA INTERNATIONAL™

Prepared by

InterVISTAS

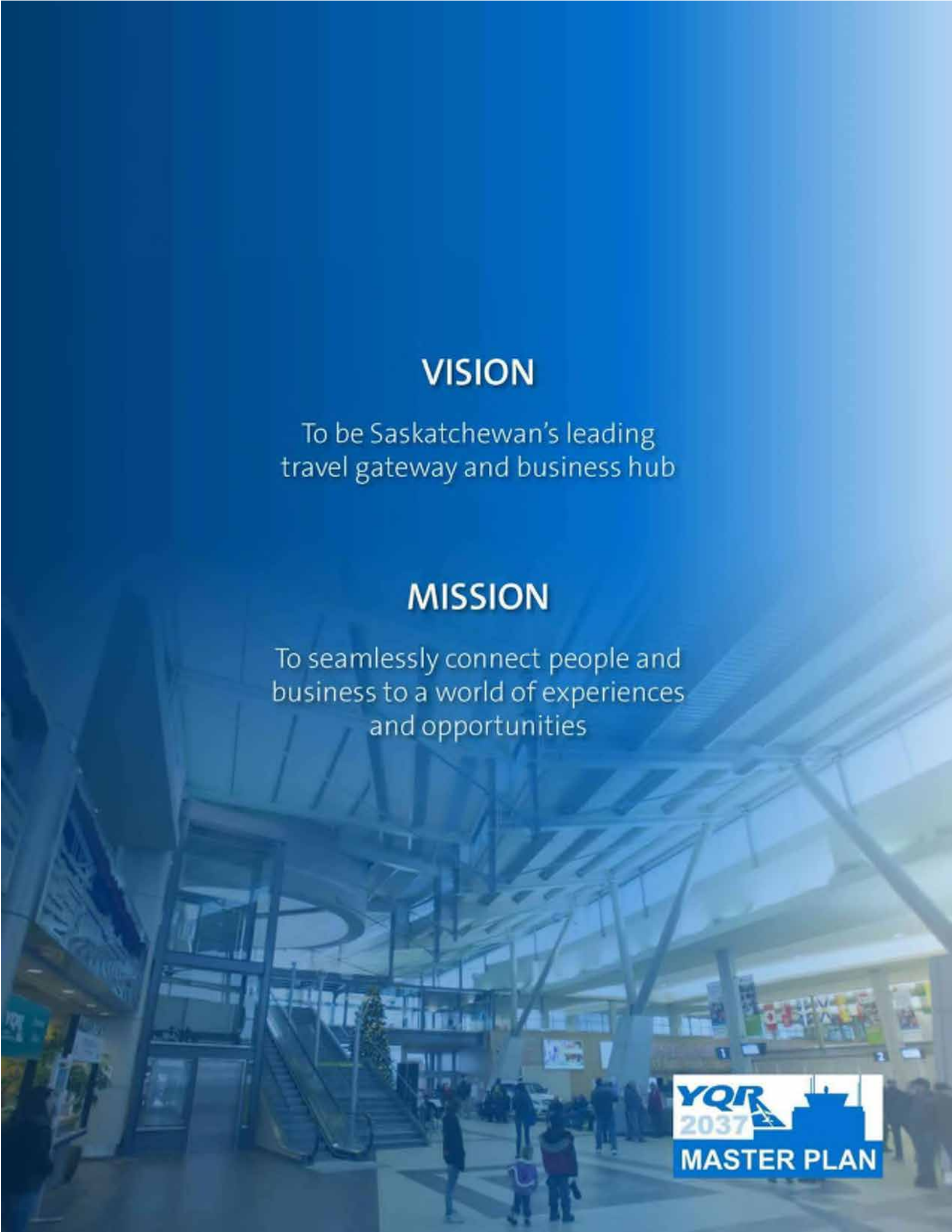
a company of Royal HaskoningDHV

And supported by

Stantec

May 2018

YQR 2037 MASTER PLAN



VISION

To be Saskatchewan's leading travel gateway and business hub

MISSION

To seamlessly connect people and business to a world of experiences and opportunities

YQR 2037 MASTER PLAN

CONTENTS

Tables

Figures

Chapter 1 – Introduction

YQR 2037 MASTER PLAN

Chapter 1 – INTRODUCTION

The Master Plan for Regina International Airport (Master Plan 2037) was developed to provide a strategic roadmap for the Regina International Airport (the Airport or YQR). One of the fundamental basics of airport planning is to ensure that the timing of future infrastructure development meets the needs of the airport. A systematic development methodology was used to develop the Master Plan to forecast needs, assess required capacity, and integrate different functional areas. Input was sought from various departments within the Regina Airport Authority (RAA), surrounding communities, and the various stakeholders of the Airport. Some of the key issues that were considered in the Master Plan included:

- Terminal building "legacy" challenges, facility renovations, and potential expansions;
- Parking demand and existing/future capacity;
- Changing airline aircraft fleet mix: 19-, 35-, and 55-seat aircraft phase out;
- Non-aeronautical revenue including Concessions and Land development;
- Key processes and automation; and
- Competitive environment.

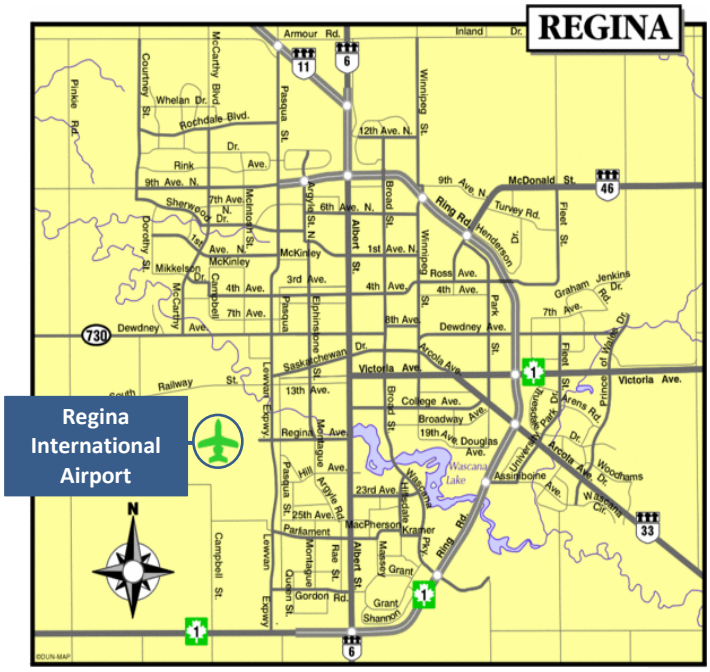
This chapter includes an overview of the Airport, its history, its local economic impact, an overview of the master planning process, and several planning principles and goals to guide the Master Plan.

OVERVIEW OF REGINA INTERNATIONAL AIRPORT

YQR serves the City of Regina in the southeast part of the Province of Saskatchewan, a region with a population of more than half a million people. The Airport is located four kilometres southwest of Regina's city center, as shown in Figure 1-1. It is situated on approximately 600 hectares of land. The Airport is bounded by the mainline Canadian Pacific Railway along the northern perimeter, by Lewvan Drive along the eastern edge, and the Harbour Landing neighborhood south of the Airport. In 2016, the Airport reached a record number of 1,262,899 passengers, which placed it 15th among Canada's busiest airports by volume of passenger traffic and second busiest in Saskatchewan. The Airport is equipped with two runways:

1. Runway 13-31 - 7,901-feet-long and
2. Runway 08-26 - 6,200-feet-long.

Figure 1-1. Map of the City of Regina



Source: Regina Airport Authority (https://www.yqr.ca/2011-05-10-16-50-29/about-raa)

REGINA INTERNATIONAL AIRPORT AND AUTHORITY HISTORY

Flying in Regina has its historical beginnings in the early 1910s with the first airfield opening in the region in 1919. After the First World War, a second airfield opened in the city's southern Lakeview district, which was designated as Canada's first licensed air harbor. In 1927, the Regina Flying Club was formed and it purchased 160 acres of land for the development of Regina's third airport site. In 1928, the city of Regina purchased this land from the flying club and started development of the present airport. Regina Municipal Airport officially opened on September 15, 1930. Upon opening a new runway in 1932, the Airport featured the first paved runway between Montreal and Vancouver. In the following years, the Airport acquired additional property, built a new hangar, and airport lighting was added. These improvements contributed to the start of scheduled airline services by Canadian Airways and Prairie Airways.

Regina Airport was taken over by Transport Canada with the outbreak of the Second World War. Ownership was handed back to the City of Regina in 1955 and Transport Canada bought the airport back from the city in 1972. In 1995, the first US scheduled airline service began under the Canada-US Open Skies agreement. In 1998, the Regina Airport Authority (RAA) was formed and Transport Canada agreed to transfer the operations and management of the airport to RAA in May 1999. Since that time, RAA has been operating as an autonomous, not for profit entity. The airfield was named Roland J. Groome Field after a local flight instructor at the Regina Flying Cub in the 1930s, who was the first commercially licensed pilot in Canada.[1]

AIRPORT ROLE AND ECONOMIC IMPACT

Under the *National Airports Policy*, the Airport is titled as a National Airport System (NAS) airport. With 26 NAS airports located across Canada, they have the combined capabilities of linking communities across Canada and internationally.[2] The Airport is both a trade and travel gateway to areas within Saskatchewan as well as areas within neighbouring provinces, territories and beyond.

With scheduled and charter services for passengers and cargo, the Airport provides essential infrastructure that links Regina and other Saskatchewan communities to the world. The Airport is served by five airlines which operate, on average, 25 departing and arriving flights per day. These flights offer non-stop connectivity to seven domestic, three transborder, and 13 international destinations, as well as one-stop connectivity to over 250 destinations worldwide throughout the year.[3] Other non-scheduled general aviation operations are also offered at the Airport, including: sightseeing, commercial flight training, aerial surveys, aerial inspection services, corporate/private aircraft operations and government aircraft services. Support services, such as hanger storage, aircraft maintenance and fixed base operations, are also provided.[4]

The Airport's mission is *"To seamlessly connect people and business to a world of experiences and opportunities,"* and it is supported through its vision to be "*Saskatchewan's leading travel gateway and business hub."*[5] The combined effort of this vision and mission has enabled the Airport to achieve a record

[1] 2001-2021 YQR Airport Master Plan, 2002
Regina Flying Club (Online)
History of Canadian Airports, T.M. McGrath, 1992
[2] http://www.tc.gc.ca/eng/programs/airports-map_tc_airports-65.htm
[3] RAA 2016 Annual Report - https://www.yqr.ca/images/annual-report.pdf
[4] https://www.yqr.ca/images/corporate/reference-materials/yqr_master_plan_2007_-_2027.pdf
[5] https://www.yqr.ca/2011-05-10-16-50-29/about-raa

number of passengers in 2016 totaling at 1.263 million, built primarily on the growth of domestic travel in Canada.[3]

Regina is the capital and second largest city in Saskatchewan, with a population of nearly 236,500 people. The province of Saskatchewan itself has a population of 1.10 million, making it the sixth largest province in Canada, enabling it to produce a yearly GDP of $62.5 billion in 2016.[6]

Saskatchewan

- **Population (2016)**: 1.10 million (sixth largest province in Canada)
- **GDP (2016)**: $62.5 billion
- **Median Household Income (2016)**: $84,900
- **Largest Industries**: Industrial production, mining, quarrying, oil & gas, energy, agriculture, forestry & fishing

Source: Statistics Canada[7]

YQR contributes significantly to employment and economic development in both the local community and throughout the Province of Saskatchewan. Its economic importance is reflected in the estimated 3,497 Full-Time Equivalents (FTEs) of employment that are directly supported or facilitated by the airport and $354 million directly contributed to economic output.[8] Development in the regional and provincial economy is supported by a strong transportation and logistics sector. The Airport operates as a critical component to the economic prosperity of Saskatchewan, allowing Regina to host a several company headquarters and facilitate travel by government officials.

- The Airport is one of the Top Ten Centres of Employment in the Regina area.
- Each 1,000 E&D[9] passengers support 5.2 full-time jobs.
- Each 1,000 E&D passengers create $241,000 of annual labor income.
- Each 1,000 E&D passengers support $668,000 of GDP activity.
- Each time a Boeing 737 lands and takes off, it supports 1.4 FTEs; $63,000 of annual labour income; and $174,000 of GDP activity.
- Each time a Bombardier Q400 lands and takes off, it supports 0.8 FTEs; $36,000 of annual labour income; and $100,000 of GDP activity.

[6] Statistics Canada
[7] Photo in figure 1-2: https://m.aliexpress.com/item/32478062094.html
[8] The 2015 Economic Impact of the Regina International Airport, R. *P. Erickson & Associates* (June 2016).
[9] E&D – Enplaned and Deplaned

MASTER PLAN OVERVIEW

Airport master plans are one of several key documents maintained by airport authorities. The plan is guided by the overall business strategy of RAA, which establishes the core mission, vision, values and strategic targets. The master plan provides long-term guidance and helps facilitate the more detailed capital plans and annual business and operational plans. The master plan projects demand 20 years into the future to adequately plan the long-term investments needed to meet changing markets.

Air carriers, cargo/logistics firms and airport customers will not remain static over the course of the next 20 years. For example, some of the major trends in the aviation industry include the growth of ultra low-cost providers, new international/network opportunities, and technological changes that generate new possibilities in streamlining the flow of passengers on every step of their journey through an airport.

Ultimately, Master Plan 2037 serves as the document for RAA to:

- Define future investments in the airport property;
- Ensure that the physical infrastructure of the airport aligns with the business strategy;
- Provide flexibility for changing market conditions; and
- Ensure aviation potential for the community is realized.

With Master Plan 2037, the Airport will become:

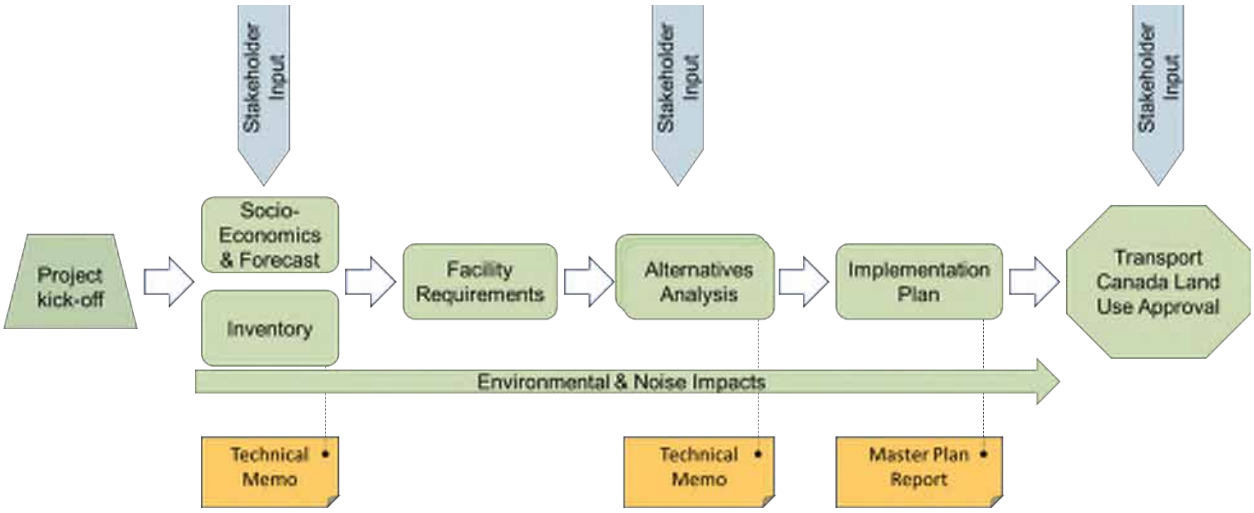
- A more connected airport to the city, the province, and the world;
- An optimized and flexible facility, ready to meet future demands; and
- A major contributor to the community by creating jobs and supporting the economy.

The master planning process is divided into seven primary stages:

1. **Inventory** – Identify the existing facilities at the Airport, their conditions and capacities, and collect qualitative data regarding airport operations and facility functions.
2. **Socio-Economics and Forecasts** – Create aviation demand forecasts for commercial passenger carriers, air cargo carriers, military, and general aviation.
3. **Facility Requirements** – Calculate the existing demand and capacity for Airport facilities and project the demand for those facilities for future years. Develop requirements with basic simulation models and analytical tools that account for the interplay between facilities.
4. **Alternatives Analysis** – Develop and conduct an evaluation of conceptual alternatives for future development. Evaluation criteria includes economic viability, operational efficiency, and social responsibility.
5. **Implementation Plan** – Refine the preferred development alternatives and develop a phasing plan that will provide both near-term and long-term solutions.
6. **Environmental Overview** – Document the Airport's performance with respect to several environmental resource categories and tie its future development to enterprise-wide sustainability goals.
7. **Land-Use Approval and Documentation** – Submit Land Use Plan to Transport Canada for official approval.

A simplified diagram of the master planning process is shown in Figure 1-2.

Figure 1-2. Master planning process timeline



PLANNING PRINCIPLES AND GOALS

Throughout the master planning process, the team referred to the Airport's pre-existing Strategic Goals as Planning Principles. Two goals were developed for each of the Strategic Goals. These Strategic Goals/Planning Principles and the corresponding goals are as-follows:

- Planning Principle: Exceptional Customer Service
  - Goal: Enhance the image of the Airport campus with intuitive wayfinding and consistent branding
  - Goal: Provide a sense-of-place within the terminal building
- Planning Principle: Grow Our Business
  - Goal: Proactively accommodate potential growth in airline traffic
  - Goal: Provide land-use guidelines and investment principles to inform quick decisions on development opportunities
- Planning Principle: Operational Excellence
  - Goal: Enhance the safety, operational efficiency, and capacity of the airfield
  - Goal: Implement sustainable solutions and mitigate impacts
- Planning Principle: Sustained Financial Strength
  - Goal: Provide an affordable capital improvement program
  - Goal: Identify projects that generate new revenues and fast-track them, if appropriate
- Planning Principle: Exceptional People doing an Exceptional Job Every Day
  - Goal: Encourage ownership of initiatives through staff engagement
  - Goal: Increase awareness of the plans throughout Authority communication

Chapter 2 – Aviation Demand Forecast

YQR 2037 MASTER PLAN

Chapter 2 – AVIATION DEMAND FORECAST

This chapter consists of two primary sections: Socio-Economic Environment and Air Traffic Forecasts.

SOCIO-ECONOMIC ENVIRONMENT

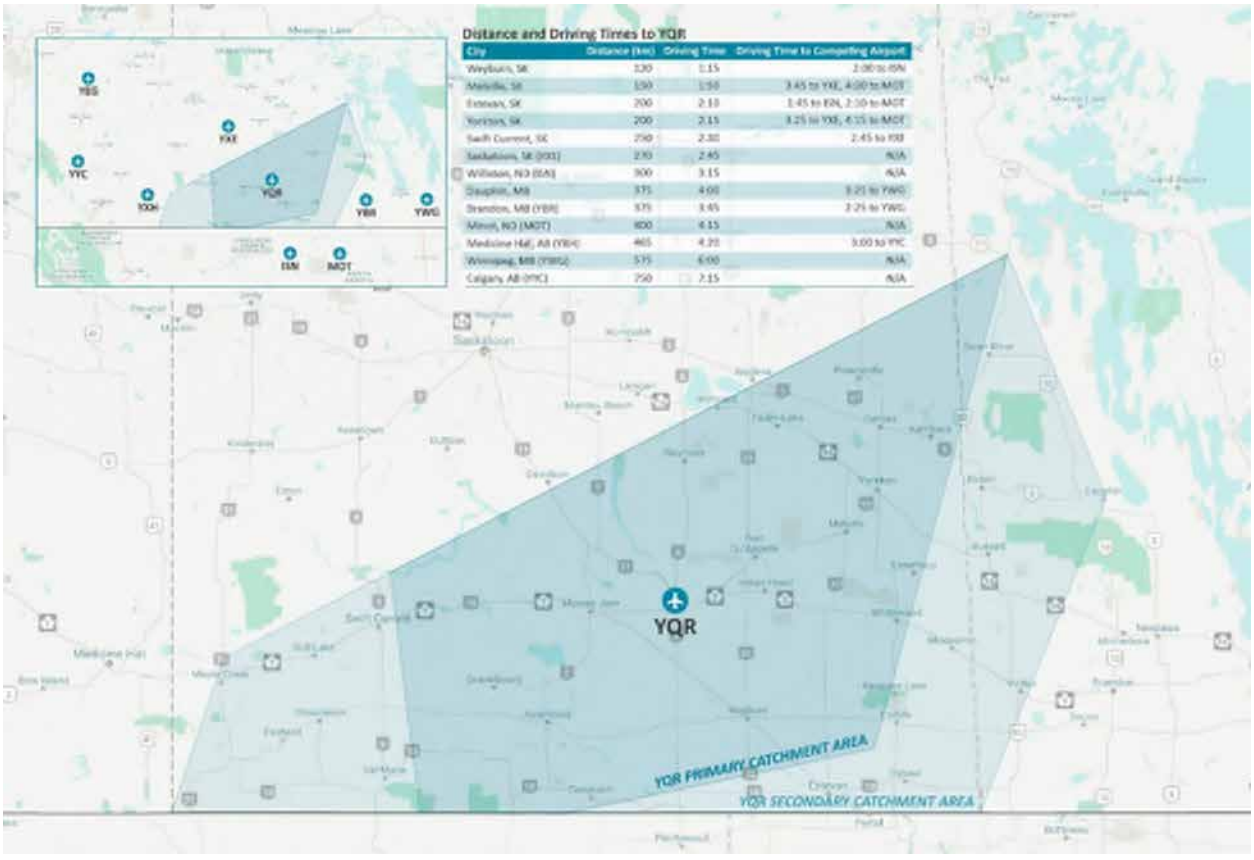
Throughout its history, YQR has been tied to the socio-economic fabric of Regina and Saskatchewan. A socio-economic profile is outlined below, which informs the development of the air traffic forecasts.

Geography

Regina is the capital of the Province of Saskatchewan, acting as the centre of the provincial government's services and operations. It is situated 240 kilometres south-southeast of Saskatoon (Saskatchewan's other major metropolitan area). It is also located over 500 kilometres west of Winnipeg, Manitoba, the nearest city with a population of over 500,000 residents. The regional location and estimated catchment area are identified in Figure 2-1.

The City occupies 180 km^2 of flat and waterless prairie land, making it Saskatchewan's second largest urban centre by area. Notable neighbourhoods include the downtown business district, Harbor Landing (immediately South of the Airport), the Crescents, and Westerra (currently in development northwest of the Airport).

Figure 2-1. Regina's Regional Geography and Catchment Area



Population

According to Statistics Canada, Saskatchewan's estimated 2016 population is 1,150,632. This is an increase of 84,283 persons (7.9%) from the 2011 Census population of 1,066,349. This growth is similar to urban population growth, as Saskatchewan's cities grew in aggregate by 9.9% from 596,124 in 2011 to 655,313 persons.[10]

The City of Regina is the second most populated area in Saskatchewan. Regina accounts for approximately 21% of the provincial population. Regina's population totalled 215,106 in 2016, compared to 192,079 in 2011, representing an 11.4% increase. The Regina Census Metropolitan Area's (CMA's) population was 247,224 in 2016. Table 2-1 compares the population of Saskatchewan and the Regina CMA between 1996 and 2016.

Table 2-1. Saskatchewan and Regina Population, 1996-2016

Year	Saskatchewan	% Change from Preceding Census Year	Regina CMA	% Change from Preceding Census Year
1996	1,018,945	n/a	200,458	n/a
2001	1,000,239	-1.8%	197,031	-1.7%
2006	992,302	-0.8%	200,142	1.6%
2011	1,066,349	7.5%	217,710	8.8%
2016	1,150,632	7.9%	247,224	13.6%

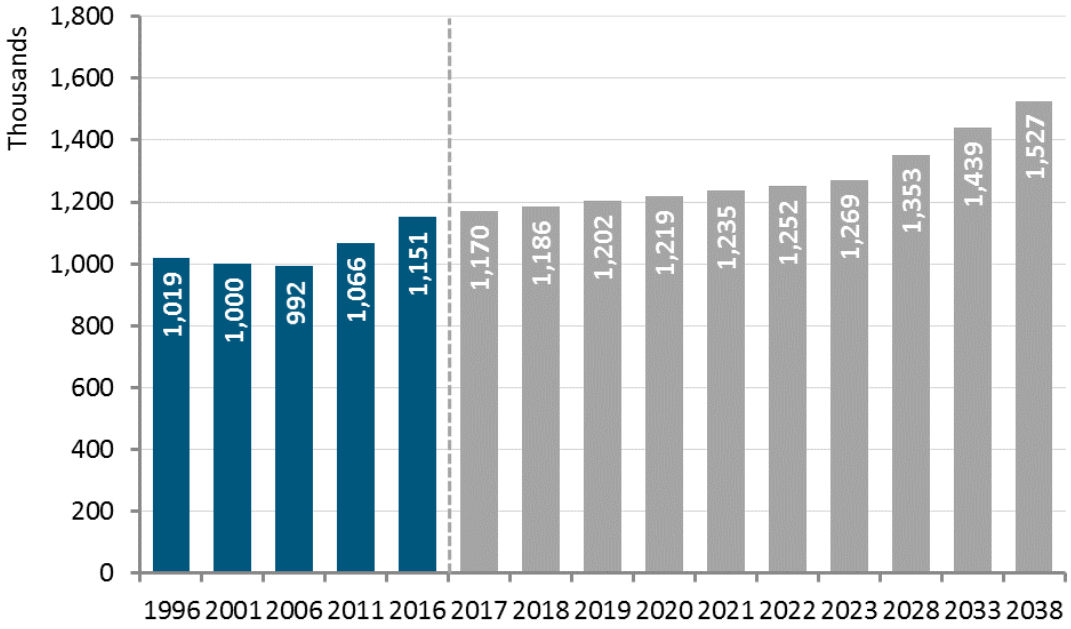
Source: Statistics Canada

Based on Statistics Canada's medium-growth (M5) provincial population forecast scenario, Saskatchewan's population is expected to reach a total of 1.5 million people by 2038.[11] However, the province's population growth rate is acutely sensitive to interprovincial migration patterns and may change in the event of a shift in such migration. Saskatchewan's projected population from 2017-2036 is presented in Figure 2-2.

[10] Saskatchewan Bureau of Statistics, Ministry of Finance. Saskatchewan Population Report 2016. (http://www.stats.gov.sk.ca/stats/pop/2016%20census%20population%20counts.pdf)

[11] Statistics Canada , Population Projections for Canada, Provinces and Territories, 2015 (http://www.statcan.gc.ca/pub/91-520-x/91-520-x2014001-eng.pdf)

Figure 2-2. Saskatchewan's Projected Population, 2017-2038



Source: Statistics Canada & InterVISTAS calculations based on Statistics Canada data.

Employment

Although total employment in the Regina region has grown each year, employment opportunities have not grown in proportion to the growth in the working age population over the past several years. This has resulted in a decline in the region's employment rate. However, Regina still enjoys one of the highest employment rates in Canada. Regina's employment rate is nearly 4% higher than Saskatchewan's average employment rate and 8% higher than the national average. Table 2-2 compares Regina's employment statistics to those at the provincial and federal level.

Table 2-2. Employment, 2010-2016

Year	Regina		Saskatchewan		Canada	
	Employment (thousands)	Employment Rate	Employment (thousands)	Employment Rate	Employment (thousands)	Employment Rate
2010	118.9	68.4%	530.7	66.4%	16,945.3	61.5%
2011	123.5	69.6%	535.4	66.0%	17,207.0	61.7%
2012	127.8	69.9%	547.9	66.4%	17,418.6	61.7%
2013	135.9	72.1%	564.1	67.3%	17,674.0	61.8%
2014	136.6	70.5%	569.9	66.9%	17,787.3	61.4%
2015	137.9	69.6%	573.5	66.6%	17,937.3	61.3%
2016	139.2	69.1%	569.3	65.6%	18,064.9	61.1%

Source: Statistics Canada, CANSIM Table 282-0135

Labour Force Participation

Regina benefits from one of the highest labour force participation rates in the nation. This is largely made possible by international migration, which results in an influx of young workers into Saskatchewan. As of

2016, Regina's labour force participation rate was 3.2% above Saskatchewan's, and 7.3% above the national average. A comparison of Regina's labour force statistics to those at the provincial and federal level is provided in Table 2-3.

Table 2-3. Labour Force Participation, 2010-2016

Year	Regina		Saskatchewan		Canada	
	Labour Force (thousands)	Participation Rate	Labour Force (thousands)	Participation Rate	Labour Force (thousands)	Participation Rate
2010	125.6	72.1%	560.4	70.1%	18,450.5	66.9%
2011	129.8	73.0%	563.4	69.4%	18,619.6	66.7%
2012	133.8	73.0%	575.7	69.7%	18,809.5	66.5%
2013	141.5	74.9%	589.5	70.2%	19,037.8	66.5%
2014	141.8	73.1%	593.7	69.7%	19,124.5	66.0%
2015	144.3	72.7%	604.1	70.1%	19,278.0	65.8%
2016	147.1	73.0%	606.8	69.8%	19,440.5	65.7%

Source: Statistics Canada, CANSIM Table 282-0129

Unemployment

Unemployment in the City of Regina has grown in recent years, due in part to population growth. However, the impact of historically low commodity prices on the regional economy over the past two years has magnified the unemployment rate. Despite this, Regina's unemployment rate remains below provincial and federal rates. Table 2-4 compares Regina's unemployment statistics to those at the provincial and federal level.

Table 2-4. Unemployment, 2010-2016

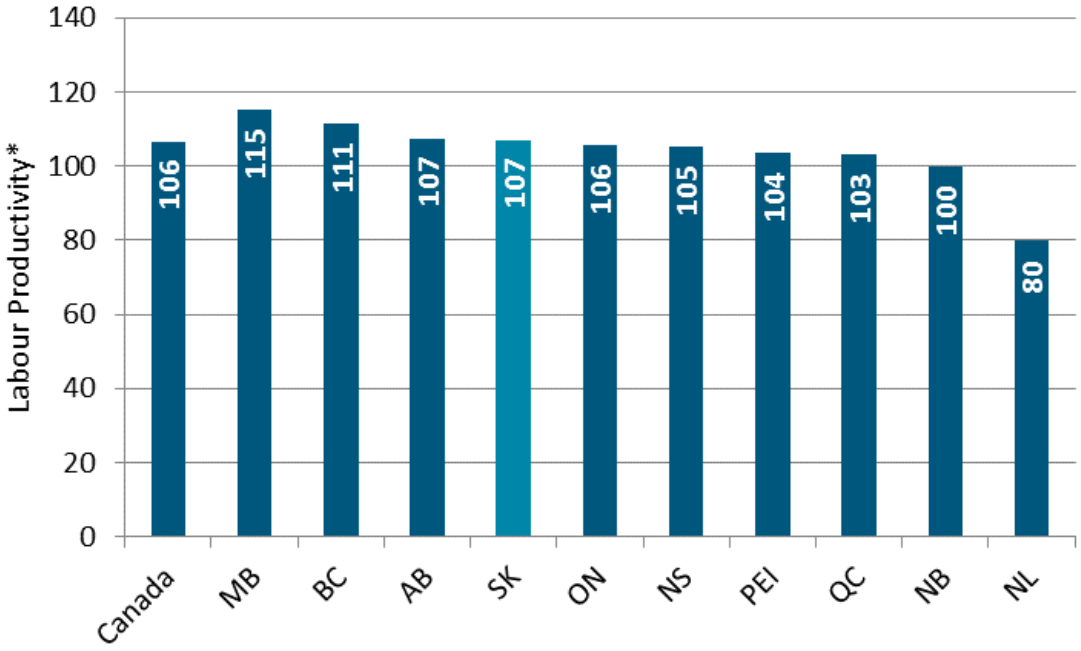
Year	Regina		Saskatchewan		Canada	
	Unemployment (thousands)	Unemployment Rate	Unemployment (thousands)	Unemployment Rate	Unemployment (thousands)	Unemployment Rate
2010	6.1	4.9%	29.5	5.3%	1,492.4	8.1%
2011	5.9	4.5%	28.0	5.0%	1,399.2	7.5%
2012	5.5	4.1%	27.3	4.8%	1,378.4	7.3%
2013	5.4	3.8%	24.4	4.1%	1,350.5	7.1%
2014	5.2	3.7%	22.9	3.9%	1,329.5	7.0%
2015	6.2	4.3%	29.3	4.9%	1,322.9	6.9%
2016	7.7	5.3%	38.1	6.3%	1,363.4	7.0%

Source: Statistics Canada, CANSIM Table 282-0135

Labour Productivity

Canada's western provinces continue to have the highest labour productivity rates in the country, with Saskatchewan ranked as the 4th highest. As a result, Regina's businesses benefit from greater output and lower labour costs when compared to their eastern Canada counterparts. Figure 2-3 provides an interprovincial comparison of labour productivity levels.

Figure 2-3. Labour Productivity

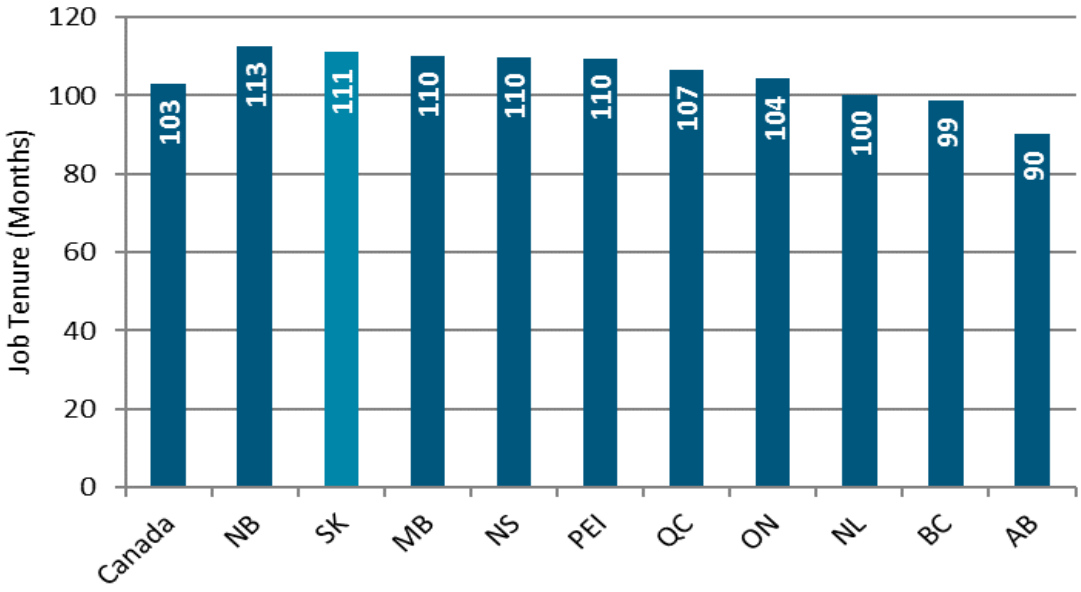


Source: Statistics Canada, CANSIM Tables 383-0026 and 383-0008
**Labour productivity is measured as real gross domestic product (GDP) per hours worked.*

Job Tenure

Average job tenure in Saskatchewan has consistently been the highest in Canada, exceeding the national average by nearly eight months. This results in lower employee turnover and training costs while also allowing companies to recoup hiring costs at a faster pace. Figure 2-4 compares job tenure figures among Canada's provinces.

Figure 2-4. Job Tenure



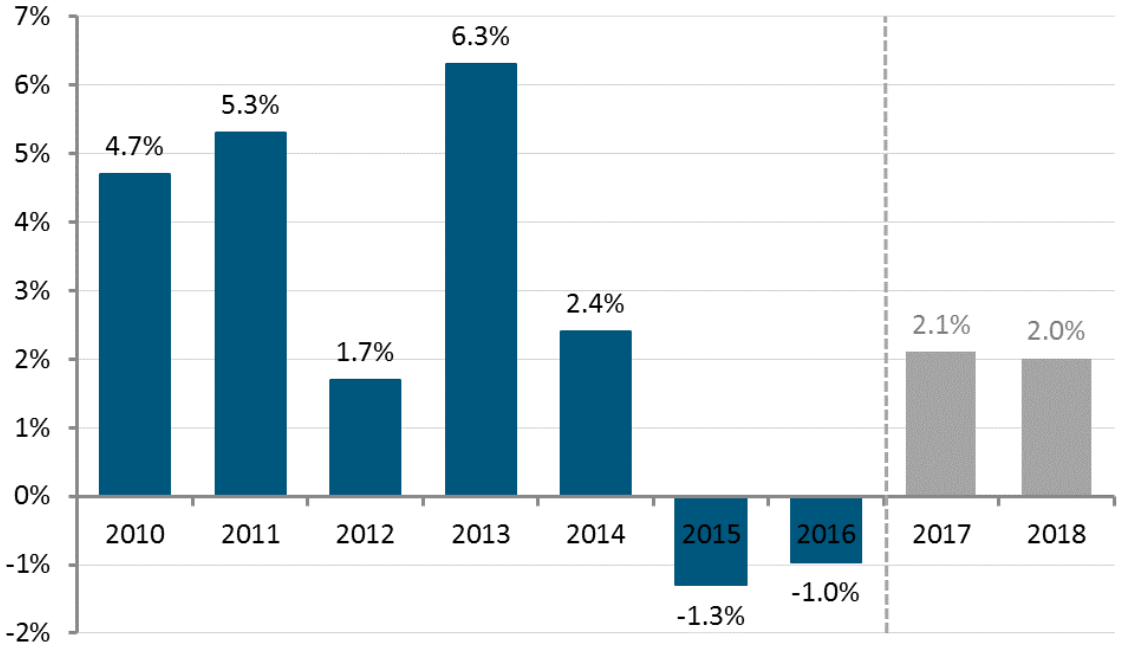
Source: Statistics Canada, CANSIM Table 282-0038

Economy

According to Statistics Canada's estimates, Saskatchewan's real Gross Domestic Product (GDP) reached a total of $58.8 billion in 2016.[12] In the last two decades (from 1995 to 2015), Saskatchewan's real GDP grew at an average rate of 2.1 per cent annually.[13] Following the 2009 economic contraction, GDP grew by 4.7% in 2010, 5.3% in 2011, 1.7% in 2012 and 6.3% in 2013.[14] However, economic growth began to slow in the latter half of 2013, due to severe decreases in energy prices. Since 2014, Saskatchewan's economy and GDP have been relatively stagnant due to low global commodity prices.

Real GDP growth in Saskatchewan has been lower than the national rate of growth in recent years. However, Saskatchewan's economic growth is forecasted to recover to a rate similar to national averages in 2017 and 2018. Figure 2-5 shows the historical and forecasted real GDP growth of Saskatchewan from 2010 to 2018.

Figure 2-5. Real GDP Growth of Saskatchewan, 2010-2018

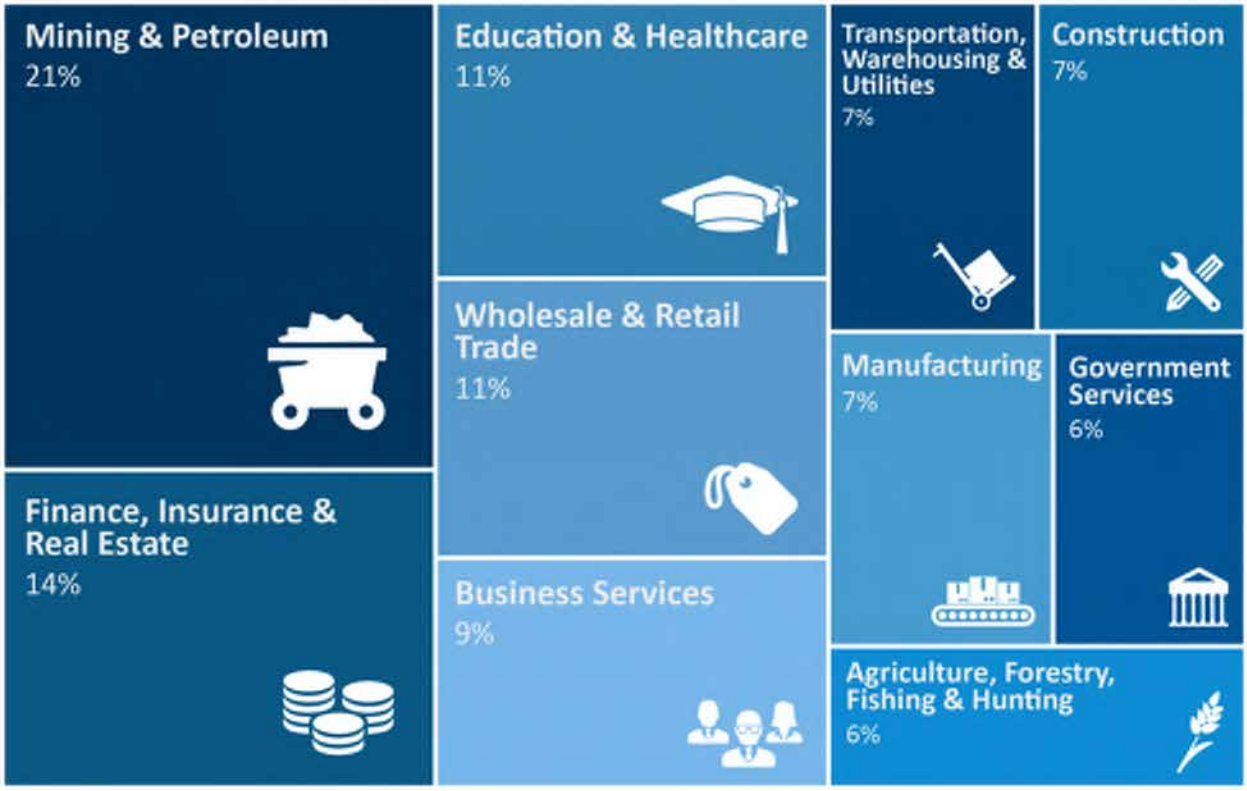


Since 2012, several industries have experienced changes in their relative shares of Saskatchewan's economy.[15] Goods-producing industries as a whole have declined by 13% since 2012, as service-producing industries now make up over 56% of the provincial economy. As an example, the Finance, Insurance & Real Estate industry grew by 29% and the Business Services industry grew by 20%, while the Energy and Construction industries declined by 31% and 22%, respectively.

[12] Government of Saskatchewan. Saskatchewan's Economic Overview. (https://www.saskatchewan.ca/business/invest-and-economic-development/economic-overview).
[13] Inter*VISTAS* calculations based on Statistics Canada data.
[14] Inter*VISTAS* calculations based on Statistics Canada data.
[15] Statistics Canada, CANSIM, Table 379-0028.

However, despite significant decline in recent years, the mining and petroleum industry remains the single largest sector in Saskatchewan's economy. In addition to being the largest industry, the mining and petroleum industry pays the highest average wages in the province at $1,960 per week[16]. Following mining and petroleum, the next largest industries are finance and real estate, education and healthcare, as well as wholesale and retail trade. Other notable industries include manufacturing, government services, and farming. Figure 2-6 summarizes the current composition of the province's industry by sector.

Figure 2-6. Saskatchewan's Economy by Industry



Source: Government of Saskatchewan, Saskatchewan's Economic Overview

AIR TRAFFIC FORECAST

Aviation activity forecasts for an airport are an integral component of the master planning process. The forecasts provides insight into future airport activity, which is used to identify capital projects that are required to meet future demand and assist with the appropriate sizing and timing of those projects. Forecasts have been produced for the following segments of Regina International Airport's aviation activity, from 2016 to 2037:[17]

- Enplaned and deplaned (E/D) air passengers by sector:
  - Domestic (within Canada)
  - Transborder (to/from the United States)
  - Other International (all other non-U.S. international destinations)
- Aircraft movements by commercial aircraft and General Aviation/other aircraft

[16] Government of Saskatchewan, 2016 Economic Review
[17] 2016 was the base year for the traffic forecasts.

- Planning peak hour passengers and commercial aircraft movements

The aviation activity forecast methodology uses a combination of traditional econometric forecasting techniques to develop 'base case' forecast projections. The 'base case' forecast is supplemented with a stochastic, or risk-based, scenario simulation methodology to capture the inherent uncertainty in predicting future aviation activity levels.

Air Passenger Forecast

Historical Background – Air Passengers

Growth in annual E/D passenger volumes at the Airport from 1995-2016 is presented in Figure 2-7. Over the past 22 years, total E/D passenger traffic at the Airport has grown from 572,413 annual passengers in 1995 to 1,262,899 annual passengers, growing at a rate of 3.8% per annum, on average. Domestic traffic historically makes up 78%-91% of total passenger traffic. The remaining passengers are either Transborder (to/from the United Sates) or Other International passengers (non-U.S. international passengers).

From 1995-2016, traffic at YQR has grown in three major phases.

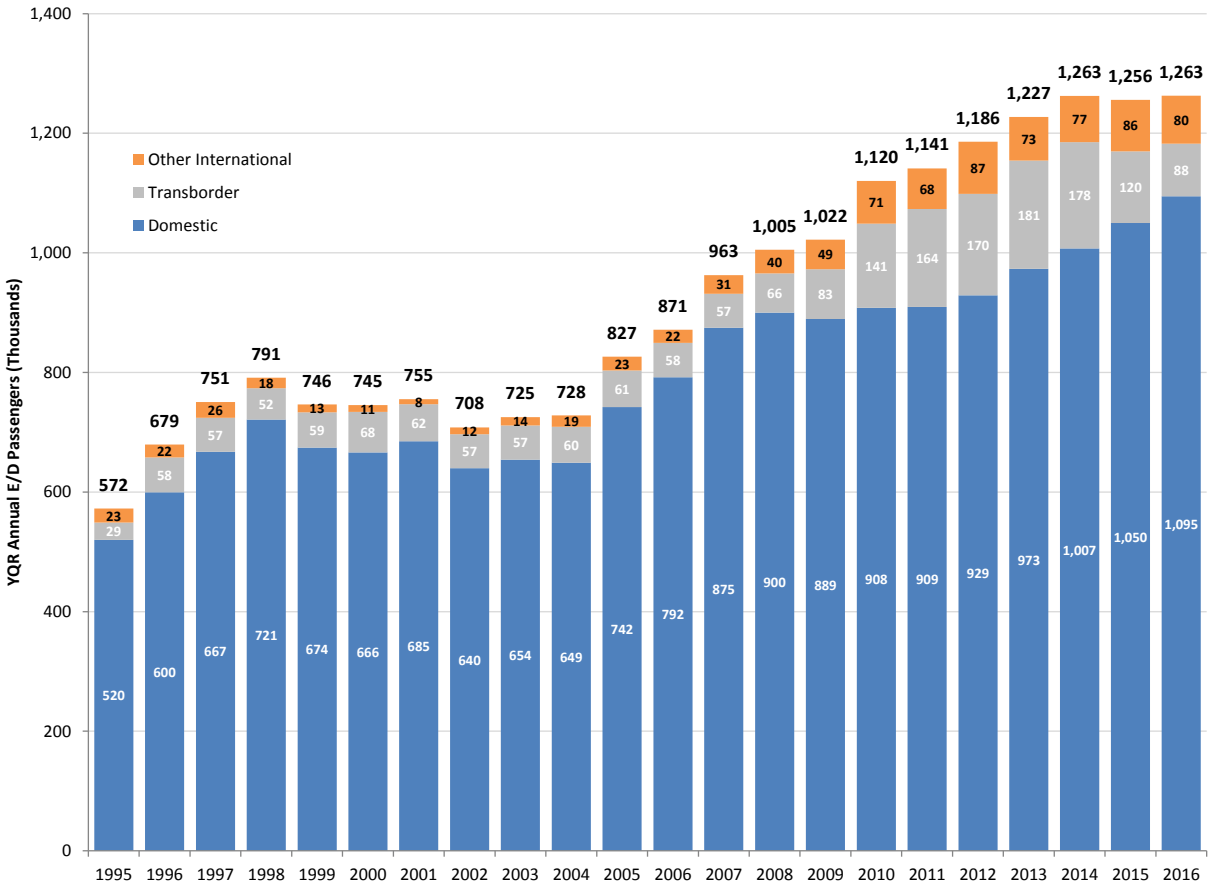
- First, between 1995 and 1998, passenger volumes expanded rapidly due to growth in economic conditions in Canada and Saskatchewan coupled with the entry of WestJet and Delta Air Lines services at YQR. From 1999-2004, traffic growth was limited and experienced a downturn in 2002 as a result of, (a) the 9/11 terrorist attack and ensuing decline in air travel demand throughout North America, (b) the merger between Air Canada and Canadian Airlines and, (c) a recession in the Saskatchewan economy.

- The second growth phase began in 2005. Passenger traffic entered a period of accelerated growth due in part to strong economic conditions in Saskatchewan along with incremental capacity added by WestJet. A significant expansion of schedule and charter Transborder services began in 2008/09 when both United Airlines and WestJet entered the Regina-U.S. market. As more non-stop Transborder services were added over the 2008-2013 period, Domestic passenger volume growth slowed compared to the rapid expansion seen from 2004-2008. This was partially due to fewer Transborder origin-destination passengers at YQR needing to connect over a Domestic gateway to reach their U.S. or overseas destination.

- Third, beginning in 2014, Transborder capacity began to decline rapidly, as United Airlines and Delta Air Lines scaled back their operations at YQR. From its historical peak of non-stop Transborder capacity in 2014, at 116,300 departing seats per annum, seat capacity has steadily declined and is projected to total approximately 25,500 departing seats in 2017. This pulling back of U.S. carrier capacity was seen at small- and medium-sized airports across Canada during this period. The capacity reductions observed at many Canadian airports, including Regina, were caused primarily by (a) the depreciating Canadian dollar impacting U.S. carrier yields and (b) decreased outbound travel demand to the U.S. by Canadian residents. Other contributing factors were shortages of qualified pilots at the U.S. regional carriers (e.g., Compass Airlines, SkyWest Airlines, etc.), due to changes in Federal Aviation Administration (FAA) regulations, and the retirement of 50-seat regional jets from regional carrier fleets. The change of gauge in aircraft in some markets, from 50-seat to 70+ seat aircraft, also had contributing negative effect on yields.

While non-stop Transborder passengers (i.e. enplaned/deplaned passengers) have declined from their peak in 2013, Transborder origin-destination (O/D) passengers[18] to/from the Regina area continue to travel, but through Domestic hubs. From 2014 to 2016 total annual traffic levels have remained relatively flat, with Domestic volumes growing an average of 4% per annum and largely offsetting the decline in Transborder activity. Analysis of airline booking data suggests that despite the decline in Transborder O/D and E/D passengers, there remains a large unserved Transborder O/D market at YQR.

Figure 2-7. Historical Enplaned/Deplaned Passengers at YQR, by Sector (thousands)



Current Air Passenger Services at YQR

As of 2017, the Airport is served by three regularly scheduled carriers (Air Canada, WestJet and WestWind Aviation) and two charter holiday carriers (Sunwing and Air Transat). Table 2-5 shows the scheduled departing seat capacity and relative airline capacity share at YQR from 2014 to 2017 by sector.

WestJet is Regina's largest carrier by seat capacity in the Domestic sector, making up 54% of Domestic departing seats in 2016, followed closely by Air Canada at 45%. For both WestJet and Air Canada, Domestic seat capacity in 2016 was roughly evenly split between operations by the mainline carrier and their

[18] An origin-destination (O/D) passenger's sector reflects their true origin and destination, regardless of their initial routing. E.g., a passenger flying YQR-YYC-LAX would be considered a Domestic E/D passenger (as Calgary is their initial segment destination from YQR), but a Transborder O/D passenger as their ultimate destination is Los Angeles in the United States.

regional carriers (WestJet Encore and Air Canada Express, respectively). The remainder of Domestic seat capacity is made up by West Wind Aviation, a Saskatchewan-based regional carrier offering scheduled service to Saskatoon. Charter carriers such as Sunwing and Air Transat may technically arrive/depart to/from Domestic airports. However, these Domestic stages are part of triangular routings to/from leisure destinations in the U.S., Mexico, and the Caribbean. These seats on the Domestic segments of charter flights are typically not available for sale. As a result, these segments are considered international flights and are not included in the domestic statistics in Table 2-5.

As of 2017, WestJet is the only carrier operating regularly scheduled Transborder service at YQR, with a current focus on seasonal service to leisure destinations (Phoenix, Las Vegas, and Orlando). As previously discussed, non-stop Transborder services by major U.S. carriers have been reduced over the past three years with United Airlines exiting the YQR market in 2015 and Delta Air Lines terminating services in 2016.

Table 2-5. Scheduled Departing Seat Capacity at YQR, by Sector and Carrier

Sector & Carrier	2014	% Share	2015	% Share	2016	% Share	2017[19]	% Share
Domestic								
WestJet	385,400	53%	376,100	52%	391,200	54%	410,200	55%
Air Canada	330,400	45%	339,800	47%	328,200	45%	331,300	44%
West Wind Aviation	18,100	2%	9,700	1%	7,600	1%	7,400	1%
Total Domestic	***733,900***	***100%***	***725,700***	***100%***	***727,100***	***100%***	***748,900***	***100%***
Transborder								
WestJet	33,400	29%	33,500	45%	26,900	46%	25,500	100%
Delta Air Lines	33,200	29%	35,600	48%	31,100	54%	0	0%
United Airlines	49,700	43%	5,900	8%	0	0%	0	0%
Total Transborder	***116,300***	***100%***	***74,900***	***100%***	***58,000***	***100%***	***25,500***	***100%***
Other International								
Sunwing	26,300	56%	28,700	52%	32,100	54%	25,100	55%
WestJet	12,600	27%	13,300	24%	14,100	24%	11,200	24%
Air Transat	8,000	17%	12,700	23%	13,200	22%	9,500	21%
Total Other International	***46,900***	***100%***	***54,800***	***100%***	***59,300***	***100%***	***45,900***	***100%***
All Sectors								
WestJet	431,400	53%	422,900	52%	432,100	53%	446,900	54%
Air Canada	330,400	41%	339,800	42%	328,200	40%	331,300	40%
Sunwing	26,300	3%	28,700	4%	32,100	4%	25,100	3%
Air Transat	8,000	1%	12,700	2%	13,200	2%	9,500	1%
West Wind Aviation	18,100	2%	9,700	1%	7,600	1%	7,400	1%
Total All Sectors	***814,200***	***100%***	***813,800***	***100%***	***813,200***	***100%***	***820,200***	***100%***

Scheduled Other International services at YQR are focused on leisure destinations in Mexico and the Caribbean, often referred to as 'Sunspot' destinations. As of 2016, Sunwing Airlines operates 55% of annual Sunspot capacity, with WestJet and Air Transat operating 24% and 21% of capacity, respectively.

[19] Projected scheduled seat capacity for calendar year 2017.

Other International services typically operate only from November to April, therefore, capacity and passenger flows for this sector are highly seasonal. Destinations served by charter carriers vary from year to year while WestJet has consistently served Cancun and Puerto Vallarta for the past five years.

Air Passenger Forecast 2017-2037

Air travel is a derived demand. Demand for air transportation between origin and destination markets is derived from the socio-economic interactions between these markets, shaped by carriers' networks and available airlift capacity. Generally speaking, business/trade activity, tourism/visitor activity, and Visiting Friends and Relatives (VFR) constitute the primary components of air travel.

Dependable forecasting practice requires awareness of the uncertainties surrounding the forecasts. Considerable effort by the project team went into analyzing the factors affecting traffic activity at the airport. Nevertheless, there are uncertainties regarding these factors, such as the outlook for the local and world economies, the state of the airline industry, and the shifting patterns of air service. A pragmatic and systematic approach has been adopted to produce the aviation activity forecasts for the Airport.

The aviation demand forecasts have been developed using a combination of traditional econometric forecasting methodologies, relating macroeconomic and socioeconomic drivers of air travel to projected passenger volumes, with a risk-based simulation methodology to quantify the uncertainty inherent in estimating future airport activity levels. The risk-based methodology simulates the uncertainty in future levels of drivers of travel demand and supply (GDP, population, fuel prices, etc.) as well as incorporating airport-specific risk factors to simulate one-off events affecting traffic (e.g. a terrorism attack or pandemic) or changes to the airport's air service market or the airline industry (e.g. introduction of new non-stop Transborder services, loss of an existing carrier, entry of an Ultra-Low Cost Carrier [ULCC] at YQR, etc.). The result is a forecast that attaches specific probabilities to future levels of passenger traffic at the Airport which provides planners with insight into how likely (or not) certain levels of future traffic may be achieved.

The Master Plan forecasts are presented with the median, or "Most Likely" scenario, which has been adopted as the recommended forecast Planning Activity Level (PAL). In addition, various forecast probability ranges (the 5th, 25th, 75th, and 95th percentiles) are presented. For example, the 25th percentile forecast indicates that, in any given year, there is a 25% probability of actual traffic being less than that level, and a 75% probability of traffic being higher.

Domestic E/D Passenger Forecast

Figure 2-8 and Table 2-6 present the results of the Domestic E/D passenger forecast. Over the 20-year planning horizon, Domestic passenger volumes are forecast to grow to 1,784,000 annual passengers in 2037 in the "Most Likely" scenario, growing at an average rate of 2.3% per annum. Domestic traffic is projected to grow at a relatively lower rate than historically, as the Regina market is relatively mature and the Airport is currently well-served to its key Domestic markets.

The Domestic E/D passenger forecast provides a few key implications:

- The "Most Likely" scenario projects growth in Domestic E/D passengers over the short, medium, and long term.

- There is some short-term potential for Domestic traffic declines, but the probability is less than 25%.

- Even in the lowest traffic outcomes, YQR is projected to experience Domestic traffic growth over the medium and long term.

- The range of outcomes is relatively symmetrically distributed around the “Most Likely” scenario.

Figure 2-8. Forecast Annual Domestic E/D Passengers, 2017-2037 (millions)

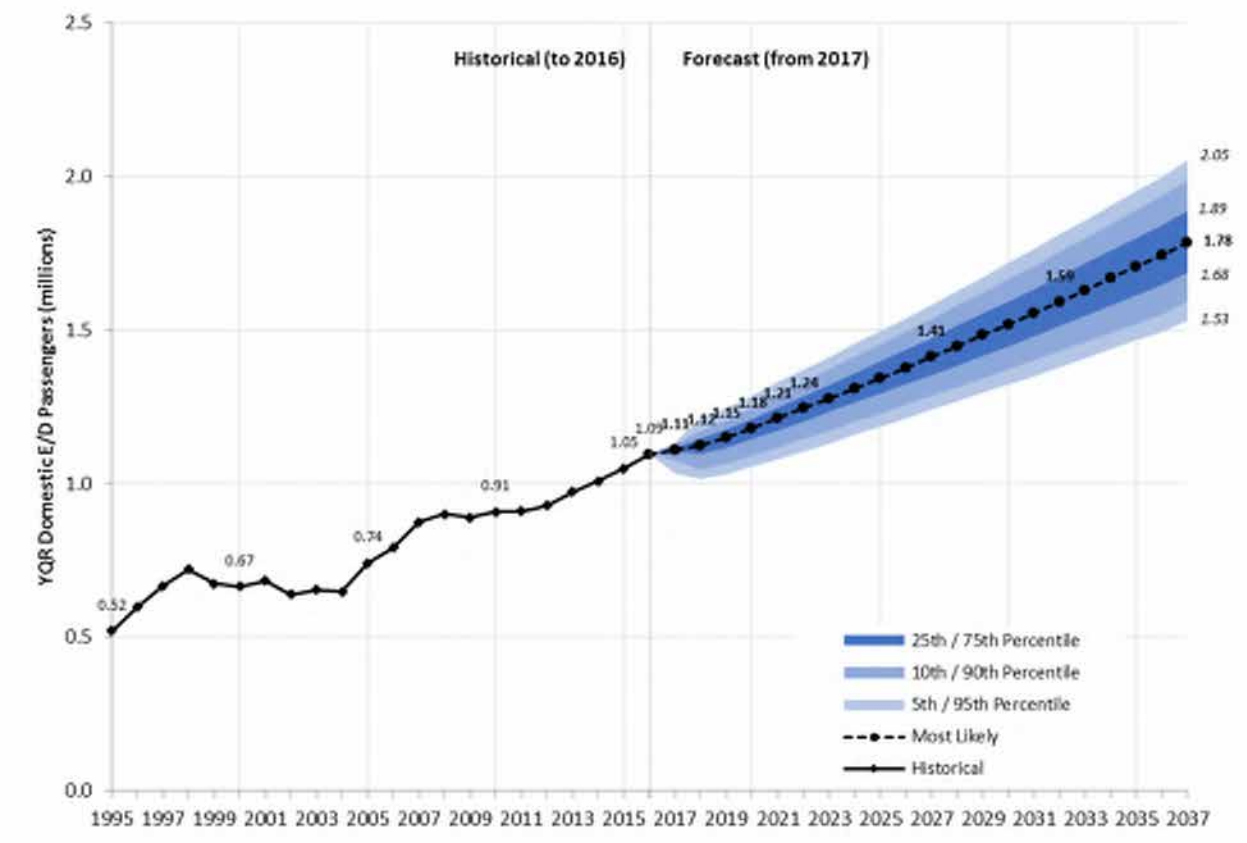


Table 2-6. Domestic E/D Passenger Forecast, 2017-2037

Year	5th Percentile	25th Percentile	Most Likely	75th Percentile	95th Percentile
2016 (actual)			*1,094,668*		
2017	1,032,000	1,098,000	1,109,000	1,120,000	1,135,000
2018	1,013,000	1,096,000	1,124,000	1,147,000	1,215,000
2019	1,029,000	1,116,000	1,149,000	1,176,000	1,244,000
2020	1,056,000	1,145,000	1,180,000	1,212,000	1,286,000
2021	1,077,000	1,172,000	1,211,000	1,248,000	1,330,000
2022	1,101,000	1,199,000	1,243,000	1,285,000	1,368,000
2027	1,245,000	1,353,000	1,414,000	1,475,000	1,582,000
2032	1,382,000	1,510,000	1,592,000	1,672,000	1,806,000
2037	1,530,000	1,684,000	1,784,000	1,890,000	2,053,000
5-Year Average Compound Growth Rates					
2017-2022	1.3%	1.8%	2.3%	2.7%	3.7%
2022-2027	2.5%	2.4%	2.6%	2.8%	2.9%
2027-2032	2.1%	2.2%	2.4%	2.5%	2.6%
2032-2037	2.0%	2.2%	2.3%	2.5%	2.6%
Long-Term Compound Annual Growth Rates					
1995-2016			3.5%		
2016-2037	1.6%	2.0%	2.3%	2.6%	3.0%

Transborder Passenger Forecast

Figure 2-9 and

Table 2-7 present the results of the Transborder E/D passenger forecast. Over the twenty-year planning horizon, Transborder passenger volumes are forecast to grow to 246,000 annual passengers in 2037 in the "Most Likely" scenario, growing at an average rate of 4.9% per annum. The forecast for the Transborder sector in 2017 incorporates expected declines in passenger volumes given known scheduled services available to the end of the calendar year. The Transborder market is currently underserved given the loss of service from U.S. carriers in recent years. However, this service is expected to return, to some

degree, early in the forecast period. The Transborder passenger forecast incorporates risk factors to simulate the re-introduction of non-stop Transborder service in the near term (2018-2020) as well as further service increases over the medium- to long-term, and the potential for U.S. CBP pre-clearance emerging in the latter half of the forecast, further stimulating incremental passenger growth.

The Transborder E/D passenger forecast provides a few key implications:

- Given the uncertainty around the main risk factors affecting Transborder traffic (namely air service), there is a high degree of variability in the forecast.

- However, there is little probability of further declines to the Transborder sector after 2017. YQR's current Transborder O/D market is estimated to be underserved with many passengers travelling to the U.S. but flying through Domestic hubs on connecting itineraries.

- After 2017, the "Most Likely" scenario projects that Transborder traffic will return to a level similar to the historical results prior to the 2010-2014 capacity bubble from U.S. carriers.

Figure 2-9. Forecast Annual Transborder E/D Passengers, 2017-2037 (millions)

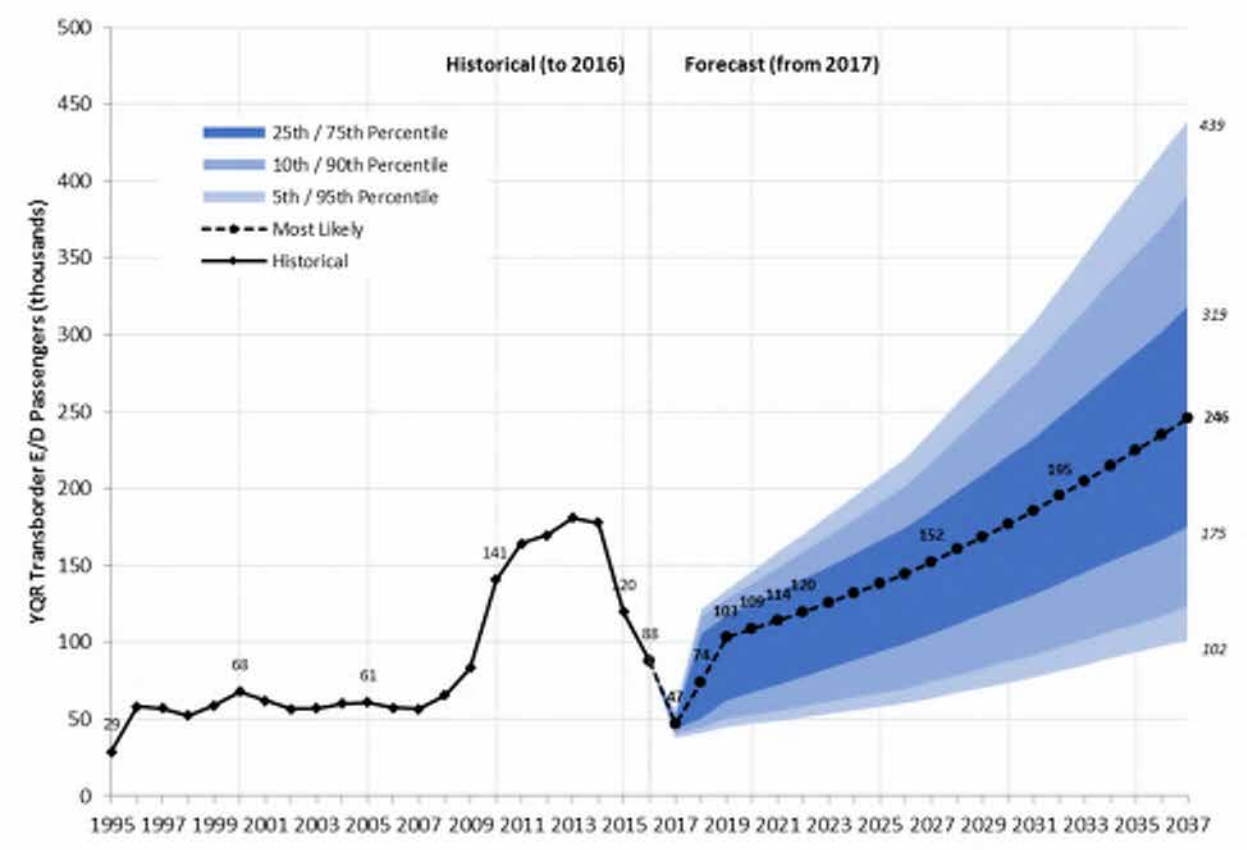


Table 2-7. Transborder E/D Passenger Forecast, 2017-2037

Year	5th Percentile	25th Percentile	Most Likely	75th Percentile	95th Percentile
2016 (actual)			*87,999*		
2017	38,000	43,000	47,000	51,000	56,000
2018	41,000	50,000	74,000	106,000	122,000
2019	45,000	62,000	103,000	117,000	134,000
2020	47,000	67,000	109,000	125,000	147,000
2021	49,000	72,000	114,000	133,000	158,000
2022	51,000	77,000	119,000	141,000	169,000
2027	63,000	105,000	152,000	186,000	238,000
2032	81,000	137,000	195,000	246,000	329,000
2037	102,000	175,000	246,000	319,000	439,000
5-Year Average Compound Growth Rates					
2017-2022	5.9%	11.7%	18.6%	20.3%	22.1%
2022-2027	4.2%	6.2%	4.9%	5.5%	6.8%
2027-2032	5.0%	5.3%	5.0%	5.6%	6.5%
2032-2037	4.6%	4.9%	4.6%	5.2%	5.8%
Long-Term Compound Annual Growth Rates					
1995-2016			5.3%		
2016-2037	0.7%	3.3%	4.9%	6.1%	7.7%

Other International Passenger Forecast

Figure 2-10 and Table 2-8 present the results of the Other International E/D passenger forecast. Over the 20-year planning horizon, Other International passenger volumes are forecast to grow to 238,000 annual passengers in 2037 in the "Most Likely" scenario, at an average rate of 5.2% per annum. Other International traffic is projected to grow at a rate similar to its historical average given historical demand growth for outbound leisure travel to Sunspot destinations from the Regina market.

The Other International E/D passenger forecast provides a few key implications:

- After 2017, the "Most Likely" scenario projects growth in Other International E/D passengers over the short-, medium-, and long-term.

- In relation to the Most Likely scenario, the distribution of forecasts projects a larger upside range than downside. That is, the high-traffic scenarios have the potential for growth above historical levels.

- There is some short-term potential for traffic declines, but the probability is low.

Figure 2-10. Forecast Annual Other International E/D Passengers, 2017-2037 (millions)

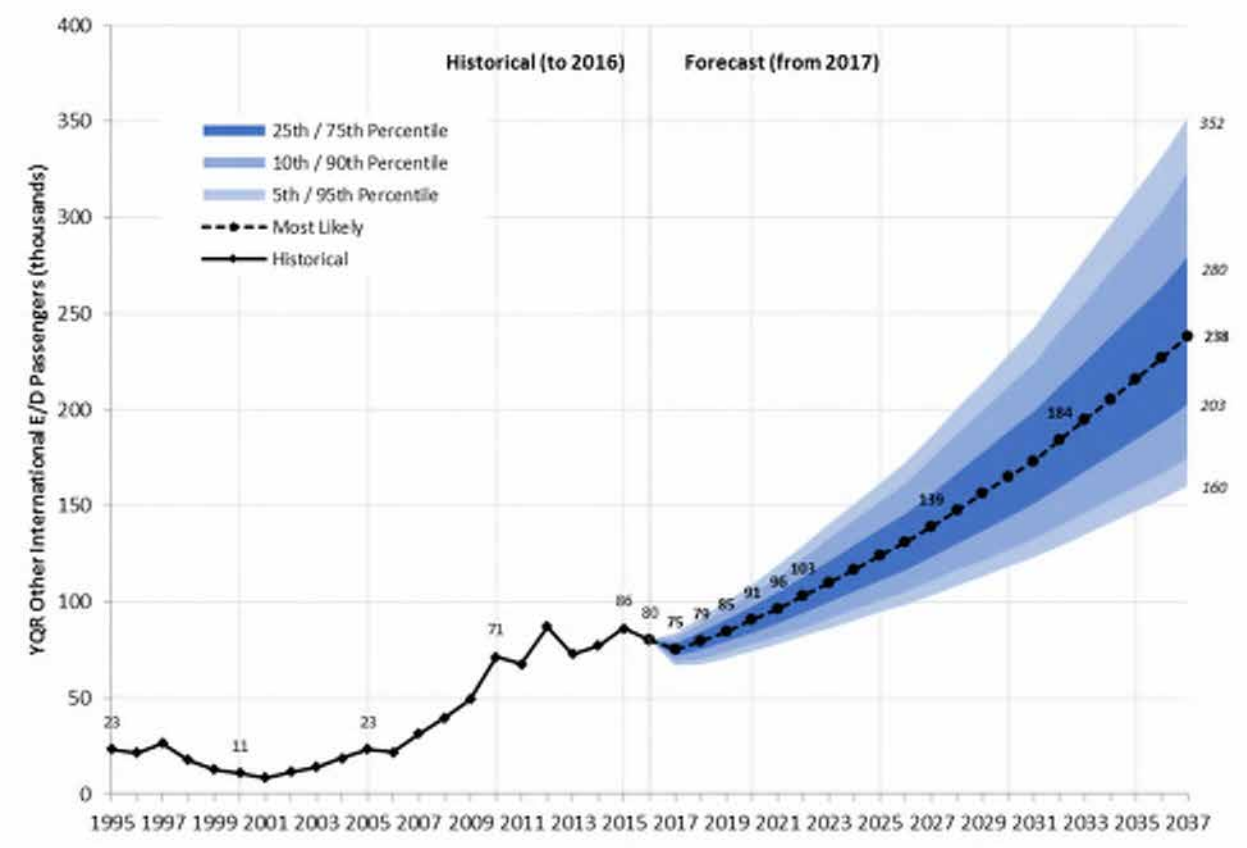


Table 2-8. Other International E/D Passenger Forecast, 2017-2037

Year	5th Percentile	25th Percentile	Most Likely	75th Percentile	95th Percentile
2016 (actual)			*80,232*		
2017	67,000	72,000	75,000	79,000	84,000
2018	67,000	75,000	79,000	85,000	92,000
2019	71,000	79,000	85,000	91,000	100,000
2020	74,000	84,000	91,000	98,000	109,000
2021	78,000	89,000	96,000	105,000	119,000
2022	81,000	93,000	102,000	112,000	128,000
2027	103,000	123,000	138,000	156,000	186,000
2032	129,000	159,000	183,000	211,000	258,000
2037	160,000	203,000	238,000	280,000	352,000
5-Year Average Compound Growth Rates					
2017-2022	3.8%	5.1%	6.1%	7.0%	8.4%
2022-2027	4.8%	5.6%	6.0%	6.6%	7.5%
2027-2032	4.5%	5.1%	5.6%	6.0%	6.5%
2032-2037	4.3%	4.9%	5.3%	5.7%	6.2%
Long-Term Compound Annual Growth Rates					
1995-2016			5.9%		
2016-2037	3.3%	4.4%	5.2%	6.0%	7.1%

Total E/D Passenger Forecast
Figure 2-11 and

Table 2-9 present the results of the Total E/D passenger forecast. Over the twenty-year planning horizon, total passenger volumes are forecast to grow to 2,273,000 annual passengers in 2037 in the Most Likely scenario, at an average rate of 2.8% per annum (as highlighted in Table 2-9). Over the coming 20 years, total passenger traffic at the airport is expected to grow at rates below the long-term historical (3.8% per annum) as YQR's primary domestic market matures. The Transborder and Other International sectors are forecast to take a larger share of the overall passenger volume as these faster-growing sectors are projected to add new services over the planning period.

The forecasts provide a few key implications:

- After 2017, the "Most Likely" scenario projects growth in Total E/D passengers over the short-, medium-, and long-term.
- There is some short-term potential for traffic declines, but the probability is less than 25%.
- Even in the lowest traffic outcomes, YQR is projected to experience traffic growth.
- For 2037, the central 50% of forecast scenarios project Total E/D traffic to fall between 2.1 and 2.5 million passengers.

Figure 2-11. Forecast Annual Total E/D Passengers, 2017-2037 (millions)

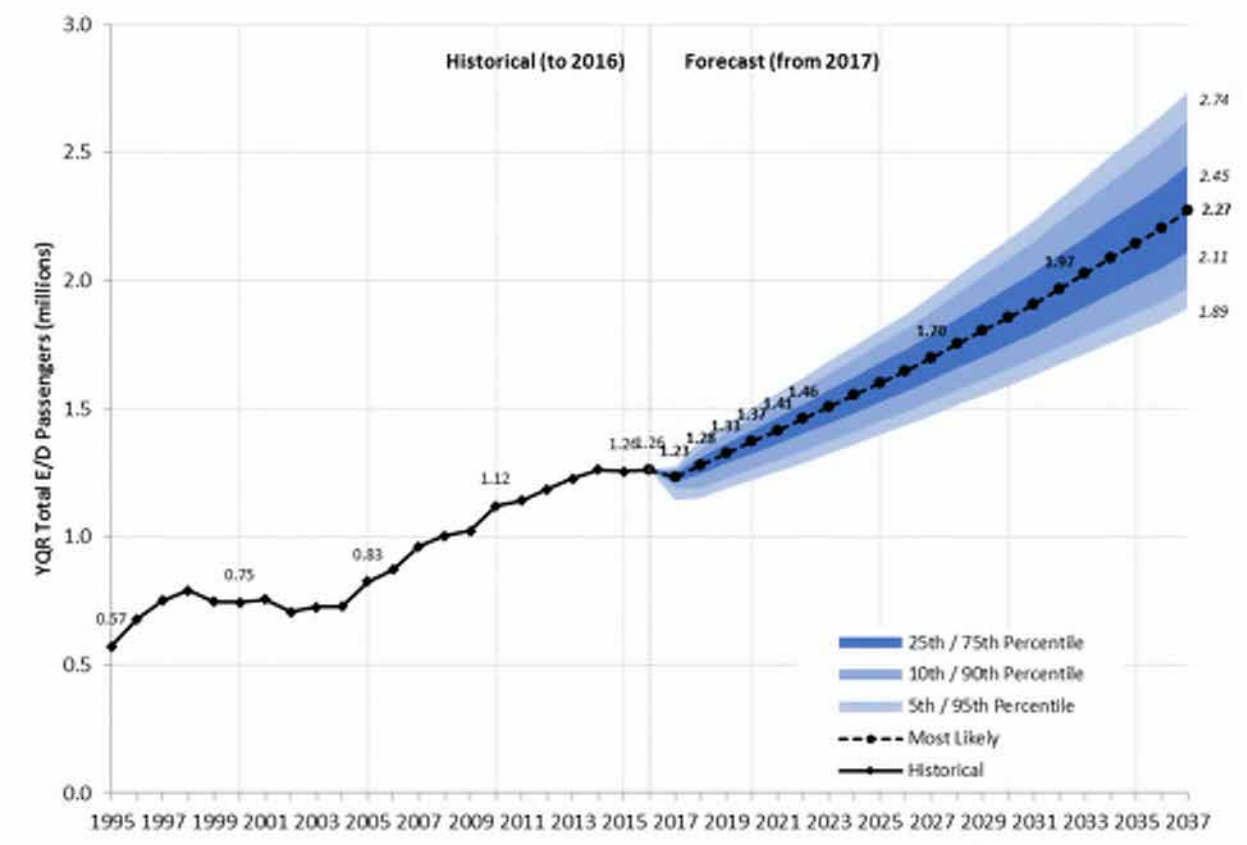


Table 2-9. Total E/D Passenger Forecast, 2017-2037

Year	5th Percentile	25th Percentile	Most Likely	75th Percentile	95th Percentile
2016 (actual)			*1,262,899*		
2017	1,143,000	1,214,000	1,231,000	1,248,000	1,273,000
2018	1,150,000	1,246,000	1,282,000	1,313,000	1,384,000
2019	1,187,000	1,285,000	1,327,000	1,366,000	1,440,000
2020	1,221,000	1,322,000	1,371,000	1,416,000	1,504,000
2021	1,252,000	1,359,000	1,413,000	1,467,000	1,562,000
2022	1,284,000	1,396,000	1,456,000	1,518,000	1,621,000
2027	1,475,000	1,611,000	1,700,000	1,791,000	1,948,000
2032	1,674,000	1,843,000	1,965,000	2,102,000	2,309,000

2037	1,889,000	2,107,000	2,273,000	2,450,000	2,737,000
5-Year Average Compound Growth Rates					
2017-2022	2.3%	2.8%	3.4%	3.9%	4.8%
2022-2027	2.8%	2.9%	3.1%	3.3%	3.7%
2027-2032	2.5%	2.7%	2.9%	3.2%	3.4%
2032-2037	2.4%	2.7%	2.9%	3.1%	3.4%
Long-Term Compound Annual Growth Rates					
1995-2016			3.8%		
2016-2037	1.9%	2.4%	**2.8%**	3.2%	3.7%

Aircraft Movements Forecast

Historical Background – Aircraft Movements

Growth in annual aircraft movements at the Airport from 2007-2016 is presented in Figure 2-12. Generally, aircraft movements consist of local and itinerant movements. Local movements are flights that depart and return immediately to the same airport (e.g., training flights, equipment tests, etc.). Itinerant movements include flights that depart from one airport and proceed to a different airport. In accordance with conventional practice, the aircraft movements forecast pertains only to itinerant movements. Over the past 10 years, total itinerant movements at the airport declined from 44,500 annual movements in 2007 to 36,500 movements. This is an average annual decline of -2.2% per annum.

Nearly half of the movements at the Airport are currently commercial flights.[20] Commercial movements are driven by air carrier operations providing YQR's scheduled passenger service, as well as smaller regional and charter carriers. Commercial movements grew in the last decade by 1.3% per annum on average, from 16,000 annual movements in 2007 to 18,000. This low historical growth is attributable in part to airlines up-gauging their fleets to higher capacity aircraft, which has the effect of reducing the number of movements required to serve the same number of passengers. Compared to other similarly-sized airports in Canada, YQR is already well down the path of up-gauging 35-55 seat regional aircraft in favour of 70-110 seat turboprops and regional jets. YQR's turboprop fleet is now dominated by 78-seat Dash 8-Q400 aircraft, with small numbers of 55-seat Dash 8-300 aircraft in service. No 35-seat Dash 8-100 aircraft remain in regular service at YQR. Similarly, the regional jet fleet has largely seen the replacement of the 50-seat CRJ200 with 70-seat CRJ700 and even larger ERJ-190 aircraft.

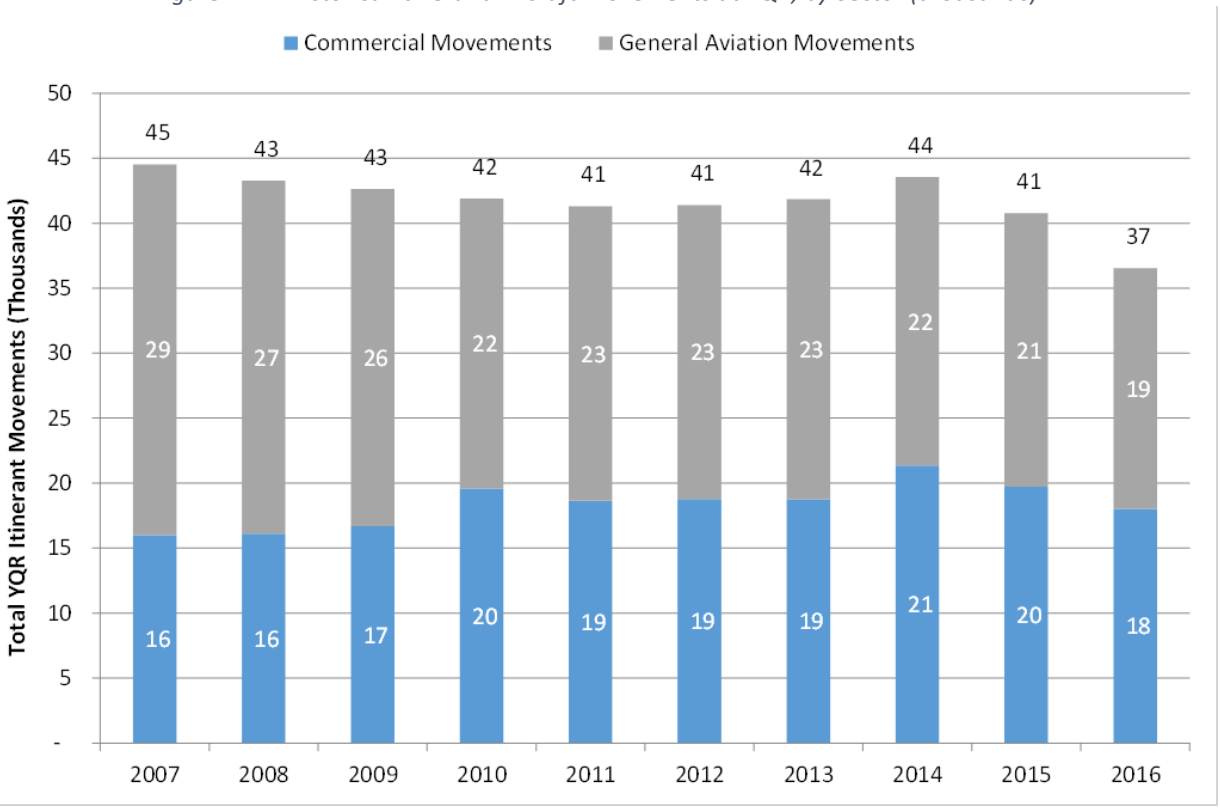
The remaining movements are contributed by general aviation (GA),[21] which has continued its steady decline at YQR over the past decade. GA operations at YQR were influenced in recent years by the loss of

[20] Commercial movements are defined as operations by Level I-III carriers, as defined by Statistics Canada. Level I-III carriers include any commercial operator realizing gross revenues of at least two million Dollars in the preceding operating year, as well as all foreign carriers.

[21] General aviation movements are movements by all other aircraft not classified as Level I-III commercial carriers by Statistics Canada. This includes: private flying, Level IV-VI carriers (air taxies, small charter operators), 'other commercial' operators (agricultural flying, flight training), and government civil and military operations.

onsite maintenance business as well as a decline in private and recreational flying (mostly piston aircraft) – a trend that has been observed throughout North America. GA movements fell by -4.7% per annum on average, from 28,500 annual movements in 2007 to 18,500 in 2016.

Figure 2-12. Historical Itinerant Aircraft Movements at YQR, by Sector (thousands)



Commercial Aircraft Movements Forecast

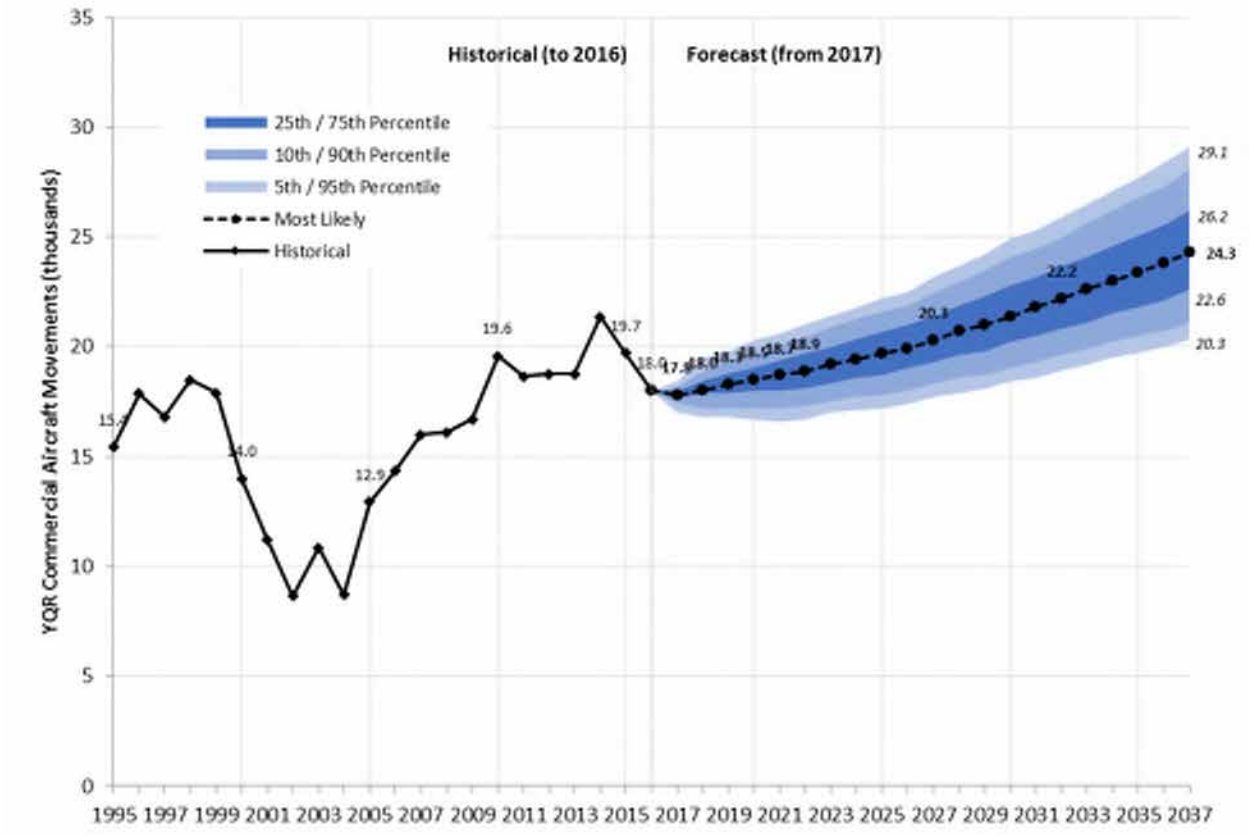
The commercial aircraft movements forecast includes those operations which are relevant to the operation, design and capacity of the passenger terminal building. Figure 2-13 and Table 2-10 present the results of the commercial aircraft movements forecast. The commercial aircraft movements forecast methodology draws directly from the passenger traffic forecast while incorporating market intelligence and future expectations on industry trends and fleet mix in order to develop projections of average passengers per movement over the forecast period.

Over the twenty-year planning horizon, commercial movements are forecast to grow to 24,300 annual movements in 2037 in the Most Likely scenario, growing at an average rate of 1.4% per annum. Commercial movements are expected to grow at a rate above historical trends, given that the major up-gauging of regional aircraft in Canada from 35-55 seat aircraft to 70-110 seat aircraft is largely complete, as of 2017. Therefore, future up-gauging at YQR is not expected to be as significant over the forecast period, leading to a relatively higher growth in commercial aircraft movements. In addition, the new capacity required to meet growing demand will likely be achieved through incremental additions of flights (especially in the Transborder and Other International markets) rather than reducing or maintaining service frequency on larger aircraft.

The commercial movements forecast provides a few key implications:

- After 2017, the Most Likely Scenario projects year-over-year growth in commercial movements over the short-, medium-, and long-term.
- Long-term growth in commercial movements is driven by YQR's passenger traffic, with some growth in passenger volumes (e.g. Transborder and Other International passengers) most likely to be accomplished with incremental aircraft movements rather than up-gauging of existing services.
- The range of outcomes is relatively symmetrically distributed around the Most Likely scenario, with the central 50% of outcomes projecting a range of 22,600 to 26,200 commercial movements by 2037.
- While there is potential for a decline in commercial movements throughout the short- and medium-term, the probability is low.

Figure 2-13. Forecast Annual Commercial Aircraft Movements, 2017-2037 (thousands)



Note: 2007-2016 movements data provided by RAA. 1995-2006 movements refer to Transport Canada data (movements for some years may be shifted due to classification differences).

Table 2-10. Commercial Aircraft Movements Forecast, 2017-2037

Year	5th Percentile	25th Percentile	Most Likely	75th Percentile	95th Percentile
2016 (actual)			*18,014*		
2017	17,000	17,600	17,800	18,000	18,400
2018	16,800	17,900	18,000	18,500	19,500
2019	16,800	17,900	18,300	18,800	19,800
2020	16,700	18,000	18,500	19,100	20,300
2021	16,600	18,000	18,700	19,400	20,600
2022	16,700	18,100	18,900	19,700	21,000
2027	17,700	19,300	20,300	21,400	23,200
2032	18,900	20,800	22,200	23,700	25,900
2037	20,300	22,600	24,300	26,200	29,100
5-Year Average Compound Growth Rates					
2017-2022	-0.4%	0.6%	1.2%	1.8%	2.7%
2022-2027	1.2%	1.3%	1.4%	1.7%	2.0%
2027-2032	1.3%	1.5%	1.8%	2.1%	2.2%
2032-2037	1.4%	1.7%	1.8%	2.0%	2.4%
Long-Term Compound Annual Growth Rates					
1995-2016			1.1%		
2016-2037	0.6%	1.1%	1.4%	1.8%	2.3%

General Aviation Aircraft Movements Forecast

The GA itinerant aircraft movements forecast includes those operations which are not expected to significantly impact the terminal but nonetheless constitute a large enough portion of operations to affect airfield operations, aviation facilities, and airport land use. Figure 2-14 and

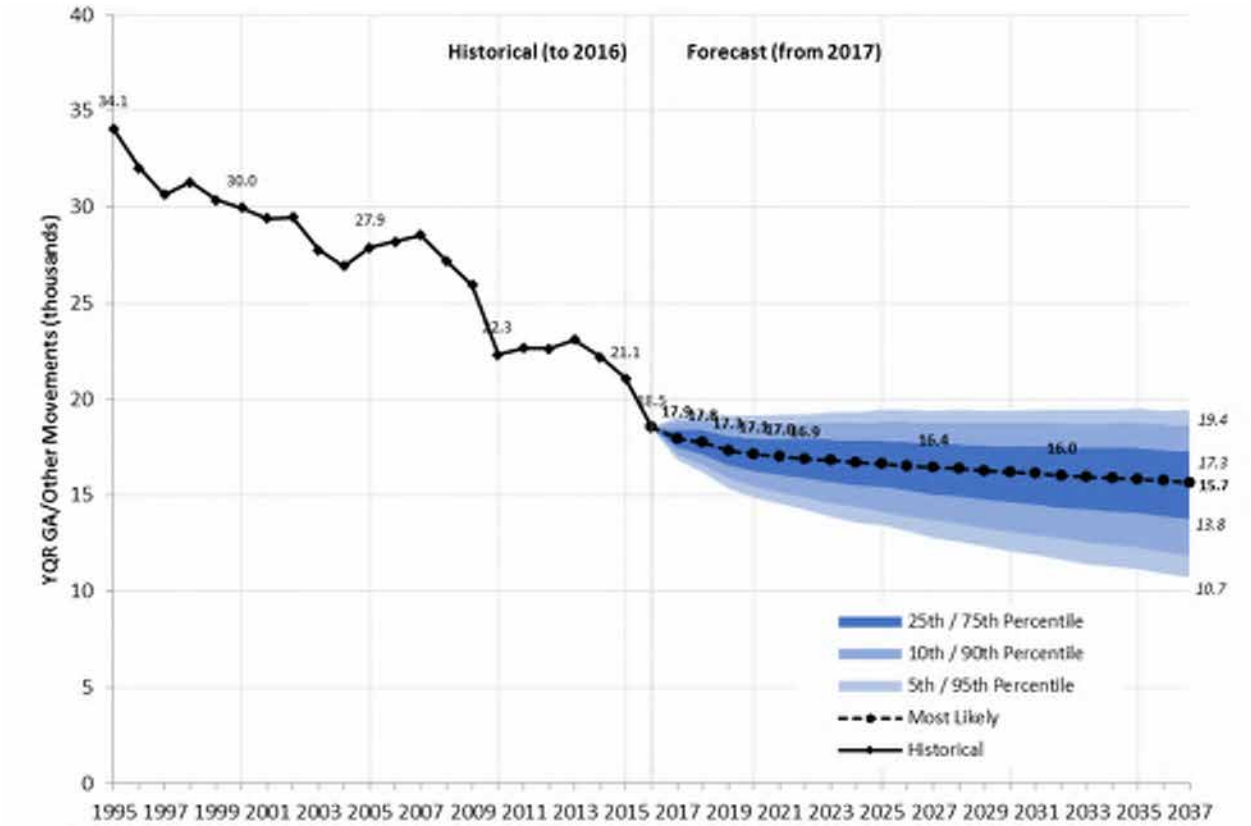
Table 2-11 present the results of the GA itinerant aircraft movements forecast. The methodology for this forecast involves an econometric model relating historical GA movements to economic drivers of GA demand (such as fuel prices and long-term demand trends like GDP and local population), with a risk-based simulation to incorporate uncertainties around future levels of drivers behind GA demand and supply.

The forecast projects a continuation of the historical trend in declining GA movements at YQR. Over the twenty-year planning horizon, GA itinerant movements are forecast to fall to 15,700 annual movements in 2037 in the Most Likely scenario, at an average rate of -0.8% per annum. While GA operations are unlikely to disappear from YQR, movements are not expected to rise significantly beyond recent levels. This forecast mirrors industry trends that show reduced activity from piston aircraft commonly used for private and recreational flying, offset partially by growth in turbine GA use (for example, corporate travel).

The GA forecast provides a few key implications:

- The Most Likely Scenario projects year-over-year declines in GA movements over the short-, medium-, and long-term.
- GA flying is projected to make up a smaller proportion of the airport's total aircraft operations over the forecast period relative to total aircraft movements.
- In relation to the Most Likely scenario, the distribution of forecasts projects a larger downside range than upside, as GA movements are not expected to rise significantly beyond recent levels over the forecast period.

Figure 2-14. Forecast Annual General Aviation Aircraft Movements, 2017-2037 (thousands)



Note: 2007-2016 movements data provided by RAA. 1981-2006 movements refer to Transport Canada data (movements for some years may be shifted due to classification differences).

Table 2-11. General Aviation Aircraft Movements Forecast, 2017-2037

Year	5th Percentile	25th Percentile	Most Likely	75th Percentile	95th Percentile
2016 (actual)			*18,524*		
2017	16,800	17,500	17,900	18,400	19,100
2018	16,100	17,100	17,800	18,400	19,300
2019	15,400	16,500	17,300	18,100	19,100
2020	14,900	16,200	17,100	17,900	19,100
2021	14,500	16,000	17,000	17,900	19,200
2022	14,200	15,900	16,900	17,900	19,200
2027	12,800	15,000	16,400	17,700	19,400
2032	11,700	14,300	16,000	17,500	19,400
2037	10,700	13,800	15,700	17,300	19,400
5-Year Average Compound Growth Rates					
2017-2022	-3.4%	-1.9%	-1.1%	-0.6%	0.1%
2022-2027	-2.1%	-1.2%	-0.6%	-0.2%	0.2%
2027-2032	-1.8%	-1.0%	-0.5%	-0.2%	0.0%
2032-2037	-1.8%	-0.7%	-0.4%	-0.2%	0.0%
Long-Term Compound Annual Growth Rates					
1995-2016			-3.0%		
2016-2037	-2.6%	-1.4%	-0.8%	-0.3%	0.2%

Total Aircraft Movements Forecast

Figure 2-15 and

Table 2-12 present the results of the total itinerant aircraft movements forecast, which combines the projections for commercial and GA movements. The forecasts of total aircraft movements represent a projection of overall growth in aircraft operations at the airport over the coming 20 years. Over the twenty-year planning horizon, total itinerant movements are forecast to grow to 40,000 annual movements in 2037 in the Most Likely scenario, at an average rate of 0.4% per annum. Positive growth is attributable to higher levels of increasing commercial activity offsetting decreasing GA activity. Total movements are not expected to surpass the levels observed in the 2007-2014 period.

The total aircraft movements forecast provides a few key implications:

- The Most Likely Scenario projects modest growth in total movements over the medium- and long-term.
- The range of outcomes is in a relatively symmetrical distribution around the Most Likely scenario, with the central 50% of outcomes projecting a range of 36,400 to 43,500 total movements by 2037.
- There is reasonable potential for either modest growth or decline in total movements throughout the forecast period, depending on how the oppositional trends in commercial versus GA movements occur

Figure 2-15. Forecast Annual Total Aircraft Movements, 2017-2037 (thousands)

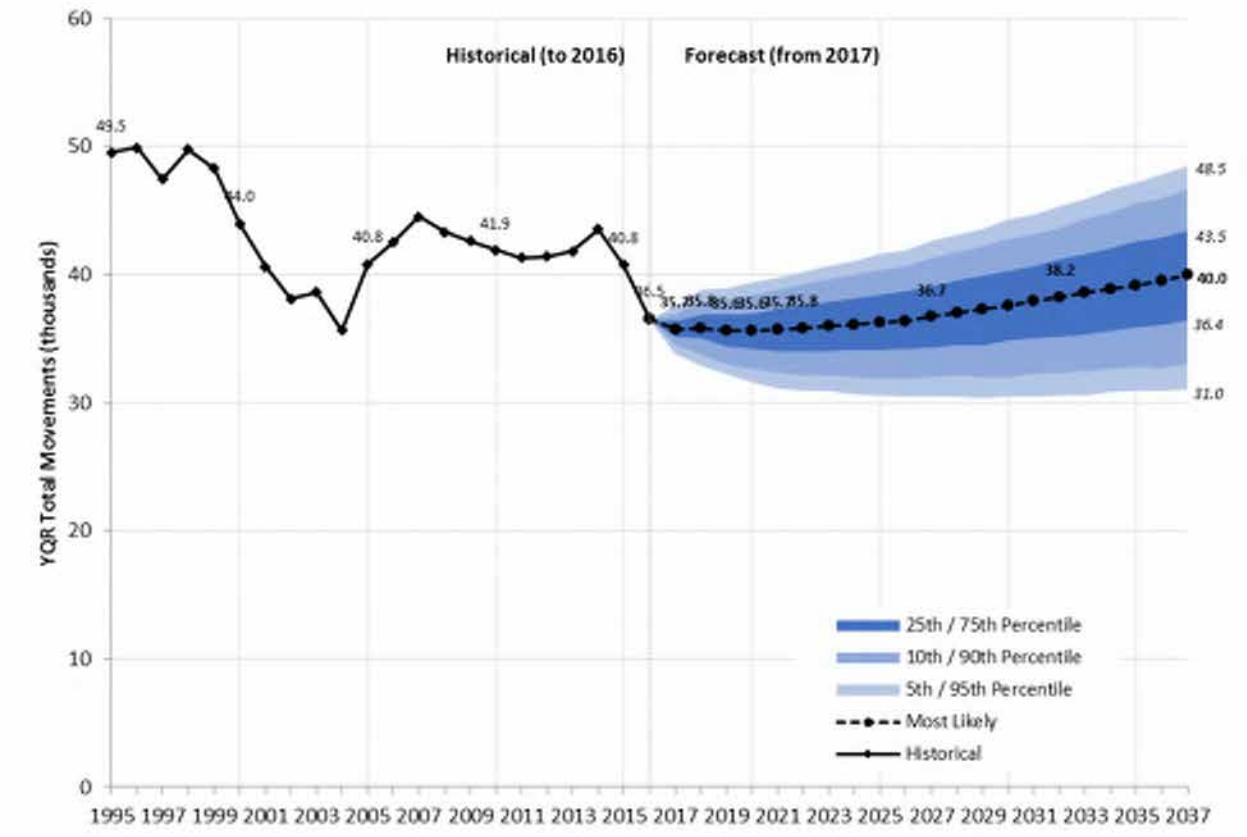


Table 2-12. Total Aircraft Movements Forecast, 2017-2037

Year	5th Percentile	25th Percentile	Most Likely	75th Percentile	95th Percentile
2016 (actual)			*36,538*		
2017	33,800	35,100	35,700	36,400	37,500
2018	32,900	35,000	35,800	36,900	38,800
2019	32,200	34,400	35,600	36,900	38,900
2020	31,600	34,200	35,600	37,000	39,400
2021	31,100	34,000	35,700	37,300	39,800
2022	30,900	34,000	35,800	37,600	40,200
2027	30,500	34,300	36,700	39,100	42,600
2032	30,600	35,100	38,200	41,200	45,300
2037	31,000	36,400	40,000	43,500	48,500
5-Year Average Compound Growth Rates					
2017-2022	-1.8%	-0.6%	0.1%	0.6%	1.4%
2022-2027	-0.3%	0.2%	0.5%	0.8%	1.2%
2027-2032	0.1%	0.5%	0.8%	1.0%	1.2%
2032-2037	0.3%	0.7%	0.9%	1.1%	1.4%
Long-Term Compound Annual Growth Rates					
1995-2016			-1.6%		
2016-2037	-0.8%	0.0%	0.4%	0.8%	1.3%

Peak Hour Forecast

The peak planning hour drives many of the terminal and apron facility requirements. Planning for the *absolute* peak demand (i.e., the greatest demand anticipated) is not generally appropriate as it will result in facilities that are impractically oversized and under-utilized for the vast majority of the year. As a result, the peak planning hour criterion of the *average day of the peak month* (ADPM) was adopted to identify the "design" hour for passengers and commercial aircraft movements.

The ADPM forecast methodology is based on identifying the "design" hour using historical data and projecting the increased peak hour facility usage based on the annual traffic forecasts, projected ratio of peak hour to annual traffic, and assumptions regarding airline operations. Historical planning peak day passenger volumes were estimated using flight level seat capacity data and monthly passenger load factors, by sector. Peak hours are defined as the forward rolling hour, calculated throughout the ADPM on 10-minute intervals.

It is important to note that the passenger peak hour and the aircraft movements peak hour are not necessarily the same. Passenger peaks may arise due to a small number of larger aircraft arriving/departing within a short time span, while the movements peak (at a different time of day) may be driven by the arrival/departure of larger numbers of smaller aircraft.

Current Peak Hour Activity

The current peak hour activity was identified using towerlog data, provided by the Regina Airport Authority, for the 12-month period ending 31 May 2017. Tuesday 17 January 2017 was identified as the historical peak planning day as it is the day which most closely matches the average day in the peak month (January) and is representative of both regularly scheduled airline operations and winter seasonal charter operations. The absolute peak day of the year for estimated passenger volumes was 10 February 2017, with daily passenger traffic estimated to be 51% greater than the historical peak planning day.

Figure 2-16 below depicts the planning peak day's passenger profile. Arriving passengers, depicted in blue, peak between 21:30-22:30 consisting of the arrival of four aircraft: three 737-800s operated by charter carriers Sunwing and Air Transat, and one Dash 8-Q400 operated by WestJet Encore. This peak hour is also the total (i.e. both arrival and departures) peak for the entire planning peak day. The current planning peak hour for departing passengers occurs in the morning departures bank between 06:40-07:40 consisting of four Domestic departures (Calgary, Edmonton, Vancouver, and Saskatoon) by Air Canada and WestJet and one International departure (Puerto Plata, Dominican Republic) by charter carrier Sunwing.

Figure 2-16. Estimated Arriving and Departing Passengers, 17 January 2017

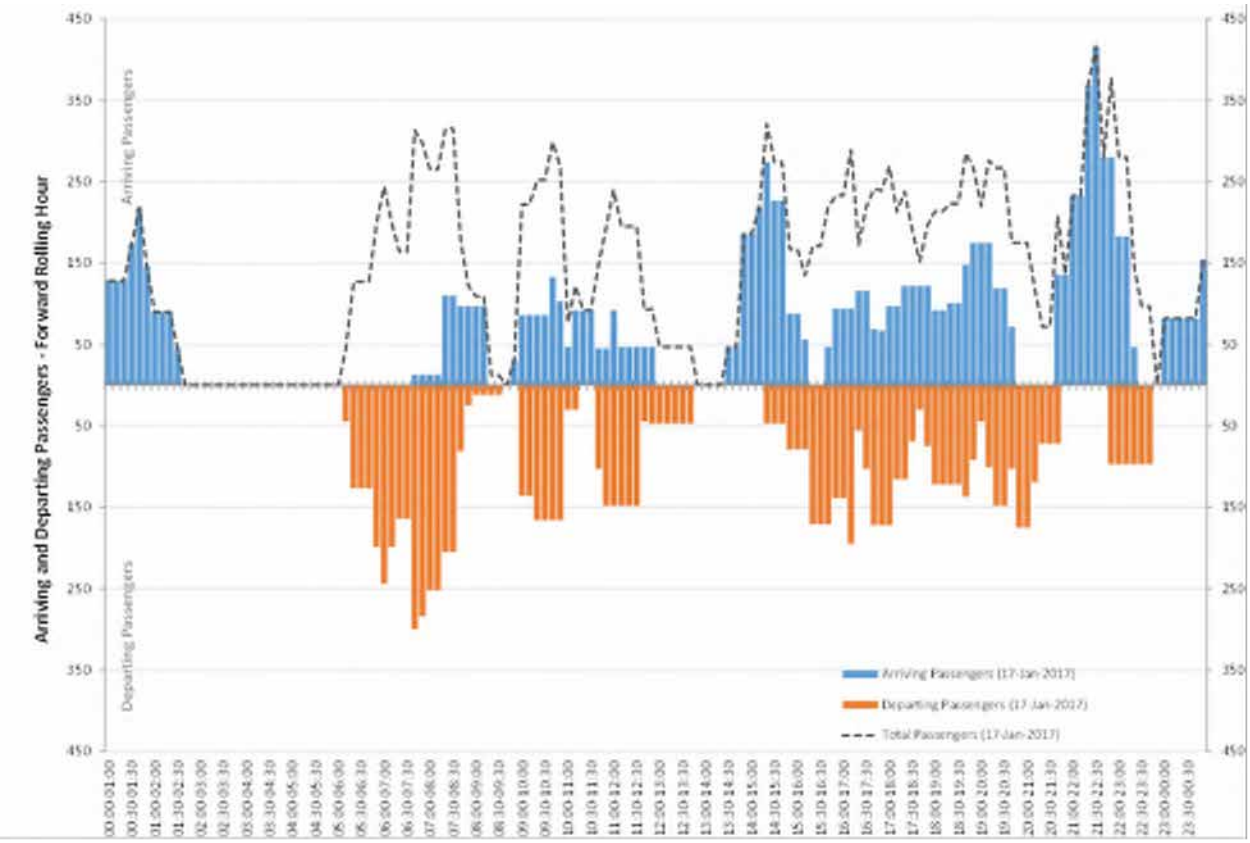
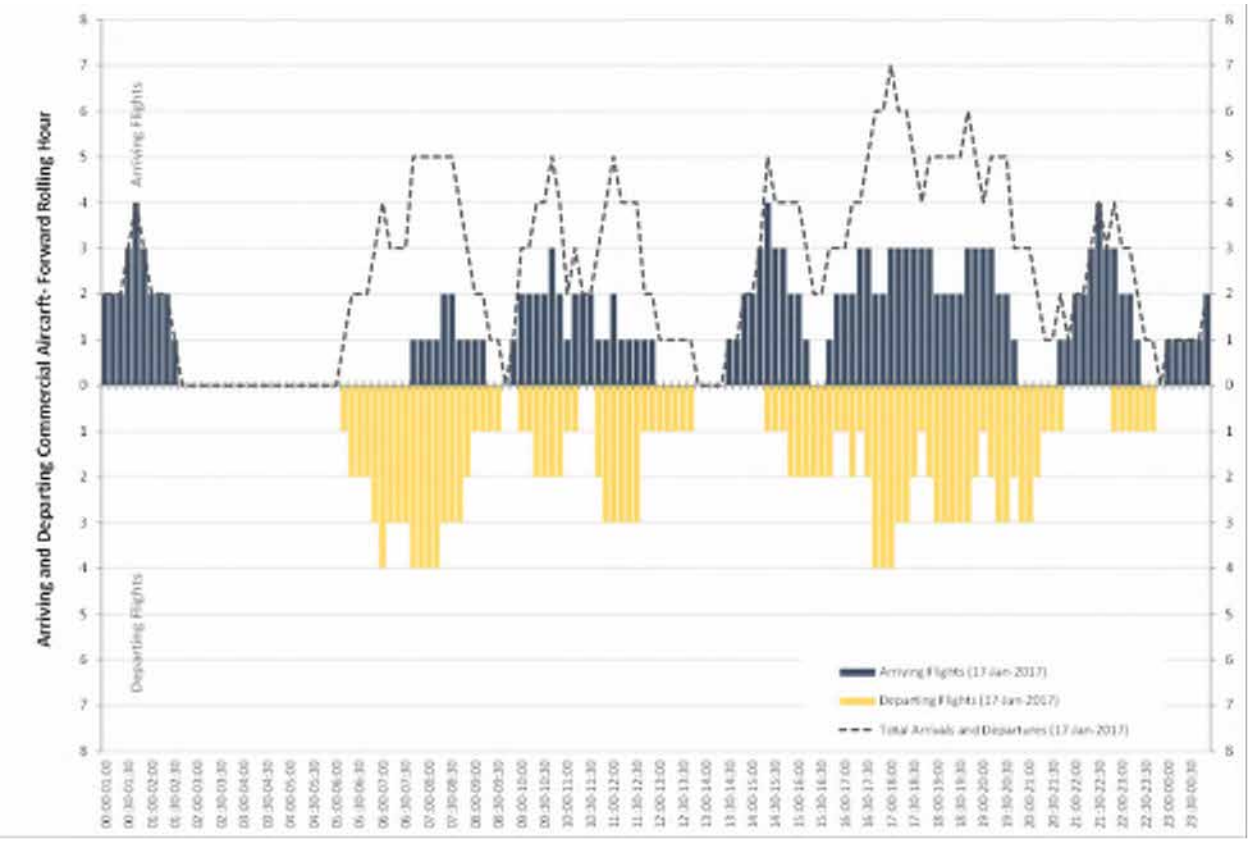


Figure 2-17 below depicts the rolling hour flow of commercial aircraft movements at the terminal on the peak planning day. On 17 January 2017, peak hour aircraft arrivals total four and occur twice, once between 00:40-01:40 and again mid-afternoon at 14:20-15:20. The departures peak for aircraft movements is also four, occurring in the morning and late afternoon departures bank. The combined arriving/departing aircraft peak is seven commercial aircraft movements, which occurs between 17:00-18:00.

Figure 2-17. Arriving and Departing Commercial Aircraft, 17 January 2017



Forecast Planning Peak Hour Passengers and Commercial Movements

It is expected that peak hour passenger volumes and commercial aircraft movements will grow at rates greater than annual passenger volumes over the Master Plan forecast horizon. This expected intensification of the peak hour is based on the following assumptions:

- Projections of modest increases in average aircraft size and average passenger load factors, leading to an increase in passengers per flight and thus an intensification of the existing peak hour profile.
- Assumptions that passenger growth will most likely be accommodated by incremental frequencies rather than substantial aircraft up-gauging, with carriers likely desiring to time incremental flights on existing peak periods to hit hub airports at key connecting times (morning, mid-day, evening).

- With respect to projected growth in the Transborder and Other International segments, growth in passenger volumes will likely be seen as additional flights on key peak periods throughout the day. These include the early morning, mid-day, and early-evening arrival/departure banks for Transborder flights and early-morning and late-evening timings for Other International flights.
- Existing airside capacity suggests that there will be less pressure to push incremental flying to off-peak periods, as is often the outcome at large, congested airports.

Forecasts of ADPM peak hour passengers were prepared for the years 2022, 2027, and 2037 based on the Most Likely air passenger forecast, presented in Table 2-13. By 2037, ADPM peak hour passenger volumes for combined arrivals is forecast to 1,129/hour in 2037, while the peak for departing passengers is 814/hour. The forecast assumes that the combined arrivals/departures peak will be driven by arriving passengers.

Table 2-13. Forecast ADPM Peak Hour Passengers, Most Likely Forecast

Year	Current[22]	2022	2027	2037
Annual E/D Passengers	1,239,332	1,456,000	1,700,000	2,273,000
Planning Peak Hour Passengers				
Combined Arriving/Departing	416	624	844	1,129
Arriving Passengers	416	624	844	1,129
Departing Passengers	300	450	609	814

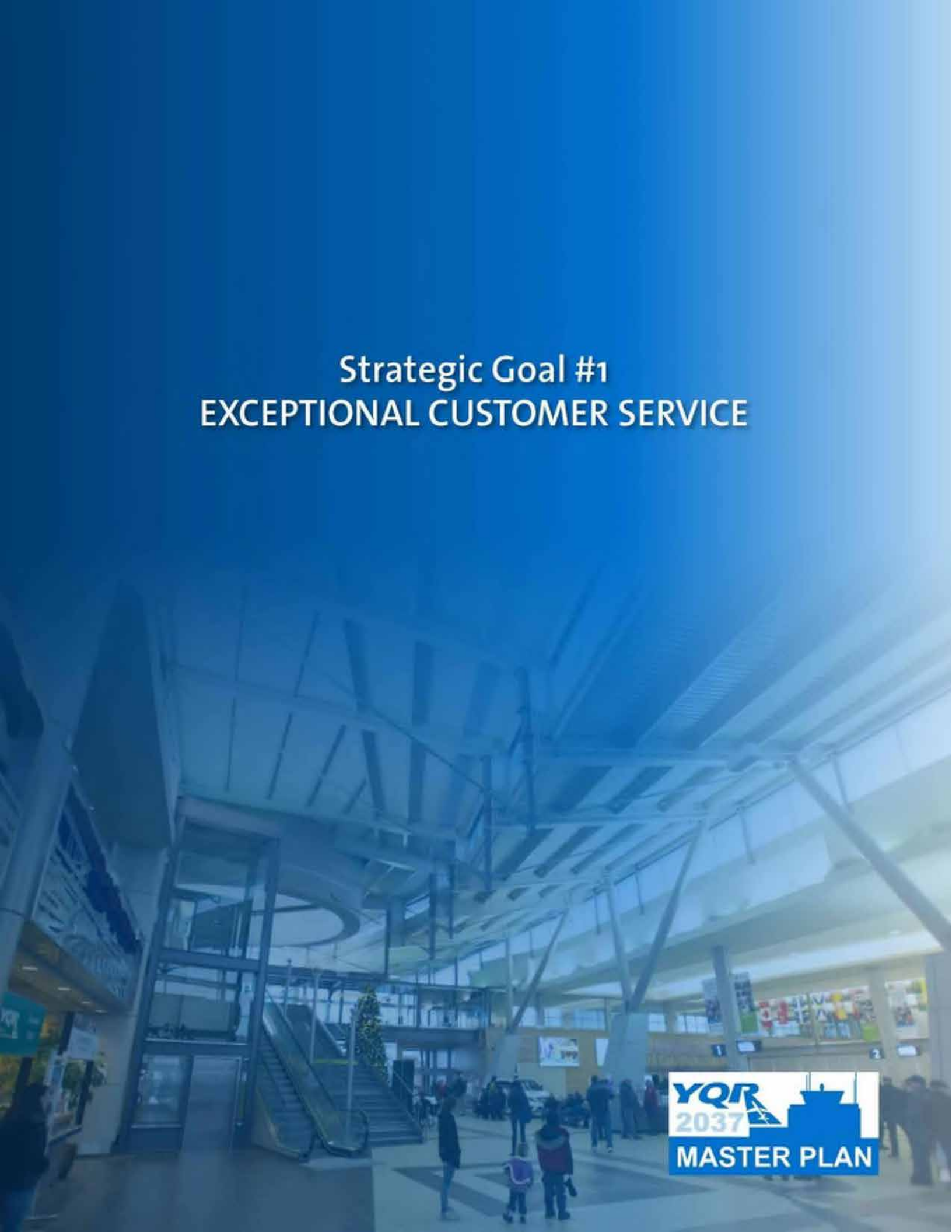
The forecast of ADPM peak hour commercial aircraft movements is presented in Table 2-14. By 2037, combined arriving/departing flights in the planning peak hour are forecast to increase to 14/hour, with planning peak hour arrivals and departures both forecast to reach 8/hour. As discussed above, it is likely that growth in annual passenger volumes, and therefore annual commercial aircraft movements, will be accomplished by incremental flights with carriers most likely placing a preference on flying during key arrival/departure banks to hit connecting banks at hub airports.

Table 2-14. Forecast ADPM Peak Hour Commercial Aircraft Movements, Most Likely Forecast

Year	Current[23]	2022	2027	2037
Annual Commercial Movements	18,724	18,900	20,300	24,300
Planning Peak Hour Commercial Movements				
Combined Arriving/Departing	7	9	11	14
Arriving Flights	4	5	6	8
Departing Flights	4	5	6	8

[22] For the year ending May 2017.
[23] *Ibid.*

Strategic Goal #1
EXCEPTIONAL CUSTOMER SERVICE



Chapter 3 – Existing Facilities and Conditions

YQR 2037 MASTER PLAN

Chapter 3 – EXISTING FACILITIES AND CONDITIONS

Existing facility and land use conditions are presented in this chapter.

AIRPORT SITE

The Airport is located within the City of Regina, approximately four kilometres southwest of the city center. The Airport is bordered by the mainline Canadian Pacific Railway along the northern perimeter, by Lewvan Drive along the eastern side, by the Trans-Canada Highway 2.5 kilometres south of the perimeter, and by agricultural and light industrial lands along the western border.

The Airport site occupies 600 hectares of land and is shown in

Figure 3-1. The Airport sits at an elevation of 1,895 feet/577 metres above mean sea level. The overall land use pattern can be subdivided into the following areas:

- The main passenger terminal complex is located on the east side of the airport.
- Ground access and parking areas are located between the terminal and Lewvan Drive.
- Aviation-related commercial facilities are located north and south of the main terminal building, including aircraft hangars, maintenance services, and cargo processing.
- The airfield is west of the passenger terminal with a northwest/southeast orientation for the primary runway and an east/west orientation for the secondary runway.

- Other commercial facilities are based northeast of the terminal.
- There are large areas of vacant land to the West and North of the airfield.

A map of the developed area of the Airport is shown in

Figure 3-2. An inventory of the buildings on the Airport campus is shown in Table 3-1.

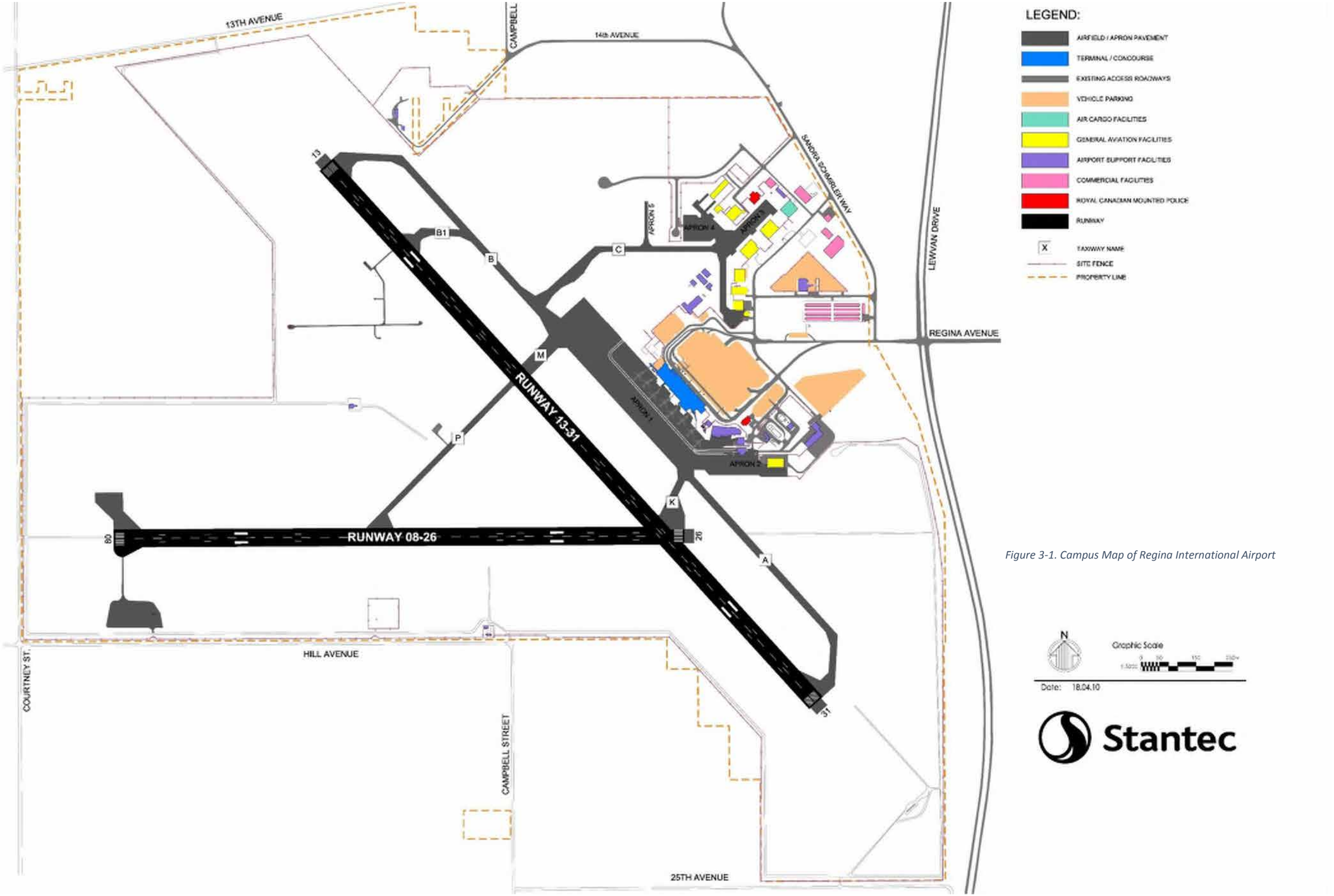


Figure 3-1. Campus Map of Regina International Airport

Figure 3-2. Terminal Area Map of Regina International Airport

Table 3-1. Existing building inventory

Description	Use	Condition
Air Cargo Facilities		
MacPherson	FedEx Ops.	Fair
MTF-G	Cargo Operations	New
General Aviation Facilities		
Government - Saskatchewan	Government hangar	Fair
STARS	Emergency Response	New
Redhead	Private hangar	New
Flying Club	Flight training	Poor
Aerocentre	FBO	Good
Rich Corp.	Private hangar	Good
Dobs	Private hangar	Fair
Prairie T	Private hangar	Fair
Southern	Private hangar	Fair
Emergency Response Property and Facilities		
RCMP Hangar	Government hangar	Good
RCMP Offices	Government offices	Good

Description	Use	Condition
Airport Support Facilities		
NAV Canada	FSS	Poor
MTF-A	Airline Support	New
Firehall	Fire Fighting	Poor
NPS-V/CATSA	Security	New
Esso	Fueling	N/A
RAA Maintenance	Airport support	Fair
Storage	Airport support	Fair
Cold Storage	Airport support	Fair
Tent Storage	Airport support	Fair
Sand Shed	Airport support	Fair
Car Rental QTA	Rental Cars	New
ASIG	N/A	N/A
Commercial Facilities		
SASKTEL	Office space	Good
STOR-EDGE	Public storage	Good
KRAMAIR	Private hangar	Fair
LEX Holding 1	CBSA Offices	Good
LEX Holding 2	Office space	Good
CANMAR	Food processing	Good

AIRFIELD

The airfield consists of the runways, taxiways, and surrounding airspace, which are described as follows:

Runways

The Airport has two intersecting runways: Runway 13-31 and Runway 08-26. The runways were originally part of a triangular runway layout developed during World War II. Runway 13-31 is the primary runway. It is 7,900 feet (2,408m) long and 150 feet (45m) wide. It has a full-length parallel taxiway with five runway

exits. Runway 08-26 is the secondary runway (cross-wind). It is 6,200 feet (1,890m) long and 150 feet (45m) wide. It does not have a parallel taxiway; taxiway exits are found approximately at the runway mid-point and near the runway 13-31 intersection. There are no taxiways for the west half of the runway, requiring aircraft to back-taxi on the runway. Both runways meet the International Civil Aviation Organization (ICAO) Code D standards, which allows aircraft similar in size to the Boeing 767 to operate on them. In 2011, the Airport resurfaced both the main runway and the cross-wind runway.

Table 3-2. Regina Airport runway characteristics

Item	Runway 13	Runway 31	Runway 08	Runway 26
Runway length	7,901 ft./2,408 m	7,901 ft./2,408 m	6,200 ft./1,890 m	6,200 ft./1,890 m
Runway width	150 ft./45 m	150 ft./45 m	150 ft./45 m	150 ft./45 m
Runway Surface	Asphalt	Asphalt	Asphalt	Asphalt
True/Magnetic Bearing	138˚/127˚	318˚/307˚	090˚/079˚	270˚/259˚
Threshold Elevation (ASL)	1,895 ft./578 m	1,895 ft./578 m	1,894 ft./577 m	1,895 ft./578 m
Runway lights	High Intensity Approach Lighting and runway indicator lights	Omni-directional approach lights	Omni-directional approach lights	Omni-directional approach lights
Visual Glide Slope Indicators	None	P2 (PAPI)	P2 (PAPI)	P2 (PAPI)
Approach Aids	Category I ILS or NDB	LOC (BC) or NDB	NDB	NDB
Reference Code	4D Precision	4D Non-Precision	4C Non-Precision	4C Non-Precision
Lowest Landing Minima (AGL)	200 ft.	346 ft.	467 ft.	626 ft.
Lowest Landing Visibility	½ mi RVR 26	1 mi	1 ½ mi	2 mi
Lowest Authorized Take Off Minima	½ mi	½ mi	½ mi	½ mi

In 2011, the Airport resurfaced both the main runway and the cross-wind runway. Runway end safety areas (RESAs) were also expanded in 2011, to increase safety and to anticipate future impending regulations in the aviation industry. The existing RESAs are 150 metres long and 91 metres wide at each of the runway ends, which closely follow the minimum dimensions stated in the TP312 fifth edition Aerodrome Standards and Recommended Practices.

Taxiways

The taxiways system at the Airport consists of eight taxiways: A, B, B1, C, K, M, and P. Taxiways A and B run parallel to Runway 13-31. Taxiways B1, M, and K are exit taxiways for Runway 13-31. Taxiways K and P provide access to Runway 08-26. A decommissioned taxiway, referred to as "*Old Taxiway C*," is located south of Taxiway C. The inventory of existing taxiways is summarized in Table 3-3.

Table 3-3. Regina Airport taxiway characteristics

Taxiway	Purpose	Width	Surface
A	Connects Runway 31 threshold to Apron I	23 m/75 ft.	Asphalt
B	Connects Runway 13 threshold to Apron I	23 m/75 ft.	Asphalt
B1	Runway 13-31 midfield exit taxiway	23 m/75 ft.	Asphalt
C	Connects Taxiway B to aircraft Aprons III, IV, and V	23 m/75 ft.	Concrete
K	Runway 13-31 midfield and Runway 26 threshold exit taxiway	23 m/75 ft.	Asphalt
M	Runway 13-31 midfield exit and Taxiway P and Taxiway B connector taxiway	23 m/75 ft.	Asphalt
P	Runway 08-26 midfield exit taxiway	23 m/75 ft.	Asphalt

Aprons

There are five aircraft parking aprons at the Airport. Apron I is located on the airside of the Air Terminal Building (ATB) and this is the main apron used for scheduled passenger service. Apron I was expanded in 2011 and again in 2017 to increase aircraft parking availability, mitigate apron congestion, and to add four remote parking positions. There are currently 14 aircraft parking positions on Apron I, the locations of which are shown in Figure 3-3. Airspace

There is a noise abatement procedure that diverts all aircraft arrivals and departures to right hand circuits for Runway 08 and Runway 13. There are not any other airports in close proximity to the airport. There is an ozone research balloon that launches approximately 14 miles south of the airport every Wednesday, weather permitting. Additionally, a stationary vertical green laser light beam projection is visible at nights from a local observatory, 14 miles south of the airport.

Table 3-4 details the current aircraft parking positions available to commercial aircraft.

Apron II is located southeast of the ATB and is used for remote parking for commercial aircraft, general aviation, and military activity. Aprons III, IV, and V are located northeast of the ATB, accessed via Taxiway C, and are primarily used by general aviation aircraft. Apron III is restricted to aircraft under 45,000 lbs. Only single row aircraft parking is permitted on Apron III. Apron IV is located west of Apron III and is restricted to aircraft under 5,000 lbs. Apron V is the smallest apron, located adjacent to Apron IV.

Figure 3-3. Map of aircraft parking positions on Apron I

Airspace

There is a noise abatement procedure that diverts all aircraft arrivals and departures to right hand circuits for Runway 08 and Runway 13. There are not any other airports in close proximity to the airport. There is an ozone research balloon that launches approximately 14 miles south of the airport every Wednesday, weather permitting. Additionally, a stationary vertical green laser light beam projection is visible at nights from a local observatory, 14 miles south of the airport.

Table 3-4. Aircraft parking space allocation

Operational Stand Position	Aircraft and Max. Size	Special Notes
01 – Ground Load	CRJ-200 up to B737-800W (Code C)	NO aircraft parking if Stand 2a is in use for B757, A310, or B767
02 – Apron Drive Bridge	CRJ-200 up to B737-800W (Code C)	
2a – Ground Load Option	Up to A310/B767 (Code D)	When B757, A310, B767 uses 2a, NO parking on Ops Stand 01
03 – Apron Drive Bridge / Ground Load Option	CRJ-200 up to B737-800W (Code C)	
04 – Apron Drive Bridge / Ground Load Option	CRJ-200 up to B737-800W (Code C)	
05 – Apron Drive Bridge	CRJ-200 up to B737-800W (Code C)	
06 – Apron Drive Bridge Transborder Ops/Swing Gate /	CRJ-200 up to B737-800W (Code C)	Ground Load Option
07 - Apron Drive Bridge Transborder Ops/Swing Gate	CRJ-200 up to B737-800W (Code C)	
08 - Apron Drive Bridge Transborder Ops/Swing Gate	CRJ-200 up to B757 and A310	
8a – Apron Drive Bridge / Ground Load Option	B767 and A330	When B767, A330 uses 8a, NO parking on Ops Stand 09, 10
09 - Apron Drive Bridge Transborder Ops/Swing Gate / Ground Load Option	CRJ-200 up to B737-800W (Code C)	Large aircraft on Stand 8a prohibits parking on Stand Over steer Lead-in Line provided
10 – Apron I – remote	CRJ-200 up to B737-800W (Code C)	Overnight/out of service parking – power in, push out
11 – Apron I – remote	CRJ-200 up to B767-300W/A310/B757(Code D)	Overnight/out of service aircraft parking – power in, push out
12 – Apron I – remote	CRJ-200 up to B767-300W/A310/B757(Code D)	Overnight/out of service parking NO use when Stand 13a is in use
13 – Apron I – remote	CRJ-200 up to B737-800W (Code C)	
13a – Apron I – remote	CRJ-200 up to B767-300W/A310/B757 (Code D)	When in use, NO aircraft parking on Ops Stand 12, 13, and 14
14 – Apron I- remote	CRJ-200 up to B737-800W (Code C)	Overnight/out of service parking NO use when Stand 14 is in use
Stand 1 – Apron II	CRJ-200 up to B737-800W (Code C)	Power in, push out position. Frequently used by cargo B727.
Stand 2- Apron II	Up to CRJ-700	Tow-in, push out position, NO power in permitted (obstruction/NPS-V structure)

AIR TERMINAL BUILDING (ATB)

The existing passenger terminal building was constructed in 1960. It underwent a major expansion and renovation in the 1980s and once again in 2005 to accommodate traffic growth. In 2016, the ATB accommodated a record high number of 1,262,899 passengers.[24]

The ATB currently has two public levels and a basement. The main level is accessible from the curbside and vehicle parking lots. Twenty-three (23) common-use airline ticket counters and 17 self-service kiosks are located across the hall from the terminal entrances. An inline hold baggage screening system and baggage makeup area are located immediately behind the ticket counters. Rental car customer service counters are located in the ticketing hall, opposite from the airline ticketing counters. The north side of the terminal building is occupied by the Canada Border Services Agency (CBSA), and the domestic and international baggage claim areas. Three flat-plate baggage claim devices serve both domestic and international arriving passengers. Airport administration offices occupy the south end of the ATB. Vertical circulation at the southern end of the ticketing lobby provides access to the second level of the terminal, where the pre-board security (PBS) lanes, passenger holdrooms, and concession facilities are located. The basement primarily contains operations and mechanical space along with offices.

Figure 3-4,

Figure 3-5, and

Figure 3-6 present the floorplan for each level in the terminal building. **Error! Not a valid bookmark self-reference.** summarizes the total amount of area dedicated to each function within the terminal building.

Table 3-5. Terminal building space allocation

(square metres)	Basement	Level 1	Level 2	Total
Airline operations	100.2	580.6	60.1	740.9
Airport administration	366.8	979.2	-	1,346.0
Baggage claim	-	621.0	-	621.0
Baggage handling	-	2,962.0	-	2,962.0
CATSA	71.1	-	440.1	511.2
CBSA	17.1	358.5	1.1	376.7
Concession space	-	268.4	973.8	1,242.2
Holdroom	-	-	1,496.0	1,496.0
Operations and mechanical	2,285.8	161.8	662.6	3,110.2
Public circulation	-	2,197.2	657.2	2,854.4
Secure/Sterile Circulation Area	506.0	419.4	1,244.7	2,170.1
Ticketing Hall	-	557.1	-	557.1

[24] RAA 2016 Annual Report - https://www.yqr.ca/images/annual-report.pdf

Washroom	63.8	108.7	211.1	383.6
Vacant	-	161.7	-	161.7
TOTAL	3,410.8	9,375.6	5,746.7	18,533.1

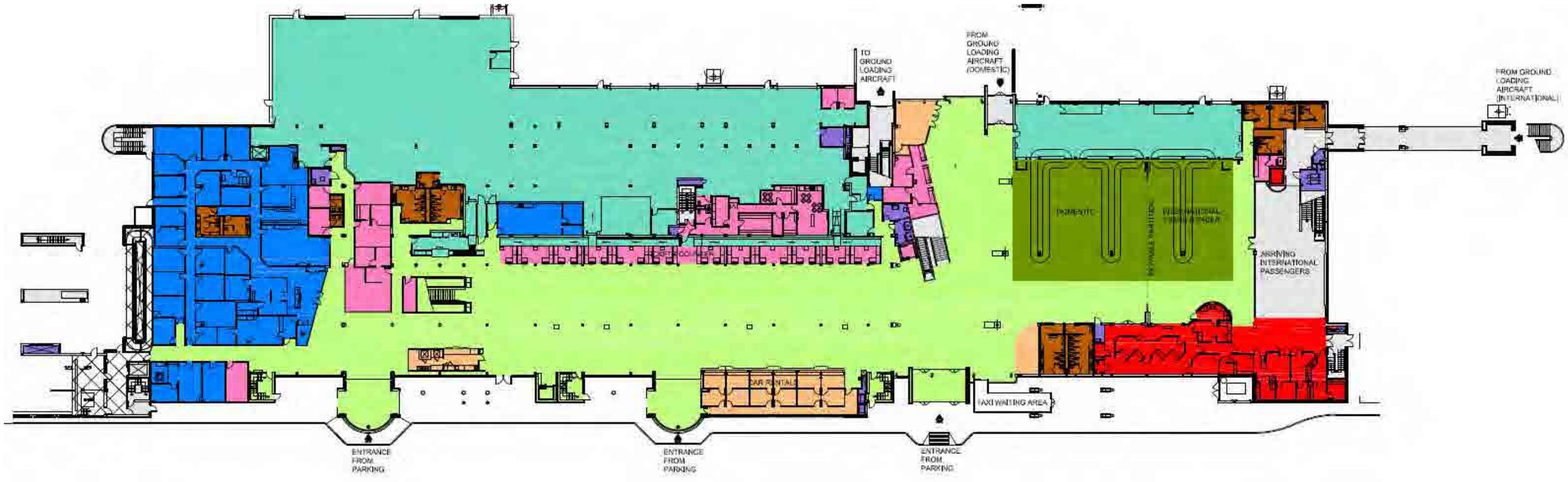


Figure 3-4. Terminal building main level floor plan

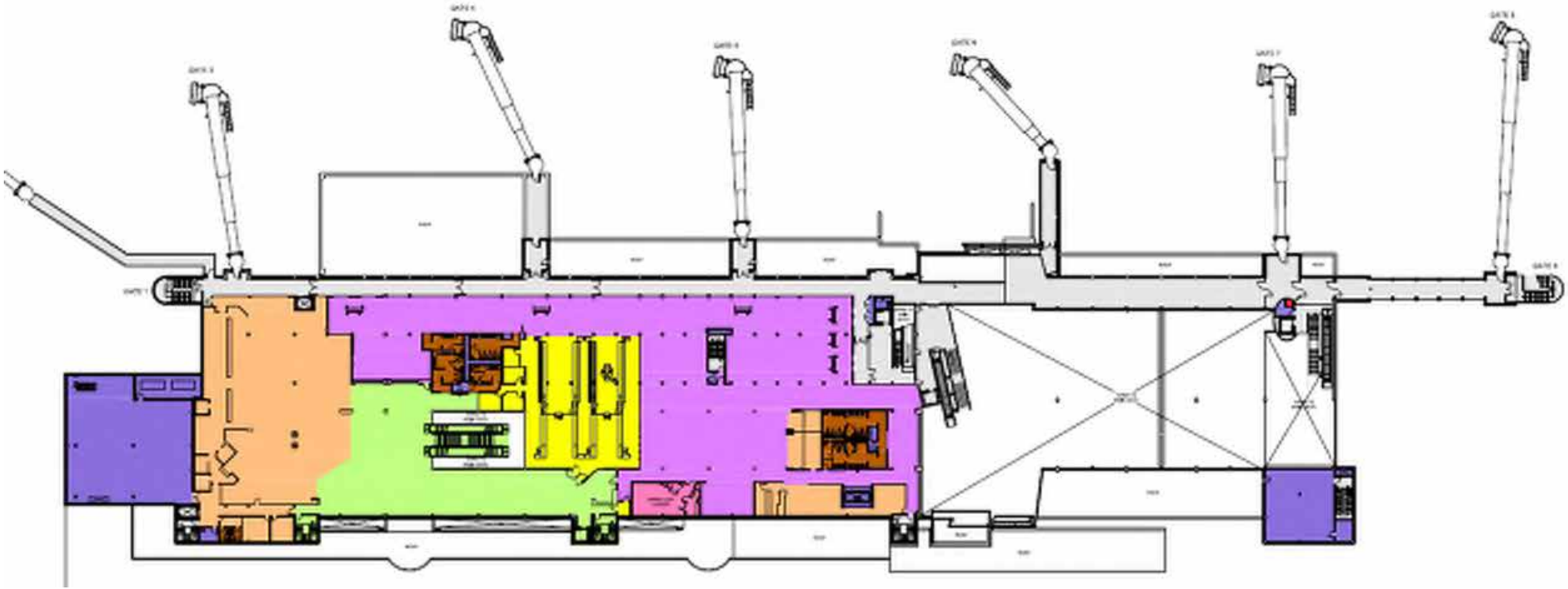


Figure 3-5. Terminal building second level floor plan

Figure 3-6. Terminal building basement level floor plan

LEGEND;

- AIRLINE OPERATIONS
- CANADIAN AIR TRANSPORT SECURITY AUTHORITY
- CONCESSION
- AIRPORT ADMINISTRATION
- BAGGAGE HANDLING
- BAGGAGE CLAIM
- CANADA BORDER SERVICES AGENCY
- SECURE/STERILE CIRCULATION AREA
- PUBLIC SPACE & CIRCULATION
- BUILDING OPERATIONS, STORAGE & MECHANICAL
- HOLDROOM
- WASHROOM
- VACANT

Stantec

GROUND TRANSPORTATION

The ground transportation facilities include the airport entrance and circulation roadways, curbsides, automobile parking, rental car facilities, and commercial vehicle facilities.

Airport Entrance and Circulation Roadways

Airport access is provided from the east via Regina Avenue from Lewvan Drive. Regina Avenue connects to the Airport Loop, which provides curbside access to the main passenger terminal and to public parking.

Curbsides

A single passenger terminal curbside facility runs parallel to the face of the terminal building. There is a single lane dedicated to passenger pickup and drop-off with signs indicating a three-minute maximum wait time. The curbside is divided by cross-walks into four sections: taxis, limousines, private vehicles, and shuttles/service vehicles. A map of the curbside geometry and allocation is in Figure 3-7.

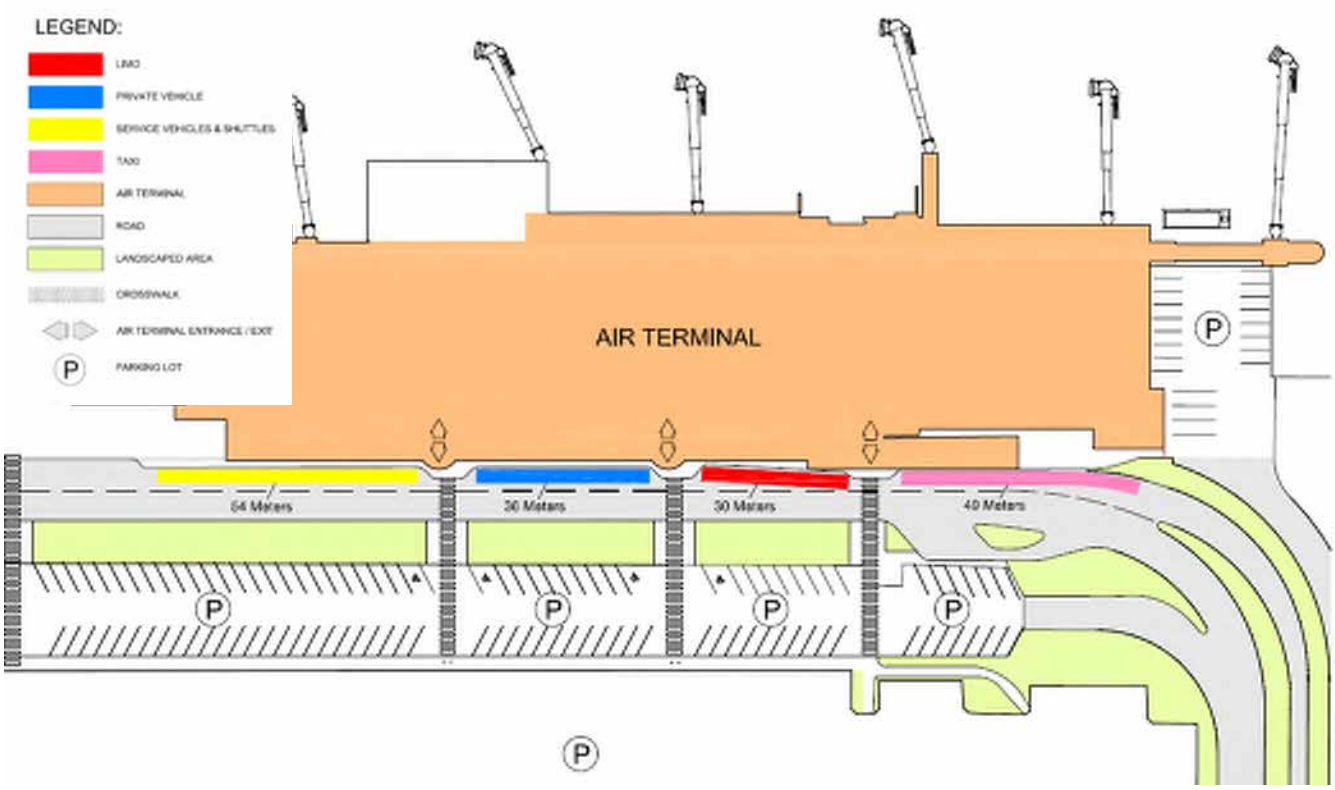


Figure 3-7. Terminal building curbside allocation

Automobile Parking Areas

There are five separate public automobile parking areas at the Airport:

- Cell Phone Parking Lot – located near the airport entrance and accessed from Regina Avenue.
- Short-Term Parking – located across the curbside from the passenger terminal and runs parallel to the curbside roadway. This lot is generally recommended for two-hour parking or less.
- Long-Term Parking – located behind the Short-Term Parking, surrounded by the Airport Loop.
- Economy Parking Lot – located outside the Airport Loop, south of Regina Avenue.
- Overflow Parking – adjacent to the outbound roadway, accommodates 147 vehicles as-needed.

- Employee Parking Lot – located north of the passenger terminal building and it is accessed from Otter Lane.

The parking facilities are identified in

Figure 3-2. The number of spaces and parking rates for each facility are shown in Table 3-6.

Table 3-6. Automobile parking facilities

Parking Facility	Capacity	Parking Rates
Short Term Parking	110 spaces	$2.00 for each half hour
Long Term Parking	1,135 spaces	$4.00 for first hour $2.00 each additional hour $15.00 for 24 hours
Economy Parking (Overflow Parking available)	400 spaces (147 spaces)	$2.00 for first hour $2.00 each additional hour $11.00 for 24 hours

Employee Parking	246 spaces	$25/month

Source: Regina Airport Authority Website, July 2017.

Rental Cars

There are five car rental companies currently operating at the Airport: Avis, Budget, Enterprise, Hertz, and National. Rental car customer service counters are located on the main level of the passenger terminal building. There are 142 rental car ready/return spaces available in a lot immediately north of the Long-Term Parking Lot, within the Airport Loop roadway.

A quick-turnaround (QTA) facility is located on Buffalo Trail, where the rental car companies fuel, wash, service, clean, and store their vehicles. This shared facility features covered fuel stations, a wash-bay, light maintenance bays, and additional parking spaces.

AIR CARGO

The largest cargo carrier at the Airport is CargoJet. CargoJet is currently operating a Boeing 757 aircraft, with scheduled services to Saskatoon and Winnipeg. This aircraft parks on Apron I, north of the ATB. CargoJet runs their freight through their facility in the Multi-Tenant Facility – Groundside (MTF-G), which requires that their tugs traverse through the ATB apron. FedEx operates out of a building near Apron III, where they load and unload cargo smaller aircraft on the airside. In addition to their Apron III operation, FedEx runs freight between their facility and the CargoJet facility via landside roads. MTF-G was designed to expand to the northwest, along Tutor Drive, should cargo demands warrant additional building space.

GENERAL AVIATION

There are eleven general aviation tenants at the Airport, which are identified in Table 3-7. There are two Fixed Based Operators (FBO) at Regina Airport: Lockhart Aviation Services (previously known as Regina & Saskatoon Airport Esso), and Regina Aerocentre (Shell). Lockhart provides fueling, whereas Shell provides full-service fueling, hangarage, ground-handling and other aviation services for general aviation users.

The Regina Flying Club (RFC) provides flight training, fueling, hangar storage, and other general aviation services with a fleet of six Cessna and Piper aircraft. RFC also hosts various Royal Canadian Air Cadet training programs, Civil Air Search and Rescue exercises, and other small aircraft public general aviation users. RFC's hangar is located northeast of the ATB.

Other general aviation service providers include Prairie Flying Service, a Cessna factory-authorized service center, located southeast of the passenger terminal. Additionally, the Shock Trauma Air Rescue Society (STARS), a not-for-profit helicopter air ambulance service, has also based a single helicopter at the Airport.

Table 3-7. General aviation tenants and facilities

Tenant	Facility Type	Location
Aerocentre	Hangar/Office space	End of Apron II
Government of Saskatchewan	Hangar/Office space	South of Apron III, Airport Rd.
STARS	Hangar/Office space	South of Apron III, Airport Rd.
REDHEAD	Hangar/Office space	South of Apron III, Airport Rd.

Flying Club	Hangar/Office space	Apron III, Airport Rd.
Rich Corp.	Hangar/Office space	Apron III, Airport Rd.
Dobs Aviation	Hangar/Office space	Apron IV, Tiger Moth Ln.
Prairie Flying Services	Hangar/Office space	Apron IV, Tiger Moth Ln.
RCMP	Hangar/Office space	Apron III, Tiger Moth Lane
Kramair	Hangar/Office space	End of Apron III, Chipmunk Drive
Menzies Aviation	Hangar	End of Apron III, Chipmunk Drive

AIRPORT SUPPORT FACILITIES

Air support facilities include the air traffic control tower, Flight Service Station (FSS), the Firehall, the airport fueling services, and aircraft de-icing.

Navigation, communication, air traffic advisory and air traffic control are provided by NAV Canada. The air traffic control tower is located atop the ATB and it is open for 16 hours a day during summer months and for 17 hours a day during winter months. The FSS is located immediately south of the ATB, and it provides weather information, advisory for flights at small remote airports, and general airport advisory information 24-hours a day.

Firefighting equipment and staff are housed in the Firehall on the north side of Apron II, south of the ATB. This central location enables a three-minute response time to all sections of the runways as-required by Transport Canada. The on-Airport Firehall responds to all aircraft accidents and incidents occurring within the airport perimeter fence. The Firehall also responds to emergency events within the Critical Firefighting Access Area (CFAA) outside the perimeter fence and can respond to other emergency events outside the CFAA and the perimeter fence. An additional Fire Training Area (FTA) is located south of the Runway 08 threshold.

The Airport hosts a single fuel farm, located east of the Firehall, north of the Aerocentre aircraft hangar. All fueling is undertaken by fuel trucks. The fuel farm has three 100,000-liter tanks for Jet A Fuel and a single 100,000-liter tank for AvGas 100LL. The third Jet A Fuel tank was installed in 2015 to mitigate fuel crises during occasional winter storms that prevented fuel delivery.

Aircraft de-icing is restricted to Apron I. This apron is equipped with the necessary grid collection system to facilitate the disposal of de-icing fluids.

A maintenance garage for airport support vehicles and snow removal equipment storage is located northeast of the passenger terminal building, in close proximity to the runways and taxiways. Additional storage facilities for cold and stand storage can be found near Apron III.

Two multi-tenant facilities were recently constructed for airport operations. Multi-Tenant Facility – Airside (MTF-A) houses a common-use lavatory dump and vehicle wash station, Air Canada, SA Aviation, and Airport Terminal Services. MTF-G houses CargoJet, Air Canada Cargo, and Gate Gourmet. MTF-G was originally designed to be expanded by an additional 10,000 ft^2 to accommodate an additional tenant.

COMMERCIAL DEVELOPMENT

A variety of other buildings at the Airport are leased to non-aviation users. Most of these buildings are located north of Regina Avenue. The following is a list of current groundside tenants with a brief description of their facilities:

- SASKTEL– Located on Sandra Schmirler Way, SASKTEL uses an office building of approximately 2,800 m^2. The building is surrounded with a large parking lot providing over hundred car lots.
- Stor-Edge (Storage Mart) – Self-storage facility located just north of Regina Avenue with a single office building and nine storage buildings.
- Southern – Located on Tiger Moth Lane, currently vacant.
- Canmar Grains Ltd. – Located on Sandra Schmirler Way, Canmar Grains uses a building of approximately 1,650 m^2 for grain storage, food processing, and office space.
- Canada Border Services Agency (CBSA) – Located at the intersection of Sandra Schmirler Way and Airport Road, providing office space for CBSA.
- Lex Capital Management – An office building, situated between SASKTEL and the CBSA buildings.

GOVERNMENT FACILITIES

The Royal Canadian Mountain Police (RCMP) Air Division has two properties at Regina International Airport, both of which have long-term lease agreements (25+ years). One of these properties is an office building near the terminal building. Airport terminal or aircraft taxiway changes are not expected to have any impacts on the RCMP operations in this building, other than modifications to vehicle parking.

The second building used by RCMP is an aircraft hangar, located in the northeastern corner of the Airport. RCMP maintains and operates the hangar and the Airport Authority provides ground maintenance, such as snow removal and lawn mowing.

Chapter 4 – Airfield Analysis

YQR 2037 MASTER PLAN

Chapter 4 - AIRFIELD ANALYSIS

The airfield requirements presented in this chapter are related to the safe and efficient departure, landing, and ground operation of aircraft on the runways, the taxiways, and the aprons. The airfield analysis is divided into five components: runway length, approach navigational aids, potential runway hot spots, expansion of Apron II, and a centralized deicing facility. The focus of the analysis is to accommodate future growth while remaining environmentally compliant. The analysis has been performed in accordance with several International Civil Aviation Organization (ICAO) and NAV CANADA publications, including the fifth edition of Aerodromes Standards and Recommended Practices (TP 312).

RUNWAY LENGTH REQUIREMENTS

The Airport has two intersecting runways: Runway 13-31 (2,408 metres) and Runway 08-26 (1,890 metres). There are two main factors in evaluating future runway length requirements. First, increased runway capabilities can allow new long-haul routes, such as flights to Iceland, Germany, or distant sun-spot locations. Second, the latest generation of narrow-body aircraft (Boeing 737 MAX or Airbus A320 Neo families) are capable of flying further than older aircraft, due to advancements in aircraft and engine design. Several Caribbean destinations currently have non-stop service to/from Regina, including several that are as much as 3,500 kilometres away that are served by mainline narrow-body aircraft. With new aircraft, airlines are capable of flying to destinations with stage lengths that range from 4,000 to 5,000 kilometres. A runway length analysis must consider these new aircraft and stage lengths.

The required runway length is a function of airport elevation, summer air temperature, the aircraft serving the airport, and the longest nonstop distance flown from the Airport. Required runway length is calculated based on aircraft manufacturer performance specifications (e.g. Boeing Airplane Characteristics for Airport Planning manual) under a set of assumptions. Figure 4-1 provides an overview of takeoff runway length requirements for five aircraft types at maximum takeoff weight (MTOW) on a hot day (30°C) at a 600-metre mean sea level (MSL) elevation. As shown, the existing runways are shorter than the required takeoff lengths at MTOW. As a result, aircraft must operate with a reduced takeoff weight on a hot day. However, aircraft rarely operate at MTOW, so the MTOW runway lengths in Figure 4-1 should not be used as a reference in determining the appropriate runway length.

To better determine the appropriate runway length, some of the longest potential routes to/from the Regina were analyzed. Table 4-1 summarizes the runway length requirements for three design-missions to Cancun (CUN), Reykjavik (KEF), and Frankfurt (FRA) operated by a Boeing 737-800, a Boeing 757-200, and a Boeing 767-300ER, respectively. These three routes are representative of potential long-distance routes that could be considered during the planning period. They do not represent routes that are currently being considered by airlines. The new Boeing 737-8MAX is also considered for CUN and KEF, as this aircraft type is expected to enter service in the coming years with airlines flying to those destinations.

Runway requirements are presented for standard day (15°C) and hot day temperatures (standard day + 15°C). Unless otherwise noted, a flap extension setting of 30 on the aircraft is used for landing field length calculations. Higher numbers correspond to higher degrees of flap extension. Runway 13-31, at 2,408 metres long, can support nonstop operations to Cancun with both aircraft types on standard days and to Reykjavik without taking any weight penalties on the Boeing 757. The required runway length exceeds the existing available runway length for flights to KEF on the Boeing 737-8MAX and to Germany on the Boeing 767. These flights would need to take a payload penalty to operate at the Airport. Runway length also

becomes a constraint for flights to CUN on warm days, although demand for Caribbean flights typically occurs during winter months, and therefore the existing runway is sufficient for them. The design-routes in Table 4-1 do not operate at MTOW, so the required takeoff lengths in Table 4-1 are shorter than the required takeoff lengths in Figure 4-1.

Figure 4-1. Takeoff Length Requirements at MTOW (Hot day, 600m MSL)

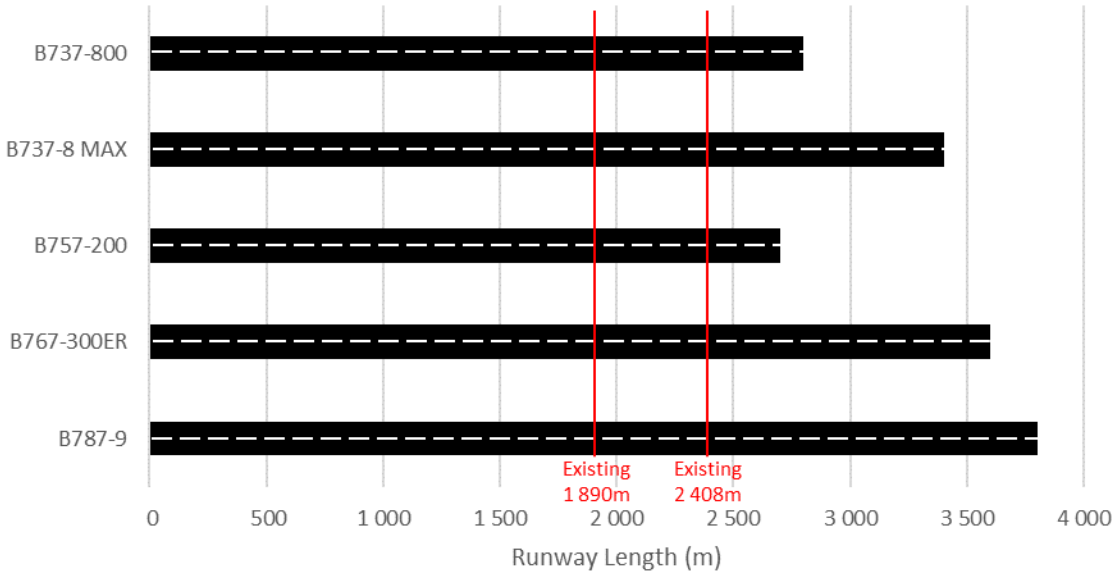


Table 4-1. Takeoff Length Requirements for Flights to Cancun, Reykjavik, and Frankfurt (not MTOW)

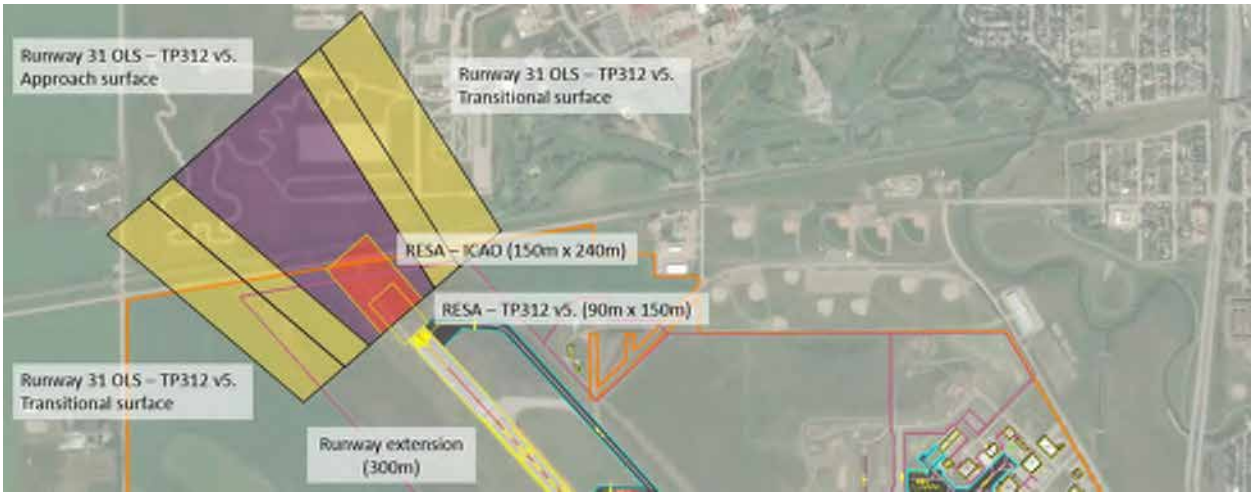
Item	Boeing 737-800	Boeing 737-8MAX	Boeing 757-200	Boeing 737-8MAX	Boeing 767-300
Design Mission	YQR-CUN	YQR-CUN	YQR-KEF	YQR-KEF	YQR-FRA
Stage Length (km)	4,161	4,161	5,521	5,521	8,290
Seats	168	180	183	153	258
Landing Field Length (m) – Flaps 30, Wet Runway	2,100	1,800 (Flaps 40)	1,800	1,800 (Flaps 40)	2,000
Takeoff Field Length (m) – Std Day (15°C)	2,400	2,400	2,000	2,500	2,500
Takeoff Field Length (m) – Hot Day (Std Day + 15°C)	2,500	2,500	2,100	2,700	2,600

Since runway length is not constraining current operations, nor expected to constrain operations during the planning period, a runway extension is not recommended during the 20-year planning period. However, new international routes may materialize in the distant future and therefore land should be preserved for a 300-metre extension to Runway 13-31.

A 300m extension of Runway 13-31 to the north is shown in Figure 4-2. The corresponding runway end safety area (RESA) and OLS are also shown for a category one instrument landing system (CAT I ILS) equipped runway with aircraft group number four (AGN IV) aircraft, based on the TP 312 fifth edition. The

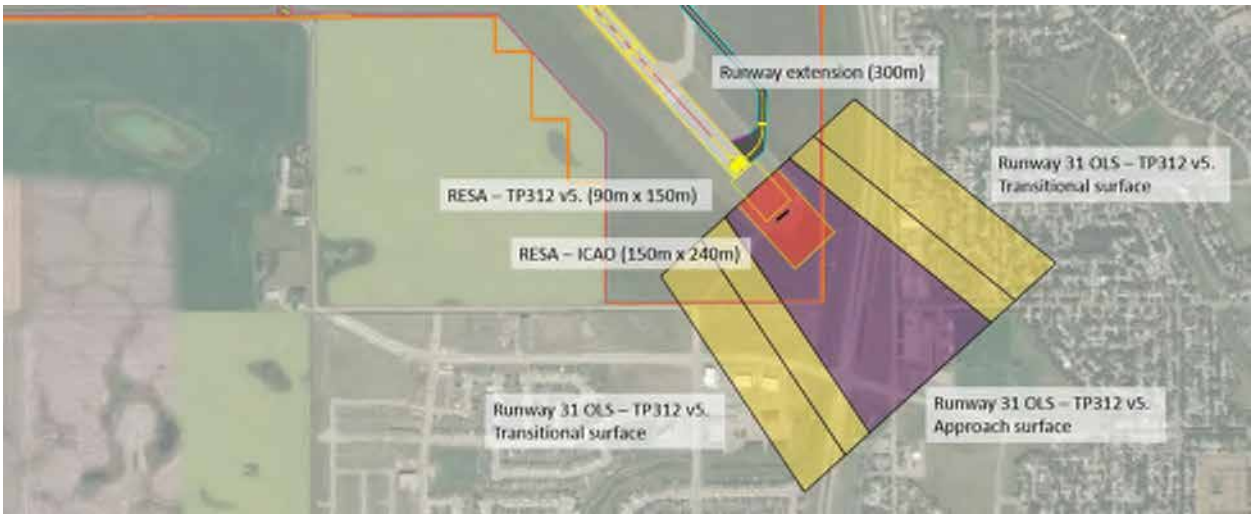
RESA is also shown according to International Civil Aviation Organization (ICAO) Annex 14 recommendations. The ICAO recommended RESA length is 240 metres from end of runway strip (300 metres from end of runway) with a width equal to that of the graded runway strip (150 metres). The size of this area is significantly larger than the TP312 fifth edition required area with a length of 150 metres and a width of 90 metres (twice the runway width). However, it is plausible that Transport Canada will introduce RESA size regulations similar to the ones described by ICAO or the FAA. This means that future runway extensions need to consider the more conservative ICAO RESA dimensions for planning purposes. As shown below, this northern runway extension is not feasible because 13th Avenue and the parallel railway would violate the Object Limitation Surface (OLS), as well as the ICAO recommended RESA.

Figure 4-2. Runway Extension to the North



A southern extension of Runway 13-31 is shown in Figure 4-3 with the corresponding RESA and OLS areas for a non-precision runway with AGN IV aircraft. The OLS would put a height restriction of approximately 6.8 metres on ground traffic traveling on Lewvan Drive. Additionally, this southern expansion would change noise levels associated with Runway 31 departures and arrivals, as aircraft would operate closer to populated areas south of the Airport.

Figure 4-3. Runway Extension to the South.

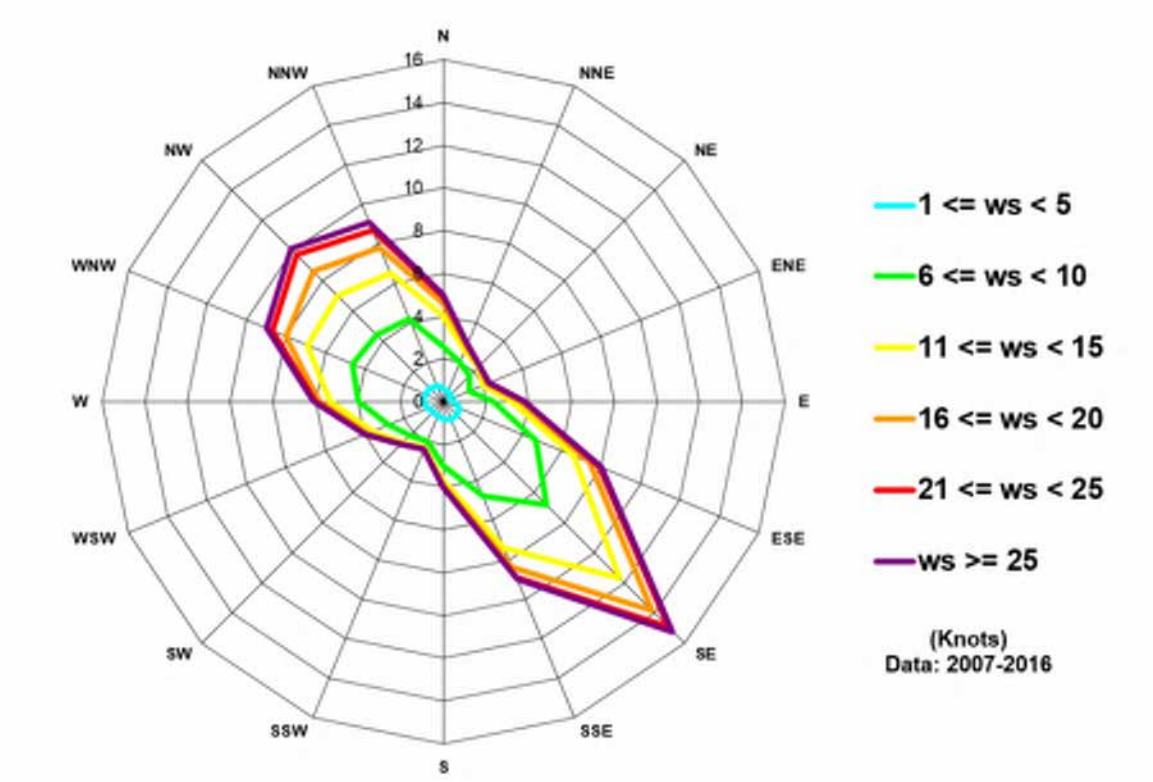


A plausible extension of Runway 13-31 would be to extend the runway by 150 metres on both ends to avoid interruptions to road and rail traffic to the north and to minimize noise impacts south of the Airport.

PRECISION APPROACH CAPABILITY FOR RUNWAY 31

Currently only Runway 13 approaches are categorized as precision approaches. In order to better accommodate traffic in all weather conditions, the possibility of an instrument landing system for Runway 31 was investigated. First, wind data from the National Oceanic and Atmospheric Administration (NOAA) for YQR was analyzed for a ten-year period from 2007 to 2016. The corresponding wind rose is shown in Figure 4-4. The shape and length of each arm is proportional to the frequency of events, or the number of times the wind was blowing from a specific direction. As shown, the wind rose extends the most to the southeast and to the northwest, meaning that winds from the southeast are the most common at the Airport, followed by winds from the northwest direction. These directions suggest that Runway 13 should be the most common arrival runway, followed by Runway 31.

Figure 4-4. Regina Airport Wind Direction and Magnitude 2007-2016.

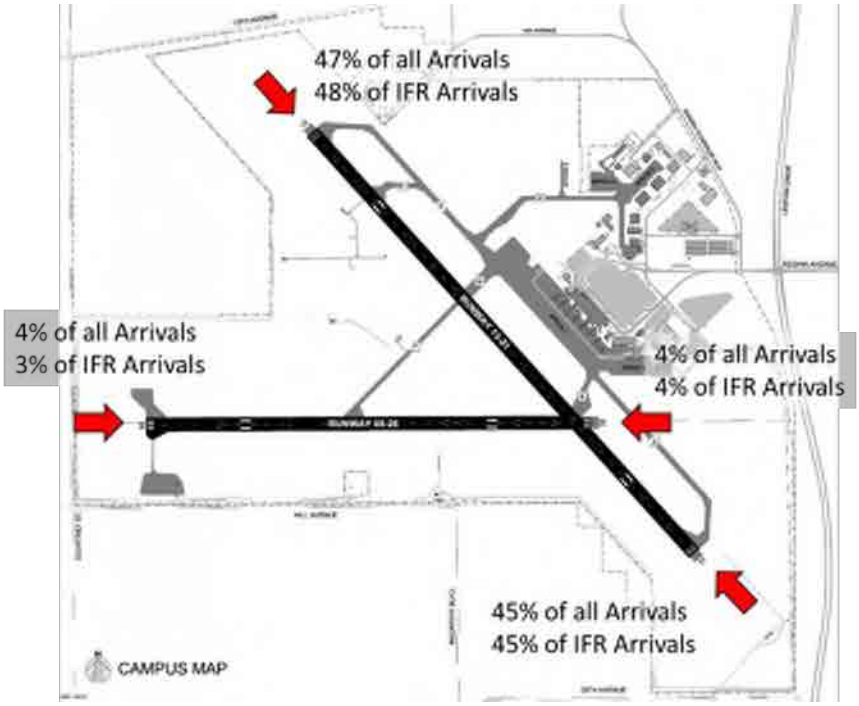


The tower log, containing operational data from 2014 to 2016, confirms Runway 13 is the most common arrival runway. 47 percent of all arrivals (48 percent of instrument flight rules - IFR arrivals) use Runway 13. Runway 31 is the second most used arrival runway, used by 45 percent of all arrivals (45 percent of IFR arrivals). Runway 08 and Runway 26 are used less frequently, as illustrated in Figure 4-5.

The combination of historic wind directions and the tower log data indicate that the existing instrument landing system (ILS) is installed for the most commonly used arrival runway, Runway 13. If a second ILS were to be installed, it would be on Runway 31. However, ILS equipment comes with high installation and

maintenance costs. Due to these costs and the expected acceptance of satellite-based navigation in the next 5-10 years, NAV CANADA has generally not accepted any recent proposals to install additional ILS.

Figure 4-5. Arrival Runway Usage 2014-2016.



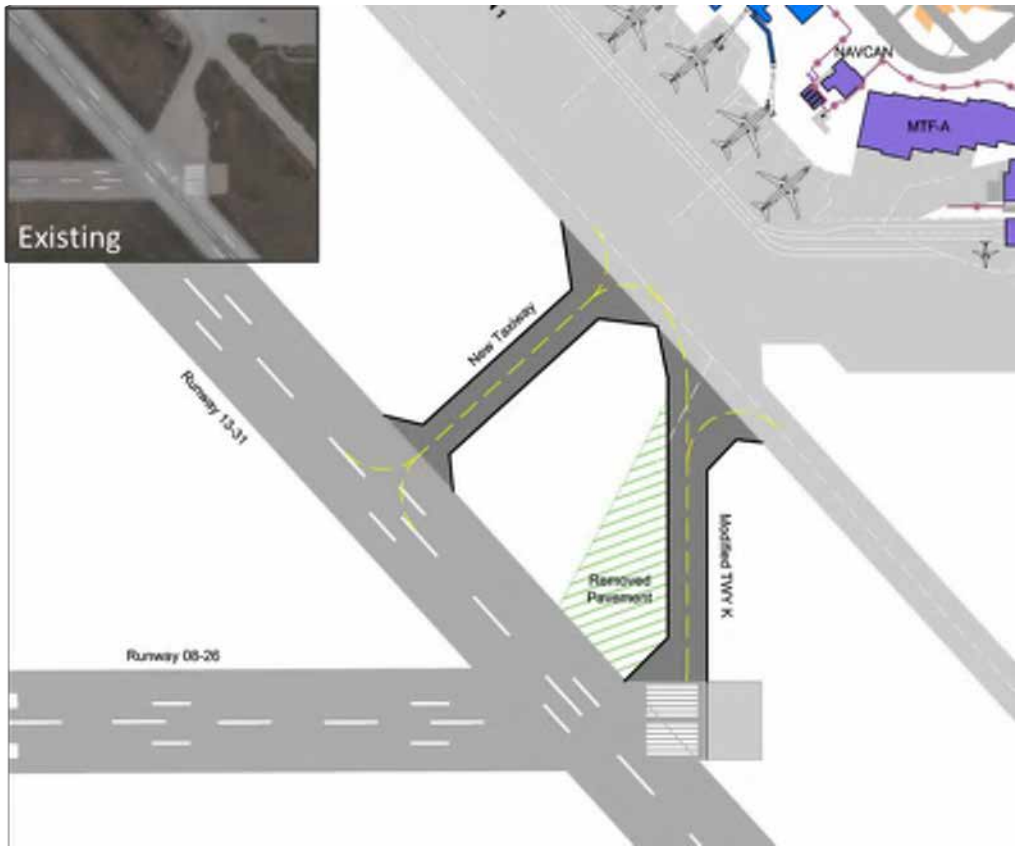
In addition to the precision approach capability for Runway 31, a new approach light system was also considered. Runway 31 is currently equipped with an Omni-Directional Approach Lighting System (ODALS). The installation of an improved lighting system, such as a Medium Intensity Approach Lighting System with Runway Indicator Lights (MALSR) or a Simplified Short Approach Lighting System with Runway Indicator Lights (SSALR) would enable operations in low-visibility weather conditions. This new approach lighting system would provide visual information to pilots on runway alignment, height perception, and horizontal guidance to identify the approach end and centerline of the runway. MALSR and SSALR are typically used for category I precision runways.

RUNWAY INTERSECTION AND TAXIWAY K

The intersection of Runway 08-26 with Runway 13-31 and Taxiway K provides a potential hot spot at the Airport. During the Master Plan public open houses, described in Chapter 13, multiple pilots identified Taxiway K as a confusing location and suggested improvements. As shown in Figure 4-6, the current geometry of Taxiway K includes a widening towards the runways, which requires heightened attention by pilots. Bad weather and poor visibility may contribute to reduced situational awareness of pilots approaching the runway intersection. Alternatively, a confusing runway and taxiway intersection may be compounded by a miscommunication between a pilot and an air traffic controller. As a result, aircraft may line up on the wrong runway or may enter a protected part of a runway, increasing the risk of a runway incursion and compromising aircraft separation standards. Lastly, small general aviation aircraft tend to become disoriented on large expanses of pavement, which Taxiway K is considered, which can also lead to runway incursions.

A potential solution for mitigating the risk of a potential runway incursion is the decoupling of runway intersection and Taxiway K, as also shown in Figure 4-6. Removing part of the pavement on Taxiway K can remove the large expanse of pavement and provide a less confusing taxi path to the Runway 26 threshold for departing aircraft, while restricting Runway 31 arriving aircraft from exiting the runway at this location. In order to accommodate Runway 13-31 arrivals exiting the runway, a new taxiway is could be constructed, providing direct access to Apron I. These two recommended modifications reduce the risk of a runway incursion, avoid dual purpose pavement, and avoid Taxiway K intersecting multiple runways at the same location.

Figure 4-6. Re-Design on Taxiway K and Runway Intersection.

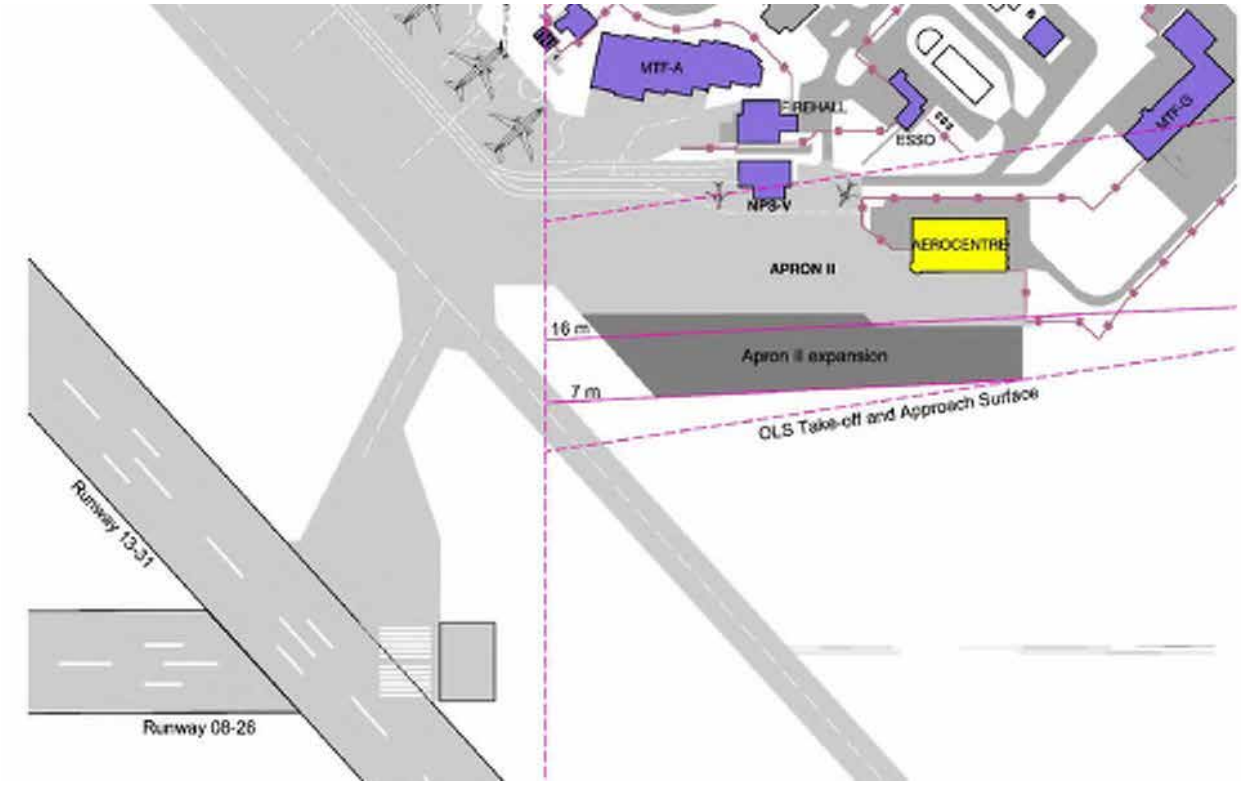


APRON II EXPANSION

A wide variety of aircraft utilize Apron II for loading and unloading (both passengers and cargo), itinerant parking, and fueling. The mix of aircraft include helicopters, military aircraft, large corporate jets, charter jets, and others. In peak periods, demand for aircraft parking at the Airport can lead to congestion on Apron II. The development of this apron has been limited in the past by the OLS associated with Runway 26 and Runway 31, as dictated by TP 312 4th edition standards. TP 312 5th edition decreases the limitations and allow for Apron II expansion, as shown in

Figure 4-7, the pink line indicates the OLS take-off and approach surface per TP 312 5th edition standards. With a seven-metre height limitation, to account for the tail heights of large general aviation aircraft, Apron II can be expanded by 48 metres to the west, and by 31 metres to the east, resulting in 9,600 square metres of additional parking space.

Figure 4-7. Apron II Expansion with Runway 26 OLS.



CENTRALIZED DEICING FACILITY (CDF)

Deicing at the Airport is currently conducted at on-stand push-back on Apron I. Aircraft are pushed back to a designated deicing area to minimize the amount of deicing fluids in the stand area. The current operations meets current airline needs, but it can cause congestion during peak hours. Additionally, Apron I slopes towards the passenger terminal building, which presents environmental and operational challenges when dealing with large volumes of precipitation or deicing fluid runoff.

In order to accommodate future growth at the airport, and to promote efficient and environmentally compliant operations on Apron I, deicing operations may need to be removed from Apron I within the Master Plan planning horizon. It is recommended that a centralized deicing facility (CDF) be constructed to ease congestion on Apron I and increase the airfield capacity.

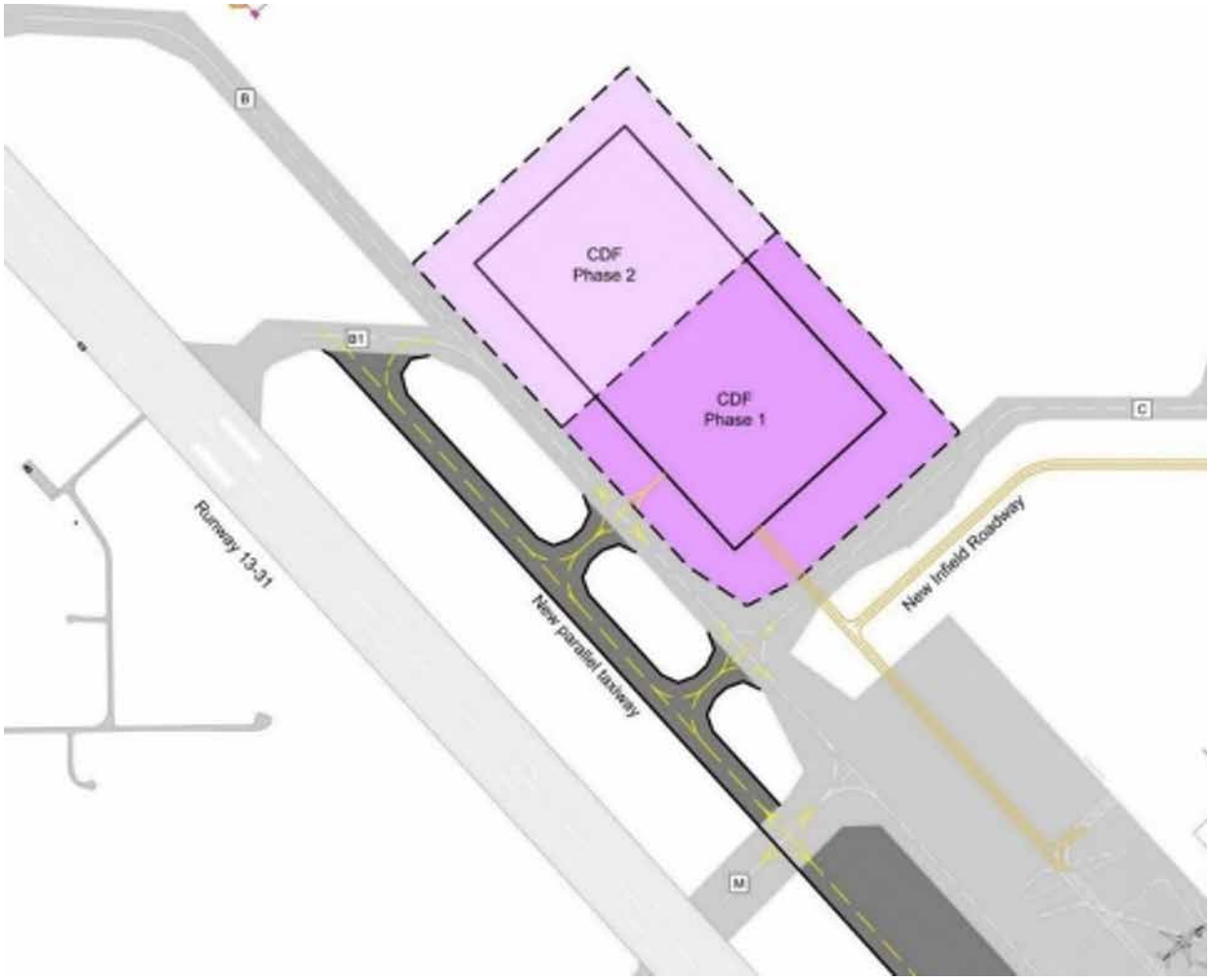
Three locations have been evaluated for a CDF:

(1) Immediately north of Taxiway C (north of the passenger terminal complex)
(2) Northeast of Apron II
(3) Near the Runway 31 threshold.

Location 2 would require relocation of several recently constructed facilities and is constrained by the Runway 26 OLS. Location 3 has been recognized as operationally inefficient, since aircraft departing from Runway 13 would need to taxi from Apron I to Runway 31 for deicing, and then taxi to the opposite threshold. This would significantly increase airfield congestion.

Location 1, near Taxiway C, has been identified as the best site for a CDF, as shown in Figure 4-8. Due to its close proximity to Apron I, this location would minimize overall taxi time for aircraft departing on Runways 13, 08, and 26 without severely impacting departures on Runway 31. A CDF would require an additional parallel taxiway to ease congestion. This new taxiway would be located outside the Runway 13-31 safety area. In conjunction with the CDF and parallel taxiway, a new infield roadway is also recommended to ease congestion on Taxiway C.

Figure 4-8. Location of the Future Centralized Deicing Facility and Parallel Taxiway.



The recommended layout plan for the CDF is shown in Figure 4-9. A two-phase construction plan is recommended for the new CDF. The first phase would be near the Taxiway B and Taxiway C intersection. This facility would accommodate three Code C or one Code C and one Code E aircraft. The second phase would be an expansion to the north, providing space for one Code C and one Code E aircraft. When deicing is not needed, these facilities would provide additional aircraft parking space. The recommended layout of the site includes aircraft parking positions that are perpendicular to Taxiway B.

Figure 4-9. Layout Plan for Proposed CDF.

Source: Centralized Deicing Facility Planning Study, July 2015; with minor adjustments

SOUTH DEVELOPMENT

A potential site for development is south of Runway 08-26. Currently the Fire Training Area (FTA) is located near the Runway 08 threshold. This space provides space and flexibility for an FBO complex, private hangars, or other development with airfield access.

In order to develop this site for aeronautical use, a new taxiway would need to be built parallel to Runway 08-26. Runway 08-26 is blocked for periods of time when Runway 08 arrivals back-taxi to Taxiway P or when Runway 26 departures taxi to the departure end of the runway. A parallel taxiway would provide access to the new developments, in addition to runway occupancy.

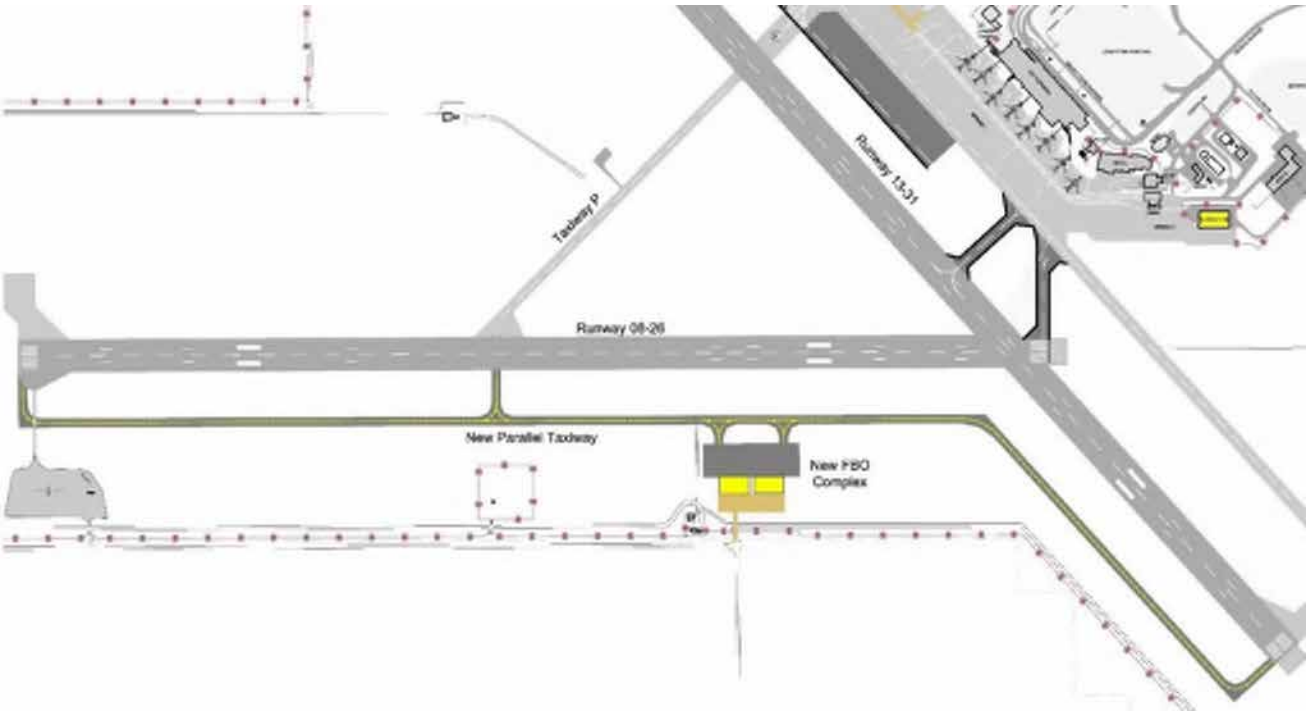
A plan for the parallel taxiway is shown in Figure 4-10 with three runway access points: one at the Runway 08 threshold, one near the mid-point of Runway 08-26 (across from Taxiway P), and one access point to

the Runway 31 threshold. A hypothetical FBO complex is included in the diagram to demonstrate potential development.

The parallel taxiway could be built in multiple stages. Since Runway 13-31 is the most used runway, the parallel section between Runway 31 threshold and Taxiway P could be constructed first to provide access to the new facility from both directions. The section between Taxiway P and Runway 08 threshold could be constructed in the second stage, enabling Runway 26 arrivals to avoid back taxiing on the runway.

This south development site is currently undeveloped and would require utilities to be connected.

Figure 4-10. South Development Area with New FBO Complex and Parallel Taxiway.



Strategic Goal #2
GROW OUR BUSINESS

Chapter 5 – Air Terminal Building

YQR 2037 MASTER PLAN

Chapter 5 - AIR TERMINAL BUILDING

This section describes the facility requirements calculated for the air terminal building (ATB) and the development alternatives to address potential capacity deficiencies. The analysis of the ATB focuses on both departing and arriving passenger flows as well as aircraft parking positions.

METHODOLOGY AND ASSUMPTIONS

The method for determining future requirements is informed by and consistent with guidance from Airport Cooperative Research Program (ACRP), Report 25, *Airport Passenger Terminal Planning and Design*, and the International Air Transport Association (IATA) *Airport Development Reference Manual (ADRM)*, 10th Edition. For each key ATB function, assumptions in line with this guidance, industry standards, and airline input are documented. For planning purposes, it is assumed that terminal facilities will be developed to meet IATA's optimum Level of Service (LoS), which is a measure of the ease of flows and delays inside the ATB. Optimum LoS corresponds to overall good levels of service, where flows are stable, delays are acceptable, and a good level of comfort is provided. Previous versions of IATA's Airport Development Reference Manual refer to optimum level of service as being most similar to LoS C.

Peak Period Activity

ATB facility requirements are primarily driven by peak-period activity, which is summarized in Table 5-1 for each planning horizon milestone.

Table 5-1. Peak Period Activity Summary

	Recommended Facilities			
	Base Year	Forecast Year		
	2017	2022	2027	2037
Peak Hour Passengers				
Peak hour enplanements	300	475	644	865
Peak hour deplanements	416	658	892	1,200
Peak hour total passengers	416	658	892	1,200
Peak Hour Operations				
Peak hour departures	4	5	6	8
Peak hour arrivals	4	5	6	8
Peak hour total operations	7	9	11	14

Source: Inter*VISTAS* Consulting Inc.

Since the Airport operates primarily as a spoke market, the enplanements peak is expected to occur early in the morning while the deplanement peak is expected to occur late in the evening. The enplanement peak, which occurs from 06:40 to 07:40 represents those passengers on flights departing the Airport

within the peak hour. The deplanement peak, which occurs from 21:30 to 22:30, represents those passengers on arriving flights within the peak hour. The peak total passengers, which also occurs from 21:30 to 22:30 represents the highest combined enplaned and deplaned passengers within the peak hour. The deplanement peak drives the peak hour total passengers as the evening arrivals are more compacted than the morning departures.

FACILITY REQUIREMENTS

Terminal requirements focus on both departing and arriving passenger flows. For departing flows, this includes check-in (self-service, kiosks, and traditional counters), security screening, and holdroom. For arriving flows, this includes CBSA facilities and domestic and international baggage claim. Aircraft parking positions requirements are also determined from the peak hour operations forecast.

Check-in

The size of the check-in lobby is typically a function of the number of peak hour departing passengers. It is influenced by the ratio of passengers checking in at the ticket counter, self-service kiosks, and online. The check-in lobby currently has 23 bag-drop enabled, full-service common-use check-in counters and 17 self-service common-use kiosks. The counter positions and kiosks are configured in a linear alignment. Approximately 557 square metres of passenger processing and queueing area are provided currently.

The existing passenger check-in behavior was obtained from the *2017 Q2 ACI ASQ Report*. More than one-half of passenger check-in using a kiosk while almost one-third check-in online. By the end of the planning period the use of full-service check-in counters is expected to decrease significantly. Online/mobile check-in is expected to be the predominant behaviour by 2037 and is expected to be adopted by all carriers serving the Airport. Check-in processing times are consistent with industry standards.

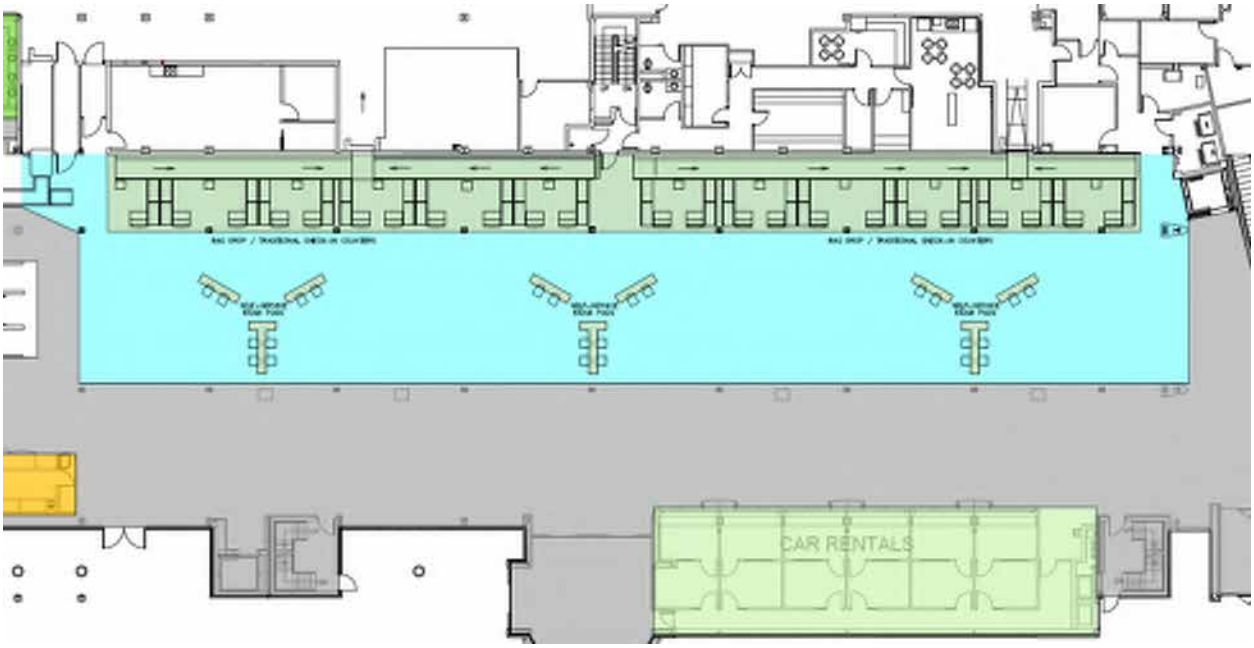
Based on the assumptions, the total number of bag-drop and full-service check-in desks in 2037 can be accommodated with the current supply. In addition, the number of self-service kiosks is sufficient through the planning period. The area required to accommodate the number of check-in desks and self-service kiosks is also sufficient, but the location of the kiosks and queueing should be redeveloped to provide an optimal layout and passenger flow. An example layout for the check-in lobby is provided in Figure 5-1.

Table 5-2. Check-in Lobby Requirements

	Existing Facilities	Recommended Facilities			
		Base Year	Forecast Year		
		2017	2022	2027	2037
Number of self-service kiosks	17	9	13	15	17
Number of check-in desks					
Traditional	-	4	4	4	4
Baggage Drop	-	5	7	9	12
Total check-in desks	**23**	**9**	**11**	**13**	**16**

Source: Inter*VISTAS* Consulting Inc.

Figure 5-1. Sample Optimized Check-in Lobby



Security Screening

The Pre-board Screening (PBS) area includes four screening lanes and space for passenger queueing. A throughput of 120 passengers per hour is assumed based on the 2016 CATSA Annual Report. A maximum queue time of 10 minutes is assumed based on IATA ADRM guidance for optimum level of service. This wait time assumption is also consistent with CATSA's goal of processing 85% of passengers in 15 minutes.

Two additional screening lanes are required by 2037 based on the current throughput assumptions. If the throughput can be increased roughly 50% due to implementation of CATSA Plus technology, the requirement in 2037 reduces to four lanes.

Table 5-3. Security Screening Requirements

	Existing Facilities	Recommended Facilities			
		Base Year	Forecast Year		
		2017	2022	2027	2037
Number of lanes	3	2	4	5	6
Queue area (square metres)	n/a	60	100	135	180

Source: Inter*VISTAS* Consulting Inc.

Holdroom

There is currently 1,496 square metres of common holdroom. There are several constraints in the existing holdroom, however, which reduce the effectiveness of the holdroom capacity. This includes narrow corridors and holdroom located behind visual obstructions such as restrooms. It is assumed that the useable holdroom is approximately 20% smaller to account for these inefficiencies.

IATA's optimum LoS assumes 50-70% of passengers are seated. Given the large number of leisure flights during the winter seasonal peaks and the likelihood of early passenger arrivals at the Airport, it is assumed that 75% of passengers are seated in the holdroom. The remaining passengers are either assumed to be standing or utilizing an adjoining concession or retail area. A 5% buffer on the number of seats is added to account for passenger belongings occupying adjacent seats. A 20-30% factor is applied to the holdroom requirements to account for aircraft boarding operations, podiums, and passenger circulation. Based on the expected future fleet mix, the design aircraft has 160 seats and operates with a 70% load factor.

While the demand for holdroom through just before 2027 is below the existing supply, additional effective holdroom is required to meet demand. An additional 500 square metres of total holdroom, along with renovation of the existing facility, is required to meet demands in 2037.

Table 5-4. Holdroom Requirements

	Existing Facilities	Recommended Facilities			
		Base Year	Forecast Year		
		2017	2022	2027	2037
Peak Hour Departures	n/a	4	5	6	8
Peak Hour Passengers	n/a	300	450	609	814
Holdroom (square metres)	1,496	920	1,240	1,490	1,980

Source: Inter*VISTAS* Consulting Inc.

Given the longer earliness distributions of passengers arriving to the Airport in advance of their flights and to account for schedule perturbations and irregular operations, a holdroom sensitivity was developed. Requirements were increased by 50% to represent additional passengers in the holdroom that may occur due to the above reasons. As a result, the holdroom requirement at the end of the planning period increases to 2,970 square metres.

Canada Border Services Agency

The Canada Border Services Agency (CBSA) area currently consists of five primary inspection line (PIL) booths and space at the bottom of vertical circulation for passenger queueing. There are currently no automated kiosks such as Primary Inspection Kiosks deployed at Vancouver and Toronto airports. Beyond international baggage claim, passenger pass through a CBSA area before exiting into the domestic baggage claim. Since flight schedules were not developed, international arrival demand was generated from projected flight schedule patterns. It is assumed that 300 peak hour arriving international passengers will use the facility, as this represents two narrowbody aircraft arriving simultaneously. The maximum PIL queue time is 10 minutes to be consistent with IATA optimum level of service.

A processing time of 45 seconds per passenger is assumed for primary inspection. Ten percent of passengers are assumed to be subject to secondary CBSA inspection, which process passengers in 60 seconds.

The current supply of CBSA primary inspection desks is sufficient to process two simultaneous international narrowbody arrivals. Due to the location of the vertical circulation core used to enter the CBSA PIL queue, additional queue area is required to meet the 10-minute wait time standard.

Note that the assessment of CBSA facilities does not include the potential for northbound Preclearance that US and Canadian governments are discussing – regarding the point at which passengers will clear CBSA and arrive at Canadian airports. Furthermore additional automation is expected to potentially create space savings. These will life-extend the existing space envelope further before expansion is needed.

Baggage Claim

The baggage claim consists of two dedicated domestic claim devices and one swing claim device, with capability to serve both domestic and international arrivals. The total useable frontage is approximately 114 metres. Baggage claim requirements are a function of peak hour deplanements, the concentration of arriving passengers within the peak 30-minutes, and the number of passengers checking in bags. As with CBSA, international demand is derived from two simultaneous narrowbody arrivals. 80% of passengers are assumed to reclaim baggage and the average claim device occupancy time is estimated to be 20 minutes. This is consistent with similar sized airports where baggage claim is in close proximity to the aircraft parking positions. Short walking distances from the aircraft to the baggage claim can create short but steep spikes in demand on the baggage claim units. 20% of bags are estimated to recirculate as some passengers may use the restrooms first or require additional time to reach the baggage claim.

An additional baggage claim device is required by 2037. The additional device should function as a swing device. It is expected that there is sufficient frontage to meet the passenger demands in 2037, but the additional device is required to provide space to offload baggage on the airside.

Table 5-5. Baggage Claim Requirements

	Existing Facilities	Recommended Facilities			
		Base Year	Forecast Year		
		2017	2022	2027	2037
Domestic Baggage Claim Units	2	1	2	2	3
International Baggage Claim Units	1	1	1	1	1
Frontage (metres)	114	35	50	60	75

Source: Inter*VISTAS* Consulting Inc.

Aircraft Parking Positions

The number of aircraft parking positions are a key component of evaluating the size and configuration of the passenger terminal area. There are currently seven boarding bridge-enabled parking positions, numbered 2 through 8, and two ground loaded parking positions, numbered 1 and 9 that can be utilized simultaneously. Several boarding bridge-enabled positions can accommodate ground loading. In addition, larger Code D and E aircraft can be accommodated at positions 2 and 8, but restrictions are placed on adjacent parking positions. There are also five remote parking positions numbered 10 through 14. Some of these positions, under adjacency restrictions, can accommodate Code E aircraft. Power in/power out

operations are also possible at position 13. The sterile corridor within the air terminal building allows all parking positions to serve both domestic and international departures and arrivals.

In 2017 there are four peak hour departures, four peak hour arrivals, and seven total peak hour operations. Based on 2037 peak hour demand, there are expected to be eight peak hour departures, eight peak hour arrivals, and a total of 14 peak hour operations. The peak hour aircraft fleet mix is likely to be composed almost entirely of Code C aircraft. Based on the baseline flight schedule and industry acceptable standards for Code C aircraft, a turn time of 60 minutes is assumed.

Under these conditions, one additional boarding bridge-enabled contact position is required by 2037. Given the projected future fleet mix, there is not a requirement for ground loaded positions. A second additional parking position, either ground loaded or boarding bridge-enabled, may be considered to support irregular operations and provide flexibility.

During current wintertime operations, deicing occurs roughly 50 metres back from the parking position. As a result, the parking position is considered occupied during the deicing process, which can often add up to 20 minutes to the turn time. By the end of the planning period, it is also assumed that a centralized deicing facility (CDF) will be constructed. If the CDF is not constructed during the planning period, and changes are not made to the current deicing protocols, then the parking position requirement in 2037 increases to 11.

Table 5-6. Aircraft Parking Position Requirements

	Existing Facilities	Recommended Facilities			
		Base Year	Forecast Year		
		2017	2022	2027	2037
Contact positions	7	4	5	6	8
Ground loaded positions	2	0	0	0	0

Source: Inter*VISTAS* Consulting Inc.

CONSTRAINTS AND LIMITATIONS

Prior to embarking on development of terminal alternatives, a number of planning constraints and limitations were identified. These considerations, which serve as a guide during alternatives development, include:

- Maintaining the clear story above the baggage claim hall due to aesthetics and its unique structural system
- Maintaining the new hold baggage screening room and baggage makeup area located behind the check-in lobby
- Maintaining the existing arrivals circulation core (stair, escalator, and elevator)
- Reviewing the location of the current restrooms and their impact on circulation and wayfinding
- Accounting for the depth of the ATB, which is such that an east-west PBS alignment creates a circulation bottleneck, regardless of the location

- Balancing holdroom with future gate locations to the north, as the existing holdroom is only adjacent to Gates 1-5
- Developing a centralized commercial area post-security which combines retail with food and beverage, with the intent to have 80% of the concession program located on the secure side of the terminal

TERMINAL ALTERNATIVES

ATB improvement alternatives were split into two phases: short-term and long-term. Short-term alternatives are intended to occur within five years and can likely be implemented with limited enabling projects. Long-term alternatives are intended to accommodate growth in 10-20 years. The long-term alternatives require enabling capital projects. This section first focuses on the short-term alternatives which can be used as enabling projects and then discusses the long-term alternatives.

Short-Term Alternatives

Renovation of the second level of the ATB provides some immediate benefits and provides for a first phase of the long-term development alternatives later described. The two areas of focus for short-term projects are relocation of the PBS and holdroom expansion.

Short-Term Pre-Board Screening Locations

The existing PBS area is not in an ideal location, as it creates a bottleneck in the holdroom and limits expansion opportunities. Four alternatives were considered for relocating the PBS area within the existing second level footprint. Each option is described below and also presented in Figure 5-2**.** All options allow for eventual expansion of the PBS area and relocation to the main level for the long-term alternatives.

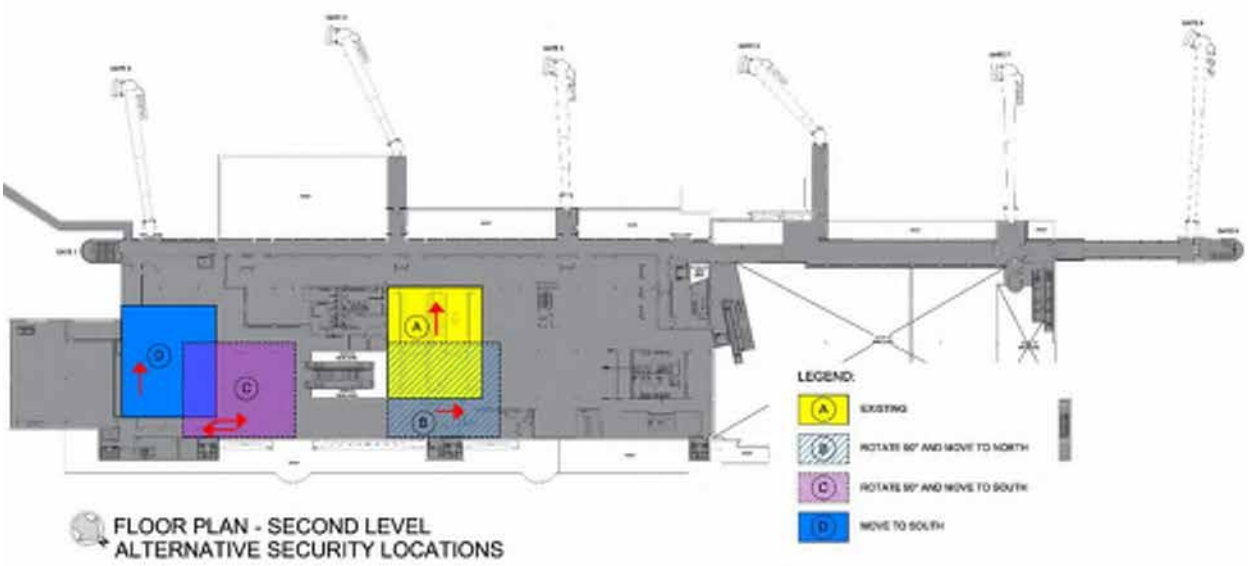
Option A – Remain in place: This option does not relocate the PBS. While the screening area could expand to the north in the future, reducing holdroom, the bottleneck after recomposure would remains.

Option B – Rotate 90°, north of escalator: This option rotates the screening area and aligns it parallel with the queue. Passengers would exit the recomposure area after screening and enter the center of the holdroom, eliminating the existing bottleneck. Rotating the screening area requires relocation of the existing Maple Leaf Lounge.

Option C – Rotate 90°, south of escalator: This option rotates the PBS and shifts it to the top of the escalator from the ticketing hall. Shifting security to this side of the ATB allows for the existing landside concession to be converted to an airside concession. It would also create additional holdroom in the area currently occupied by food court seating. This option would require all passengers to pass by the most number of boarding areas to access the center of the holdroom. Alternatively, the flow of the PBS would be from South to North, allowing the development of a centralized concession area.

Option D – Move south toward concession: This option moves the screening area to the southernmost portion of the second level, on the location of the existing landside concession. The concession would be relocated to a post-security location. The remaining space vacated by the concession could be converted into holdroom. This option would require all passengers to pass by the most number of boarding areas to access the center of the holdroom.

Figure 5-2. Short-Term Pre-Board Screening Location Alternatives



Holdroom Expansion

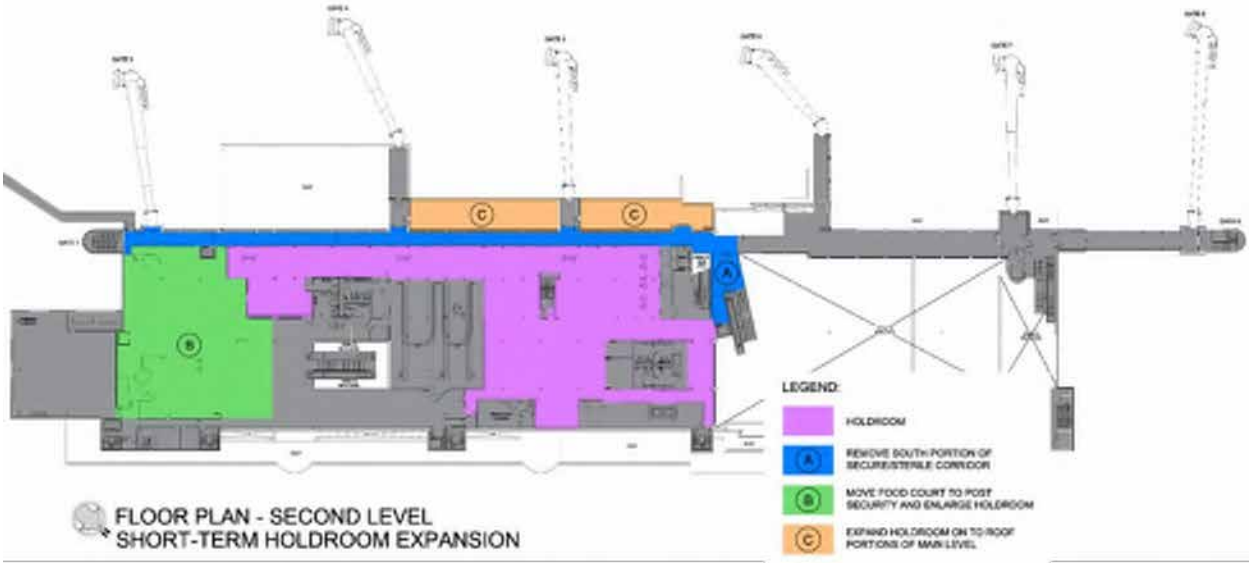
It is anticipated that holdroom expansion can be achieved in the short-term with limited heavy infrastructure investment. Three alternatives were explored to increase the holdroom area. Each option is described below and also presented in Figure 5-3**.**

Option A – Sterile corridor removal: This option removes the sterile corridor south of Gate 6 and converts the space into holdroom. While this does not increase the holdroom significantly, it creates a wider corridor near the exit from PBS and the adjacent boarding position C. Removing the corridor also allows for domestic arriving passengers to mix with departing passengers. This allows for arriving passengers to utilize the concessions and restrooms in the holdroom before heading to the baggage claim hall. Without the corridor, Gates 1 through 5 are restricted to domestic arrivals. This is not anticipated to be an issue since there are sufficient international capable gates to meet demand.

Option B – Food court conversion: This option converts the pre-security food court to post-security. A wall would be constructed near the top of the escalator leading to pre-board screening and the existing food court seating area would be merged into the holdroom. Advantages of this alternative include adding more airside concessions, which are currently in short supply. A disadvantage is that the new holdroom and concession node would be on the south side of the second level and not centrally located to the location of most of the gates.

Option C – Roof expansion: This option expands the holdroom onto the main level roof sections between Gate 4 and 6. This option requires the execution of Option A as well since the roof sections are disconnected from the existing holdroom. Similar to Option A, the incremental expansion is not significant, but it provides additional circulation area and holdroom in the center constrained portion of the terminal. The constructability of these extensions would need to be confirmed.

Figure 5-3. Short-Term Holdroom Expansion Alternatives

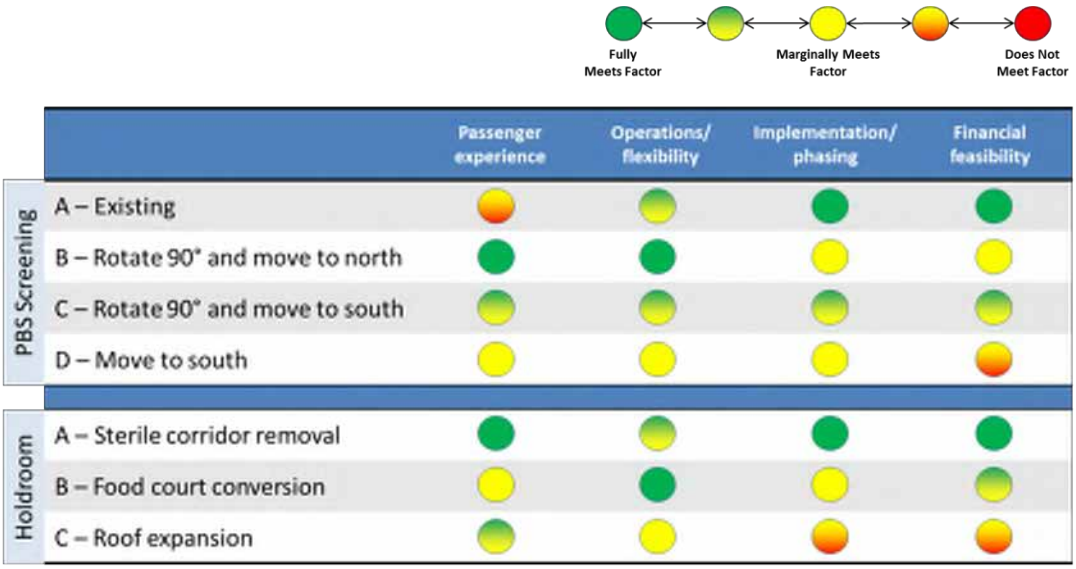


Short-Term Alternatives Evaluation

Based on the evaluation criteria discussed earlier, each of the short-term alternatives was evaluated. The evaluation is shown in Figure 5-4. Rotating the PBS by 90 degrees and shifting it either north or south of the existing vertical circulation core provides benefits to operations and passenger experience. Moving south provides the additional benefit of converting landside concessions to airside concessions.

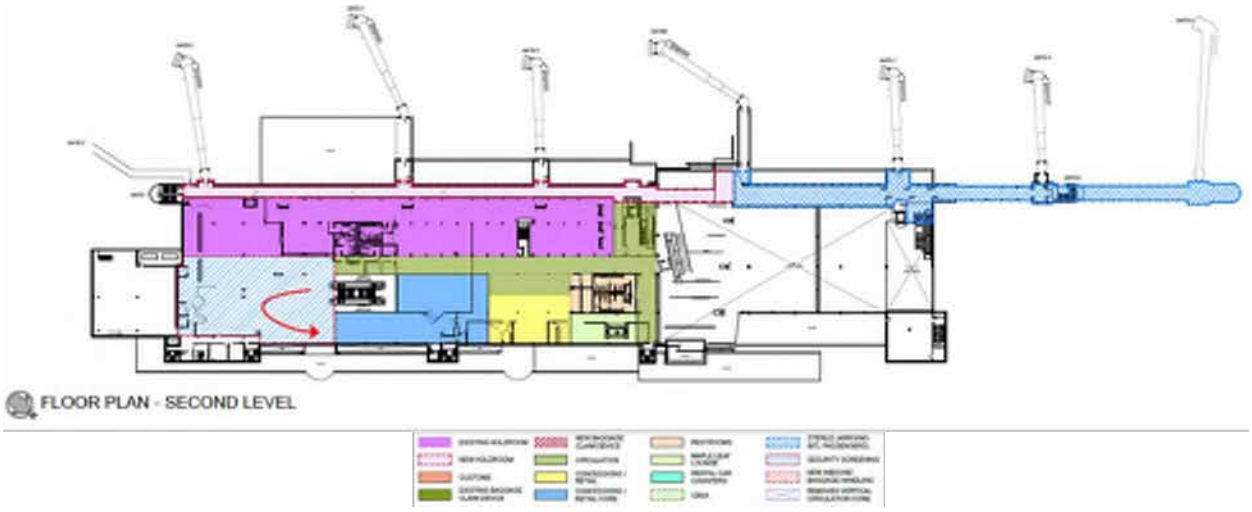
For holdroom expansion, removing the sterile corridor is the easiest step to implement from both a phasing and operational perspective. It also enables the potential to expand holdroom over the existing main floor on Level 1 between Gates 4 and 6, which currently extends beyond Level 2. These holdroom alternatives are not mutually exclusive, so more than one alternative can be selected.

Figure 5-4. Short-Term Alternatives Evaluation



The preferred short-term development of the second level is shown in Figure 5-5. Removing the sterile corridor and relocating PBS to the existing landside concession area provides the most benefit to the operation of the second level. Rotating and relocating PBS to the south allows for a centralized retail and concession core to be developed just beyond screening and also allows for more intuitive north-south circulation flows on the second level. The holdroom can be expanded into a contiguous space to provide more seating near more boarding positions. This layout is compatible with all long-term development alternatives.

Figure 5-5. Preferred Short-Term Development of Second Level



Long-Term Alternatives

In addition to the capacity deficiencies defined earlier, several key issues were identified as-follows for consideration in long-term development:

- Providing all of the required CBSA facility components
- Baggage claim congestion that occurs on the international device during peak season
- Condition and age of infrastructure
- Accommodating process automation
- Additional holdroom in an efficient configuration
- Additional concession space in ideal locations
- Utility of the sterile corridor
- Additional gates (ATB expansion)
- Location of pre-board screening (PBS) and goods screening
- Security operations center

The long-term alternatives were developed in two phases: preliminary alternatives and refined alternatives.

Preliminary Long-Term Alternatives

Seven ATB alternatives were developed to represent various combinations of ATB improvements. They are shown in Figure 5-7 through Figure 5-13. They include renovation and repurposing of existing space, as well as expanding the ATB. The alternatives focus on six key functional areas: (1) pre-board screening (PBS), (2) holdrooms, (3) sterile corridor/primary inspection, (4) baggage claim, (5) CBSA area, and (6) rental car counters. Each alternative highlights a different approach to the solving deficiencies in these functional areas. Certain aspects from one alternative may be combined with different alternatives.

Terminal alternative components are evaluated against a series of qualitative and quantitative criteria to determine the preferred option. The criteria are broad and represent the interests of both passengers and operators. They are organized into four main categories: Passenger experience, operations/flexibility, implementation/phasing, and financial feasibility. A summary of the criteria is shown in Figure 5-6. The seven alternatives are presented in graphical form below and are followed by a brief summary of the key functional area alternatives.

Figure 5-6. Proposed Evaluation Criteria

Pre-board Screening

Three potential locations on the main level have been identified for the PBS:

- The first site, shown in Alternatives 1 and 2, is located just south of the ticketing lobby between the vertical circulation core and the hold baggage screening matrix.
- The second site, shown in Alternative 5, extends southward through existing airport offices and requires a building extension toward the old baggage claim facility. It requires a new vertical circulation core to move passengers to the second level of the terminal.
- The third site, shown in Alternatives 3, 4, 6, and 7 is located entirely inside of the existing building footprint and occupies the majority of the existing airport offices.

Given the existing location of the vertical circulation core and the challenges associated with impacting the hold baggage screening matrix, the preferred pre-board screening location is the third site, shown in Alternatives 3, 4, 6, and 7.

Holdrooms

Given the limited depth of the terminal building coupled with limited holdroom access to some passenger boarding gates, holdroom expansion and relocation is required. Each alternative evaluates a different magnitude of expansion toward the apron and toward the north. The expansion toward the apron varies in depth but does not extend towards the apron beyond the existing hold baggage screening facility.

Alternative 3 provides no expansion to the north while Alternative 5 provides minimum building expansion toward the apron. Contiguous holdroom is preferred as it provides ease of wayfinding and reduces the overall holdroom requirement due to efficiencies gained by sharing between adjacent gates.

Figure 5-7. Air Terminal Building Alternative 1

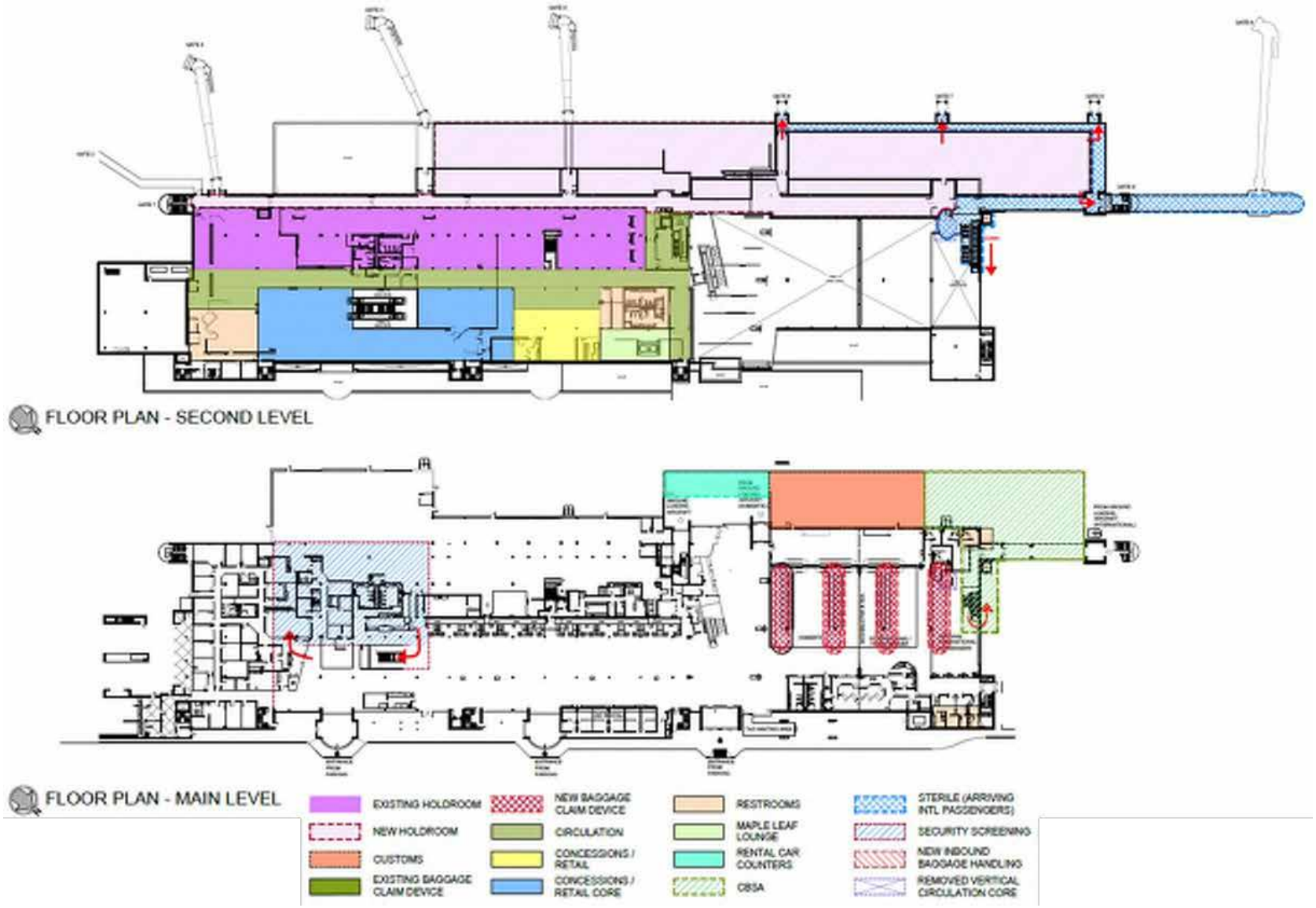


Figure 5-8. Air Terminal Building Alternative 2

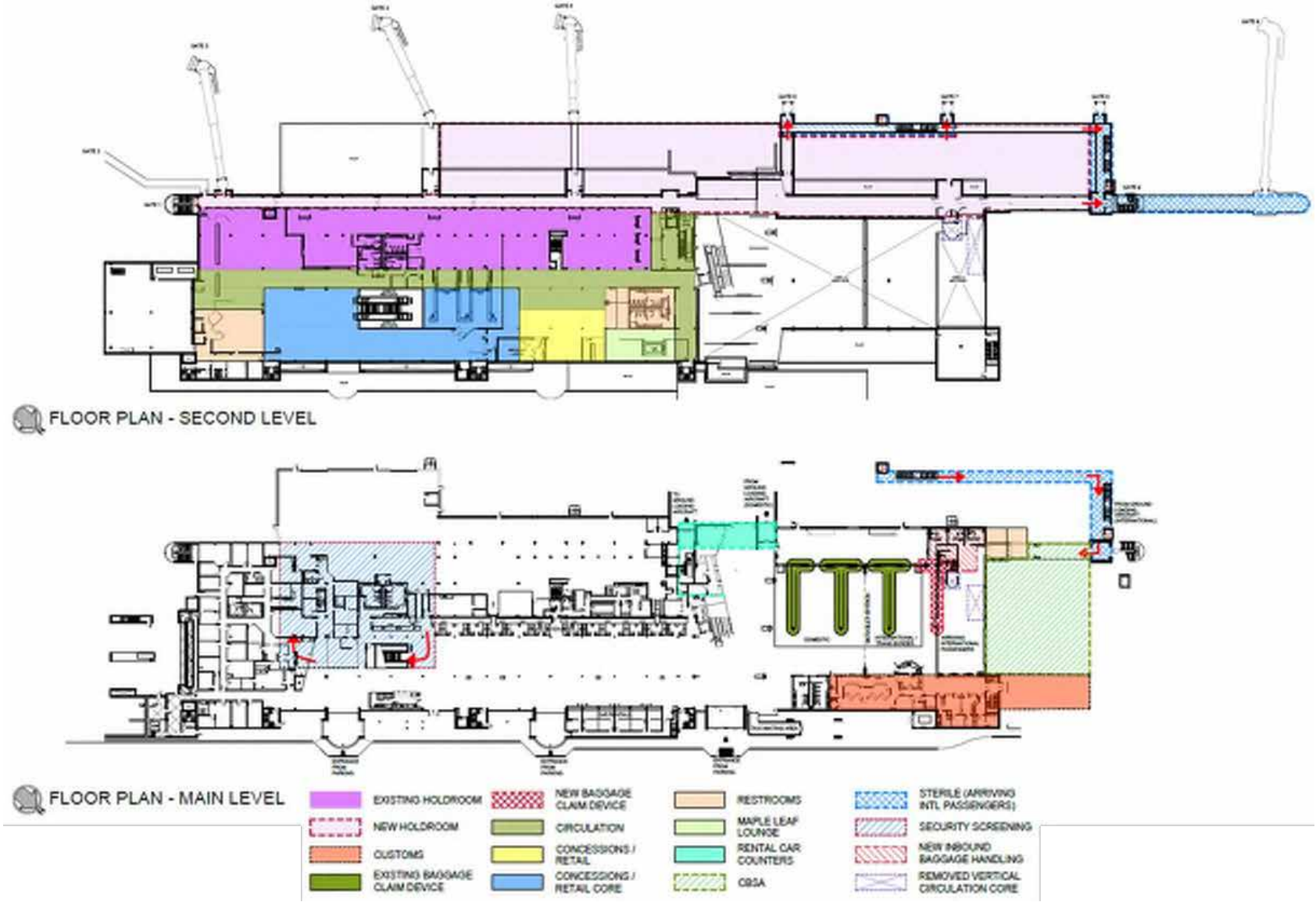


Figure 5-9. Air Terminal Building Alternative 3

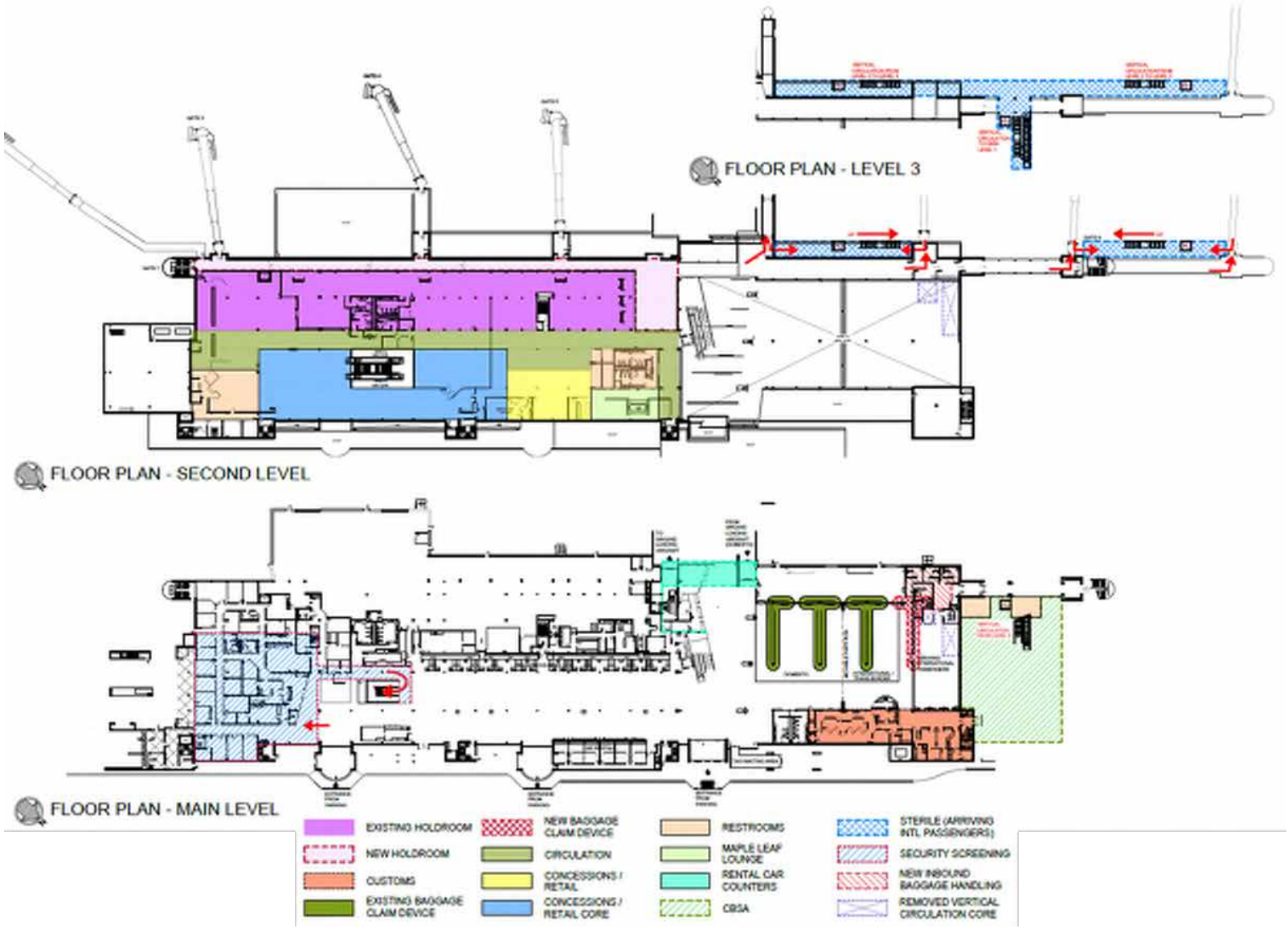


Figure 5-10. Air Terminal Building Alternative 4

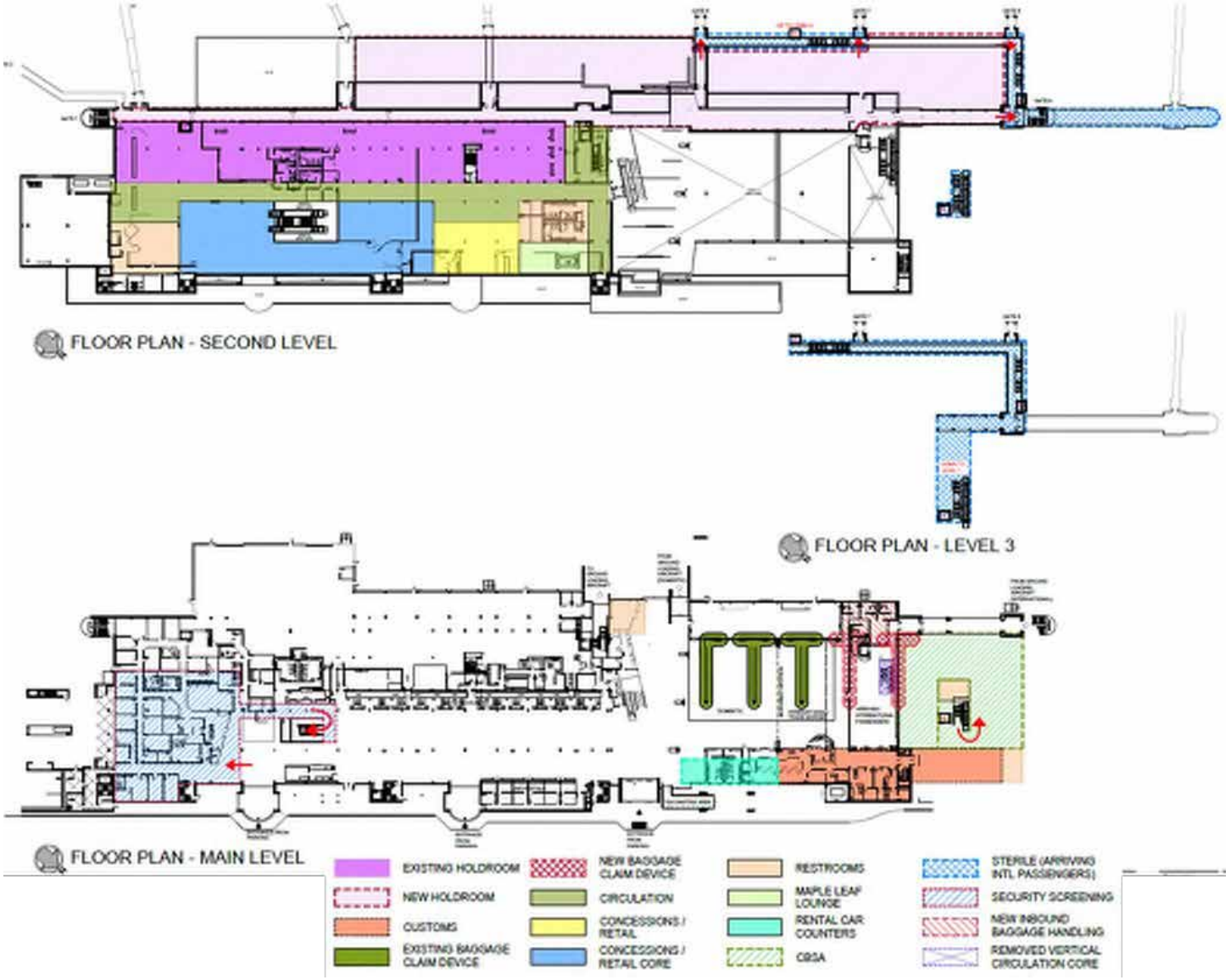


Figure 5-11. Air Terminal Building Alternative 5

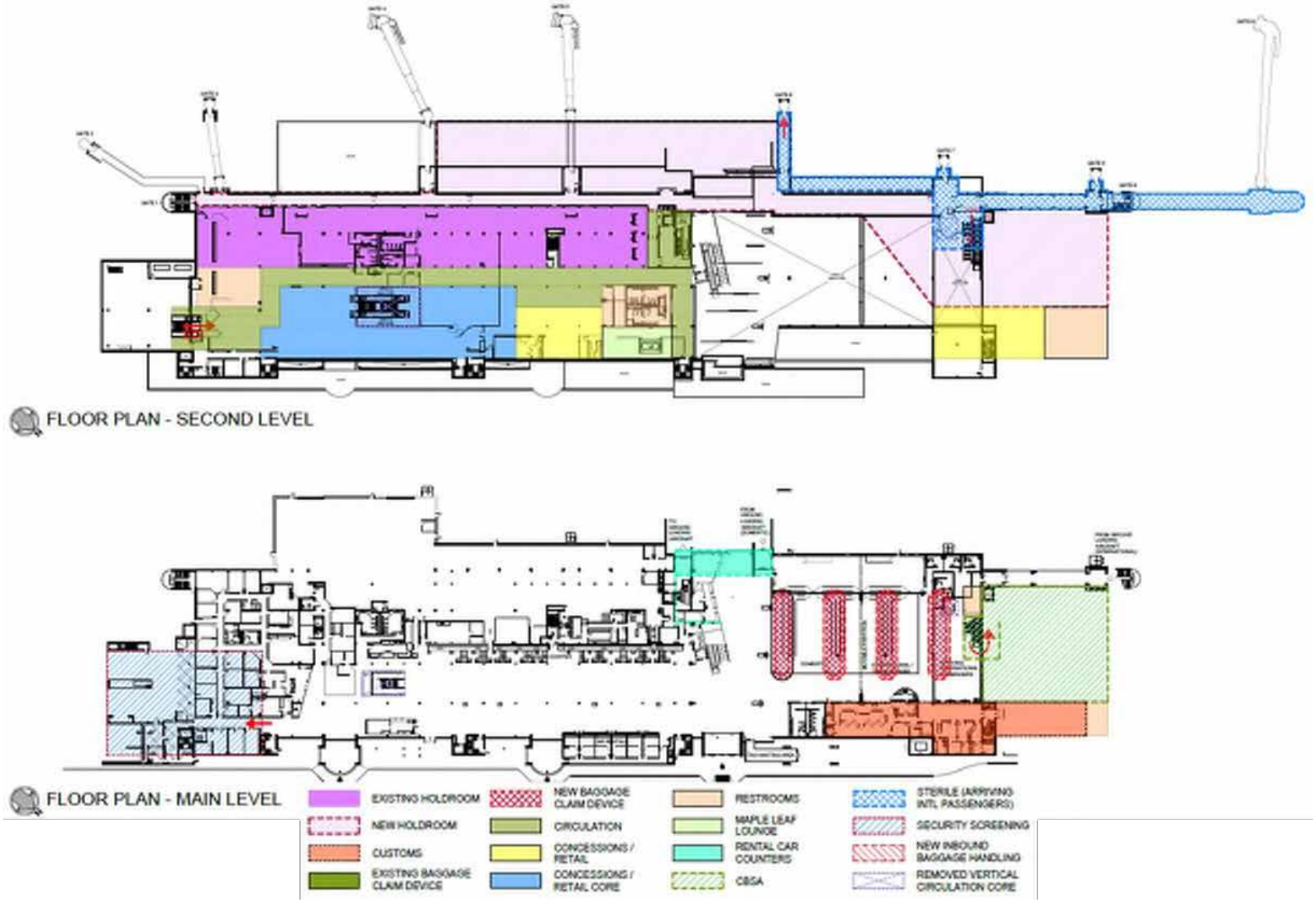


Figure 5-12. Air Terminal Building Alternative 6

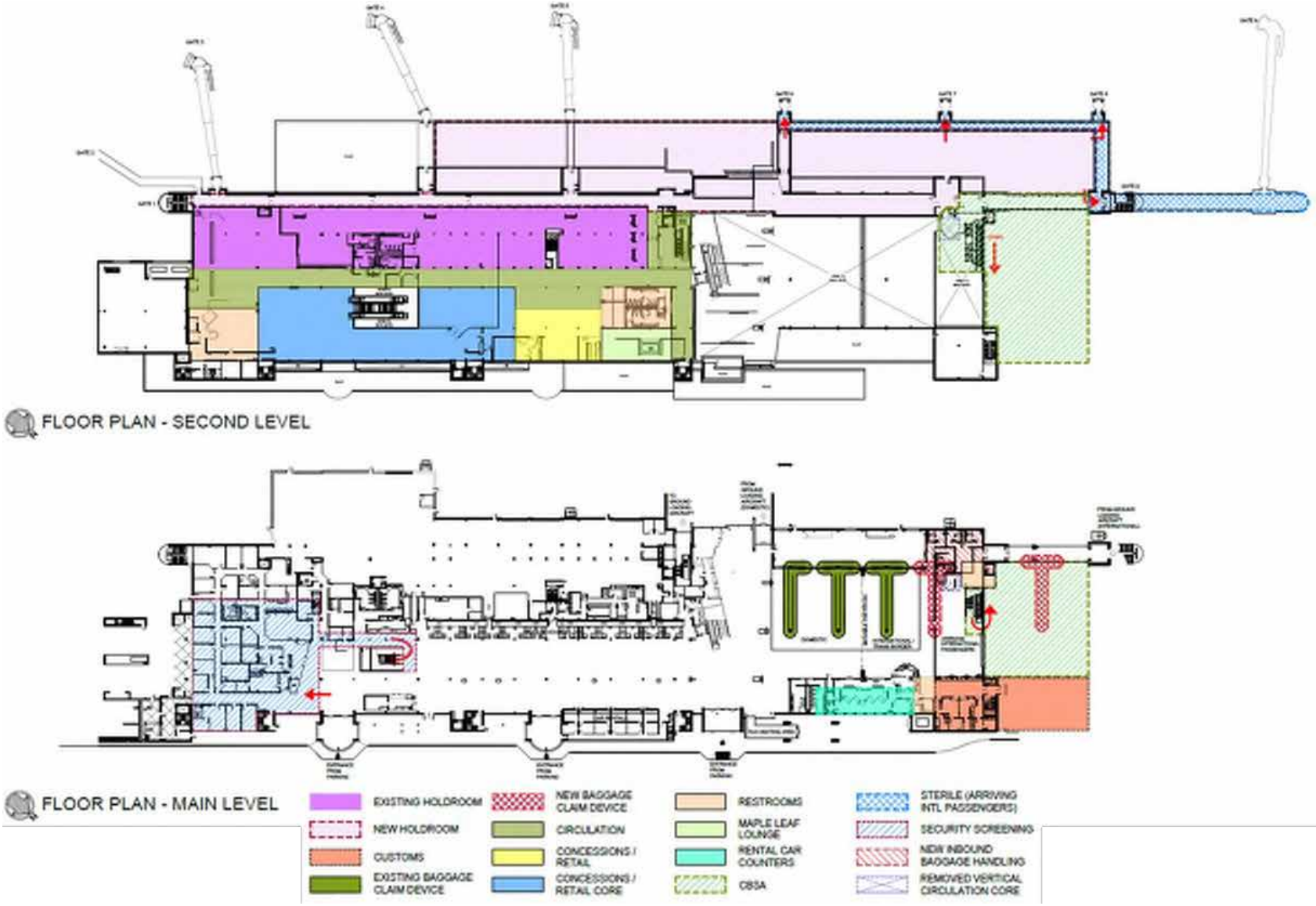
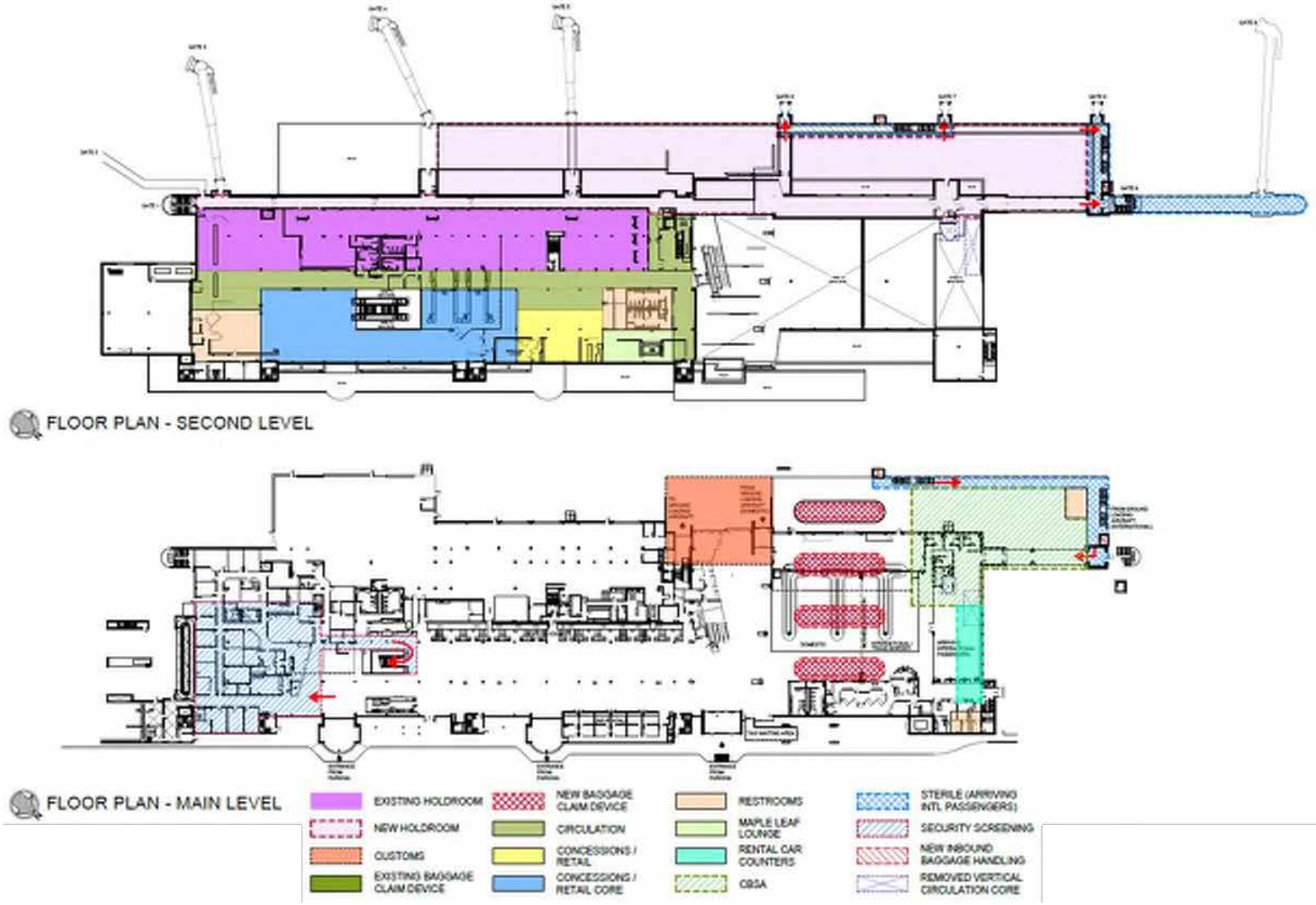


Figure 5-13. Air Terminal Building Alternative 7



Sterile Corridor/Primary Inspection

Several sterile corridor alternatives were developed in order to segregate international arriving passengers from all departing passengers:

- Alternatives 1, 5, and 6 provide a sterile corridor that passes by each international capable boarding gate before connecting passengers to CBSA. These corridors provide limited flexibility to accommodate a simultaneous arrival and departure at adjacent gates.
- Alternatives 2 and 7 provide a direct connection to a sterile corridor on the main level, eliminating any direct conflicts with departing passengers and operations at adjacent gates. Expanding on the main level may create conflicts with the inbound baggage handling and requires building expansion toward the apron.
- Alternatives 3 and 4 provide a direct connection to a sterile corridor on a proposed third level mezzanine. This eliminates any direct conflicts with departing passengers and operations at adjacent gates. Passengers are provided a direct connection from the mezzanine down to CBSA on the main level. These alternatives require additional level changes and more complex wayfinding. Construction of a mezzanine level would also be required.

Preference is given to alternatives that can segregate arriving passengers and limit conflicts with operations at adjacent gates.

Primary inspection is provided on the main level in each alternative except for Alternative 6, where it is provided on the second level. Providing CBSA primary inspection services on a separate level from baggage claim and CBSA secondary inspection is common at airports outside of Canada, but it creates staffing challenges for CBSA. Preference is also given to CBSA solutions that allow for terminal building expansion flexibility to the north.

Baggage Claim

Two baggage claim delivery systems were explored. Alternatives 1, 5, and 7 utilize sloped-plate devices while Alternatives 2, 3, 4, and 6 utilize flat-plate devices.

- Flat-plate devices require direct airside access for baggage tugs to offload bags directly onto the devices. This limits the linear frontage available to passengers and also creates congestion for offloading baggage tugs if the devices are spaced closely together.
- Sloped-plate devices are fed from infeed belts that are located away from the devices. Bags are fed to the devices either through the floor or from the ceiling, which is generally more costly than flat-plate devices. These devices provide additional linear frontage for passengers and alleviate security concerns by eliminating direct access to the airside. Sloped-plate devices also allow for flexibility in orientation and location.

Given these benefits, sloped-plate devices are the preferred baggage delivery system.

CBSA Area

Alternatives 1 and 7 relocate and expand the CBSA area to a different location, while the other alternatives expand the facility around its current location. The preferred CBSA area location will be chosen in concert with the preferred passenger processing and baggage claim design since this facility requires placement adjacent to international baggage claim devices.

Rental Car Counters

Ideally, the rental car counters would be located closer to the baggage claim to improve wayfinding. Additionally, removing the rental car counters from the ticketing lobby would improve circulation. The alternatives relocate the rental car counters either near the airline baggage counters and security desk or near the area currently occupied by CBSA processing. The specific location will be dictated by the orientation of the international arrivals functions.

Refined Alternatives

The long-list of alternatives, which explored different approaches for expanding and improving the deficient functional areas, was reviewed and distilled down to create four refined alternatives. These four alternatives reflect common themes developed during the review of the longlist of alternatives, which include:

- Locating Pre-Board Screening on the south end of the main level is preferable to allow for the entire second level to function as secure space
- Providing contiguous holdroom and a centralized retail/concession core for passengers
- Limiting the depth of building expansion toward the apron and/or toward the landside
- Providing one more passenger board bridge accessible parking position and holdroom
- Operating a sterile arrivals corridor which provides the flexibility to accommodate simultaneous departures and arrivals on adjacent gates
- Utilizing sloped-plate devices in the baggage claim and maintaining swing-device flexibility
- Relocating rental car counters to the baggage claim

The four alternatives are presented in graphical form in Figure 5-14 through Figure 5-6Figure 5-17 on the following pages along with a brief narrative summary highlighting the components of each alternative.

Alternative 1

Alternative 1 is depicted in Figure 5-614. This alternative provides a small building bump out toward the apron to accommodate growth of the arrivals functions. Key components include:

- PBS located on level 1 on the site of the existing administration offices, which would be relocated to the south
- Building expansion toward the apron on the northern end of the building, no deeper than the pedestal of existing boarding bridge 6, to allow for bridging across the baggage claim to the north
- Four co-located sloped-plate baggage claim devices with the ability to operate between two and four as domestic, depending on demand levels
- Two sterile corridors, which allow for the simultaneously enplaning and deplaning of four international flights as well as the ability to swing between domestic and international operations

This alternative supports future growth by providing northward expansion opportunities that do not conflict with existing functional areas. It also minimizes operational impacts and limits construction complexities that would occur when bridging directly across the baggage claim. Airside impacts would be minimal as only parking position 7 would require relocation away from the building.

Alternative 2

Alternative 2 is depicted in Figure 5-15. This alternative does not expand the terminal building toward the apron or toward the landside. Instead this alternative requires a larger expansion toward the north to accommodate future growth. Key components include:

- PBS located on level 1 on the site of the existing administration offices, which would be relocated to the south
- Bridging the baggage claim along the eastern half of the building
- Two separate baggage claim areas due to fixed building depth
- Two sterile corridors, which allow for the simultaneously enplaning and deplaning of four international flights as well as the ability to swing between domestic and international operations
- Reuse of the existing sterile corridor vertical circulation core down to level 1

This alternative limits impacts to both apron and landside functions. Limiting the depth of the building, however, creates wayfinding and passenger flow challenges for passengers. This is especially apparent in the baggage claim area. In addition, bridging the baggage claim is expected to be challenging and costly due to the architectural and structural design of the existing facility.

Alternative 3

Alternative 3 is depicted in Figure 5-616. This alternative provides a small building bump out toward the curbside and parking areas to accommodate growth of the arrivals functions. Key components include:

- PBS located on level 1 on the site of the existing administration offices, which would be relocated to the south
- Building expansion toward the landside on the northern end of the building by approximately seven metres to allow for baggage claim expansion
- Four co-located sloped-plate baggage claim devices with the ability to operate between two and four as domestic, depending on demand levels
- Two sterile corridors, which allow for the simultaneously enplaning and deplaning of four international flights as well as the ability to swing between domestic and international operations
- Reuse of the existing sterile corridor vertical circulation core down to level 1

This alternative supports future growth by providing northward expansion opportunities that do not conflict with existing functional areas. Bridging the baggage claim, however, is expected to be challenging and costly due to the architectural and structural design of the existing facility. Landside impacts would involve relocating 80 linear metres of curbside and surface parking, which is not compatible with the increased parking and rental car demands.

Figure 5-14. ATB Refined Alternative 1

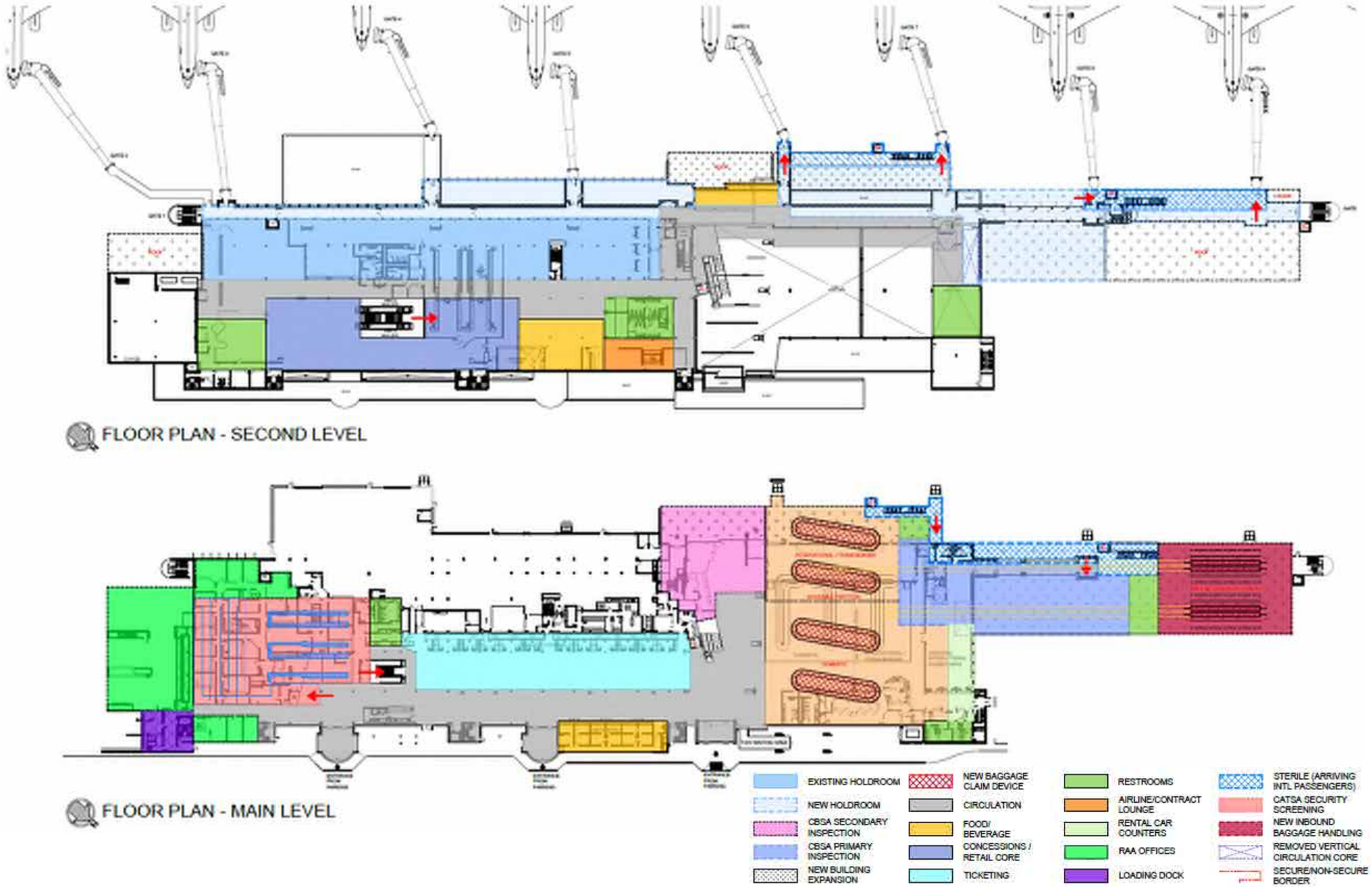


Figure 5-15. ATB Refined Alternative 2

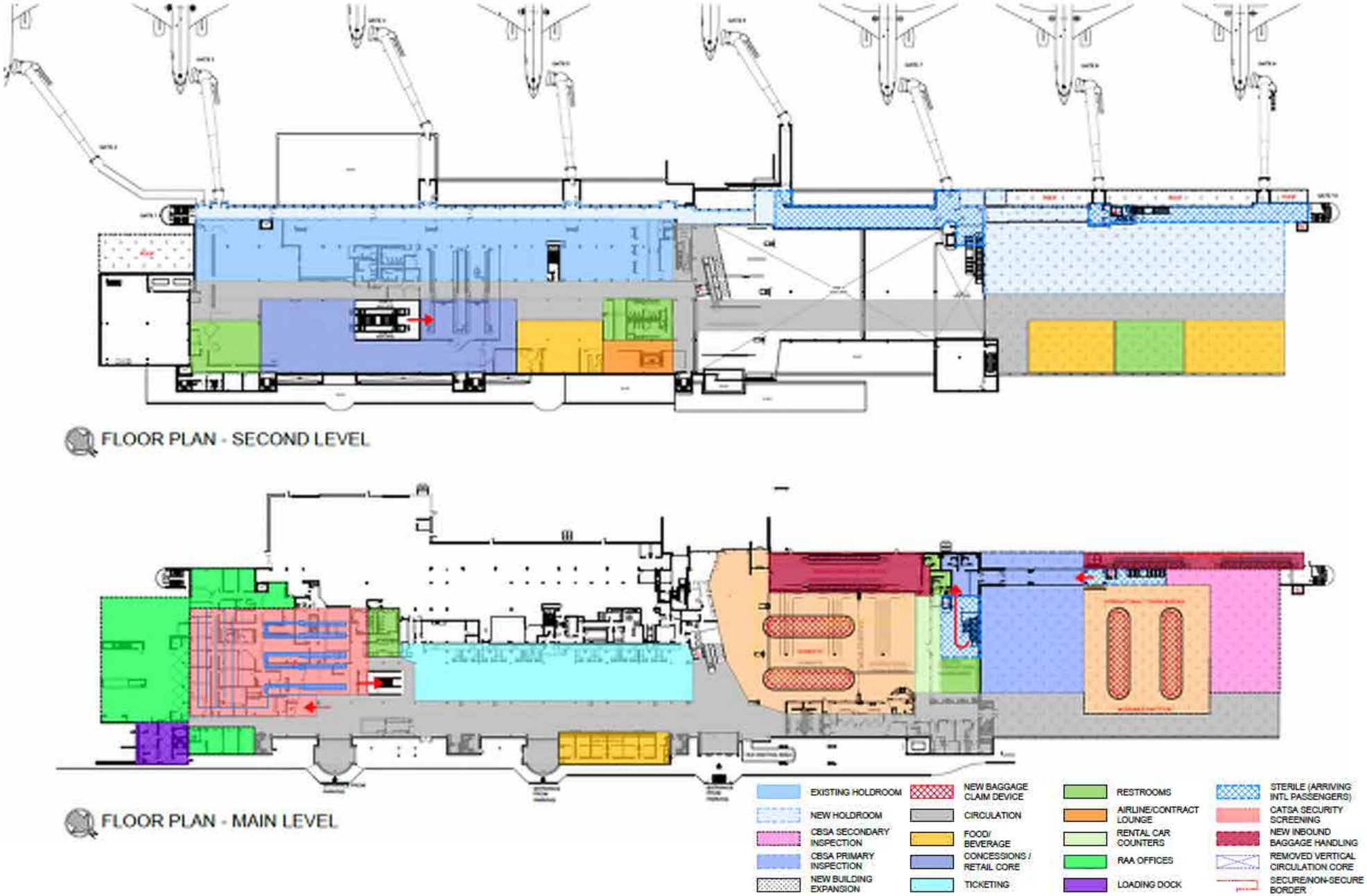


Figure 5-16. ATB Refined Alternative 3

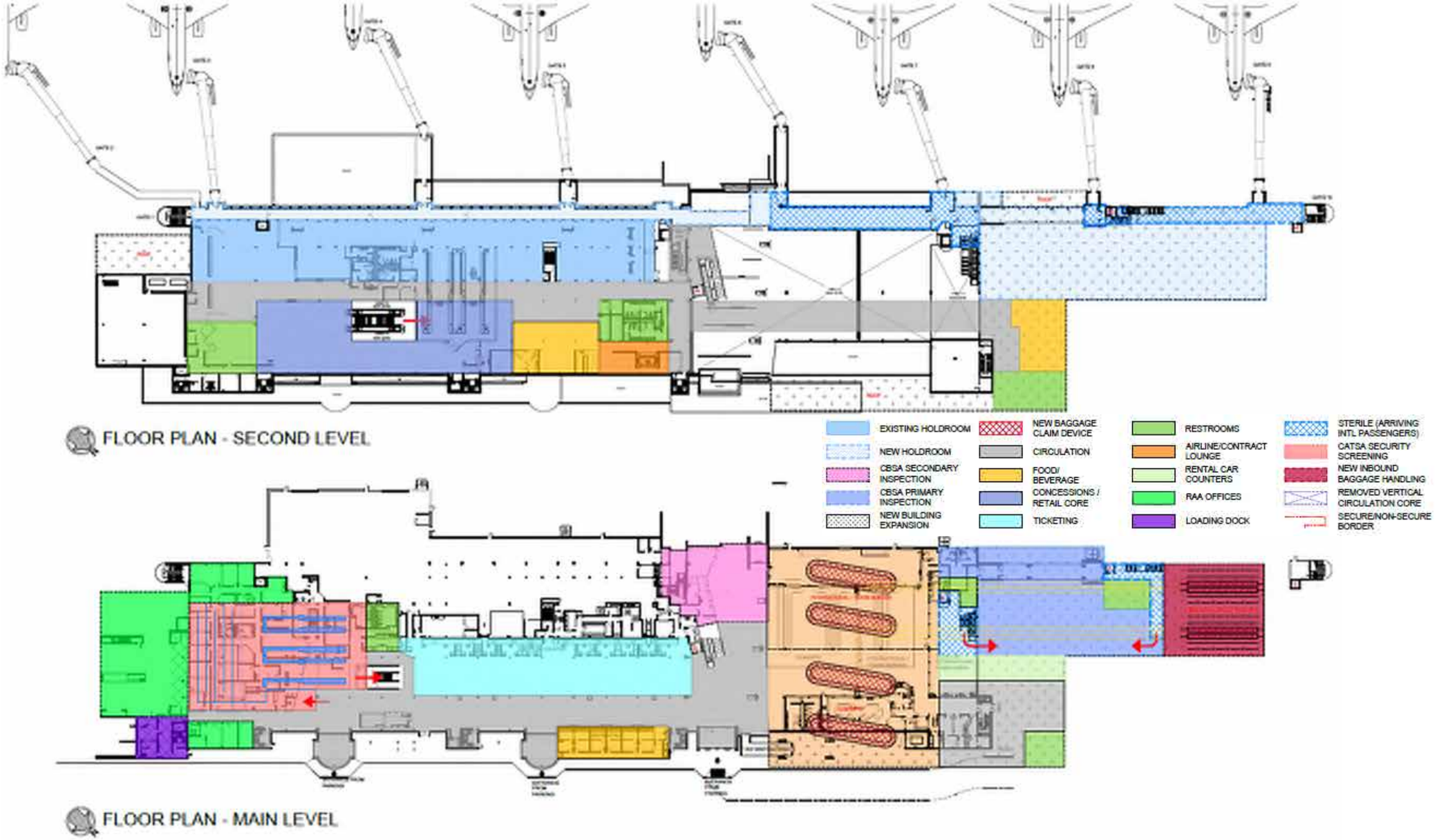
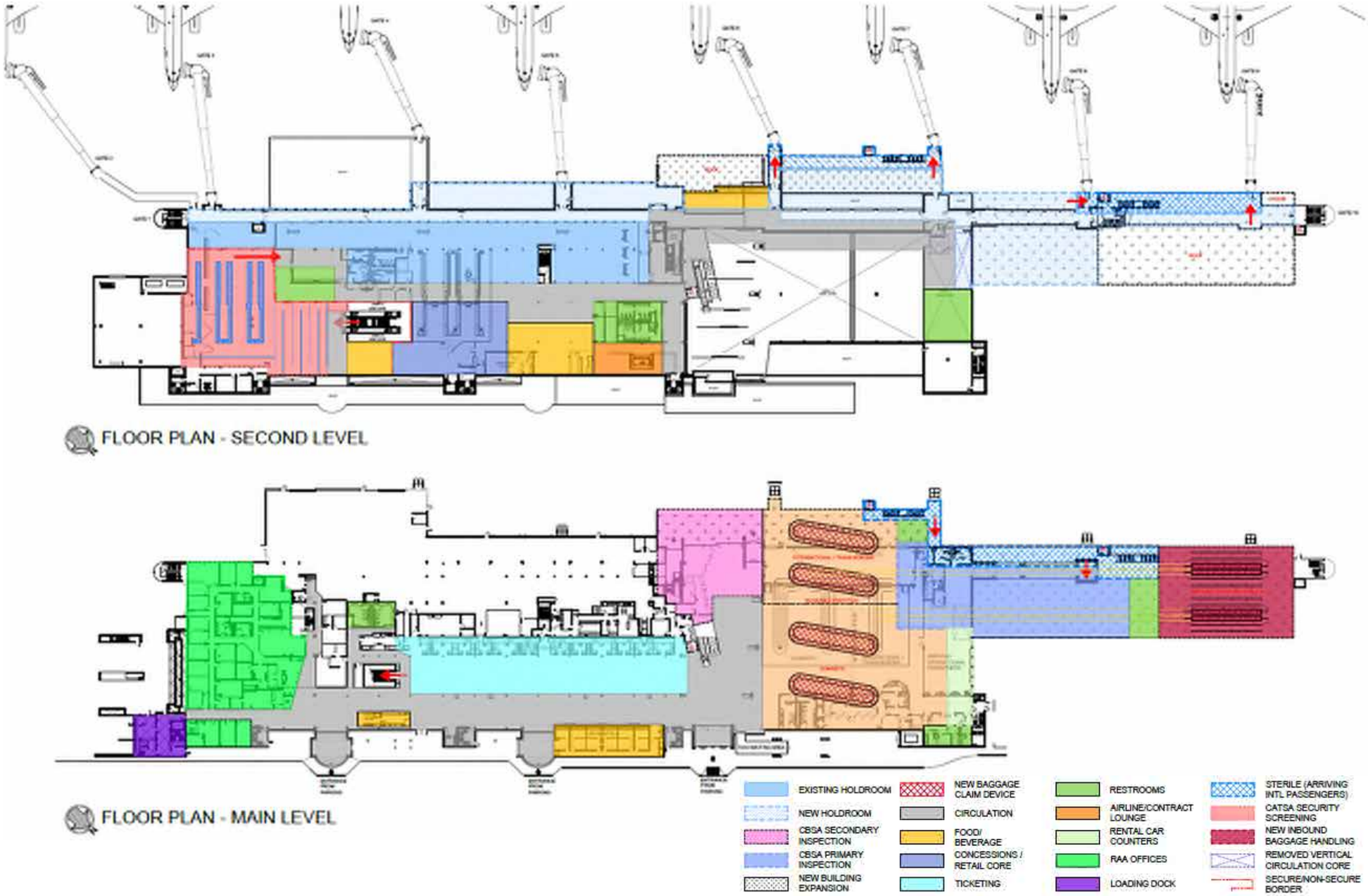


Figure 5-17. ATB Refined Alternative 4



Alternative 4

Alternative 4 is depicted in Figure 5-617. This alternative is a variation of Alternative 1 involving relocation of PBS. Key components include:

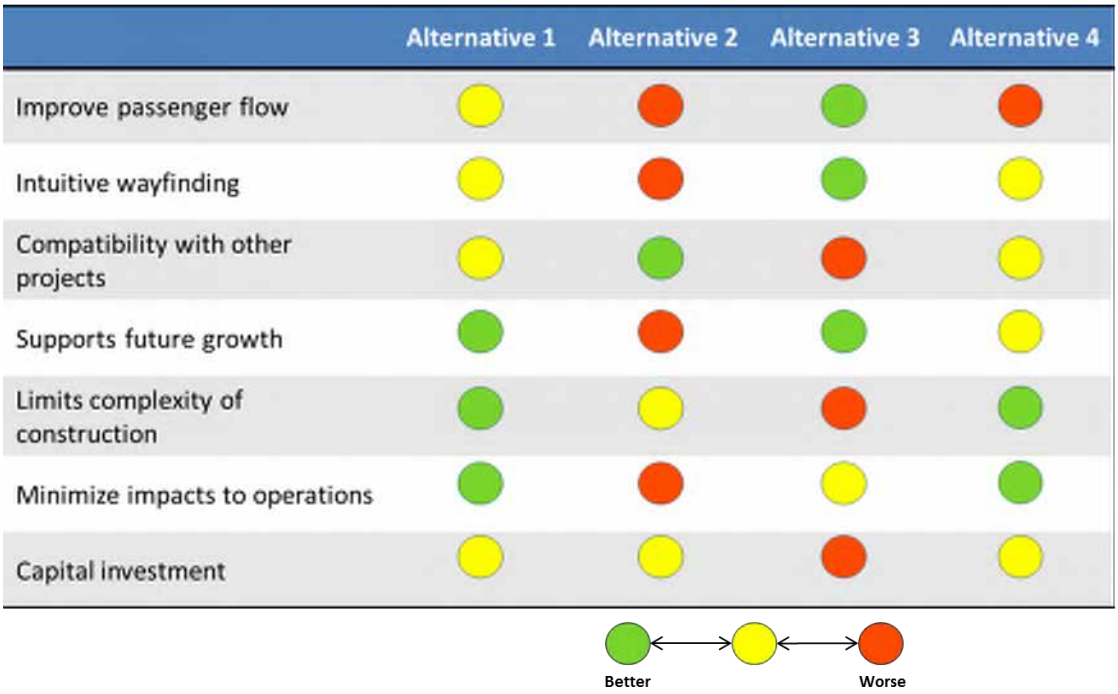
- PBS located on level 2, preserving the administration offices on level 1
- Building expansion toward the apron on the northern end of the building, no deeper than the pedestal of existing boarding bridge 6, to allow for bridging across the baggage claim to the north
- Four co-located sloped-plate baggage claim devices with the ability to operate between two and four as domestic, depending on demand levels
- Two sterile corridors, which allow for the simultaneously enplaning and deplaning of four international flights as well as the ability to swing between domestic and international operations

As with Alternative 1, this alternative supports future growth by providing northward expansion opportunities that do not conflict with existing functional areas. PBS growth, however, is limited in this alternative. Airside impacts would be minimal as only parking position 7 would require relocation away from the building. Passenger flows are less desirable because all passengers enter the secure holdroom area from the southernmost point in the building. In addition, PBS on level 2 reduces the holdroom available for Gates 1, 2, and 3.

Evaluation

A summary of the air terminal building long-term alternatives evaluation is provided in the Figure 5-618. The criteria used to evaluate the preliminary terminal alternatives was refined and reduced to seven evaluation criteria. These criteria were scored against all four alternatives, with green representing a better score and red representing a worse score. Alternative 2 scored lowest due to the constraints on passenger flow and operations imposed by not widening the building. Alternative 3 was not preferred as the impact of this alternative to the landside functions was deemed more detrimental than the impact to the airside. Alternative 1 was ultimately preferred over Alternative 4 because of the holdroom and future expansion limitations of locating PBS on level 2. Phasing Alternative 1 would allow for a final decision to be made on the location of PBS depending on demand levels and other developments present at that future time.

Figure 5-18. Long-Term Alternatives Evaluation



RECOMMENDED PHASING PLAN

The recommended ATB phasing plan is divided into three phases. Each phase is divided into a number of work sequences in order to provide a rough sense of how to proceed through each phase. Phase 1 provides a stopping point during development and is intended to serve the near-term, but Phases 2 and 3 must be completed together.

Phase 1, shown in in Figure 5-619**,** serves primarily to relocate PBS and expand the existing holdroom. To meet these goals, the landside concessions on the south side of the building must be removed before PBS can be relocated. Once PBS is relocated, new landside and secure food and beverage outlets can be constructed. In the holdroom, the sterile corridor is removed and additional area is provided on the roof of level 1 between Gates 4 and 6. No changes are made to the main level during this initial phase.

Phase 2, shown in in Figure 5-620**,** provides steps to relocate PBS to the main level and reconfigure the second level for expanded holdroom and concessions. The enabling project for PBS relocation is construction of new administration offices immediately to the south of the terminal building. Work also begins on the building bump out between Gates 6 and 7 to allow for additional holdroom and baggage claim. A new inbound baggage room and tunnels are constructed and the first two sloped-plate baggage claim belts are installed. The building bump out also allows for construction of a new CBSA secondary screening area.

Phase 3, shown in in Figure 5-621**,** expands the terminal building to the north to accommodate new holdroom, boarding bridges, and CBSA primary inspection. Relocation of CBSA primary and secondary inspection allows for installation of the remaining baggage claim devices. The final step relocates rental cars to the baggage claim and converts the original space into a food and beverage outlet.

Figure 5-19. ATB Phase 1

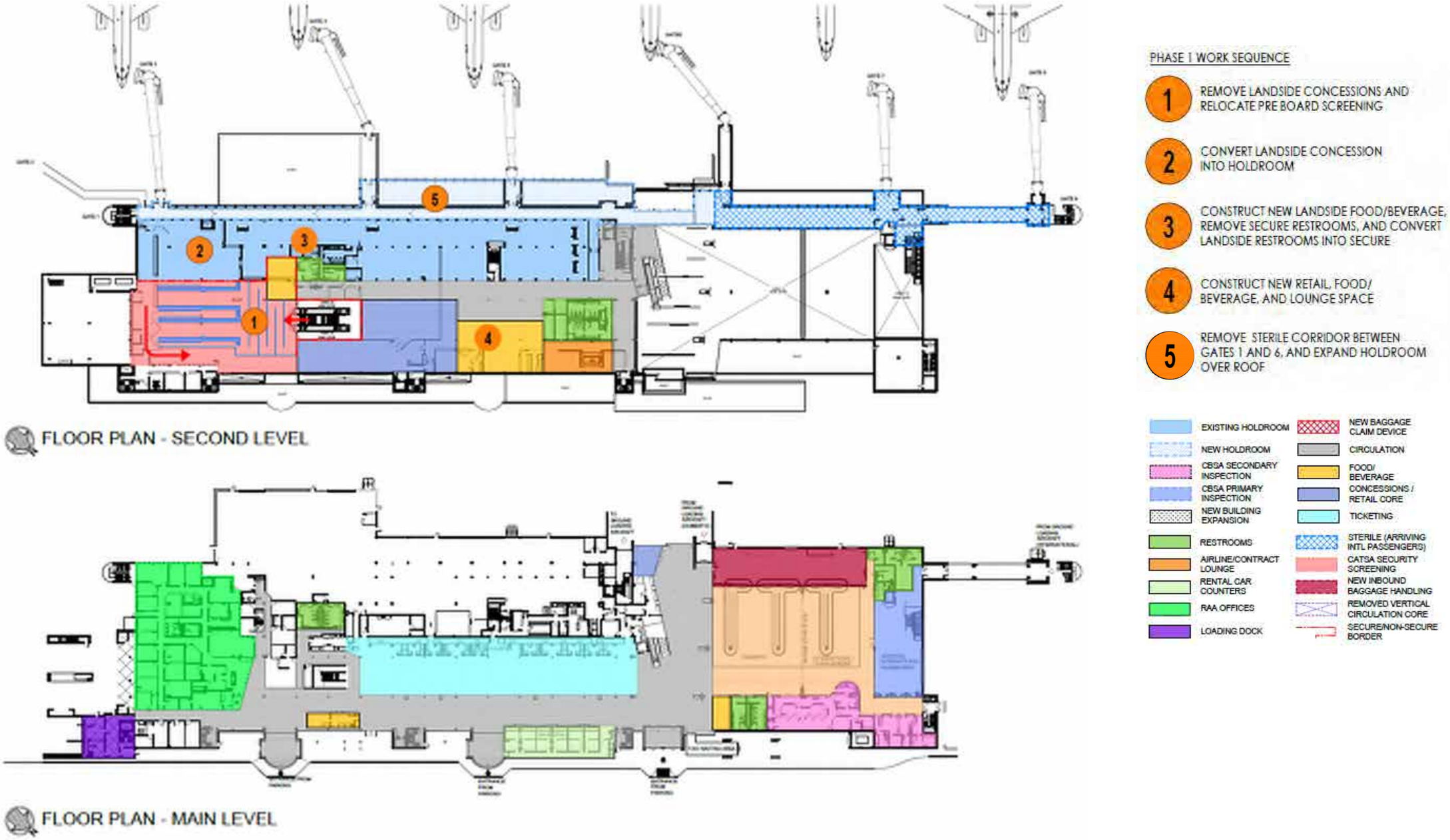


Figure 5-20. ATB Phase 2

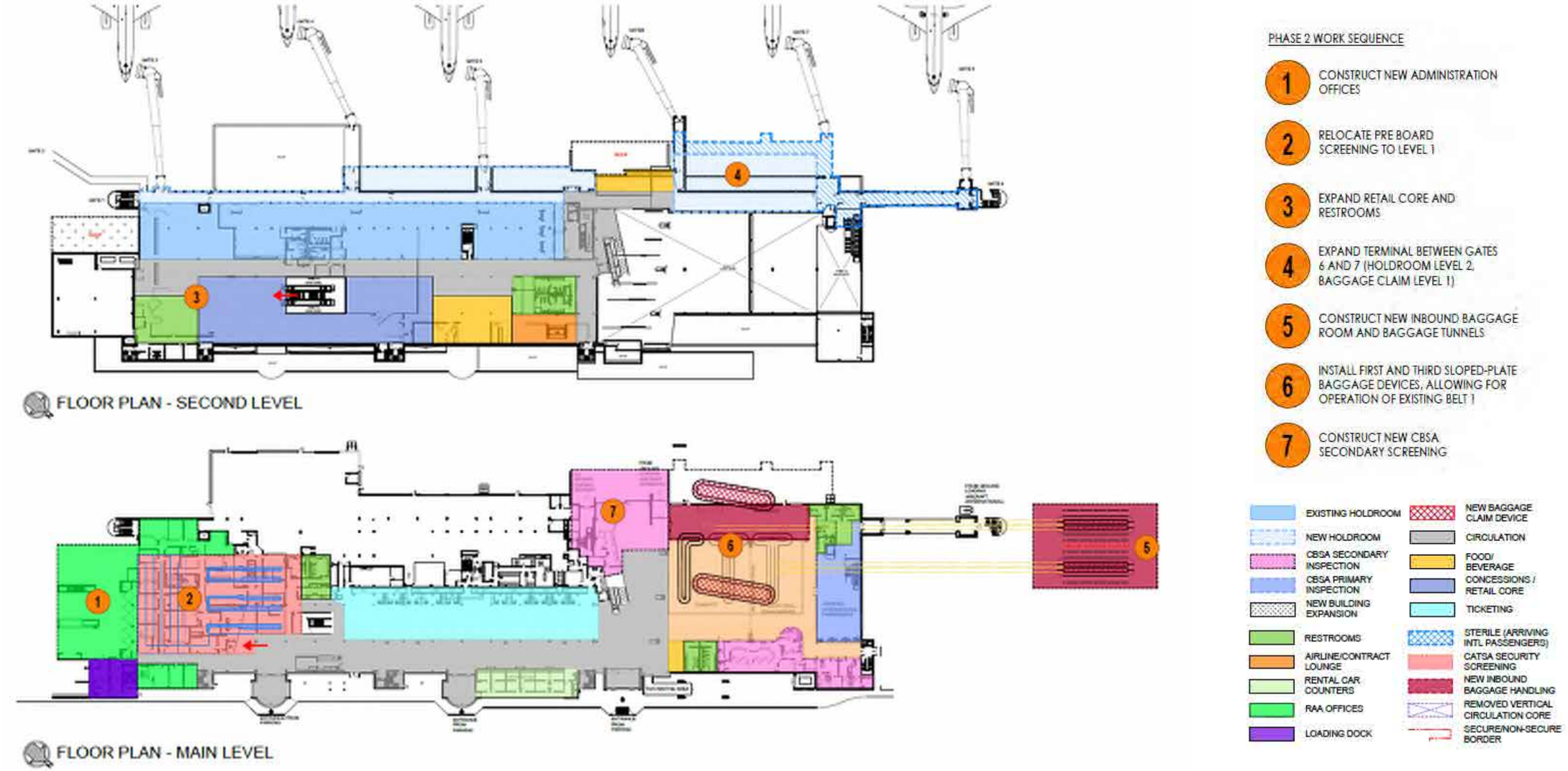
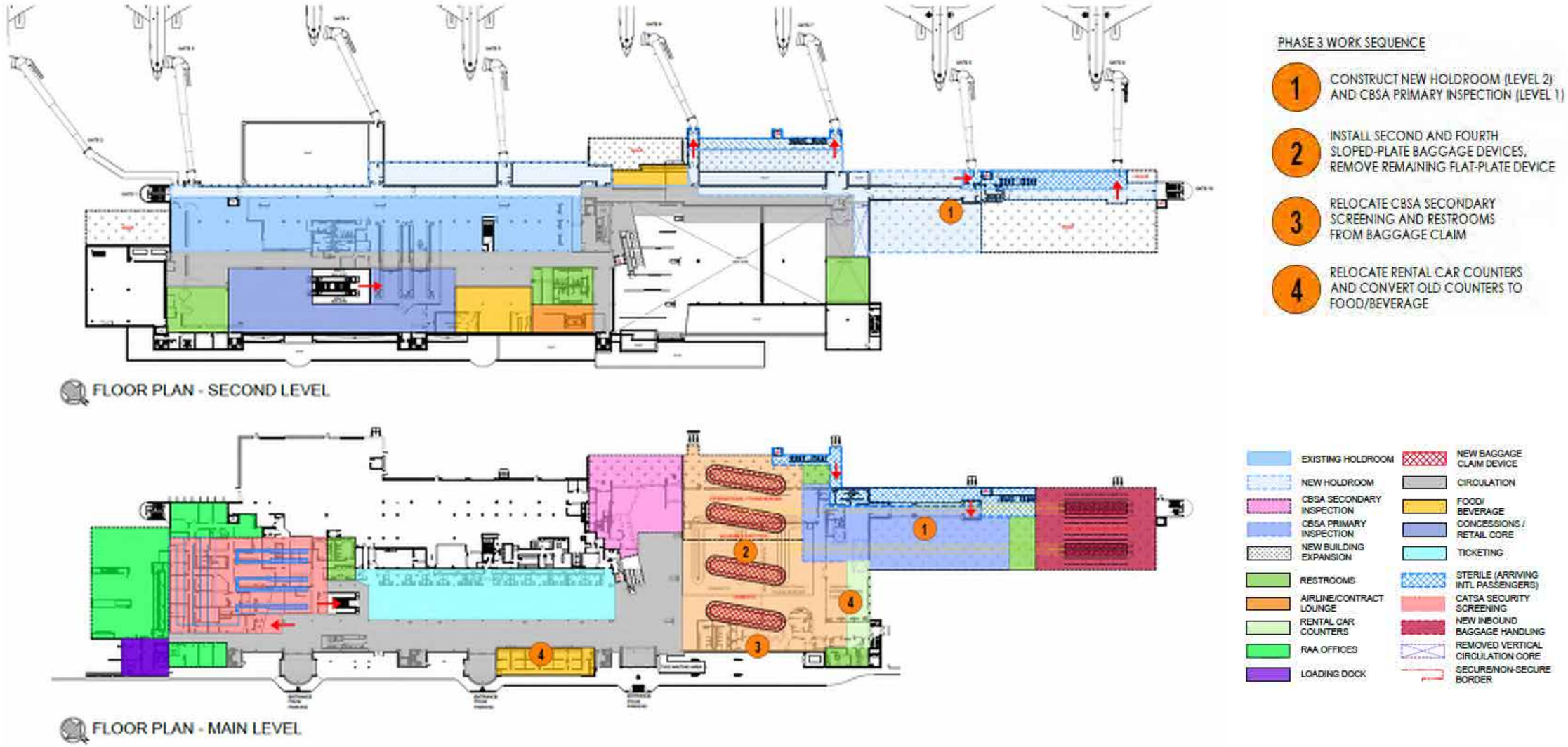


Figure 5-21. ATB Phase 3



Strategic Goal #3
OPERATIONAL EXCELLENCE

YQR 2037 MASTER PLAN

Chapter 6 – Groundside Access

YQR 2037 MASTER PLAN

Chapter 6 GROUNDSIDE ACCESS

This section describes the facility requirements calculated for the groundside components of the Airport and the development alternatives to address potential deficiencies. The groundside components consist of public parking, employee parking, the terminal curbside, airport roadways, and the rental car facilities.

FACILITY REQUIREMENTS

The groundside facility requirements are divided into the various groundside components.

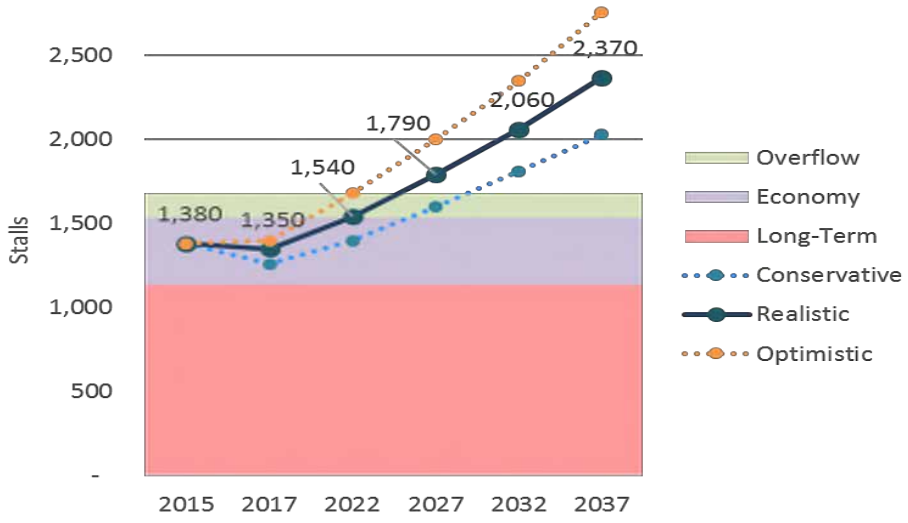
Public Parking

2015 data was available to determine the design-demand. In 2015, the average daily occupancy was highest in February, with 1,187 occupied stalls. The average daily peak occupancy is assumed to be 10% higher than average daily occupancy, resulting in an average peak occupancy during the peak month to be 1,310 vehicles. A 5% circulation factor was added to account for drivers' difficulty finding the last stalls in a large parking facility. The resulting design-demand for 2015 is 1,380 stalls.

In the past, parking demand has generally increased in direct proportion to the growth in passenger activity. However, recently at other airports parking has grown at a reduced rate, due to the increased customer-use of Transportation Network Companies (TNCs – e.g., Uber and Lyft). It is anticipated that TNCs will be allowed to operate in Regina and that future growth rates in parking demand will be 75% of the growth in passenger traffic from 2017 to 2022. After 2022, it is assumed that TNCs will likely approach their full market share and that parking will thereafter grow at 95% of the growth in passenger traffic.

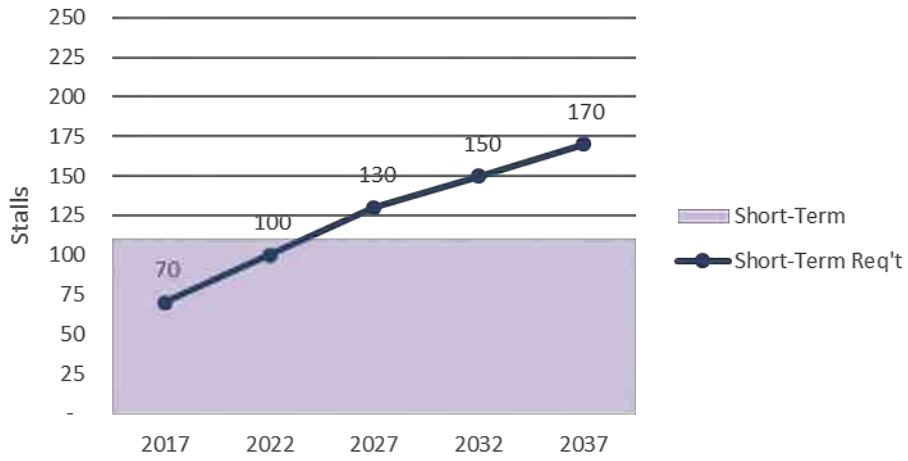
The future public parking program for the conservative, realistic, and optimistic forecasts are shown in Figure 6-1. The realistic requirements increase from 1,350 spaces in 2017 to 2,370 spaces in 2037.

Figure 6-1. Public Parking Program



Short-Term public parking had a peak-occupancy of 80 vehicles in 2015, which was assumed to decrease to 70 vehicles in 2016 based on anecdotal information. The Short-Term Public Parking demand is assumed to grow in direct proportion to the peak-hour passenger forecast. The Short-Term Parking program is shown in Figure 6-2. It increases to 130 stalls in 2027 and 170 stalls by 2037.

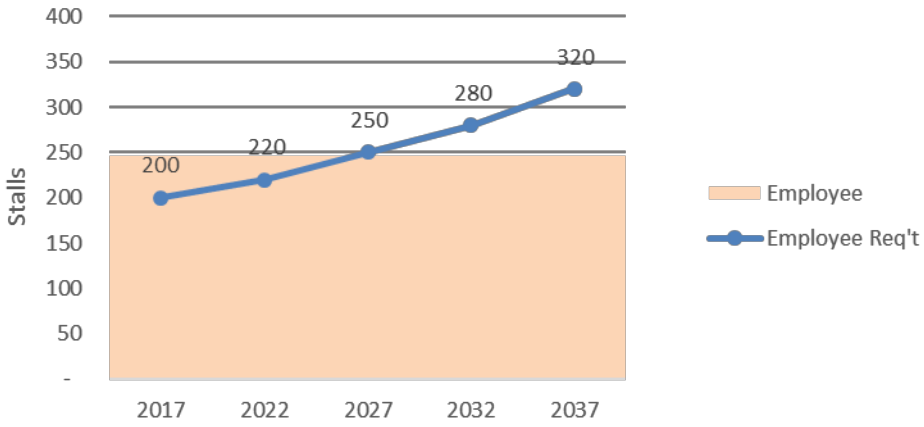
Figure 6-2. Short-Term Public Parking Program



Employee Parking

Occupancy data was not available for the employee parking lot. It is assumed that the lot is 80% occupied on a typical busy day, based on anecdotal information provided by RAA staff. The employee parking demand is assumed to increase in proportion to a mix of the annual passenger forecast and the annual movements forecast. The employee parking program is shown in Figure 6-3. The employee parking demand is expected to increase to 250 vehicles in 2027 and 320 vehicles in 2037.

Figure 6-3. Employee Parking Program

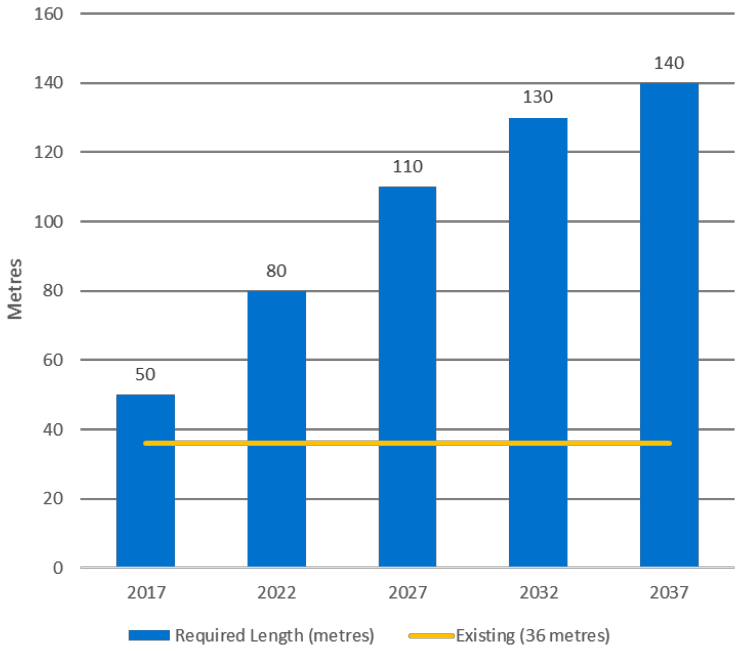


Terminal Curbside

Vehicular traffic volumes for the airport roadways and terminal curbside are not available. The curbside traffic volumes were calculated by using the current peak-hour passengers (416) and assuming that 52% of passengers use private vehicles to arrive at the Airport (216 passengers), in accordance with the 2017 passenger profile report. Assuming 1.7 passengers per vehicle (a typical average) results in 127 Airport vehicle-trips during the peak hour. In accordance with the parking assumptions, 70 vehicles use the Short-Term Parking Lot and 30 vehicles enter or exit the long-term parking facilities during the peak hour, which results in 27 vehicles using the curbside.

An average dwell time of 6 minutes was assumed for private vehicles, which is the same as was observed at Ottawa MacDonald-Cartier Airport prior to enforcement of active loading/unloading-only. The curbside program in shown in Figure 6-4. The curbside requirement is currently 50 metres compared to the existing 36 metres. The requirement increases to 110 metres in 2027 and 140 metres in 2037.

Figure 6-4. Terminal Curbside Program



Airport Roadways

The Airport roadways are not expected to have any capacity constraints during the planning period. However, there are several roadway segments that have poor geometry that creates difficult traffic flows or exhibit poor resiliency. Four deficient areas have been identified as-follows and which are shown in Figure 6-5.

- **Rental car access** – due to the location of the rental car ready/return lot, exiting customers depart the Airport via the terminal curbsides, which increases terminal curbside traffic. Similarly, in order for rental car employees to move returned/dirty vehicles to the Quick-Turn Around (QTA) facility for washing and fueling, they also must drive through the terminal curbsides, often above the speed limit.
- **Intersection of Regina Ave. and Airport Rd.** – the frontage road that provides access to the employee lot, maintenance garage, and taxi queue intersects with Airport Rd. in close proximity to the intersection with Regina Ave. These closely-spaced intersections result in frequent unsafe traffic movements.
- **Airport entrance on Regina Ave.** – the primary entrance to the Airport consists of one lane in both directions. If an accident were to occur on this road, access to the Airport would be blocked until the accident is cleared, causing passengers to miss flights. This is an example of poor resiliency. This roadway width is constrained by the bridge structure over the creek east of Airport property.

- **Lewvan Drive Intersection** – the intersection geometry of Lewvan Drive and Regina Ave. does not match the Regina Ave. geometry accessing the Airport (e.g., two left turn lanes from Lewvan Drive merge into a single lane on Regina Ave.). Additionally, there is pedestrian access on Airport property and along Regina Ave. east of Lewvan Drive. However, there is not pedestrian access between the Airport property boundary and Regina Ave. east of Lewvan Drive.

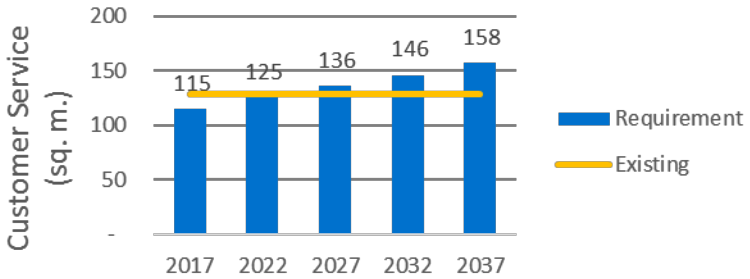
Figure 6-5. Airport Roadway Safety and Resiliency Issues

Rental Car Facilities

The rental car facilities are split into three general areas: customer service counters, ready/return parking lot, and the Quick-Turn Around (QTA).

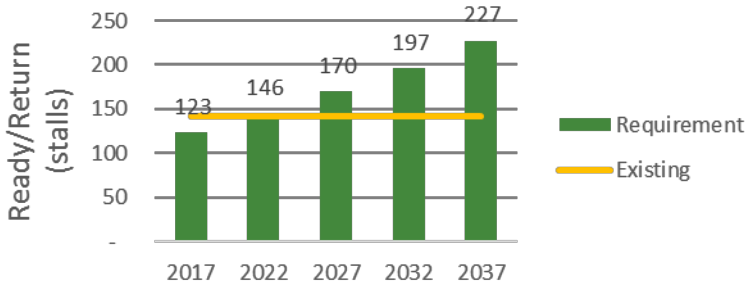
- **Customer Service Counters –** the requirements for the rental car customer service counters are shown in Figure 6-6. The area in the ATB allocated to these counters is currently adequate. The 2037 requirement exceeds the current allocation by 30 square metres. While the slight deficiency may not warrant expansion, ideally the customer service counters would be located in the baggage claim hall, rather than the check-in hall.

Figure 6-6. Rental Car Customer Service Counter Requirements



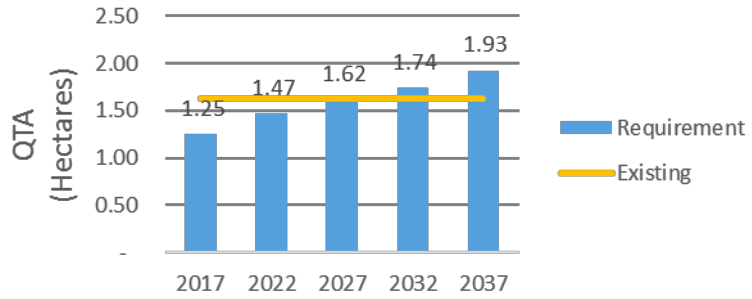
- **Ready/Return Parking Lot –** the requirements for the rental car ready/return parking lot are shown in Figure 6-7. There are sufficient spaces to accommodate current rental car ready/return needs. The rental car industry is expected to require an additional 20 parking spaces by 2027 and an additional 90 parking spaces by 2037.

Figure 6-7. Rental Car Ready/Return Parking Space Requirements



- **QTA –** the current QTA is relatively new and is expected to meet the requirements through at least 2027, as shown in Figure 6-8. A small expansion to the QTA may be required to meet vehicle storage demands by 2037.

Figure 6-8. Rental Car QTA Area Requirements



ALTERNATIVES

In order to accommodate the deficiencies identified in the requirements analysis, a series of alternatives were developed and evaluated. These alternatives include expansion and/or construction that occurs in two phases, with Phase 1 addressing the 2027 requirements and Phase 2 addressing the 2037 requirements. These alternatives have been divided into four families. Each of the alternatives includes widening the entry and exit road to two lanes in both directions.

Alternative 1 – Expand Existing Facilities

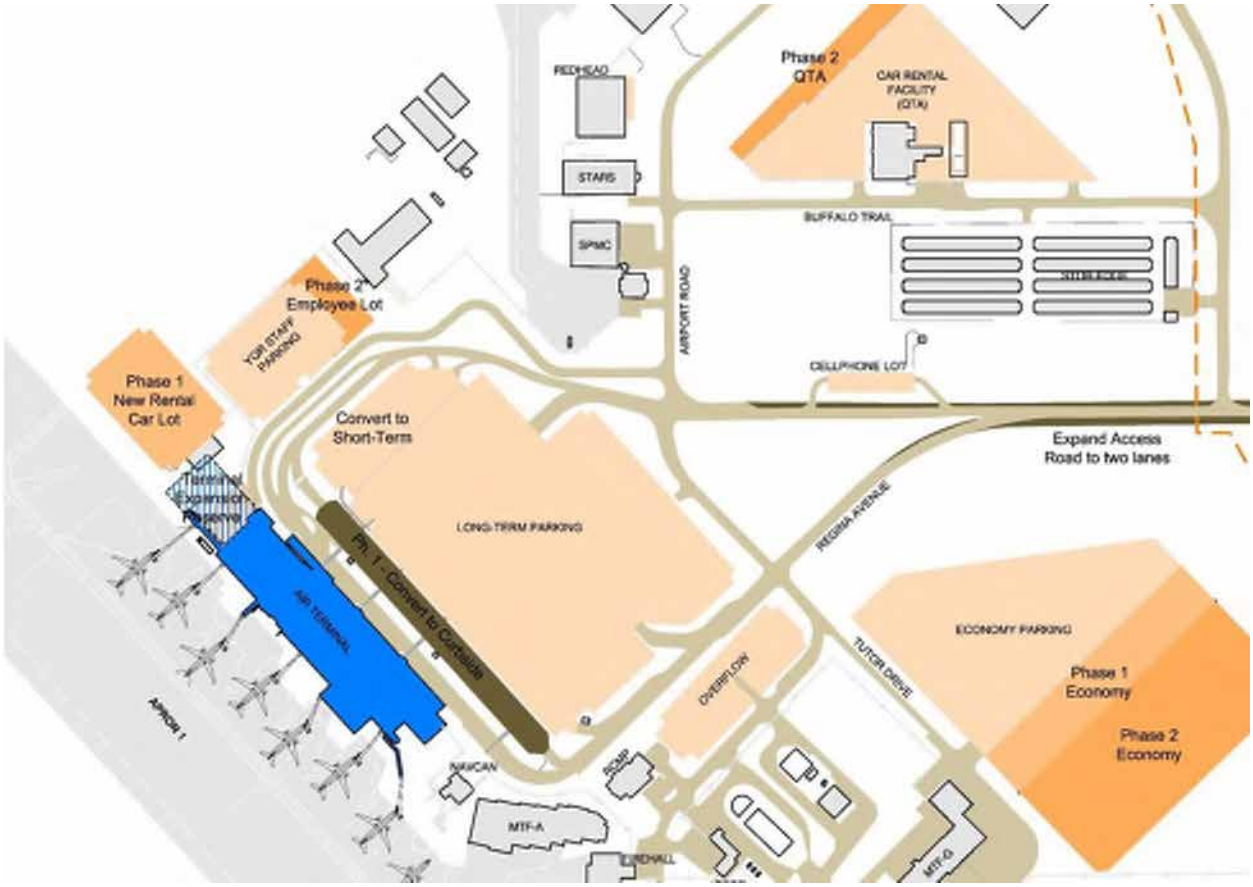
Alternative 1 is depicted in Figure 6-9. This alternative primarily consists of maintaining the existing facilities and expanding the parking lots as-necessary. Key components include:

- Constructing a new rental car Ready/Return Lot north of the ATB.
- Converting the existing rental car Ready/Return Lot to Short-Term Parking.
- Converting the Short-Term Parking Lot to a Curbside facility.
- Expanding Economy parking in two phases.

- Expanding the existing Employee Lot as-necessary.

This alternative is low-cost and would be relatively simple to implement. However, this alternative would reduce customer level-of-service for the short-term parkers and the increased parking capacity is accommodated in the Economy Lot, which provides low customer service, low-revenue per space, and high-operational costs (i.e., bussing).

Figure 6-9. Groundside Alternative 1 - Expand Existing Facilities



Alternative 2 – Parking Garage

Two parking garage alternatives were developed and evaluated. Alternative 2A is depicted in Figure 6-10 and Alternative 2B is depicted in Figure 6-11. The key element of both alternatives is to construct a parking garage in the Long-Term Lot across from the terminal. The difference between the two alternatives is that 2A maintains the existing terminal roadway loop and 2B expands the terminal roadway loop.

An evaluation of these alternatives weighs cost against improved customer service and revenue potential.

For alternative 2A, the primary components include:

- Constructing a parking garage in two phases, that accommodates both rental car ready/return and Short-Term Parking on Level 1 and Public Parking on Levels 2 and 3.
- Converting the Short-Term Parking lot to curbsides.

For Alternative 2B, the primary components include:

- Expanding the roadway loop to the north and expanding the curbside, Short-Term Parking, and Long-Term Parking areas in accordance with the expanded loop.
- Construct a 3-level parking garage in Phase 2 that exclusively accommodates public parking.

Alternative 2A places the garage in the preferred location, immediately across from the baggage claim and ticketing halls. Alternative 2A also has lower costs, due to not including any relocation of roadways. Alternative 2B includes flexibility regarding the timeframe of when the garage is constructed, as it is not required until Phase 2. Alternative 2B does not meet the requirements for curbsides and Short-Term Parking.

Figure 6-10. Groundside Alternative 2A - Phased Parking Garage

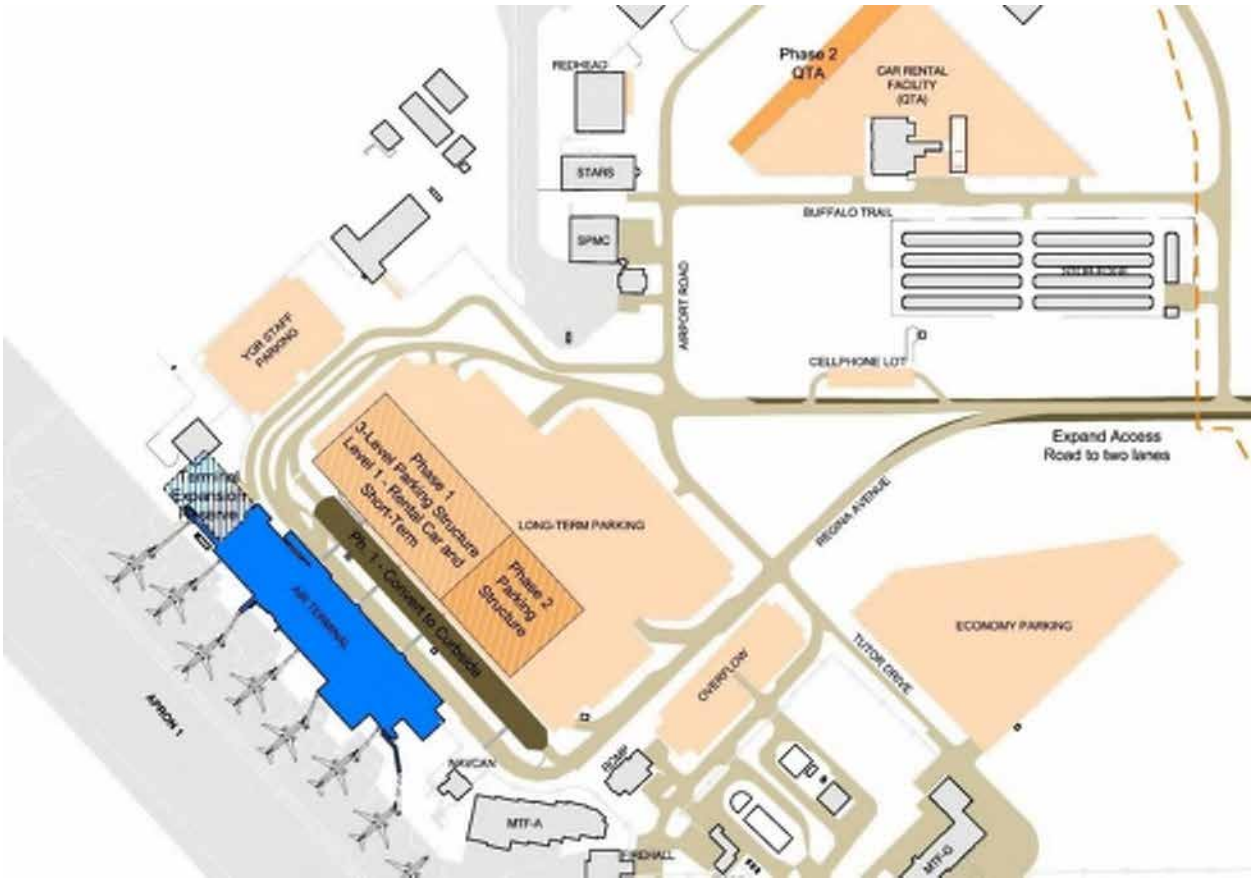
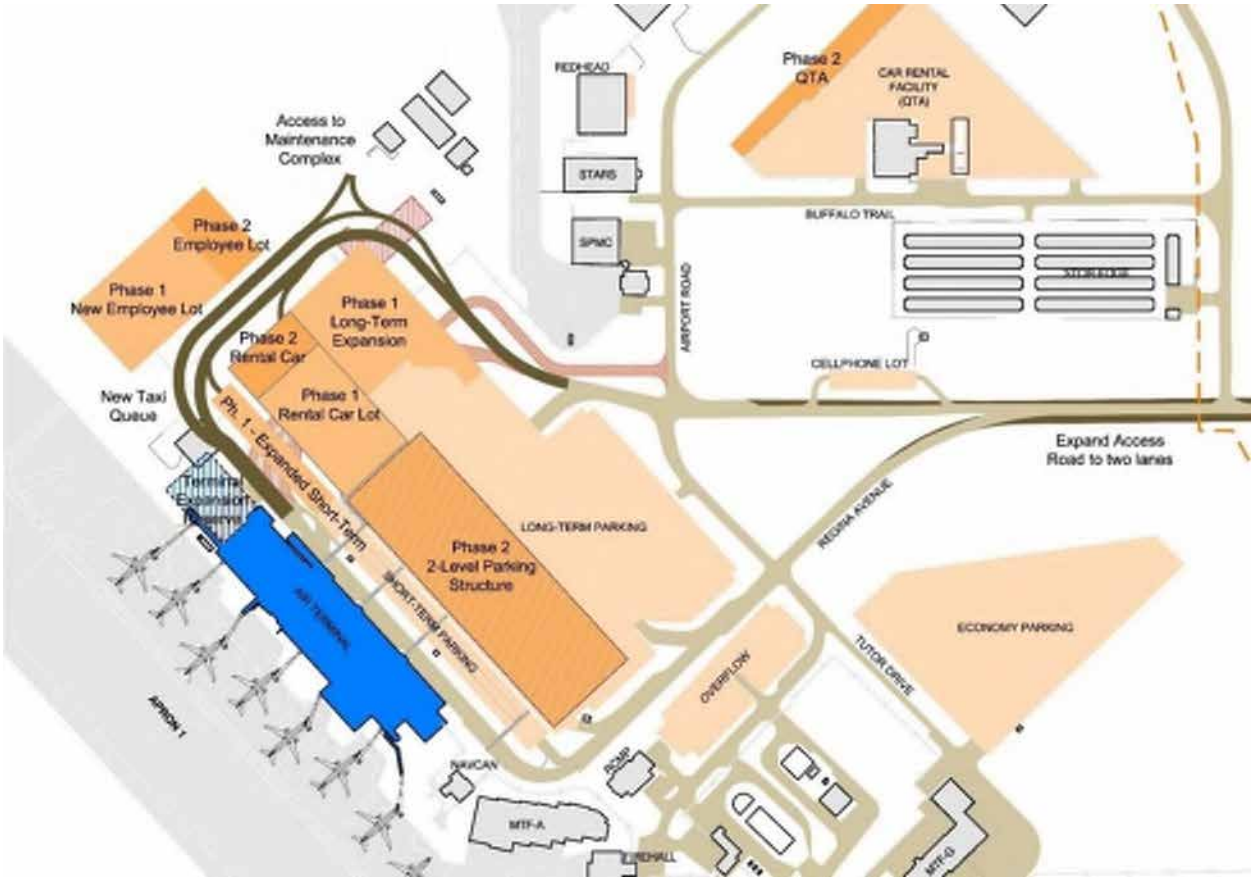


Figure 6-11. Groundside Alternative 2B - Phase 2 Garage



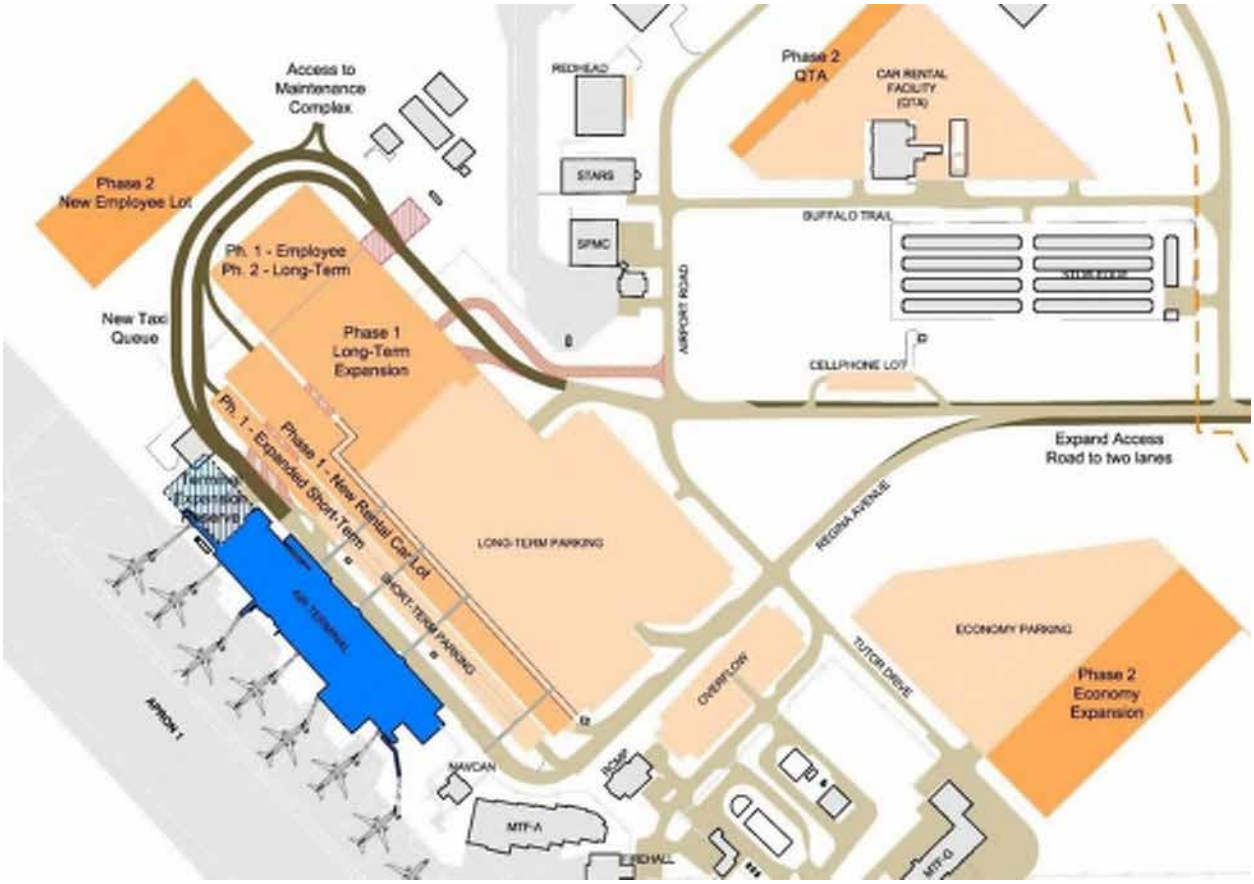
Alternative 3 – Expand Roadway Loop

Alternative 3 is depicted in Figure 6-12. This alternative primarily consists of maintaining the existing Regina Ave. entry/exit point but expanding the roadway loop. This facilitates expansion of the Long-Term Parking facility. Key components include:

- Expanding the Terminal Area roadway loop to the north, which facilitates an extension to the curbside and to Short-Term Parking.
- Developing a new rental car Ready/Return lot parallel to the existing Short-Term Parking Lot.
- Expanding Long-Term parking by: (a) converting the remaining area from the existing rental car Ready/Return Lot to Long-Term Parking in Phase 1, (b) further expanding the lot in Phase 1, and (c) converting the existing Employee Lot to Public Parking in Phase 2.
- Constructing a new Employee Lot in Phase 2.
- Expanding the existing Economy Lot as-necessary.

This alternative resolves the terminal-area roadway issues and allows for expansion of the Long-Term lot, without the costs associated with a parking garage. It also improves customer service for rental cars. Alternative 3 does not fully meet the curbside requirements.

Figure 6-12. Groundside Alternative 3 - Terminal Loop Expansion



Alternative 4 – New Loop Road

Two alternatives that provide a new Loop Road via the SPMC Hangar site were developed and evaluated. Alternative 4A is depicted in Figure 6-13 and Alternative 4B is depicted in Figure 6-14. The key element of both alternatives is to demolish the SPMC Hangar and route a new access roadway through the hangar site. Buffalo Trail is also extended through the SPMC Hangar site, providing access to a new Employee Lot, employee access to the rental car lot, and access to the taxi queue. Buffalo Trail is a two-way road to the rental car Ready/Return Lot. Both alternatives show identical roadway alignments to the north of Long-Term Parking. Both alternatives also improve access to the south support facilities and the ATB service dock.

The difference between the two alternatives is that 4A includes extending Sandra Schmirler Way to the south and west, along the north and west sides of the Economy Parking Lot, so that it provides access to the facilities along Tutor Drive. Alternative 4B converts the intersection of Regina Ave. and Sandra Schmirler Way into a roundabout, with Sandra Schmirler Way extending directly south, past the Economy Lot, and turning west to provide access to the south support facilities.

In both alternatives, the terminal roadway loop is separated from non-Terminal traffic. This improves wayfinding for customers. Also, rental car employee traffic is moved to Buffalo Trail, which allows for

direct movement of vehicles between the Ready/Return Lot and the QTA, which decreases traffic in the terminal area.

Alternative 4A is lower cost, while Alternative 4B creates a large loop area ideal for commercial development. Alternative 4B is further complicated because it requires that the outbound road is two-ways, providing access to the South support sites and Economy Parking without the employees driving through the ATB area.

Figure 6-13. Groundside Alternative 4A – New Roadway Loop Through SPMC Hangar Site

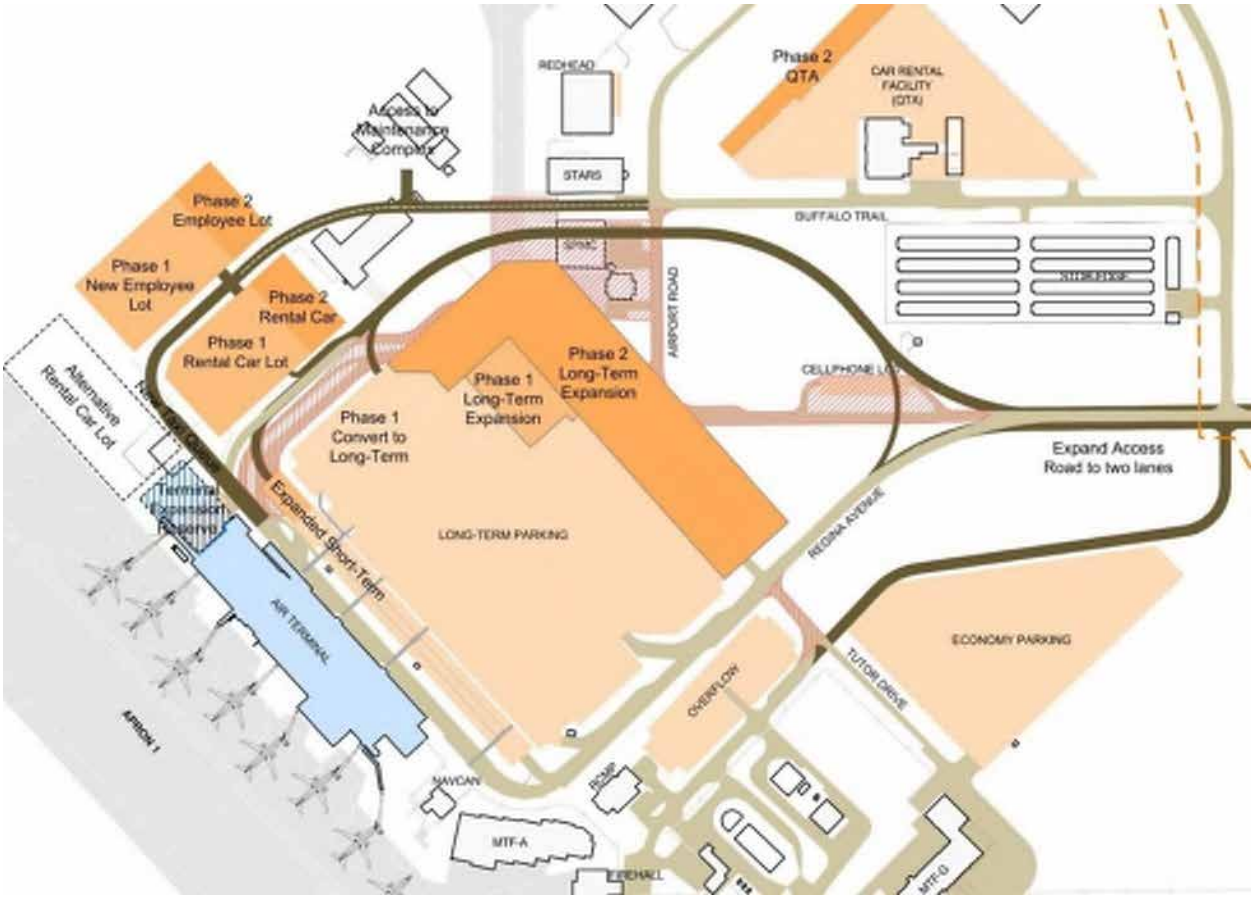
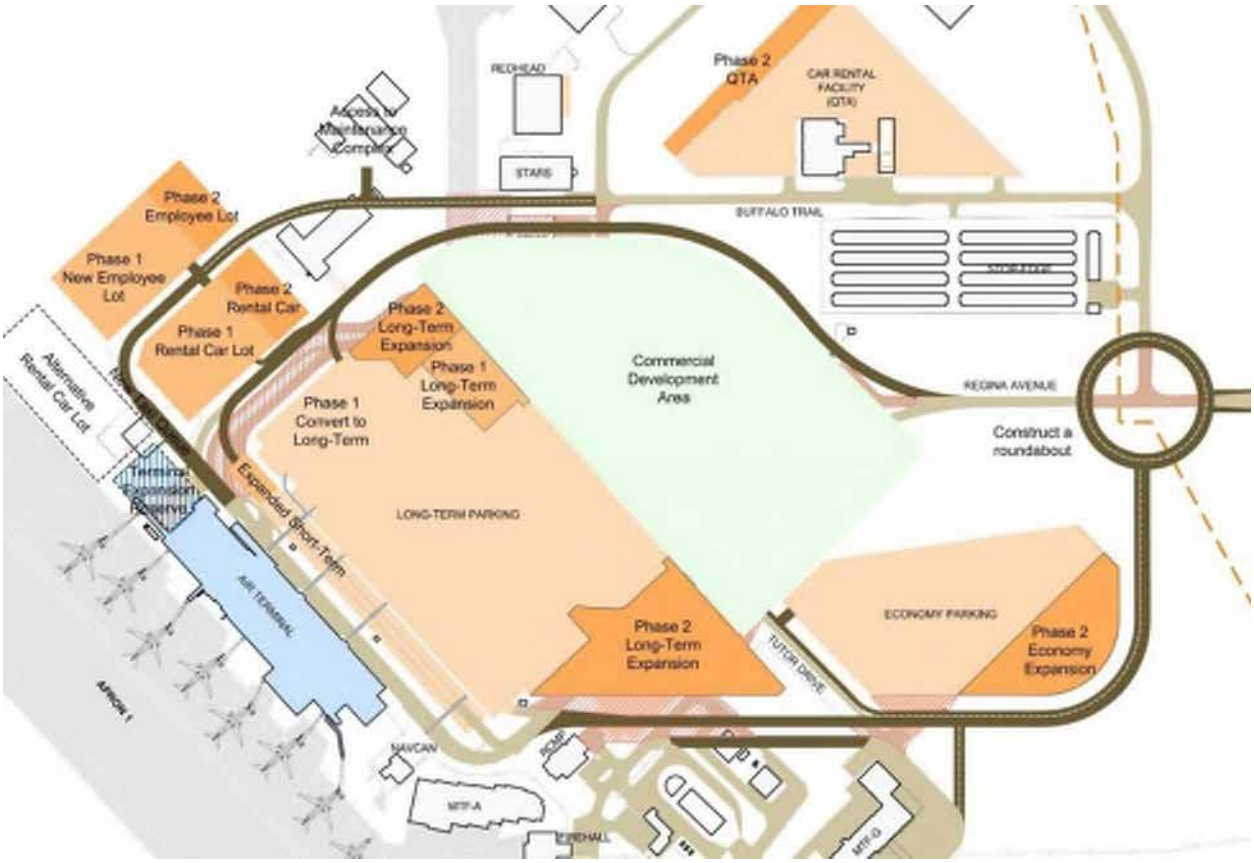


Figure 6-14. Groundside Alternative 4B - New Roadway Loop Through SPMC Hangar Site and Modified Access to Southern Support Area



Evaluation

A summary of the groundside alternatives evaluation is provided in the Table 6-1. Seven evaluation criteria were scored for each alternative, with red representing a poor score and green representing a positive score. Alternative 2 – Parking Garage, was deemed financially infeasible and the roadway alignment in Alternative 3 was not preferred. It was recommended that a phased approach would allow for flexibility. A variation of Alternative 1, phasing in a variation of Alternative 4A, and eventually phasing into a variation of Alternative 4B were recommended.

Table 6-1. Evaluation of Groundside Alternatives

	Meets Curbside Requirements	Rental Car Customer Service	Public Parking Customer Service	Roadway Improvement	Cost	Implementation	Commercial Development
Alt. 1 – Expand Existing Lots							
Alt. 2 – Parking Garage							
Alt. 3 – Expand Loop Road							
Alt. 4 – New Loop Road							

Fully Meets Criteria — Marginally Meets Criteria — Does Not Meet Criteria

Chapter 7 – Support Facilities

YQR 2037 MASTER PLAN

Chapter 7 – SUPPORT FACILITIES

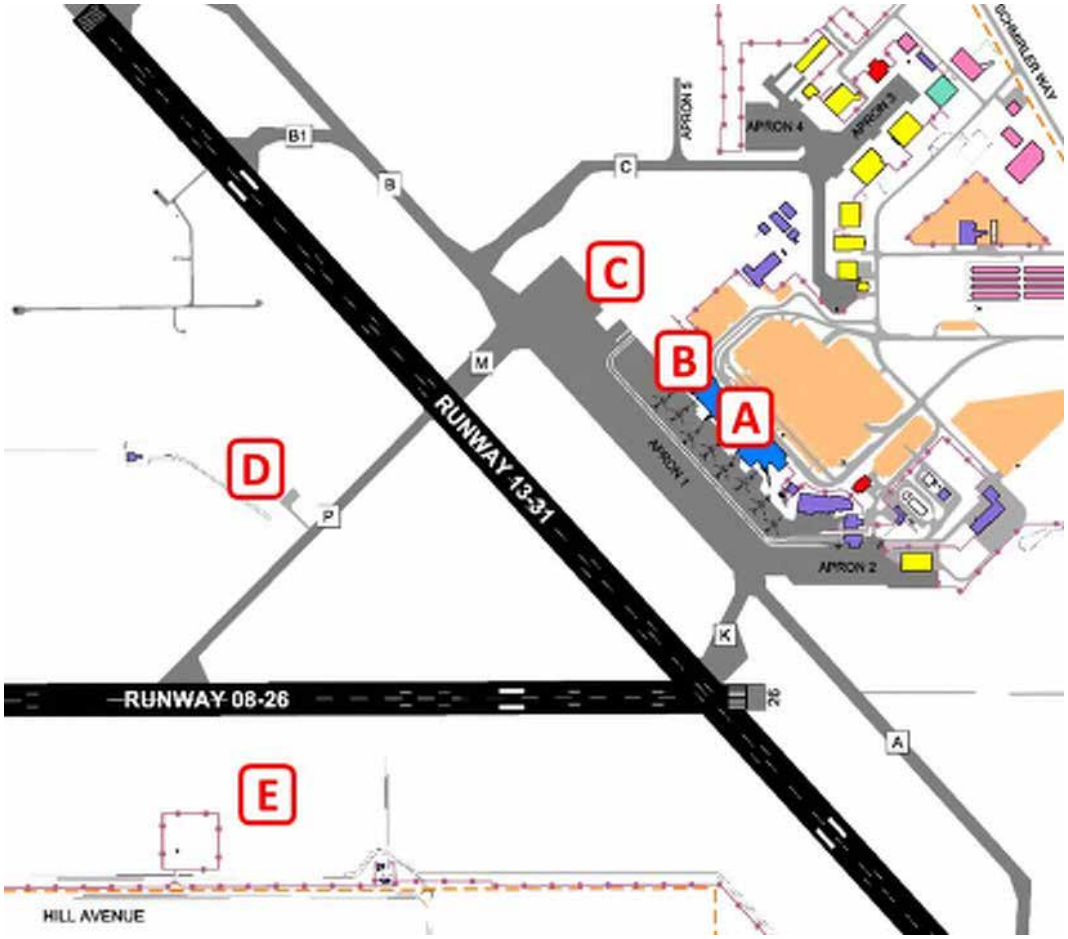
The two key support facilities requiring consideration for the Master Plan are the Airport Traffic Control Tower (ATCT) and the Maintenance and Support facilities.

AIR TRAFFIC CONTROL TOWER (ATCT)

The ATCT at the Airport is the oldest operational tower in Canada. As such, the facility does not comply with several standards leading to NavCanada emphasizing the need for a new tower. The Flight Service Station (FSS) facility is also old and in need of replacement. Ideally, the FSS and ATCT would be co-located. The Air Traffic Control Tower is a project that would be undertaken and funded by Nav Canada. Nevertheless, the RAA should preserve the requisite land for the new tower. As part of the Master Plan, five sites for a new NavCanada facility were evaluated in consultation with Nav Canada personnel. The five sites are identified in Figure 7-1 and are described as-follows:

- **Site A – Current Site.** Update the existing ATCT.
- **Site B – Expanded ATB.** A new ATCT on top of a northward expansion of the ATB.
- **Site C – Taxiway C.** A new stand-alone ATCT on a site near Apron Position 14 and Taxiway C, but which would allow for an eventual terminal/concourse extension.
- **Site D – Midfield.** A new stand-alone ATCT on a site in the midfield.
- **Site E – South Field.** A new stand-alone ATCT on a site south of Runway 08-26.

Figure 7-1. Potential ATCT Locations

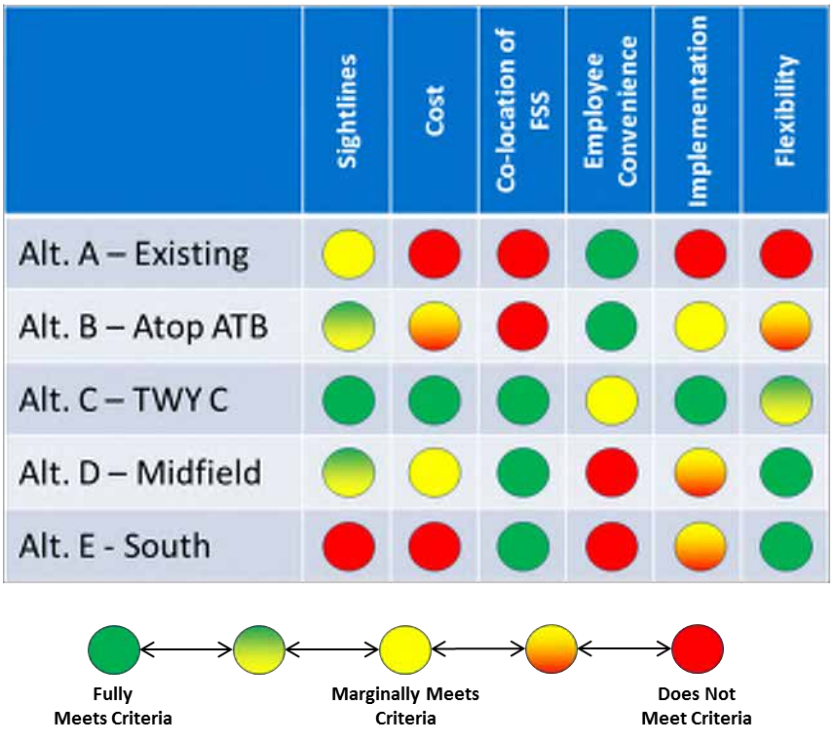


A summary of the evaluation of the five potential ATCT sites is provided in Table 7-1. Six evaluation criteria were identified and evaluated on a five-scale basis, with green meeting the criteria and red not meeting the criteria.

- Alternative A is considered infeasible both financially and functionally.
- Alternative B has improved site-lines and provides excellent convenience for employees with the ATB amenities. However, if the ATB expansion were to have an integrated ATCT, it would require careful coordination with NavCanada and a cost-sharing agreement. Additionally, given the relatively-small proposed ATB expansion, co-location of the FSS is likely not possible.
- Alternative C has the best site-lines. It also allows NavCanada to develop the site in full compliance with their standards and expectations, without a cost-sharing agreement with RAA. Costs to the RAA would be limited to the extension of utilities and roads from the terminal-area.
- Alternative D has good site-lines and it would allow NavCanada to develop the site in accordance with their standards. However, Site D is within the protected Ramp Radar perimeter, which would require a waiver for facility construction.
- Alternative E has poor site-lines and would require extensive site work to extend utilities.

As a result of this evaluation, Site C is the preferred site. Given that the new ATCT project will be undertaken and funded by Nav Canada, the precise timing will be determined after further consultation with Nav Canada occurs.

Table 7-1. Evaluation of ATCT Sites



MAINTENANCE AND SUPPORT FACILITIES

Maintenance and support has five elements: the Firehall, ATB and Building Maintenance, Snow Removal Equipment, Airfield Maintenance and Wildlife Management, and Grounds keeping. The personnel for each of these functions, except the Firehall, currently report to the Maintenance Garage. However, several building maintenance workshops are currently located in the ATB. Most ATB and Building Maintenance personnel spend the majority of their time in the ATB facilities after reporting to the Maintenance Garage. The existing Firehall and Maintenance Garage were both recently renovated to extend the life of the facilities.

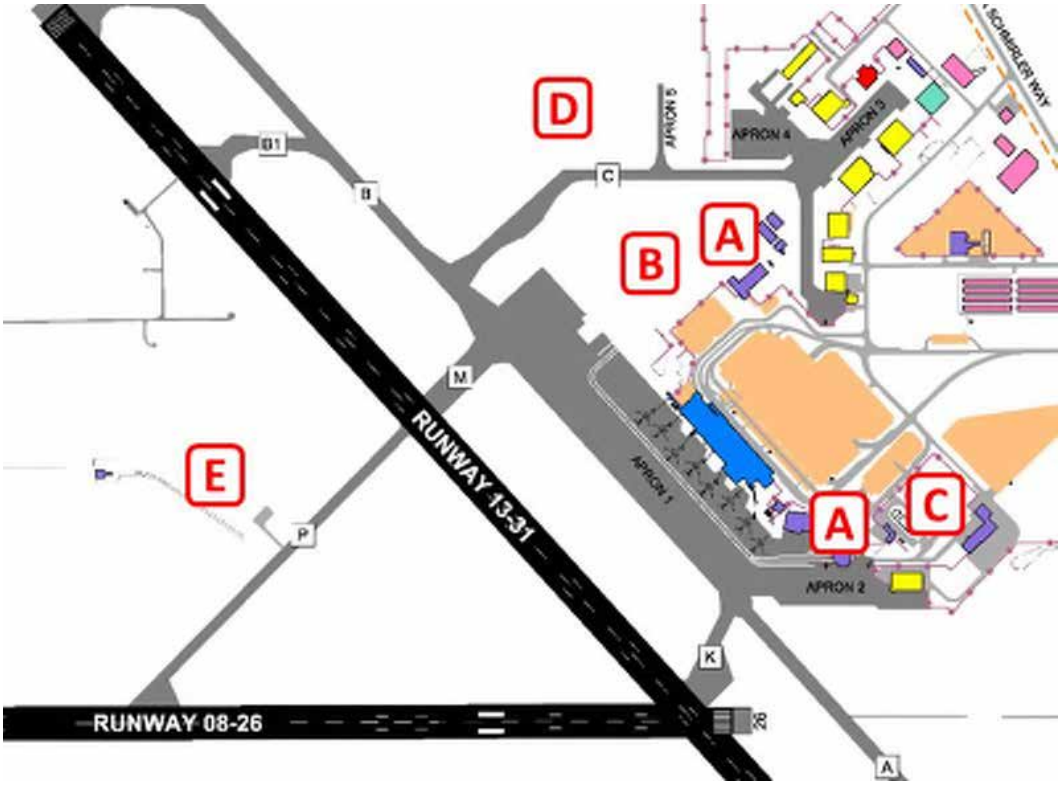
Several Canadian Airports have recently constructed Combined Services Buildings (CSB), in which each of the five maintenance/support operations are housed in a single consolidated building. The extensive building spans required and unique utilities requirements for several of these operations, can make a CSB an efficient facility compared to having separate facilities. However, each of the five maintenance/support operations have different location needs, which may not make a CSB practical.

As part of the Master Plan, five potential maintenance facility sites were evaluated. The sites are identified in Figure 7-2 and are described as-follows:

- **Site A – Current Site.** Update the existing facilities or build new on-site.

- **Site B – Taxiway C South.** Construct a new site, whether it be a CSB or a new maintenance garage, south of Taxiway C, and between Apron Position 14 and Apron 4.
- **Site C – Near Apron 2.** Construct a new site, whether it be a CSB or a new maintenance garage, near Apron 2, the fuel farm, and MTF-G.
- **Site D – Taxiway C North.** Construct a new site, whether it be a CSB or a new maintenance garage, north of Taxiway C, and between the proposed CDF site and Apron 5.
- **Site E – Midfield**. Construct a new CDF on a site in the midfield.

Figure 7-2. Potential Maintenance Facility Site Locations



A summary of the evaluation of the five potential maintenance facility sites is provided in Table 7-2. Five evaluation criteria were identified and evaluated on a five-scale basis, with green meeting the criteria and red not meeting the criteria.

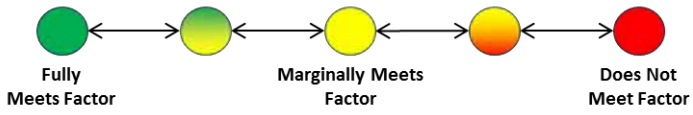
- Alternative A precludes the preferred Ground Alternative 4 for the roadways, resulting in a low rating for “opportunity cost”.
- Alternative B provides ample space for co-location, provides relatively convenient access to the ATB, and would be relatively easy to implement due to proximity to roadways and utilities. It would consume valuable terminal-area real estate.
- Alternative C is located reasonably close to the ATB and is centrally located, but it is in a congested area and it may not accommodate a CSB.
- Alternative D is located relatively further away from the ATB and terminal area. However, the area is conducive to the facility and the site provides ample space for a CSB.

- Alternative E is remotely located for Building Maintenance and Grounds Keeping personnel. This site is also within the protected Ramp Radar perimeter, requiring a waiver for development.

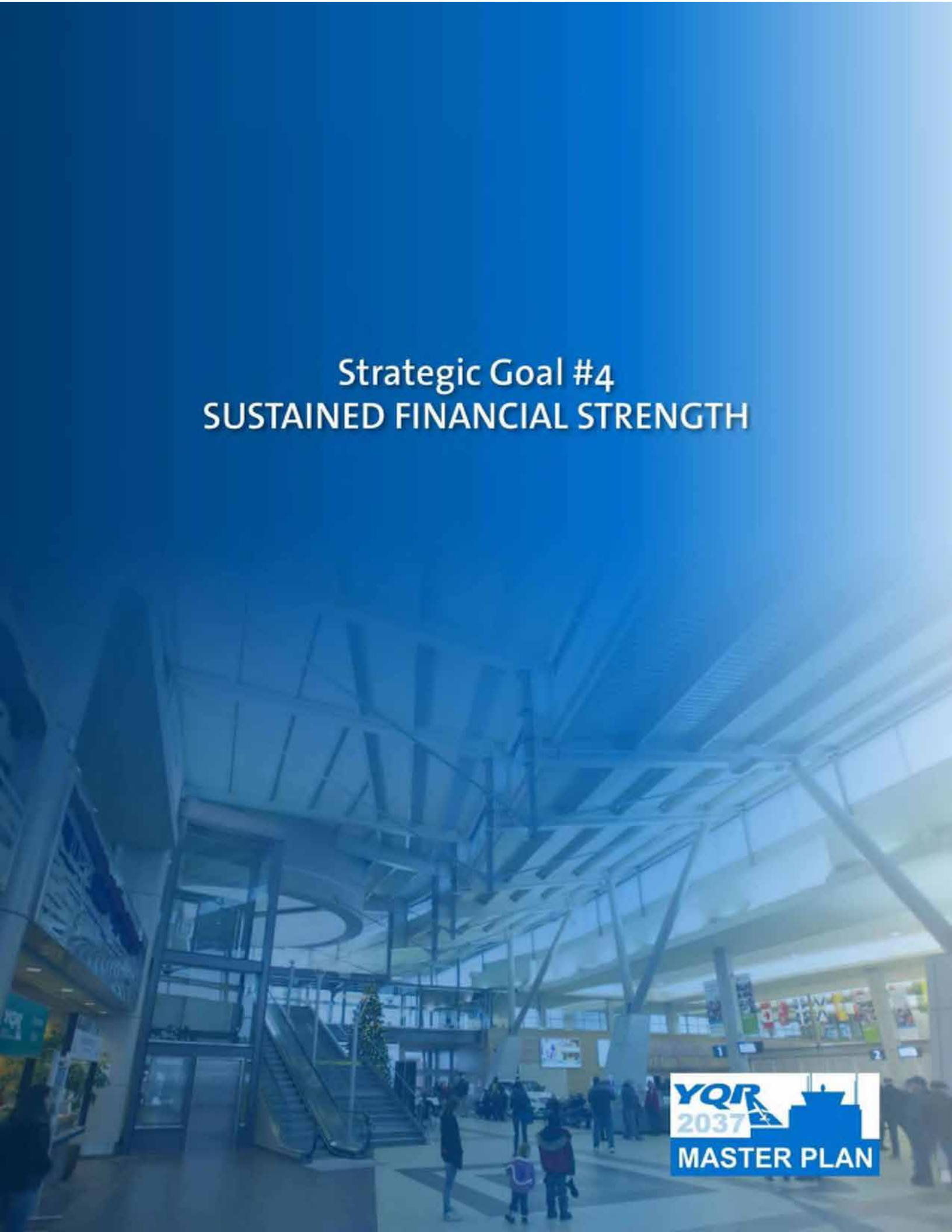
As a result of this evaluation, Site B is the preferred alternative. The development of a CSB is also recommended due to the condition of both the Maintenance Garage and Firehall. It is also recommended that Site D be preserved as an alternative CSB site, in case a higher and better use for Site B is identified in the next 10 years.

Table 7-2. Evaluation of Maintenance and Support Sites

	Convenience to ATB	Co-location	Cost	Opportunity Cost	Implementation
Alt. A – Current Site					
Alt. B – Taxiway C South					
Alt. C – Near Apron 2					
Alt. D – Taxiway C North					
Alt. E – Midfield					



Strategic Goal #4
SUSTAINED FINANCIAL STRENGTH



Chapter 8 – Commercial Development

YQR 2037 MASTER PLAN

Chapter 8 – COMMERCIAL DEVELOPMENT

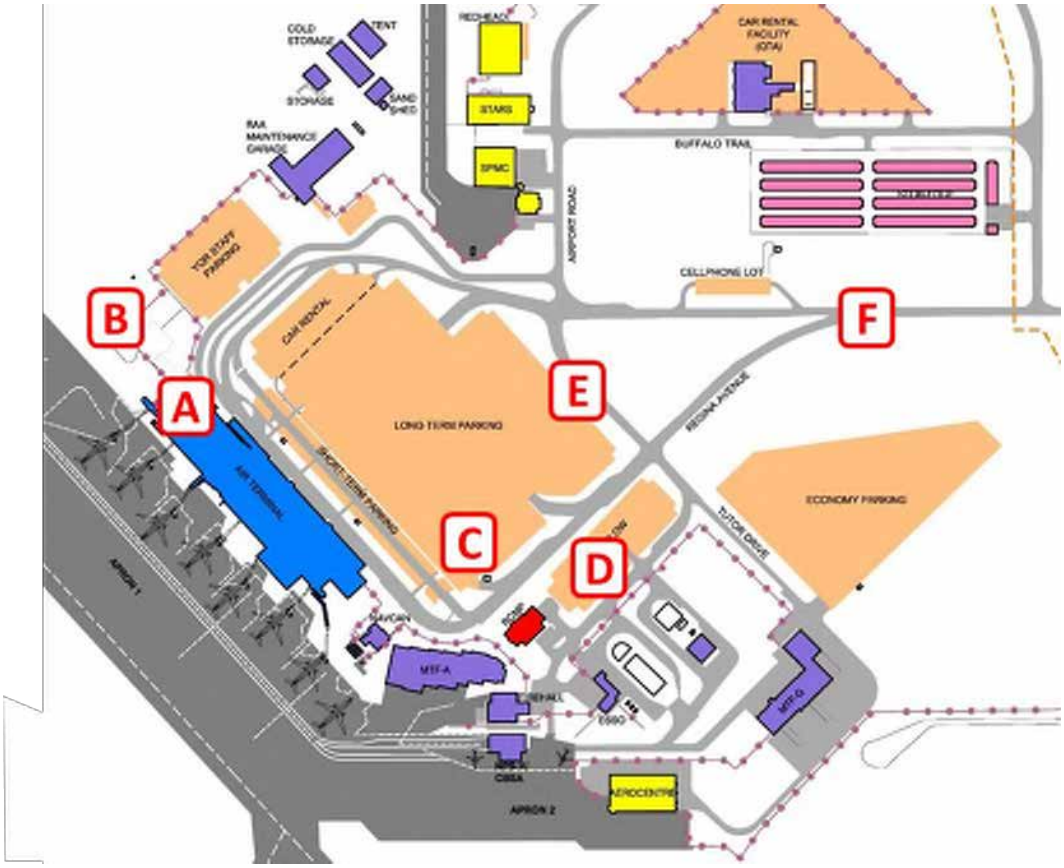
In an effort to increase non-aeronautical revenues, the Airport would like to improve opportunities for commercial development on Airport property. The Master Plan focused on three elements: a hotel site, a gas station site, and inclusion of a recent commercial development feasibility and market study.

HOTEL

Recent studies have indicated that there is a market for at least one on-Airport hotel. Six potential hotel sites were identified and evaluated. These sites are shown in Figure 8-1 and are as-follows:

- **Site A – Atop ATB Expansion.** Constructed in conjunction with and on top of the ATB expansion.
- **Site B – Adjacent to ATB Expansion.** A stand-alone hotel constructed adjacent to the ATB.
- **Site C – Long-Term Parking.** Constructed in the existing Long-Term Parking Lot, likely on the South side.
- **Site D – Overflow Parking.** Constructed on the site of the Overflow Parking Lot.
- **Site E – In Expanded Loop**. In the expanded roadway loop that is proposed in Groundside Alternative 4 that is east of the Long-Term Parking Lot.
- **Site F – Along Access Road**. Adjacent to the Airport access road.

Figure 8-1. Potential Hotel Sites



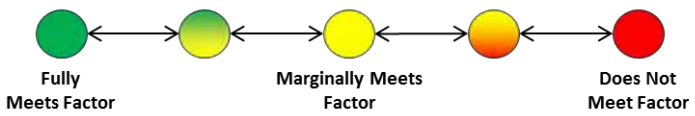
A summary of the evaluation of the potential hotel sites is provided in Table 8-1. Three evaluation criteria were identified and evaluated on a five-scale basis, with green meeting the criteria and red not meeting the criteria.

- Alternative A is viewed as an ideal location, but the likely ATB expansion footprint is smaller than is necessary for a hotel.
- Alternative B would block any future ATB expansion to the north.
- Alternative C would provide excellent customer service (short walk across the parking lot), but it would require replacement of public parking at a further location.
- Alternative D is heavily constrained and in a somewhat industrial part of the Airport.
- Alternative E provides an opportunity for an architectural gateway to the Airport; however, it does require longer walking distances and may require a shuttle.
- Alternative F would require a shuttle, but has little impact on development plans and does not have site constraints.

In conjunction with the preference of Groundside Alternative 4, Hotel Alternative Site E is the preferred hotel site. It is also recommended that Airport personnel be prepared to offer Site C as an alternative site to any hotel concessionaire, in the case that the concessionaire is not comfortable with the relatively long walking distance to Site E. Site F should also be preserved for a hotel site for an eventual second on-Airport hotel.

Table 8-1. Evaluation of Potential Hotel Sites

Recent study showed potential for on-Airport hotel with 120-150 rooms	Customer Service	Impact on Long-Term Development	Site Constraints
Alt. A – Atop Expansion			
Alt. B – Adjacent to Expansion			
Alt. C – Long-term Parking			
Alt. D – Overflow Parking			
Alt. E – In expanded loop			
Alt. F – Along access road			

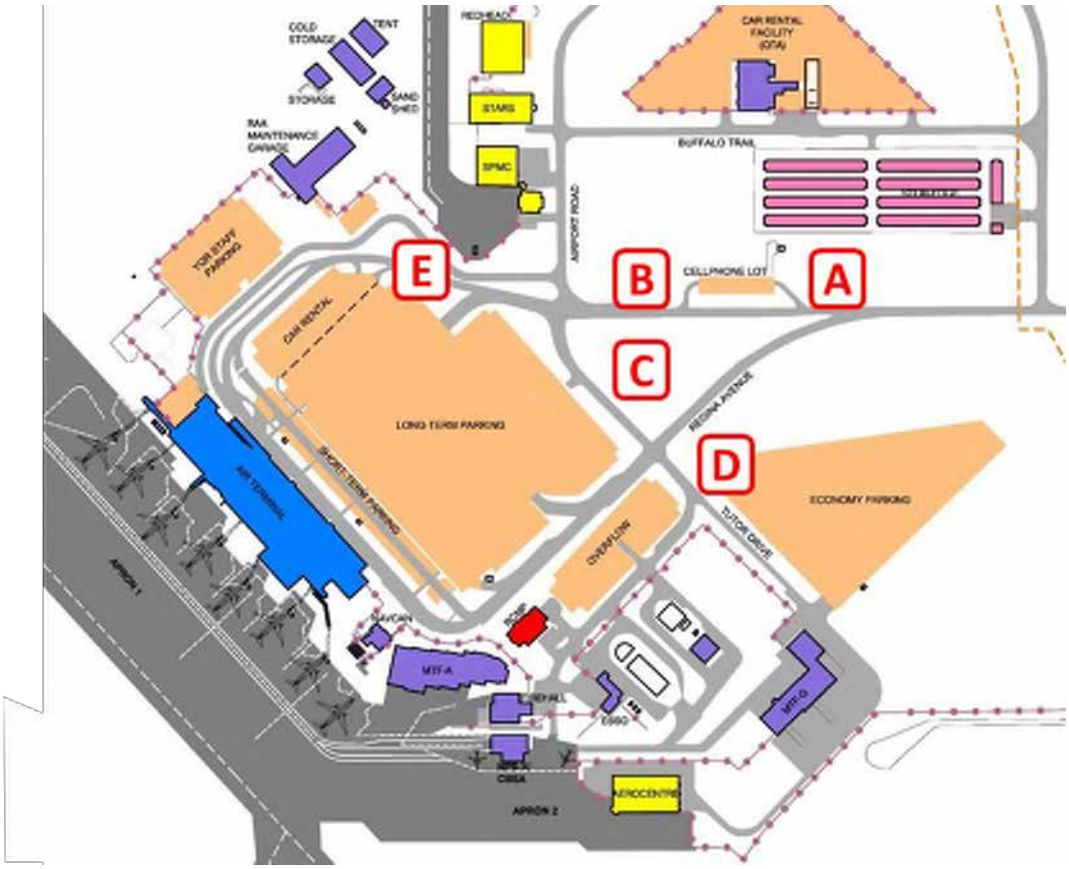


GAS STATION AND CONVENIENCE STORE

There are many success stories for on-Airport gas stations/convenience stores. Given that there is not a gas station in immediate proximity to the Lewvan Drive intersection, it is recommended that RAA develop a site for a gas station. The convenience store will also be most successful if the Cell Lot and any commercial vehicle hold lots are located adjacent to the convenience store. Five potential hotel sites were identified and evaluated. These sites are shown in Figure 8-2 and are as-follows:

- **Site A – East of Cell Lot.** North of Regina Avenue, between Cell Lot and Sandra Schmirler Way.
- **Site B – West of Cell Lot.** North of Regina Avenue, between the Cell Lot and Airport Road.
- **Site C – Inside Loop.** Inside the ATB roadway loop, with direct access (from the left lanes) from both the inbound and outbound roads.
- **Site D – Economy Lot.** Located on the northwest corner of the Economy Parking Lot, on the corner of Regina Avenue and Tutor Drive.
- **Site E – Adjacent to Rental Cars**. Located along the inbound roadway.

Figure 8-2. Potential Sites for a Gas Station and Convenience Store

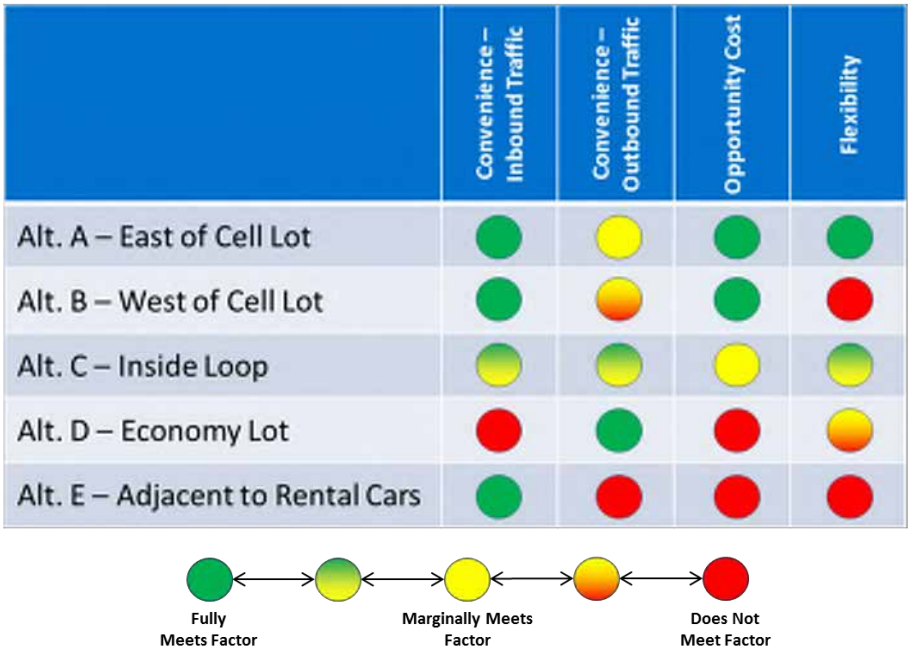


A summary of the evaluation of the potential gas station/convenience store sites is provided in Table 8-2. Four evaluation criteria were identified and evaluated on a five-scale basis, with green meeting the criteria and red not meeting the criteria. Typically, the main users of an on-Airport gas station are (1) rental car customers returning their vehicles, followed by (2) arriving passengers leaving the Airport and heading to their home, and (3) employees. The ideal location would provide convenient access to all three groups.

- Alternative A provides excellent access to inbound vehicles, but outbound vehicles would have to turn left across inbound traffic. This location provides ample area for development.
- Alternative B conflicts with the preferred Groundside Alternative 4 roadway.
- Alternative C provides good access to both inbound and outbound vehicles (albeit via left-side driveways). This site would serve as the gateway to the Airport, requiring aesthetic quality.
- Alternative D is inconvenient for inbound traffic, reduces parking capacity, and development would be limited by future development.
- Alternative E does not provide sufficient area for development or, with the expanded roadway loop in Groundside Alternative 4, this area is needed for Long-Term Parking. It also provides poor access to outbound traffic.

Alternatives A and C are recognized as the preferred sites for a gas station and convenience store.

Table 8-2. Evaluation of Potential Gas Station / Convenience Store Sites



FEASIBILITY AND MARKET STUDY

In late-2018, the RAA completed a Real Estate and Economic Development Strategy. The Master Plan is in alignment with this study. Figure 8-3 shows the type of development recommended by the study. Figure 8-4 shows the time-frame in which the development is recommended to occur.

Figure 8-3. Recommended Development Zones for Airport Property

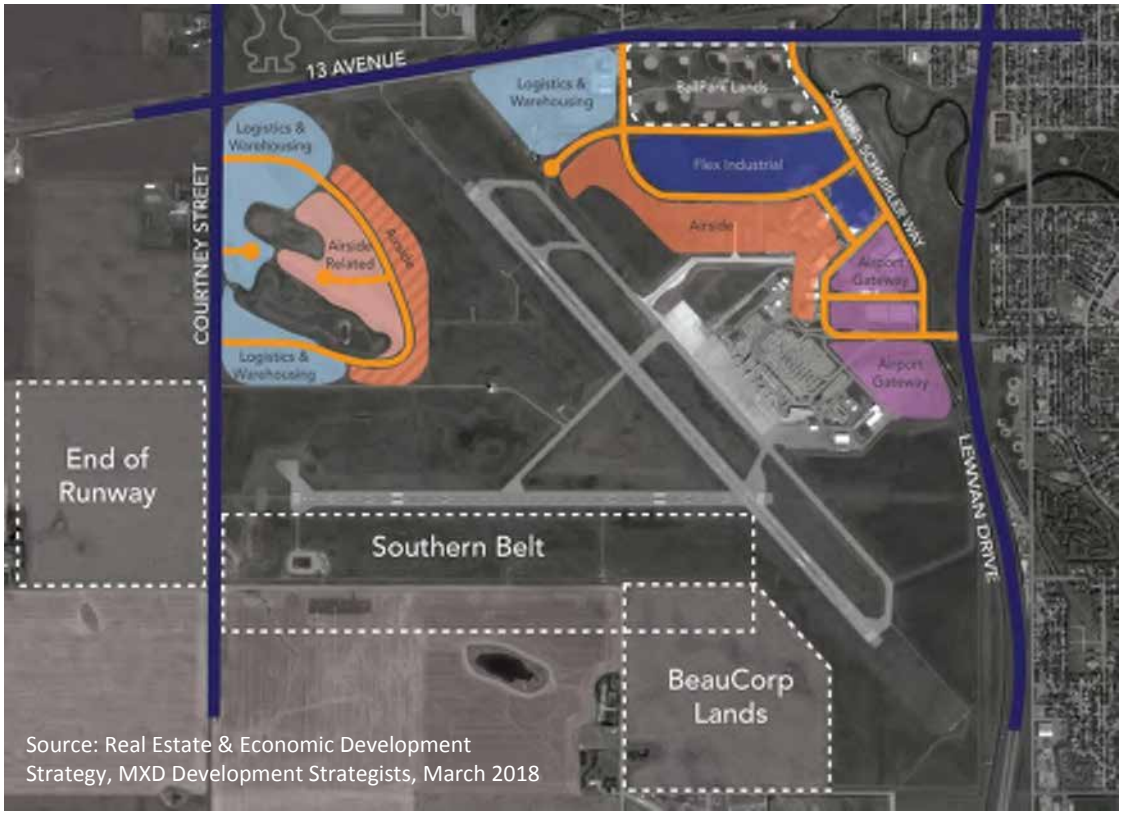


Figure 8-4. Recommended Timeframe for Airport Land Development

Chapter 9 – Environmental Considerations

YQR 2037 MASTER PLAN

Chapter 9 - ENVIRONMENTAL CONSIDERATIONS

This chapter consists of three components: (a) the Noise Exposure Forecast, (b) the known environmental issues at the Airport, and (c) a review of the environmental policies and procedures at the Airport

NOISE EXPOSURE FORECAST (NEF)

The Noise Exposure Forecast (NEF) system is the officially recognized metric used in Canada for assessing perceived noise levels at airports. It was designed to encourage compatible land uses in the vicinity of airports, and to predict human annoyance to airport operations within noise zones.

The NEF calculates the sound generated by individual aircraft type and mix expected to operate at the Airport and adjusts for the number of forecast operations. The NEF also takes into account runway usage and configuration (i.e. orientation) as well as flights times. Due to the higher social impacts of nighttime noise, aircraft movements at night have 16.7 times the impact of daytime movements.

Noise Contours

The Transport Canada NEFCalc v2.0.6 model was used to calculate NEF levels and generate noise contours that delineate perceived noise levels around the Airport. These contours designate areas of equal noise exposure and thereby provide information to assist in planning for compatible land uses. The computer-generated result is a compendium of factors, so it cannot be directly related to measured noise.

Generally, several contours are generated to delineate areas of individual noise ranges (greater than NEF 40, NEF 35-40, NEF 30-35, NEF 25-30). At extended distances from aircraft flight paths, ambient noise levels typically dominate.

Noise and Land Use

Noise contours, in conjunction with a set of guidelines, are to be used to encourage compatible land use in the vicinity of the Airport. The Design Regina, Official Community Plan (OCP) Schedule "A" to Bylaw No. 2013-48 (last amended December 14, 2016) has several goals within Section D9 Health and Safety regarding Special Policy Areas related to aircraft noise from Regina International Airport. Specifically, they are as-follows:

> 11.14.1 Apply noise attenuation standards to new residential development in the area between 25 and 30 NOISE EXPOSURE FORECAST in accordance with the Zoning Bylaw;
>
> 11.14.2 Prohibit residential land use within the 30 NOISE EXPOSURE FORECAST contour;

In addition to the overarching goals noted above, Part B B.14 of the Regina OCP for the Westerra Neighbourhood Plan has several policies regarding aircraft noise at Regina International Airport:

> 2.3.2 (b) Residential development shall not be permitted on those lands contained within the Noise Exposure Forecast contour of 30 or greater as outlined on Figure 8: NEF Contours and Height Limitations.
>
> 2.3.2 (c) Residential building construction within the 25-30 NEF contours must comply with all applicable Federal and Provincial regulations regarding noise attenuation.

2.3.2 (f) Permanent or temporary development of lands in Westerra should consider all applicable provisions of Land Use in the Vicinity of Airport Guidelines as published by Transport Canada.

The Transport Canada guidelines, Land Use in the Vicinity of Airports (TP 1247E Aviation, 2013/2014), provide community response predictions by noise contour ranges, which are summarized in Table 9-1. Transport Canada recommends that no new noise sensitive land uses be permitted above NEF 25.

Table 9-1. Transport Canada's Community Response Predictions

NEF Level	Response Prediction[25]
Over NEF 40	Repeated and vigorous individual complaints are likely. Concerted group and legal action might be expected.
NEF 35-40	Individual complaints may be vigorous. Possible group action and appeals to authorities.
NEF 30-35	Sporadic to repeated individual complaints. Group action is possible.
Below NEF 30	Sporadic complaints may occur. Noise may interfere occasionally with certain activities of the resident.

Adoption of Noise Contours for Long-Term Planning

Two sets of noise contours were developed for this master plan: a Noise Exposure Forecast for 2017 and a Noise Exposure Projection (NEP) for 2037. The 2017 Noise Exposure Forecast was developed using the 2017 historical peak planning day's level of activity with a distribution of aircraft types, destinations, and flight paths based on annual average activities for the 12-month period between June 2016 and May 2017. The 2017 noise exposure contours are shown in Figure 9-1.

A Noise Exposure Projection was developed for 2037 using the "Most Likely" forecast of annual aircraft activity at YQR in 2037 as well as projections of forecast peak day activity in 2037 (Most Likely scenario). It was assumed that the distribution of arrival and departure paths in 2037 would be broadly similar to those patterns observed in 2017. Assumptions were made regarding the type of aircraft in service in 2037 to reflect expected fleet changes and new technologies in the industry in 20 years' time. It is assumed that, given advances in latest-generation commercial aircraft and engine design, that these new-generation aircraft will be quieter than the aircraft they replace.[26] However, the NEFCal database does not contain information on the exact noise emissions of these either recently in service or yet to be introduced aircraft, proxy aircraft were used to estimate the assumed reduction in noise emissions.[27] As these proxy aircraft choices are based on professional judgement, the NEP in 2037 remains a best-estimate of potential noise exposure given changes in technology. The 2037 projection of noise exposure contours are shown in Figure 9-2.

The resulting smaller community exposure of the 2037 NEP NEFs is directly attributable to the assumed change in aircraft technology (through the use of proxy aircraft). As this reduction on forecast noise

[25] Source: Transport Canada, TP 1247 - Aviation - Land Use in the Vicinity of Aerodromes, Part IV – Aircraft Noise
[26] For example, the Embraer E-175/195, Boeing 737NG (-600, -700, and -800), and Airbus A320*ceo* aircraft types.
[27] In general, the proxy aircraft chosen were quieter than those they replaced in the 2017 simulation, e.g., substituting a 737-700 for a 737MAX8, with the -700 having a smaller noise emission footprint than an existing 737-800.

exposure is based on assumptions, it is recommended that the existing 2024 NEP (developed in 2007) be retained for land use planning purposes. As a result, the NEF contours shown in Zoning Maps in Section 19 of the Regina Zoning Bylaws and Figure 8: NEF Contours and Height Limitations in the Regina OCP – Part B Part B.14 will remain the same. While it is most likely that by 2037 the community noise exposure at the Airport will be smaller than in 2017, there is still much uncertainty over how community noise perception will change in response to new aircraft and engine technologies. Therefore, to provide the greatest level of protection to the community in terms of noise exposure it is recommended that the 2007 NEP for 2024 be retained for planning purposes.

Figure 9-1. Noise Exposure Forecast for 2017 Aircraft Movements

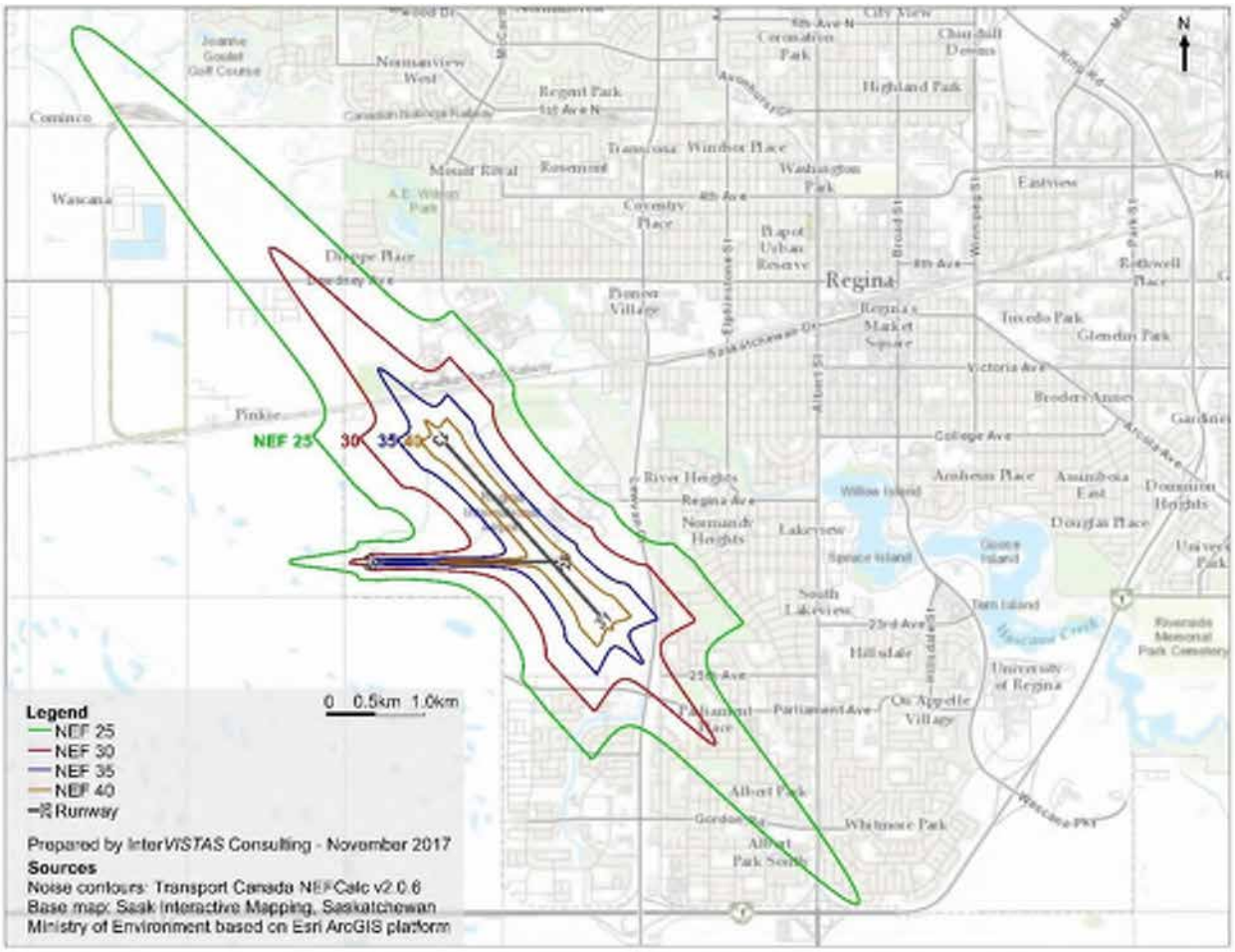
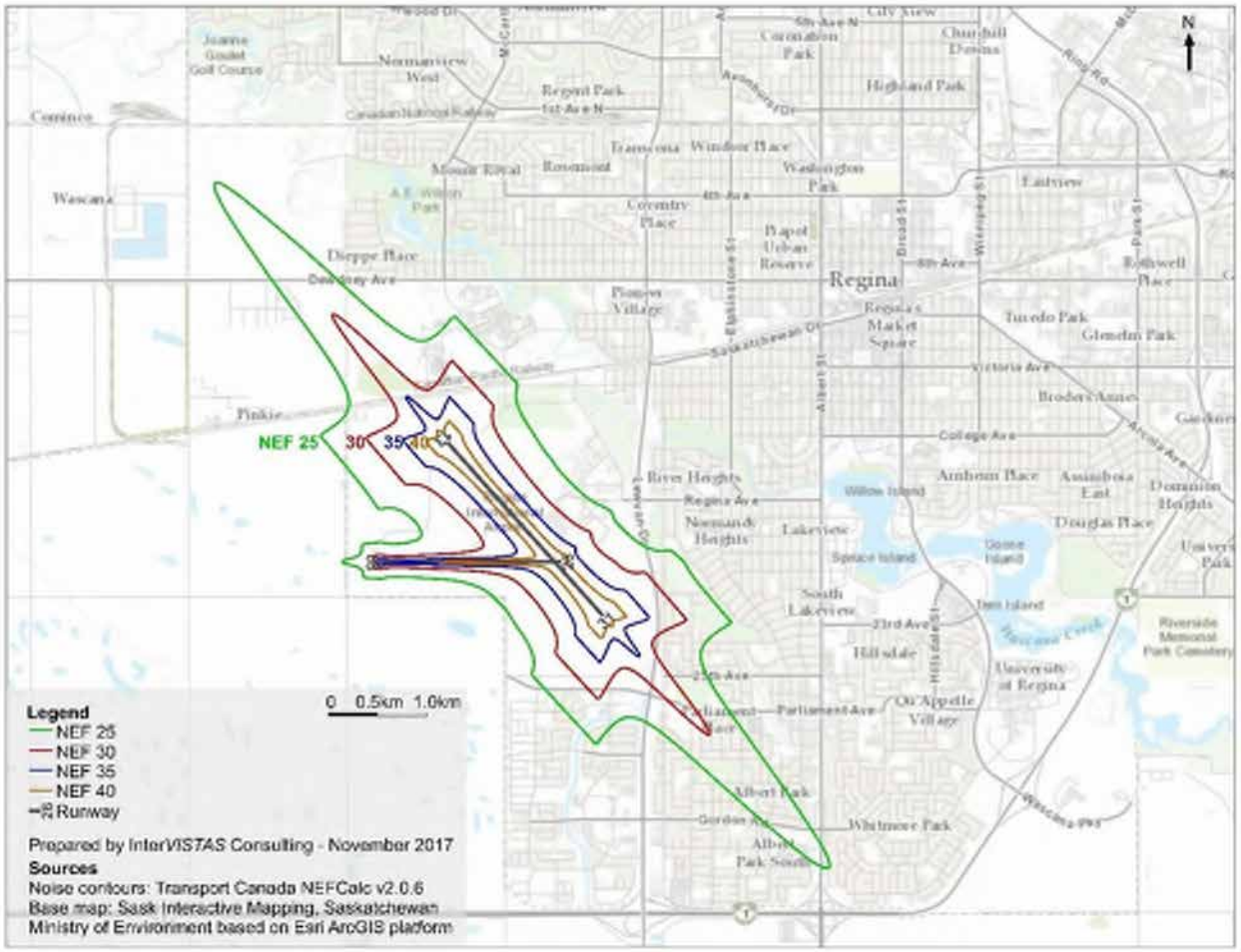


Figure 9-2. Noise Exposure Projection for 2037 Aircraft Movements



KNOWN ENVIRONMENTAL ISSUES

The only specific environmental concern identified during the master plan review included Per and poly-fluoroalkyl substances (PFAS). Common applications of PFAS include fire-fighting foams like those commonly used at airports. New guidelines are emerging from federally regulated sites to characterize and delineate potential PFAS soil- and groundwater-contamination.

ENVIRONMENTAL POLICY AND PROCEDURES REVIEW

Overview

RAA is committed to managing and operating the Regina International Airport in a safe, secure, efficient, commercially viable and environmentally responsible manner. Through the continued development, implementation, and operation of an environmental management system RAA will strive to continually improve its environmental performance.

The following sections describe the RAA's Environmental Policy, Environmental Management System (EMS), Environmental Programs and Environmental Review Process.

Environmental Policy

The Regina Airport Authority (RAA), understands the importance of balancing airport operations, future growth and development with the natural environment. The RAA is committed to minimizing the environmental footprint of our activities, while ensuring that operations are conducted in a safe and secure manner. As the primary air access gateway to southern Saskatchewan it is vital that we do our part for future generations, while balancing the need to grow the airport for the betterment and vibrancy of the region.

Our commitment to the environment:

- Minimize pollutant discharge into receiving waters and routinely test water quality.
- Reduce waste generated through refinement to operations.
- Reduce usage of electricity and natural gas through strategic investments.
- Maintain an active spill response program.
- Actively promote recycling with our customers and tenants.
- Meet or exceed all applicable environmental legislation.
- Monitor our carbon footprint and include carbon reduction initiatives in our future plans.
- Raise awareness of on-airport environmental initiatives with stakeholders and tenants.
- Integrate environmental considerations into airport planning, operations and development activities.
- Screen all capital projects and implement mitigation measures as required.
- Work closely with The City of Regina on matters of mutual environmental concern.
- Report the airport's environmental performance to the local community.
- Communicate and promote environmental responsibility among our team members, customers, partners, suppliers and other stakeholders.
- Actively participate with the Canadian Airports Council on nationwide environmental initiatives for airports.

Environmental Management System Policy Manual

The RAA has designed an Environmental Management System (EMS) Policy Manual that guides the RAA in the operation of its facilities. RAA's EMS applies to all services, operations, activities and facilities under RAA's control, but not contractors working for or on behalf of RAA. For tenants, potential environmental risks will be managed under RAA's Tenant Management Program. RAA will ensure its tenants are aware of their Environmental Policy and Tenant Management Program.

For the purposes of RAA's EMS, activities have been divided into four areas: Airport Facilities, Airport Operations, Airport Safety and Fire Services, and Common Elements, as follows:

Airport Facilities: Responsible for the operation and maintenance of RAA-owned facilities and equipment, as well as the acquisition of lands. Includes the management of non-hazardous, hazardous and international waste storage and disposal, operations and maintenance of heating and cooling equipment and storage tank systems.

Airport Operations: Responsible for the management of the glycol sewer collection system, outdoor grounds, parking lots, wildlife control, vehicle maintenance and fueling, and tenant activities.

Airport Safety and Fire Services: Responsible for responding to fires and other emergencies at the Airport. Also, responsible for the operation and maintenance of the Fire Training Center and emergency vehicles and for wildlife control outside Airport Operations hours.

Common Elements: Includes those aspects common to each operational area, such as energy use, paper use, sanitary sewage generation activities, disposal of waste, cleaning, and food intake.

Environmental Management System Overview

As part of the EMS, RAA defines a process to:

- Identify, evaluate and regularly review the environmental aspects (interactions with the environment) and environmental impacts associated with RAA's activities, operations and services which it directly controls or has influence over.
- Ensure RAA personnel are aware, have access to, and review applicable environmental legislation and other requirements, as they apply to RAA's operations.
- Set environmental objectives and targets that manage and monitor the impacts of RAA's significant aspects with the goal of improving environmental performance.
- Identify resources, roles, responsibilities and authorities of the key people within RAA to ensure the development, implementation and maintenance of the EMS.
- Ensure RAA employees who have the potential to cause environmental impacts are made aware of the importance of conforming to the EMS and are appropriately trained and competent to conduct their daily activities in a manner that prevents negative environmental impacts to the environment. This element applies to environmentally related training only, not to training related to equipment or job-specific operations.
- Provide a framework for communicating relevant information related to the EMS with internal and external parties.
- Ensure EMS documents are controlled, identifiable, locatable, accessible and kept current.
- Ensure that programs and procedures are in place to control situations where their absence could lead to a deviation from environmental legal and other requirements, or result in an environmental impact.
- Monitor the environmental performance of RAA's activities.
- Evaluate environmental compliance with legal and other requirements applicable to RAA's operations and activities.
- Identify, investigate, correct and prevent non-conformances and non-compliances.
- Ensure EMS records are maintained, legible, identifiable, locatable and protected.
- Conduct internal audits at planned intervals to determine if RAA's EMS conforms to planned arrangements and has been properly implemented and maintained.
- Conduct a review of RAA's EMS with the Environmental Committee to evaluate the system's continuing suitability, adequacy and effectiveness.

Environmental Programs

Responsible environmental practice employs planning tools and operational procedures to minimize potential negative environmental impacts that might otherwise arise from aircraft operations, land use activities or developments. The following summarizes key environmental programs that have been or will be put in place as a result of the adoption of the EMS. These programs support managing environmental issues raised during the Master Plan Review.

Water Sampling

The RAA developed a water sampling program in 2001, which identified on-Airport locations for additional sampling stations. As part of RAA's environmental due diligence undertakings, water sampling activities will take place, when required, through the utilization of the Airport's water sampling stations.

This program applies to sanitary and stormwater discharges from RAA's property and operations, including tenant operations conducted on property managed by RAA. RAA's fire training area is designed to capture wastewater effluent by directing runoff to sump pits that are manually pumped out for disposal, or by allowing water to evaporate from the area.

The objective of the program is to monitor effluent streams from RAA's property for the presence of potential contaminants, to track background levels of parameters in effluent, and to monitor compliance with relevant regulatory requirements. The program includes sampling surface water for numerous parameters including glycol.

Tenant Management

The RAA recognizes that tenant activities occurring on property have the potential to pose environmental, as well as associated legal and financial risks to RAA. As such, this program aims to address potential risks posed to the RAA by tenant operations and activities on property managed by RAA.

The program includes formal procedures for regularly evaluating tenant activities using a combination of desktop screening level assessments and on-site inspections, as well as the development of operating guidelines related to tenant activities, outlining minimum standards required by RAA related to management of potential environmental risks.

Hazardous Material Management

RAA staff receive, handle and store hazardous materials such as paints, chiller and boiler water treatment chemicals, pesticides, explosives, and petroleum products, as well as compressed gases. The RAA recognizes that the storage and use of hazardous materials on RAA property has the potential to impact the environment, depending on how such materials are handled. As such, RAA has implemented this program related to the management of hazardous materials under the control of RAA on airport property. This program includes formal procedures for the management of hazardous materials, including on-site storage and handling requirements, labelling, worker training, and disposal of residual hazardous materials, as required, for the Regina Airport Authority. The program includes maintaining a Hazardous Materials Inventory. The products to be inventoried include various hazardous materials, ozone-depleting substances, greenhouse gases, PCBs and asbestos. Where appropriate, the inventory will ensure that these substances are removed or their presence phased out from the airport property.

Halocarbon Management

The RAA owns and operates halocarbon containing equipment, including air-conditioning units, chillers and a fire suppression system. The RAA recognizes the presence of halocarbons in RAA owned and/or operated equipment has the potential to impact the environment if released. As such, this program aims

to manage the use of halocarbons and the associated equipment throughout its lifecycle (purchasing, installation, operation and disposal) to prevent such releases.

The program includes formal procedures for the management of halocarbons, including the purchasing, handling and use of halocarbons, leak testing, release reporting and record keeping, with the goal of minimizing potential impacts from halocarbon releases to the natural environment.

This program applies to all halocarbon containing equipment owned and/or operated by RAA, including air-conditioning units and chillers, located on RAA property. The program does not apply to halocarbon containing equipment owned by tenants occupying RAA property and/or facilities.

The objective of the program is to ensure that regulatory requirements related to the use of halocarbons are followed and processes are in place to prevent releases of halocarbons to the natural environment.

Storage Tank Management

The RAA stores petroleum products in storage tank systems on Airport property, for use in Airport operations. The RAA recognizes that activities related to storage tank systems have the potential to pose environmental, as well as associated legal and financial risks to the organization. As such, this program aims to address potential risks through the use and management of petroleum storage tank systems.

The program includes procedures for the management of petroleum storage tank systems, including installation, registration, labelling, inspections, use, worker training, and decommissioning of tanks for the Regina Airport Authority. This program applies to petroleum storage tank systems on RAA property and under the charge and control the Regina Airport Authority on RAA property.

The objective of the program is to ensure that regulatory requirements are followed related to petroleum storage tank systems in use by RAA, including requirements related to storage, labelling, use, and employee training. The goal of the program is to prevent and / or minimize potential impact from petroleum products on the surrounding environment.

Audit Program

RAA personnel will conduct annual tenant audits to determine the effectiveness of tenant environmental systems and to ensure compliance with environmental legislation. An external firm will perform audits of the entire airport site and RAA facilities to evaluate the EMS, the environmental quality of the site, and the fulfilment of legal requirements.

Wildlife Management

Incidents between wildlife and aircraft, including strikes and near misses, can be a serious safety concern. Although there are relatively few wildlife incidents at the airport, the RAA is determined to remain vigilant and minimize aircraft/wildlife conflicts in the most environmentally sensitive manner possible.

The RAA operates a wildlife management plan that integrates habitat modification, land use planning, dispersal methods, exclusion methods, use of firearms personnel, policy, procedures and removal methods. Identified problem species are targeted and dealt with using the most effective techniques for the species in question. The RAA also takes care to warn flight crews about potential wildlife hazards, records and reports all wildlife incidents, and ensures that wildlife control personnel are available 24 hours a day, seven days a week.

Environmental Air Quality Monitoring

Given the relatively low number of aircraft movements at the Airport and minimal amount of ground vehicle traffic, airport operations likely have no significant impact upon local air quality. It is therefore unnecessary to implement an air quality monitoring program. As air traffic increases over the longer-term, however, the RAA may initiate air quality studies to determine the effect airport operations have on the local atmosphere.

Contaminated Sites

Prior to the transfer of airport operations to the RAA, the site was subjected to a full environmental audit to identify prevailing environmental conditions at the airport. The 1998 Regina Airport Environmental Baseline Study found that the site possessed few areas of environmental concern. Of the few areas identified, environmental risks were considered to be limited and remedial measures were not recommended or undertaken. The RAA is aware of the condition of these areas and continues to monitor the entire airport site to avoid future contamination. The RAA continues to use the results of this study, along with historical data, as a record of past soil contamination. This information is considered during the planning of all airport projects and operations.

Environmental Review Process

The RAA reviews all airport projects to ascertain their potential environmental impacts. The Environmental Review Process considers the biological, physical, and social impacts of all projects, and involves the preparation of an Environmental Review Report by airport personnel before a project is authorized to proceed. The Canadian Environmental Assessment Act (CEAA) is used as a guide for all environmental assessments.

As required in the EMS environmental aspects and impacts associated with activities, products and/or services within RAA's control, are identified/reviewed, whether adverse or beneficial. In identifying/reviewing environmental aspects, consideration is given to the inputs and outputs (both intended and unintended) associated with:

- Current and relevant-past activities;
- Products and services;
- Planned or new developments;
- New or modified activities, products and services;
- Normal and abnormal operating conditions;
- Shut-down and start-up conditions; and
- Reasonably foreseeable emergency situations.

The significance of environmental aspects are evaluated by the Manager of Environment, or designate, using a Procedure for Environmental Aspect and Impact Identification and Determination of Significance.

A list of RAA's environmental aspects and impacts is documented and maintained by the Manager of Environment or designate.

Chapter 10 – Utilities

YQR 2037 MASTER PLAN

Chapter 10 – UTILITIES

This section describes the on-Airport utilities and what is required for future utility needs at the Airport. The existing utility lines for the entire Airport property is shown in Figure 10-1. The utility network near the ATB are complex and are shown in Figure 10-2.

POTABLE WATER DISTRIBUTION

Potable water is currently provided by the City of Regina water distribution network, serviced to the Airport facilities by a 250 mm diameter water main on Regina Avenue, and a 300 mm diameter water main on Sandra Schmirler Way.

In 2011, a new trunk water main was installed from Lewvan Drive to service the Global Transportation Hub (GTH) located on the west side of the city. This new trunk water main runs along the east and north sides of the Airport property and varies in size from 600 mm to 900 mm in diameter. New connections to this trunk water main have been installed on Sandra Schmirler Way, and on the north side of the Airport property. These new connections have provided additional servicing to the north area of the Airport property, and most likely increased the service pressure of the existing Airport water distribution network.

There is access to the trunk water main in the north area of the Airport property, however, the trunk water main is not readily accessible to property south of Runway 08-26. If this area is developed, there is potential to service it from a 600 mm diameter water main on Parliament Avenue in the Harbour Landing Subdivision. Discussions with the City of Regina would be required at the time of any development to determine the feasibility of servicing from this water main. The undeveloped area immediately south of the Airport property is currently under application to the City of Regina for development by the current land owners, which may have an impact on potential water service. The City of Regina Water Master Plan is currently in development and may develop strategies to guide servicing improvements to support Airport development and other growth areas.

Much of the existing water infrastructure is 60 to 80 years old. As a result, improvements may be required as the infrastructure continues to age. The existing water network loop servicing the Air Terminal Building has varying pipe sizes, from 150 mm up to 250 mm diameter. Increasing the 150 mm and 200 mm diameter pipes to 250 mm diameter for consistency could potentially provide better service levels and fire flow capacity.

The Air Terminal Building is serviced by two 150 mm diameter water service pipes located near the north end of the building. Providing a second service connection for redundancy near the south end of the building may be beneficial in case the existing service connections ever fail.

WASTEWATER COLLECTION

Wastewater is currently collected by a series of underground sewer pipes connecting to the City of Regina wastewater collection system. Wastewater is conveyed from the Airport property to a 1,350 mm diameter City of Regina owned gravity trunk sewer flowing from Regina Avenue north along Sandra Schmirler Way, then northwest through the Airport property to 13th Avenue, and ultimately to the City of Regina wastewater treatment plant on the west side of the city.

It is anticipated that this trunk sewer will have sufficient additional capacity to service future development on the Airport property. Discussions with the City of Regina would be required at the time of any future development to determine the feasibility of servicing from this trunk sewer. If there is limited capacity, on-site storage facilities, or an alternate conveyance to the wastewater treatment plant may be necessary to accommodate future development. The City of Regina Wastewater Master Plan is currently in development and may identify downstream capacity upgrades.

There is access to the trunk sewer in the north area of the Airport property, however, the trunk sewer is not readily accessible to property south of Runway 08-26. If this area is developed, wastewater may need to be conveyed to the trunk sewer by a series of sanitary sewer mains if there is capacity. The undeveloped area immediately south of the Airport property is currently under application to the City of Regina for development by the current land owners, which may have an impact on potential wastewater service.

Much of the existing sanitary sewer infrastructure is around 60 years old. Improvements may be required as the infrastructure continues to age. A closed-circuit television (CCTV) program to evaluate and prioritize improvement efforts may be beneficial.

STORM WATER COLLECTION

Storm water is currently collected and conveyed to Wascana Creek by a system of underground sewer pipes and overland flow through ditches and culverts. Wascana Creek is located adjacent to the northeast Airport property boundary, flowing to the northwest.

It is anticipated that any future Airport development will utilize similar storm water collection and conveyance infrastructure, avoiding the necessity to connect to City of Regina infrastructure. Storm water detention ponds and engineered wetlands may be incorporated to mitigate the impact of large storm events on downstream property and improve water quality.

As further development continues, capacity of existing storm sewer infrastructure may need to be evaluated. A storm water management plan that includes strategically directing overland flow to Wascana Creek may be beneficial to allow development of additional areas.

A ditch could be constructed in the slough west of Runway 13-31 to improve drainage. Although the slough is outside the Airport perimeter fence, it is within the Airport property, and could open up additional land for development.

ELECTRICAL DISTRIBUTION

Electrical power to the Airport facilities is currently provided by SaskPower. The Air Terminal Building has a backup generator for emergency power.[28] A diesel generator, located in the Field Electric Centre, provides backup power to the airfield. It is anticipated that any future development of the Airport property will have electrical service provided by SaskPower, without any major upgrades to SaskPower infrastructure. However, discussions with SaskPower at the time of any development is required. There may be significant lead times prior to any development for SaskPower to plan for possible upgrades.

[28] Pryde Schropp McComb, Inc. (2008). Regina International Airport – Airport Master Plan 2007-2027.

NATURAL GAS DISTRIBUTION

Natural gas service to the Airport facilities is currently provided by SaskEnergy. It is anticipated that any future development of the Airport property will have natural gas service provided by SaskEnergy, without any major upgrades to SaskEnergy infrastructure. However, discussions with SaskEnergy at the time of any development is required. There may be significant lead times prior to any development for SaskEnergy to plan for possible upgrades.

COMMUNICATION SERVICES

Telephone and cable television service is currently provided to the Airport facilities by the Saskatchewan Telecommunications Holding Corporation (SaskTel) and Access Communications Co-operative, Limited. It is anticipated that any future development of the Airport property will have communication service provided by SaskTel and Access Communications Co-operative, Limited, without any major upgrades to communication infrastructure. However, discussions with the utility companies at the time of any development would be required. There may be significant lead times prior to any development for the utility companies to plan for possible upgrades.

AIR TERMINAL BUILDING EXPANSION

There is the potential for expansion of the ATB on the southwest and northwest sides. If expansion occurs on the southwest side towards Apron 1, there will impacts to existing utilities as follows:

- Existing underground sanitary main and manhole south of ATB building will need to be decommissioned and relocated.
- Existing underground storm water collection infrastructure southwest of ATB will need to be decommissioned and moved further away from ATB.
- Surface grading may need to be modified, which may require modifications to Apron 1.
- Electrical and communication infrastructure will need to be decommissioned and relocated.

If expansion occurs on the northwest side, impacts to existing utilities will include the following:

- Existing underground storm main and catch basin will need to be decommissioned and possibly relocated.
- Electrical and communication infrastructure will need to be decommissioned and relocated.
- Surface grading may need to be modified.

In addition to the above noted conflicts, any expansion of the ATB will need to address the following:

- Water capacity could be a potential issue as additional square footage may require additional fire flow capacity beyond what is currently available. Usage from additional passenger volumes should not be an issue as fire flow capacity will most likely dictate requirements.
- Detailed modeling will be required to determine wastewater capacity constraints with additional passenger volumes.
- Expansion of ATB to accommodate increased passenger volumes will require additional Short- and Long-Term Parking, as well as additional unloading zone space.
- Utility companies may require upgrades to infrastructure to provide service with expansion of ATB.

Figure 10-1. Existing Utility Lines at the Airport

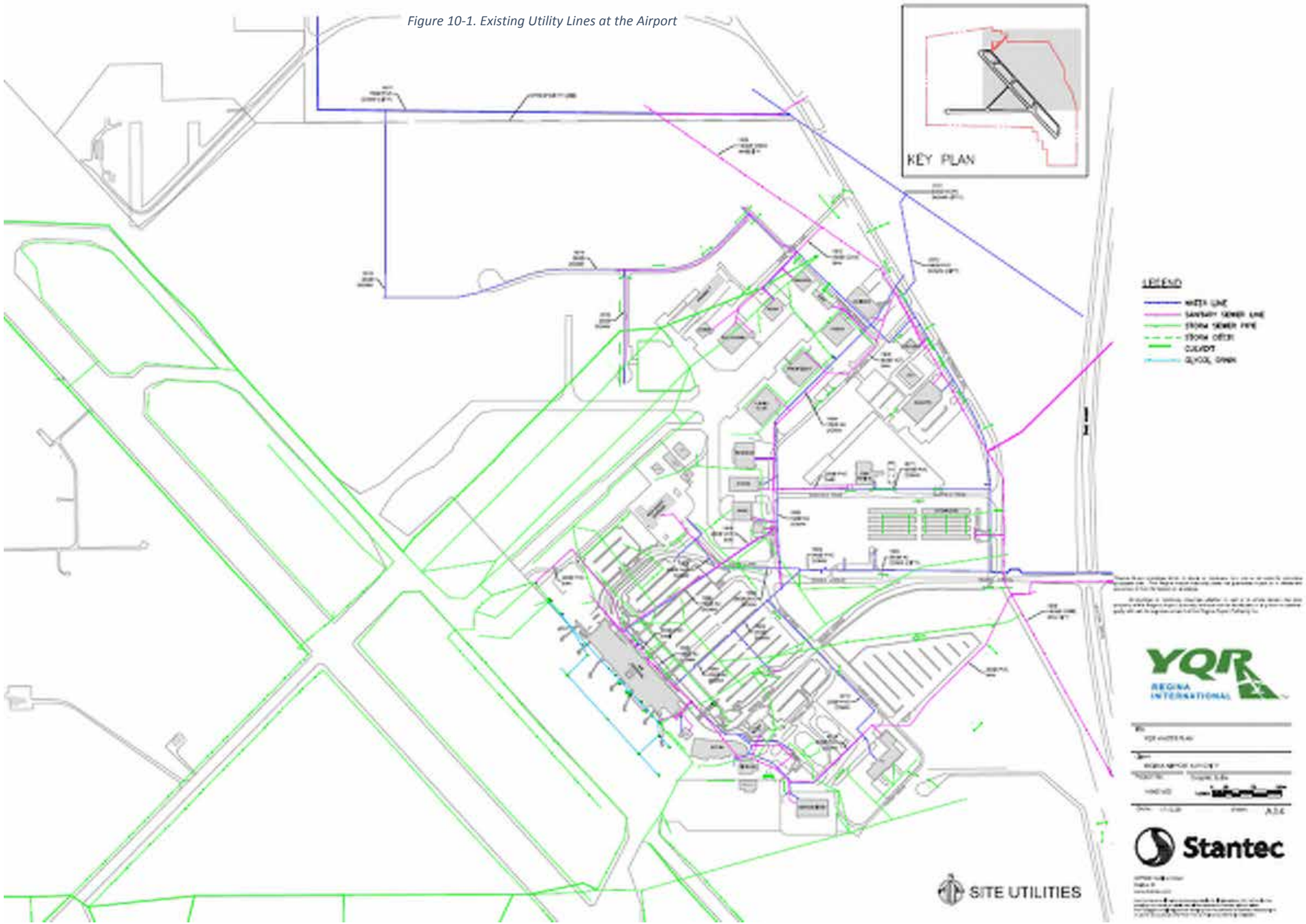
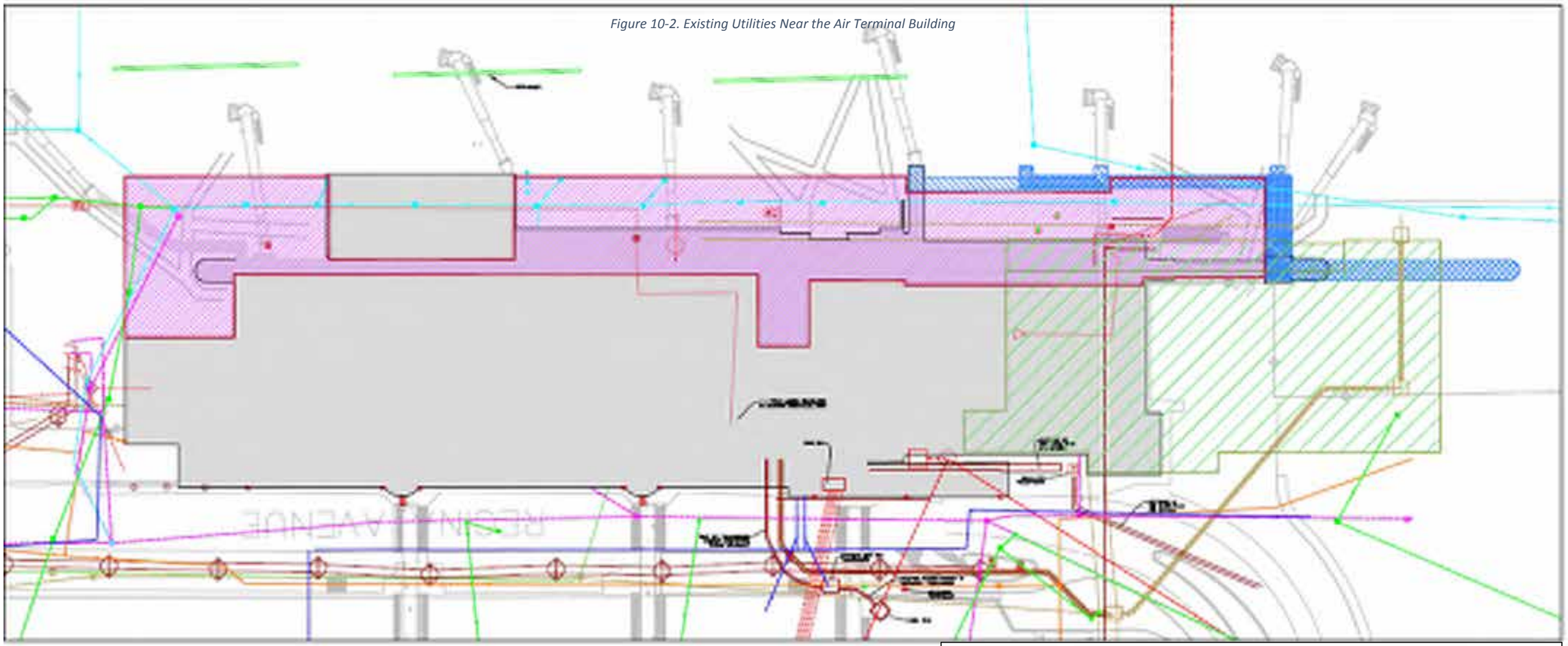


Figure 10-2. Existing Utilities Near the Air Terminal Building



LEGEND:

- NATURAL GAS MAIN
- PRIMARY POWER
- SECONDARY POWER
- COMMUNICATIONS
- AIRFIELD CABLING
- GLYCOL DRAINAGE
- DOMESTIC WATER MAIN
- SANITARY SEWER MAIN
- STORM SEWER MAIN
- GROUNDSIDE ELECTRICAL DUCTS & CABLING
- OPTION B HOLDROOM (SECOND LEVEL)
- OPTION B STERILE ARRIVING INT'L (SECOND LEVEL)
- EXISTING BUILDING
- CBSA POTENTIAL EXPANSION (MAIN LEVEL)
- TRANSFORMER
- JUNCTION BOX
- CAMERA
- EXTERIOR WALL LIGHT
- LIGHT STANDARD
- MANHOLE, STORM
- MANHOLE, GLYCOL
- MANHOLE, SANITARY SEWER
- CATCHBASIN
- CATCHBASIN
- COMMUNICATIONS JUNCTION BOX

Chapter 11 – Recommended Implementation Plan

YQR 2037 MASTER PLAN

Chapter 11 RECOMMENDED IMPLEMENTATION PLAN

The recommended implementation plan is divided into three phases. Each phase contains a list of capital projects. These projects are introduced in a rough sequence. In some cases, the projects must occur in the presented sequence. In other cases, projects are independent of one another and can occur at any time in the sequence.

PHASE 1

Phase 1 consists of projects that are anticipated to occur in the next two to five years (2019 to 2022). 14 projects are included in Phase 1. The Phase 1 projects are depicted in Figures 11-1 and 11-2. Projects 2 through 8 are dependent on the preceding projects and must occur sequentially. Projects 10 and 11 are also interconnected.

- Project 1 – **Regina Avenue Expansion** – consists of expanding Regina Avenue to two lanes on both directions, with sidewalks that allow pedestrian access to the Airport.
- Project 2 – **New Maintenance Garage** – consists of constructing a new Combined Services Building (CSB). The CSB is split into two phases, Phase 1 of which includes accommodating the services currently provided in the existing Maintenance Garage.
- Project 3 – **Demolition of the SPMC Hangar and Old Maintenance Garage** – following the end of the current lease, the SPMC facility would be demolished to make way for future road construction.
- Project 4 – **Buffalo Trail Extension** – extend Buffalo Trail to the west, adjacent to the employee parking lot, and to the ATB curbside. The Buffalo Trail extension is a two-way road for the entire east-west portion of the road. The southern segment of the extension is one-way southbound into the terminal area. The Buffalo Trail extension also includes driveways for the Maintenance Complex and Employee Parking facility.
- Project 5 – **Taxi Queue Relocation** – the taxi queue is moved to the northwest by approximately 125 metres, to the new Buffalo Trail extension. This includes relocating the small shelter where customers can wait for a taxicab. When the taxi queue is moved, the 125 metres of vacant space can then be used for additional curbside capacity for private vehicle pick-up or drop-off.
- Project 6 – **Otter Lane Demolition** – with the Buffalo Trail extension in-place, Otter Lane is demolished and all traffic that currently uses Otter Lane is moved to Buffalo Trail. This improves the traffic operations and safety by removing the closely-spaced intersections of Airport Road with Regina Avenue and Otter Trail.
- Project 7 – **New Rental Car Lot** – construct a new 170 space rental car lot to the northwest of the ATB. Vehicular access to/from the new lot is via Buffalo Trail for both customers and rental car service agents. This improves curbside traffic congestion and safety by removing all rental car traffic from the terminal area roads and curbsides. When the CBSA is closed, pedestrian access to/from the rental car lot is via the baggage claim hall.
- Project 8 – **Conversion of Old Rental Car Lot to Long-Term Parking** – convert the 142 spaces currently used by rental cars to Long-Term Parking. This project consists of closing the existing

driveway accessing the lot removing the barriers between the Long-term Lot and the Rental Car Lot.

- Project 9 – **ATB Holdroom Expansion** – expand and modify the holdroom as described in Phase 1 of the ATB expansion described in Chapter 5 (see Page 5-28) and depicted in Figure 5-19.
- Project 10 – **New Infield Roadway** – construct a new infield roadway associated with Taxiway C, to remove vehicular traffic from Taxiway C and old Taxiway C and also provide connected airfield access to the area north of Taxiway C.
- Project 11 – **New Airport Control Tower** – construct a new airport control tower and FSS facility north of the ATB, but out of the Air Terminal Reserve for long-term ATB expansion. This project includes construction of access to the facility and employee parking.
- Project 12 – **Supplemental ATB Utilities** – construct supplemental water and waste-water lines for the ATB. The new supplemental water and waste-water lines would likely be located on the north side of the ATB to connect with the largest main lines.
- Project 13 – **Apron II Expansion** – expand Apron II by 9,500 square metres, with a 48 metre extension on the west and 31 metres on the east, as depicted in Figure 4-7.
- Project 14 – **Runway 31 SALSAR** – Runway 31 currently has an Omnidirectional Approach Lighting System (ODAL). In order to maintain the current certifications, the lighting systems will likely require an upgrade to a SALSAR, similar to what is currently installed on Runway 13.

The estimated costs for each of these 14 projects are summarized in Table 11-1. Due to the high-level of the estimates a 30% range is provided. These Class D costs represent the estimated costs that RAA is responsible for. For Project 11, the New Airport Control Tower, it is assumed that RAA will support the costs associated with providing access and utilities to the facility and that NavCanada will be responsible for the remaining costs. The total estimate for all Phase 1 projects ranges from $35.3 Million to $46.7 Million.

Table 11-1. Phase 1 Project Cost Estimates

Number	Description	Low (-10%)	High (+20%)
1	Regina Avenue Expansion	$ 2,900,000	$ 3,800,000
2	New Maintenance Garage	$ 12,400,000	$ 16,500,000
3	SPMC Hangar and Old Maintenance Garage Demolition	$ 600,000	$ 700,000
4	Buffalo Trail Extension	$ 900,000	$ 1,200,000
5	Taxi Queue Relocation	$ 1,200,000	$ 1,600,000
6	Otter Lane Demolition	$ 300,000	$ 400,000
7	New Rental Car Lot	$ 600,000	$ 900,000
8	Conversion of Old Rental Car Lot to Long-Term Parking	$ 200,000	$ 200,000
9	ATB Holdroom Expansion (*see expanded detail below*)	$ 10,500,000	$ 13,800,000
10	New Infield Roadway	$ 900,000	$ 1,100,000
11	New Airport Control Tower (site preparation only)	$ 1,000,000	$ 1,300,000
12	Supplemental ATB Utilities	$ 100,000	$ 200,000
13	Apron II Expansion	$ 1,400,000	$ 1,800,000
14	Runway 31 SALSAR	$ 1,400,000	$ 1,900,000
TOTAL		**$ 34,400,000**	**$ 45,400,000**

ATB Modification Phase 1 Breakout (see Figure 5-19)			
Number	**Description**	**Low (-10%)**	**High (+20%)**
1	Remove Landside Concessions and PBS Relocation	$ 4,200,000	$ 5,600,000
2	Convert Landside Concession into Holdroom	$ 900,000	$ 1,100,000
3	Construct Landside Concessions and Modify Restrooms	$ 1,600,000	$ 2,100,000
4	Construct New Concessions and Lounge Space	$ 1,200,000	$ 1,500,000
5	Remove Sterile Corridor and Expand Holdroom	$ 2,600,000	$ 3,500,000
TOTAL		**$ 10,500,000**	**$ 13,800,000**

Note: The Class D cost estimates are based on approximate area takeoffs and unit costs on recent construction projects in the Regina area. The costs also include conservative percentage-based allowances for soft costs and contingencies. All costs are in 2018 Canadian Dollars.

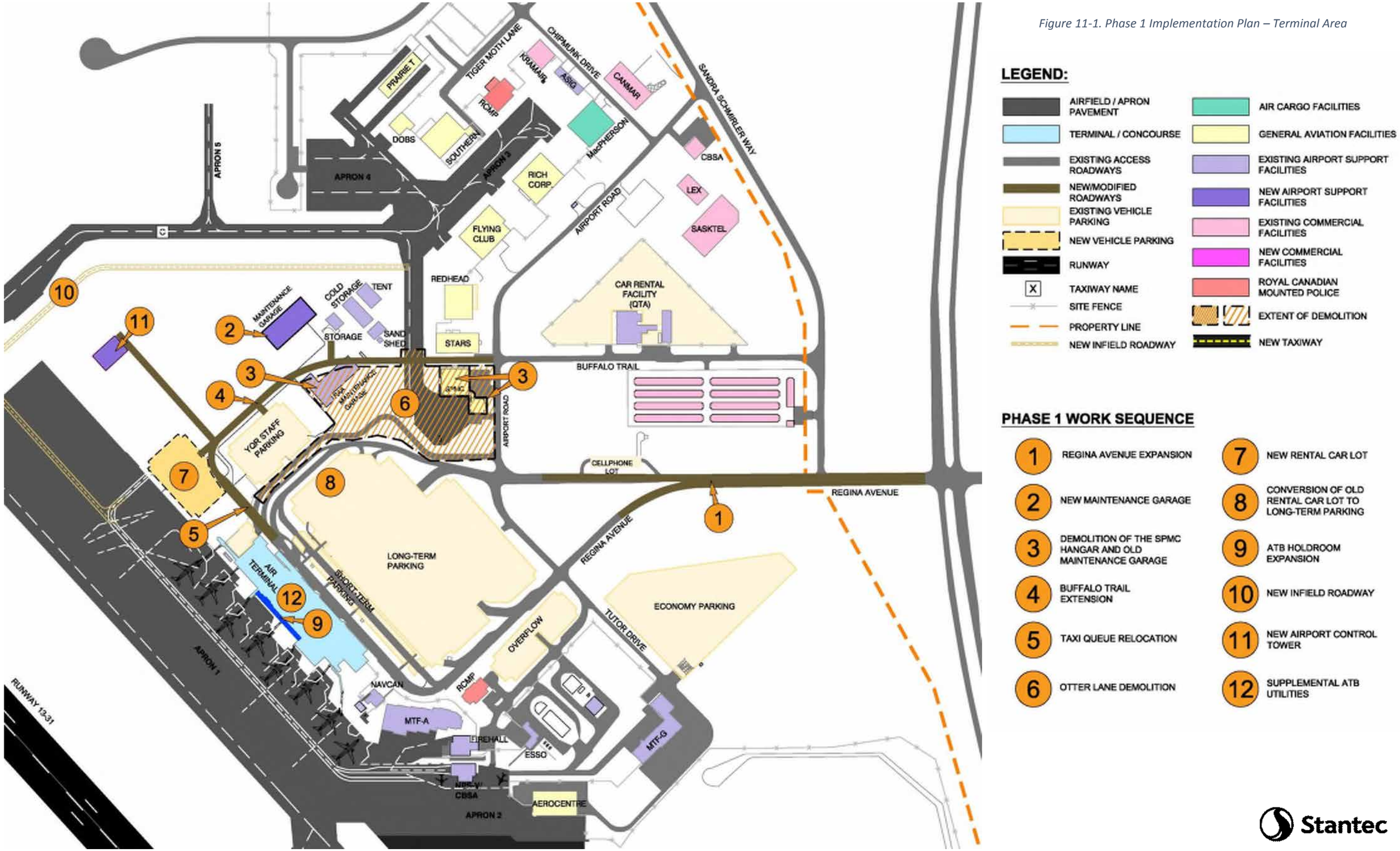


Figure 11-1. Phase 1 Implementation Plan – Terminal Area

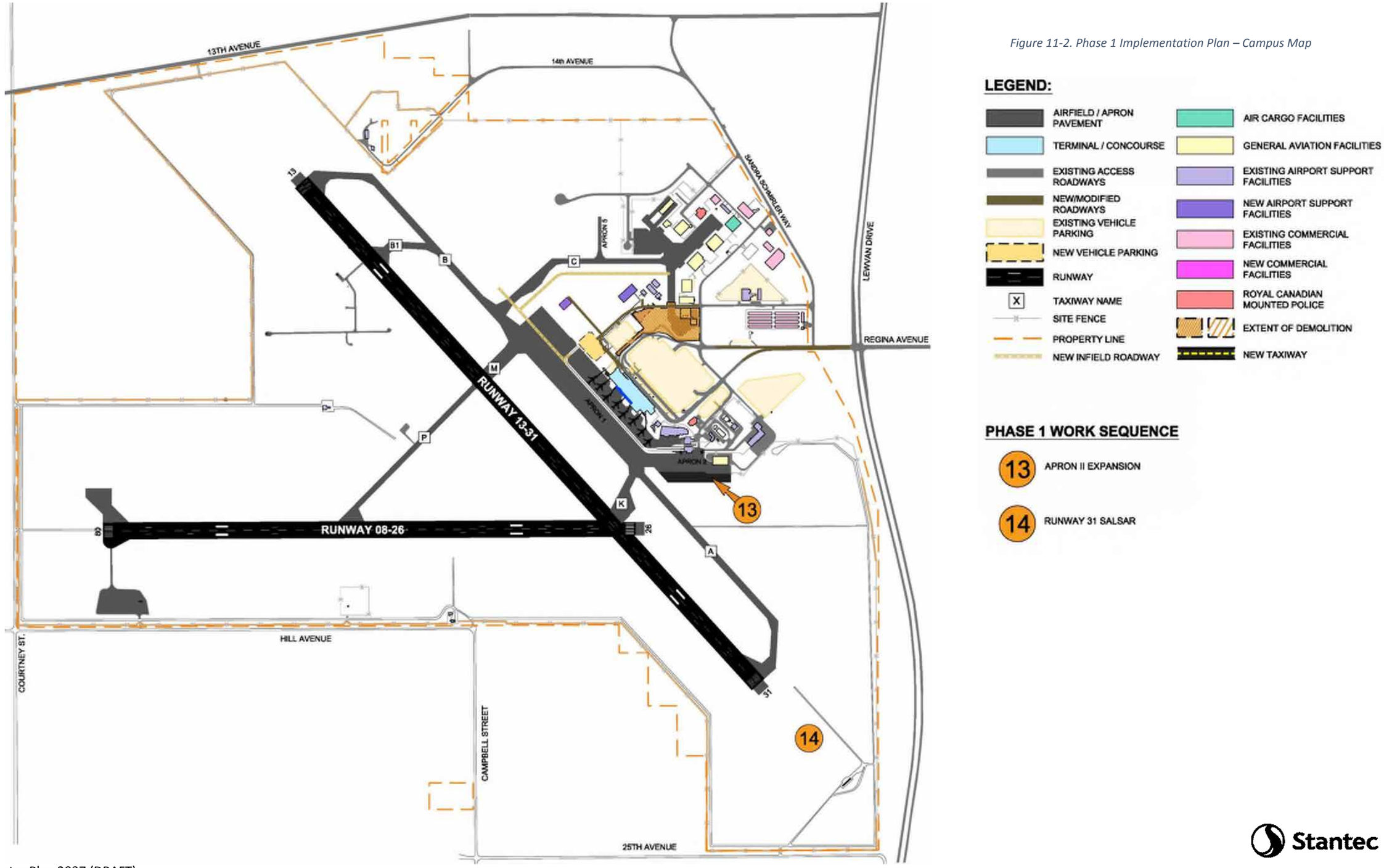


Figure 11-2. Phase 1 Implementation Plan – Campus Map

PHASE 2

Phase 2 consists of projects that are anticipated to occur in the next five to ten years (2023 to 2027). 16 projects are included in Phase 2. The Phase 2 projects are depicted in Figures 11-3 and 11-4. Project 1 through 11 are dependent on prior projects. Projects 1 through 7 must occur sequentially, while projects 8 through 11 can all occur once Project 7 is complete.

- Project 1 – **New Access Road to Tutor Drive** – extend Sandra Schmirler Way to Tutor Drive, for a new primary access route to the MTF facilities, Aerocentre, Fuel farm, and ATB loading dock.
- Project 2 – **New Signalized Intersection** – construct a traffic signal at the new four-way intersection of Sandra Schmirler Way and Regina Avenue.
- Project 3 – **Airport Road and Cell Phone Lot Partial Demolition –** demolish the portion of Airport Road between Buffalo Trail and the Overflow Lot. This forces all traffic to the south service area to use the new Sandra Schmirler Way extension and removes all non-passenger-related traffic from the ATB loop road. Also demolish the existing cell phone lot to clear area for Project 6.
- Project 4 – **New Employee Parking Lot –** construct a new 250-space employee parking lot north of the Buffalo Trail extension, between the new rental car lot and the new CSB.
- Project 5 – **Existing Employee Lot Demolition –** upon completion of the new employee parking lot, the existing employee lot is demolished to clear the land for Project 6.
- Project 6 – **New Inbound Roadway –** construct a new inbound roadway, diverging from the existing alignment near the existing cell phone lot and then running parallel to the Buffalo Trail extension. The new alignment more than doubles the development envelope inside the ATB roadway loop.
- Project 7 – **Existing Inbound Roadway Demolition –** once the new inbound roadway is constructed, the existing inbound roadway can be demolished.
- Project 8 – **Short-Term Parking Expansion –** extending the roadway loop allows for the Short-Term Parking Lot to be expanded from 110 spaces to approximately 170 spaces.
- Project 9 – **Long-Term Parking Expansion –** extending the roadway loop also allows for the Long-Term Parking Lot to be expanded by approximately 120 spaces to be in line with the 2027 facility requirements.
- Project 10 – **Ground Transportation Commercial Development –** develop a multi-use ground transportation facility. This would include a convenience store, gas station, cell phone lot, and commercial vehicle hold lot. Co-locating the gas station/convenience store with the cell phone lot and commercial vehicle hold lot allows for potentially maximizing the site's revenue generation.
- Project 11 – **Hotel Site #1 –** develop a site for a hotel in close proximity to the ATB. This site is located north of the Long-Term Parking lot.

- Project 12 – **New FireHall –** consists of constructing Phase 2 of the new CSB, which includes expanding the facility to accommodate all emergency responder operations that are currently located within the existing FireHall. Upon completion of the CSB expansion, the existing Firehall would be demolished.

- Project 13 – **Campbell Street Connector –** extend the recently constructed road north of Apron V to Campbell Street. This connectivity will increase the number of parcels available for commercial development and, by improving accessibility to these northern commercial parcels, increase the attractiveness of the land.

- Project 14 – **Centralized De-Icing Facility –** construct the first phase of the CDF, as described in Chapter 4 and depicted in light blue in Figure 4-9.

- Project 15 – **New Parallel Taxiway –** construct a parallel taxiway between Taxiway B and Runway 13-31, between Taxiway B1 and Taxiway K. This will reduce delays associated with de-icing operations, particularly during takeoff operations on Runway 31. Construction of this parallel taxiway between Taxiway M and Taxiway K could be accelerated to provide additional Apron I capacity, particularly during current de-icing operations.

- Project 16 – **Taxiway K Replacement –** de-conflict Taxiway K by striping a route perpendicular to the Runway 26 threshold, removing the pavement that connects to Runway 13-31, and constructing a new exit taxiway for Runway 13-31, as shown in Figure 4-6. As described in Chapter 4, this project will reduce the potential for wrong-runway departures, potential for runway incursions by small aircraft, and dual runway use for a single taxiway

The estimated costs for each of these 16 projects are summarized in Table 11-2. These Class D costs that are shown include only the costs for which the RAA is responsible. For Project 10, the RAA assumes responsibility for the parking facilities, site preparation, and utility extensions; but not the development of the gas station/convenience store. For Project 11, the costs of the new hotel site include what is required to prepare the site for development and not the actual cost of the building construction. The total estimated cost for Phase 2 ranges from $59.8 Million to $79.5 Million.

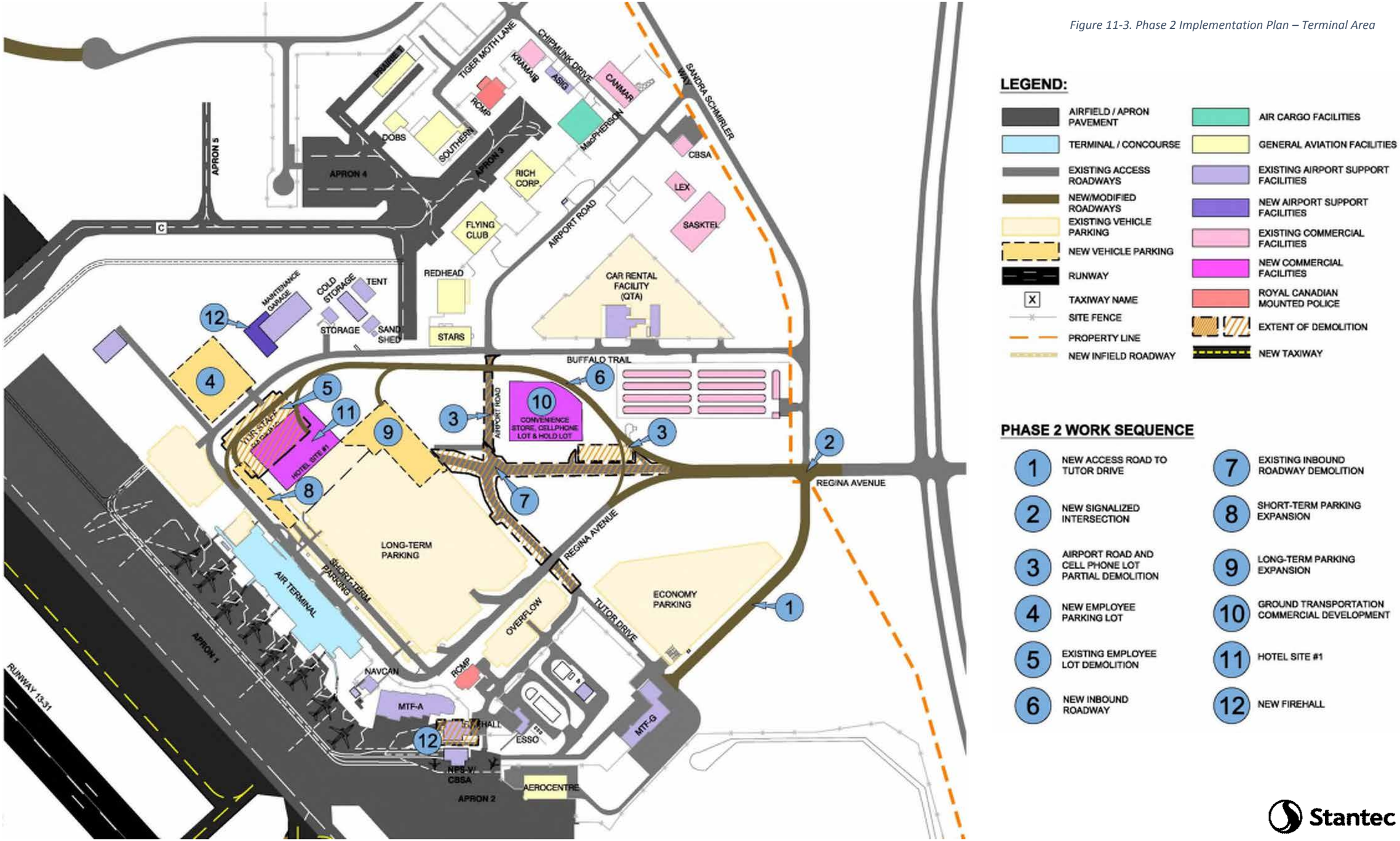


Figure 11-3. Phase 2 Implementation Plan – Terminal Area

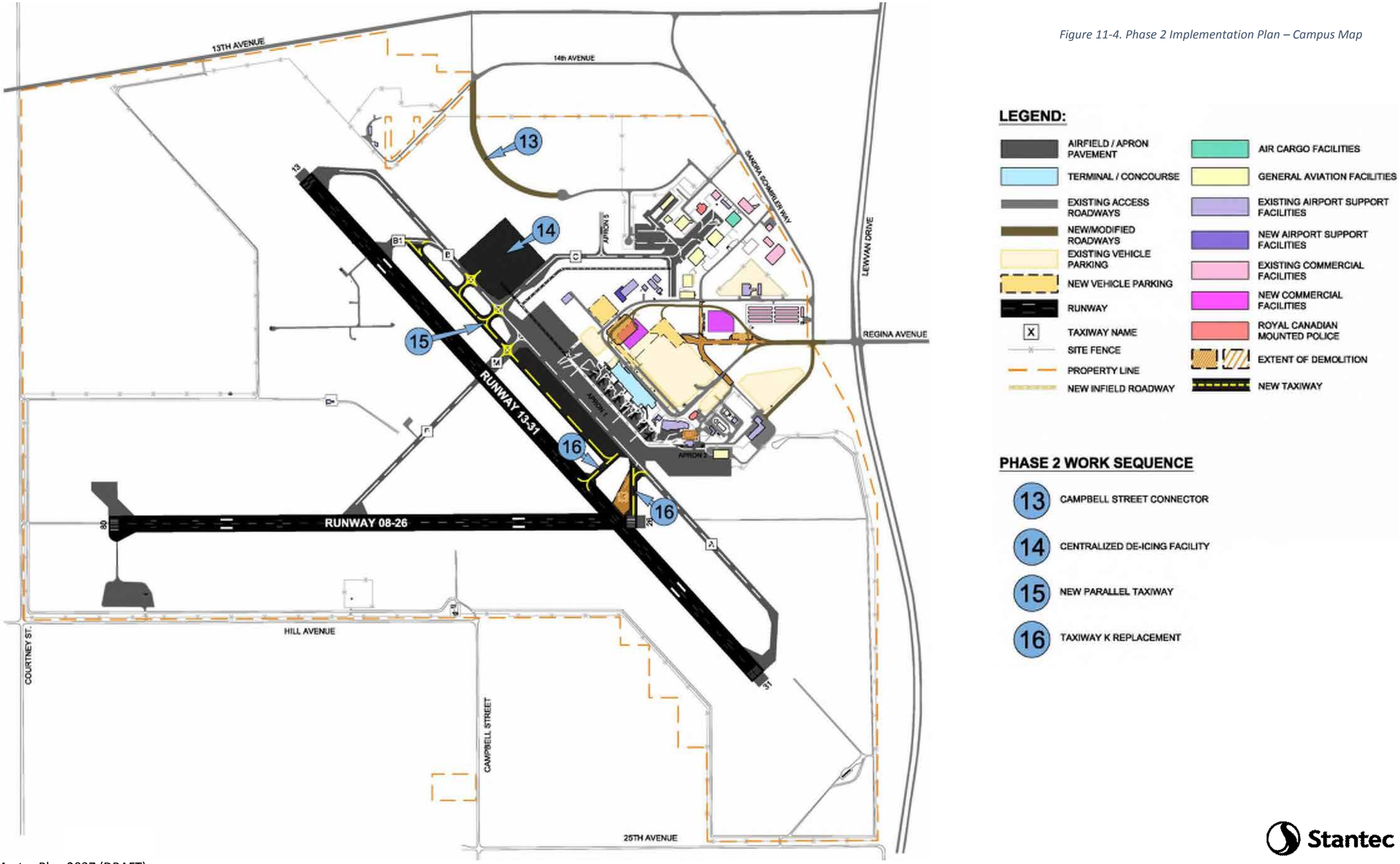


Figure 11-4. Phase 2 Implementation Plan – Campus Map

Table 11-2. Phase 2 Project Cost Estimates

Number	Description	Low (-10%)	High (+20%)
1	New Access Road to Tutor Drive	$ 600,000	$ 800,000
2	New Signalized Intersection	$ 400,000	$ 500,000
3	Airport Road and Cell Phone Lot Partial Demolition	$ 100,000	$ 100,000
4	New Employee Parking Lot	$ 600,000	$ 800,000
5	Existing Employee Lot Demolition	$ 200,000	$ 200,000
6	New Inbound Roadway	$ 1,300,000	$ 1,700,000
7	Existing Inbound Roadway Demolition	$ 200,000	$ 200,000
8	Short-Term Parking Expansion	$ 300,000	$ 400,000
9	Long-Term Parking Expansion	$ 700,000	$ 900,000
10	Convenience Store (*site preparation only*), Cell Phone Lot, and Hold Lot Construction	$ 500,000	$ 700,000
11	Hotel Site #1 (*site preparation only*)	$ 400,000	$ 600,000
12	New FireHall	$ 7,100,000	$ 9,400,000
13	Campbell Street Connector	$ 900,000	$ 1,200,000
14	Centralized De-icing Facility	$ 23,700,000	$ 31,600,000
15	New Parallel Taxiway	$ 21,200,000	$ 28,300,000
16	Taxiway K Replacement	$ 1,600,000	$ 2,100,000
TOTAL		**$ 59,800,000**	**$ 79,500,000**

Note: The Class D cost estimates are based on approximate area takeoffs and unit costs on recent construction projects in the Regina area. The costs also include conservative percentage-based allowances for soft costs and contingencies. All costs are in 2018 Canadian Dollars.

PHASE 3

Phase 3 consists of projects that are anticipated to occur in the next ten to twenty years (2028 to 2037). 11 projects are included in Phase 3. The Phase 3 projects are depicted in Figures 11-5 and 11-6.

- Project 1 – **ATB Expansion** – consists of the ATB expansion project described as Phase 2 and Phase 3 in Chapter 5 (see Page 5-28) and depicted in Figures 5-20 and 5-21.
- Project 2 – **Regina Avenue Outbound Realignment** – construction of a new two-lane outbound roadway to increase the development envelope inside the terminal loop.
- Project 3 – **Existing Regina Avenue Outbound Demolition –** upon completion of the new outbound roadway, the existing outbound roadway can be demolished.
- Project 4 – **Long-Term Parking Expansion –** expand the Long-Term parking lot by approximately 600 spaces when-warranted by demand.
- Project 5 – **Hotel Site #2** – develop a site for a hotel near the entrance to Airport property. The proposed site is at the corner of Regina Avenue and Sandra Schmirler Way, adjacent to the Economy Parking Lot.
- Project 6 – **Rental Car Lot Expansion –** expand the rental car lot by approximately 60 spaces when warranted by demand.
- Project 7 – **Employee Parking Lot Expansion –** expand the employee parking lot by approximately 70 spaces when warranted by demand.
- Project 8 – **QTA Expansion –** expand the rental car QTA by constructing a second car wash tunnel and expanding the vehicle storage area by approximately one-third of a hectare. The existing QTA building was designed to accommodate a second car-wash tunnel.
- Project 9 – **CDF Expansion –** expand the CDF to provide two additional aircraft holding positions (a code E and Code D), as shown in the dark blue in Figure 4-9.
- Project 10 – **New South Parallel Taxiway –** construct a taxiway parallel to Runway 08-26 and the threshold of Runway 31. This will eliminate back-taxiing on Runway 08 and will allow for commercial airside development on the southern Airport property.
- Project 11 – **Western Development Roadways –** construct a new roadway network in the northwest area of the airport (west of Runway 13 threshold and north of the Runway 08 threshold). This roadway network will allow for the development of potential airside, logistics, and warehousing development.

The estimated costs for each of these 11 projects are summarized in Table 11-3. These Class D costs that are shown include only the costs for which the RAA is responsible. For Project 5, the costs of the new hotel site include what is required to prepare the site for development and not the actual cost of the building construction. The total cost of Phase 3 is estimated to range from $71.1 Million to $95.0 Million.

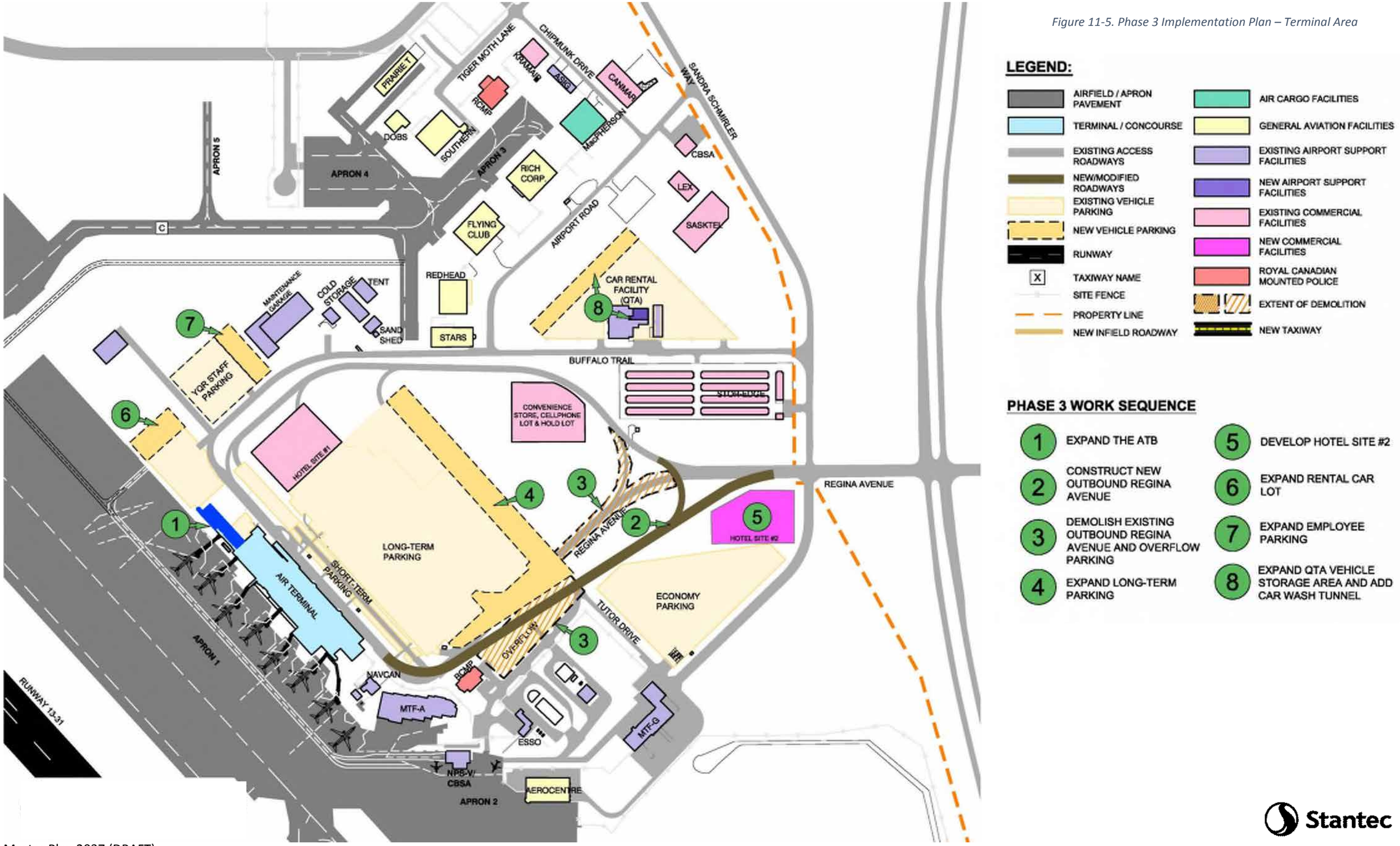


Figure 11-5. Phase 3 Implementation Plan – Terminal Area

LEGEND:

- AIRFIELD / APRON PAVEMENT
- TERMINAL / CONCOURSE
- EXISTING ACCESS ROADWAYS
- NEW/MODIFIED ROADWAYS
- EXISTING VEHICLE PARKING
- NEW VEHICLE PARKING
- RUNWAY
- X TAXIWAY NAME
- SITE FENCE
- PROPERTY LINE
- NEW INFIELD ROADWAY
- AIR CARGO FACILITIES
- GENERAL AVIATION FACILITIES
- EXISTING AIRPORT SUPPORT FACILITIES
- NEW AIRPORT SUPPORT FACILITIES
- EXISTING COMMERCIAL FACILITIES
- NEW COMMERCIAL FACILITIES
- ROYAL CANADIAN MOUNTED POLICE
- EXTENT OF DEMOLITION
- NEW TAXIWAY

PHASE 3 WORK SEQUENCE

1. EXPAND THE ATB
2. CONSTRUCT NEW OUTBOUND REGINA AVENUE
3. DEMOLISH EXISTING OUTBOUND REGINA AVENUE AND OVERFLOW PARKING
4. EXPAND LONG-TERM PARKING
5. DEVELOP HOTEL SITE #2
6. EXPAND RENTAL CAR LOT
7. EXPAND EMPLOYEE PARKING
8. EXPAND QTA VEHICLE STORAGE AREA AND ADD CAR WASH TUNNEL

Stantec

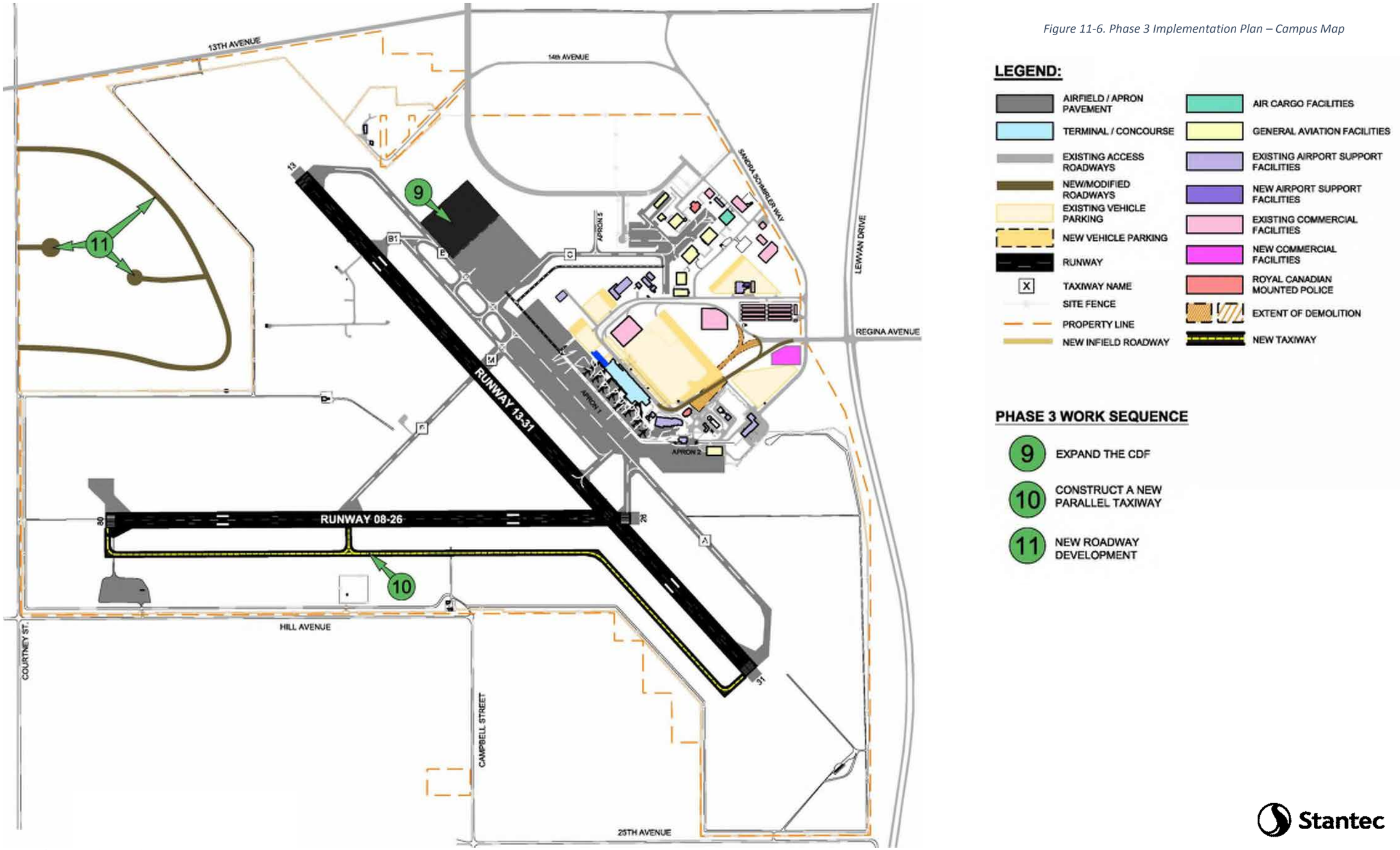


Figure 11-6. Phase 3 Implementation Plan – Campus Map

Table 11-3. Phase 3 Project Cost Estimates

Number	Description	Low (-10%)	High (+20%)
1	ATB Expansion *(see breakout below)*	$ 44,700,000	$ 59,500,000
2	Regina Avenue Outbound Realignment	$ 1,000,000	$ 1,400,000
3	Existing Regina Avenue Outbound Demolition	$ 300,000	$ 500,000
4	Long-Term Parking Expansion	$ 1,900,000	$ 2,600,000
5	Hotel Site #2 (*site preparation only*)	$ 400,000	$ 600,000
6	Rental Car Lot Expansion	$ 400,000	$ 500,000
7	Employee Parking Lot Expansion	$ 400,000	$ 500,000
8	QTA Expansion	$ 600,000	$ 800,000
9	CDF Expansion	$ 7,400,000	$ 9,900,000
10	New South Parallel Taxiway	$ 7,300,000	$ 9,700,000
11	Western Development Roadways	$ 6,700,000	$ 9,000,000
TOTAL		**$ 71,100,000**	**$ 95,000,000**

ATB Phase 2 (see Figure 5-20) and Phase 3 (see Figure 5-21) Expansion and Modification Breakout			
Number	**Description**	**Low (-10%)**	**High (+20%)**
2.1	Construct New Administration Offices	$ 4,100,000	$ 5,500,000
2.2	Relocate PBS to Level 1	$ 1,900,000	$ 2,600,000
2.3	Expand Retail Core and Restrooms	$ 1,300,000	$ 1,700,000
2.4	Expand ATB Between Gates 6 & 7	$ 2,400,000	$ 3,100,000
2.5	Construct New Inbound Baggage Room and Tunnels	$ 4,600,000	$ 6,100,000
2.6	Install 1st and 3rd Sloped Plate Devices	$ 2,700,000	$ 3,600,000
2.7	Construct New CBSA Secondary Screening	$ 2,300,000	$ 3,100,000
3.1	Construct New Holdroom and CBSA Primary	$ 19,100,000	$ 25,500,000
3.2	Install 2nd and 4th Sloped Plate Devices	$ 2,700,000	$ 3,600,000
3.3	Renovation of CBSA Secondary and Restrooms	$ 1,500,000	$ 2,000,000
3.4	Relocate Rental Car Counters and New Concessions	$ 2,100,000	$ 2,700,000
TOTAL		**$ 44,700,000**	**$ 59,500,000**

Note: The Class D cost estimates are based on approximate area takeoffs and unit costs on recent construction projects in the Regina area. The costs also include conservative percentage-based allowances for soft costs and contingencies. All costs are in 2018 Canadian Dollars.

LONG-TERM PLANNING RESERVES

There are three long-term projects that are not anticipated to be needed within the twenty-year planning period. However, these projects are critical to the Airport's mission and goals and land should be preserved for their eventual implementation. The three projects are shown in Figure 11-7

Runway Extensions

As described in Chapter 4, though it is unlikely to occur during the 20-year planning period, the Airport may eventually want to extend Runway 13-31 by 300 metres to accommodate new long-haul flights. Neither runway end is capable of being extended by 300 metres due to the proximity of roads and other structures. As a result, it is recommended that the RAA preserve land and airspace to expand both runway ends by 150 metres.

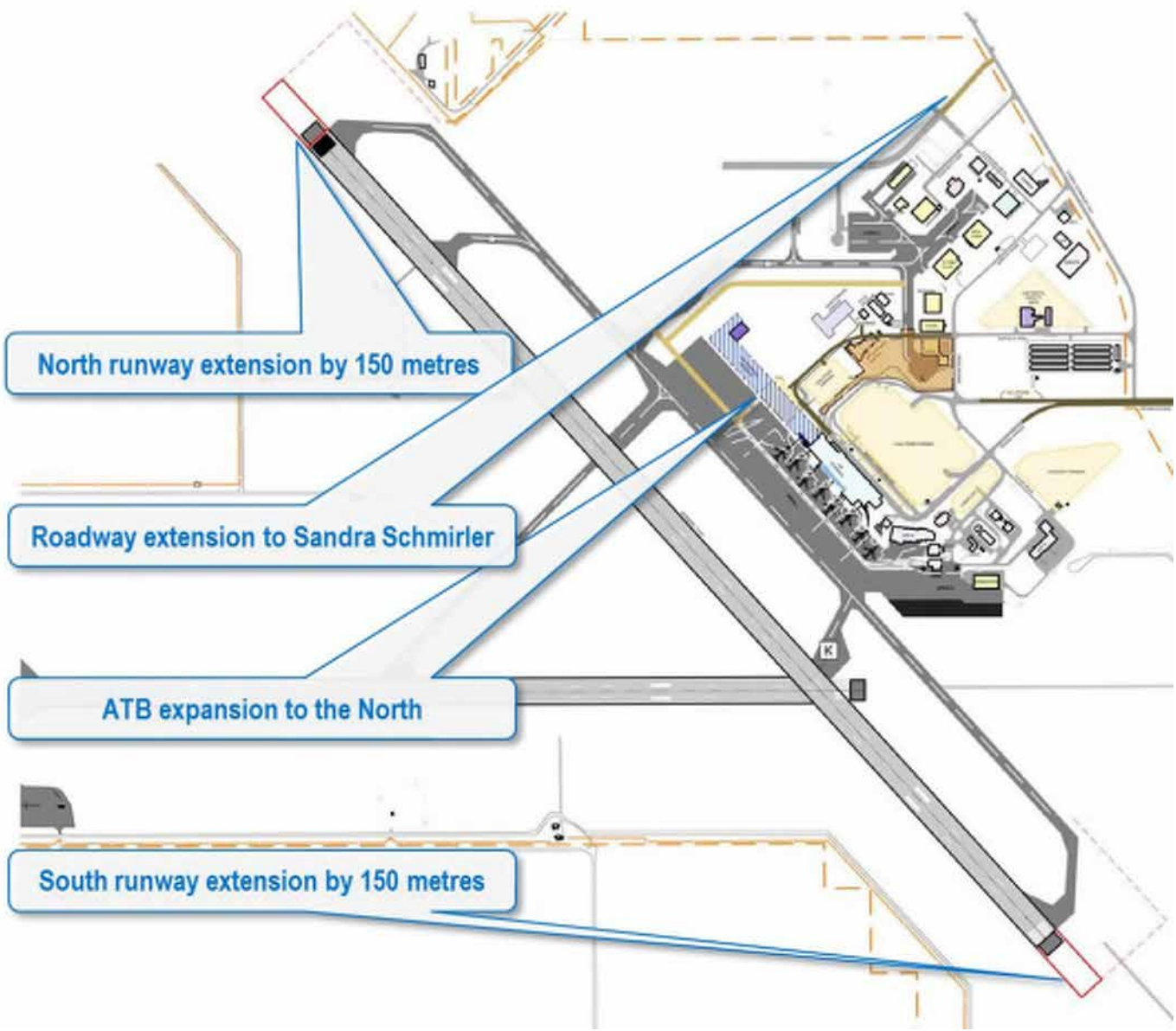
ATB Expansion

The ATB expansion described in Chapter 5 is expected to accommodate all activities at the ATB in the planning period. However, it is likely that the ATB will require additional aircraft parking positions, boarding bridges, and holdroom beyond the 20-year planning period. It is recommended that the RAA preserve land to expand the ATB to the North along the extent of Apron I. The new Airport control tower should be sited to avoid any future ATB expansion.

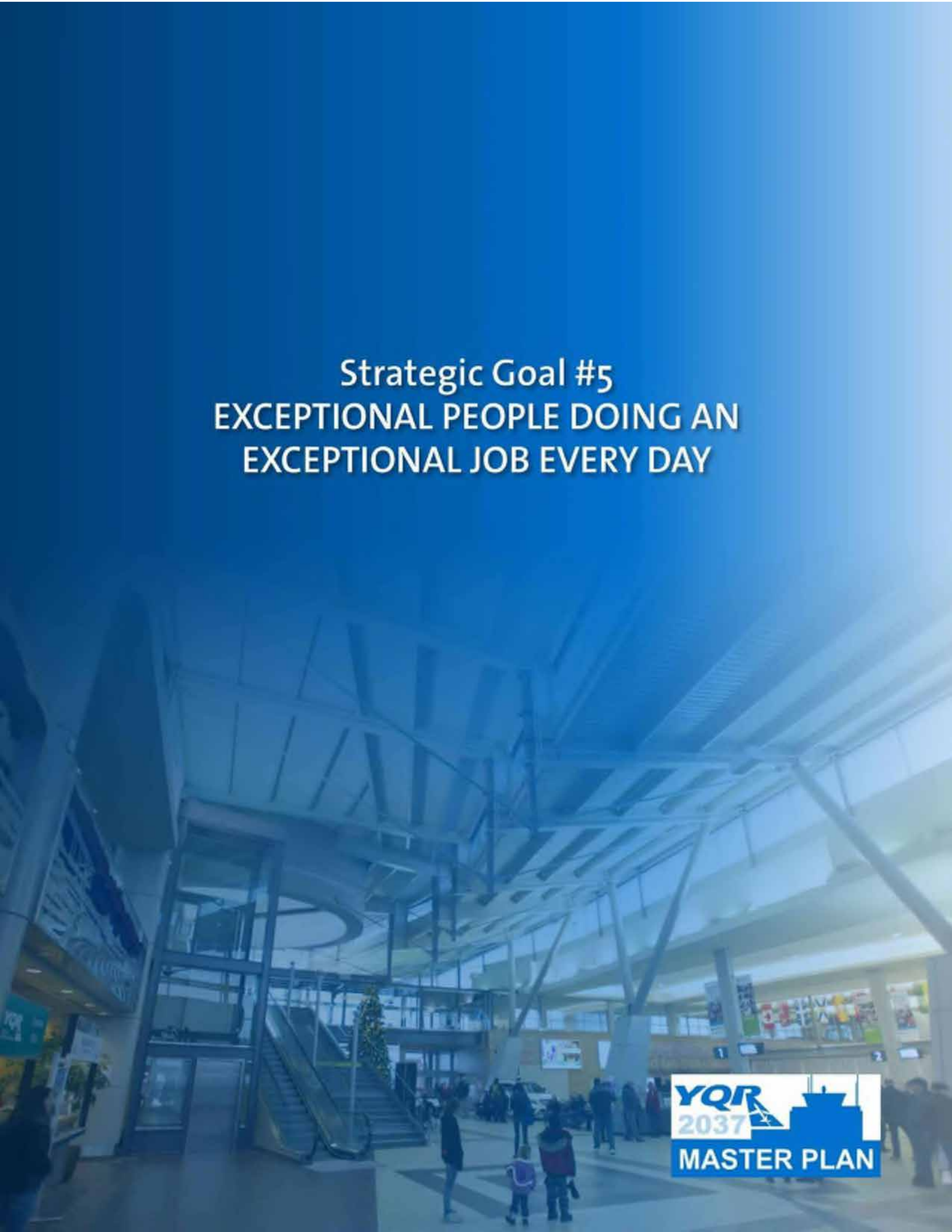
New Roadway Connector

The recently constructed roadway north of Apron V is not directly connected to Sandra Schmirler Way. Ideally, the new roadway would be connected to Sandra Schmirler Way in the future. Currently, a storm water drainage basin is located where the roadway would ideally extend to Sandra Schmirler Way. Relocating the drainage basin is not expected to be necessary during the 20-year planning period. However, should the development of Airport property in this area create heavy traffic, then the RAA may need to relocate the drainage basin and extend the roadway to solve traffic-related problems.

Figure 11-7. Long-Term Planning Reserves



Strategic Goal #5
EXCEPTIONAL PEOPLE DOING AN EXCEPTIONAL JOB EVERY DAY



Chapter 12 – Airport Land Use Plan

YQR 2037 MASTER PLAN

Chapter 12 – AIRPORT LAND USE PLAN 2037

One of the main objectives of Master Plan 2037 is to provide guidance to identify future developments. The goal of the Airport Development Implementation Plan, presented in Chapter 11, is to illustrate potential infrastructure development and key activity areas through 2037. The results of the implementation plan were compiled to develop a Land Use Plan (LUP). The LUP depicts the intent for future growth and development of airports lands through 2037. The purpose is to ensure that rational and orderly development is achieved through the designation of an appropriate mix and distribution of aeronautical and commercial uses.

GUIDING PRINCIPLES

The LUP places existing airport infrastructure and land reserves into the context of the Airport's current operating and market environment and establishes an approach to meet forecast requirements through the 2037 planning period. The planning principles used as a basis for land-use designations reflect the strategic objectives and development targets of RAA. Specifically, the key principles for land use planning seek to:

- Protect existing operational areas and provide for airfield/apron expansion requirements that may occur over the long-term and beyond;
- Designate sufficient land to allow expansion of passenger facilities and related services;
- Facilitate commercial development strategies through flexible commercial land-use designations; and
- Implement development in a manner that will protect or enhance environmental conditions at the Airport and in the Regina community at-large.

LAND USE DESIGNATIONS

For the purposes of the LUP, all Airport lands are designated for specific land uses. These land uses were defined in the original ground lease as-follows:

- Airside System – uses include the runway and taxiway systems, and apron.
- Air Terminal Building Reserve – accommodates the Air Terminal Building.
- Ground Transportation System Reserve – includes the roadway access, parking, and protection for right-of-way access to commercial areas.
- Air Cargo Reserve – contains air freight processing and storage areas.
- Operations Facilities Reserves – accommodates the Airport's radar installation and other NavCanada facilities.
- Airport Support Facility Reserves – accommodates the Emergency Response Services, Transport Canada, and Power House facilities.

- Airside Commercial Reserves – includes commercial activities requiring direct access to the airside system, including aircraft maintenance bases, Fixed Base Operators (FBOs), and commercial fueling facilities.
- Groundside Commercial Reserves – includes flight kitchens, car rental depots, maintenance garages, and other commercial activities which do not require direct airside access.
- Airport Reserves – lands protected for long-term Airport use, which are not required within the planning period.

The same color scheme that was used in the prior registered LUP was used to develop the proposed LUP.

PROPOSED LAND USE PLAN

The proposed 2037 LUP is shown in Figure 12-1. The land areas associated with each of the land use designations are summarized in Table 12-1.

Table 12-1. Area Allocation by Land Use Designation

Land Use Designation	Area in Hectares
Airside System	245.1
Air Terminal Building Reserve	3.8
Ground Transportation System Reserve	15.9
Operations Facilities Reserves	2.5
Airport Support Facility Reserves	6.1
Airside Commercial Reserves	71.2
Groundside Commercial Reserves	124.3
Air Cargo Reserve	1.2
Airport Reserves	131.6
Total	**601.7**

Airside System

The Airside System occupies the largest area of land at the Airport. It includes the two runways, all taxiway systems, the five aprons, approach paths, navigational aids, runway clearways, RESA, and runway protection areas. It also includes the area designated for the proposed Centralized De-icing Facility. Airfield land uses are maintained to provide continuity between the required facilities and future demand.

The delineation of the airside system is based on Transport Canada's *Aerodrome Standards and Recommended Practices*, 5th Edition under the assumption that the Airport will transition to 5th edition in the near future.

Air Terminal Building Reserve

The Air Terminal Building Reserve has been expanded to the north, reflecting the ATB expansion requirements and the preferred expansion alternative. The new reserve will provide sufficient area to accommodate terminal and apron development through 2037 and beyond.

Ground Transportation System Reserve

The Ground Transportation System Reserve includes the existing terminal area roadway loop, the Long-Term Parking Lot, and Buffalo Trail. Sufficient space has been preserved in the Ground Transportation System Reserve to accommodate the roadway projects and parking expansions described in the Implementation plan.

Operations Facilities Reserves

Five facilities and their associated land are included in the Operations Facilities Reserves. These include:

- The Receiver Site (west of Runway 13-31)
- The Radar Site (west of Runway 13-31)
- The AWAS (south of Runway 08-26)
- The Transmitter Site (south of Runway 08-26)
- The new proposed Control Tower site (north of the ATB)

Airport Support Facility Reserves

Four facilities and their associated land areas are included in the Airport Support Facility Reserves. These include:

- The site of the combined services building and corresponding maintenance structures (north of the ATB)
- The NPS-V and current Firehall facilities (south of the ATB)
- The Field Electrical Center (adjacent to Taxiway P)
- The Fire Training Area (located adjacent to the Runway 08 threshold)

Airside Commercial Reserves

Prior land-use plans had identified two primary Airside Commercial Reserve areas and these areas are maintained in the proposed 2037 LUP. The first area includes commercial and private hangar space in the general vicinity of Taxiway C and Aprons 3, 4, and 5. The 2037 LUP accounts for the recent relocation of Taxiway C and recent construction of a new roadway north of Taxiway C. The second previously identified area is located in the vicinity of Apron 2 and includes the MTF-A, Aerocentre FBO, and the fuel farm.

The 2037 LUP adds three new areas designated for Airside Commercial Reserves, each of which is considered a long-term development area:

- 10.3 hectares west of the Runway 13 threshold
- 20.3 hectares north of the Runway 08 threshold
- 18.8 hectares south of Runway 08-26

Groundside Commercial Reserves

Prior Land Use Plans identified large portions of the eastern Airport property as Groundside Commercial Reserves. These lands have included commercial developments, such as the buildings used by CanMar, StorEdge, CBSA, and two office buildings. These lands also include the rental car quick-turn-around facility on Buffalo Trail. The RAA continues to develop these eastern properties for commercial development. Three additional parcels in the greater terminal area were identified for commercial development, including two hotel sites and a gas station/convenience store. Lastly, 73 hectares on the western side of the Airport property were strategically identified for long-term groundside commercial development.

Air Cargo Reserve

The prior Land Use Plan had identified an area north of Taxiway C for Air Cargo Reserve. Air Cargo traffic has not increased as previously expected, thus requiring a significantly smaller land reserve. The RAA recently constructed the MTF-G facility, south of the ATB, which is predominantly used for cargo functions, and which is envisioned to expand to accommodate additional air cargo needs.

Airport Reserves

These lands are not yet assigned to any of the above land use designations. They are held in reserve for contingency requirements, and provide an effective buffer zone for continuance of safe airport operations.

SUMMARY

The LUP is the most critical aspect of the Master Plan. By designating zones for planned uses, RAA can systematically preserve lands for aeronautical functions (ATB and airfield), while enabling other lands to be available for support or revenue generation functions.

Figure 12-1. 2037 Airport Land Use Plan

Chapter 13 – Consultation Program

YQR 2037 MASTER PLAN

Chapter 13 CONSULTATION PROGRAM

As a locally-run organization, RAA is committed to connecting with the community. Consultation is a critical part of this community-centric relationship. It is a way to gather data and ideas, solicit feedback, improve communications, enhance solutions, and augment sustainable decision making. The communication and engagement strategy for the Master Plan consisted of two primary components: Airport Stakeholder Consultation and Public Consultation.

Airport Stakeholder Consultation

Two advisory committees were created for the Master Plan: the Community Advisory Committee and the Technical Advisory Committee. The members of these committees are shown in Table 13-1.

Table 13-1. Airport stakeholder consultation committees

Committee	Participants
Community Advisory	City of Regina, RM of Sherwood, Economic Development Regina, Tourism Regina, Global Transportation Hub, the Community Consultative Committee, the Province of Saskatchewan, several local developers, and representatives of private land owners who own land adjacent to the Airport
Technical Advisory	Airfield and Terminal: Air Canada, WestJet, Transport Canada, NAV Canada, Regina Flying Club, Shell Aerocentre, CargoJet, SA Aviation, and Airport Terminal Services. Safety and Security: CATSA, CBSA, Corps of Commissionaires, Regina Police, and Public Safety Groundside: Regina Transit, Rental car representatives, Taxicab representatives, and Other land tenants

The Master Planning team met with each member of the committee individually as part of the inventory efforts. These committees were invited to two committee meetings/workshops at key junctions of the master plan process:

1. Committee Meeting #1 (September 2017) – consisted of reviewing the existing conditions, the forecast results, the environmental review, the facility requirements, and preliminary alternatives.
2. Committee Meeting #2 (March 2018) – consisted of reviewing the results of the alternatives analysis, the implementation plan, the noise forecast, and the proposed land-use plan to be submitted to Transport Canada.

In addition to the sessions described above, phone or in-person bilateral discussions were held with the stakeholders to ensure that future plans for service and impacts were included in the Master Plan. Private meetings were held with representatives of local land owners and developers as-requested, to understand the impacts of the noise forecast and relevant Airport projects. Also, the relevant portions of the Master Plan were presented to the RAA's Airline Consultative Committee in January 2018, after which the airlines' representatives provided both verbal and written comments.

Public Consultation

A public awareness campaign was launched to increase market awareness and support for the Master Plan. Public open-houses were held as-follows:

1. July 2017 – consisted of an introduction to the master planning process and solicitation of feedback on existing issues and opportunities.
2. September 2017 – consisted of sharing the aviation demand forecast, environmental review, facility requirements, and preliminary alternatives and to glean feedback on the preliminary alternatives.
3. March 2018 – consisted of sharing the results of the full alternatives analysis, the implementation plan, the noise forecast, and the proposed land-use plan to be submitted to Transport Canada.

The primary purpose of the open-houses was to receive feedback on the work and garner support for the Airport future plans. Summaries of the three open houses are provided in Appendix A.

The RAA also started a website, specifically for the Master Plan, where the presentation materials from the open houses were posted.

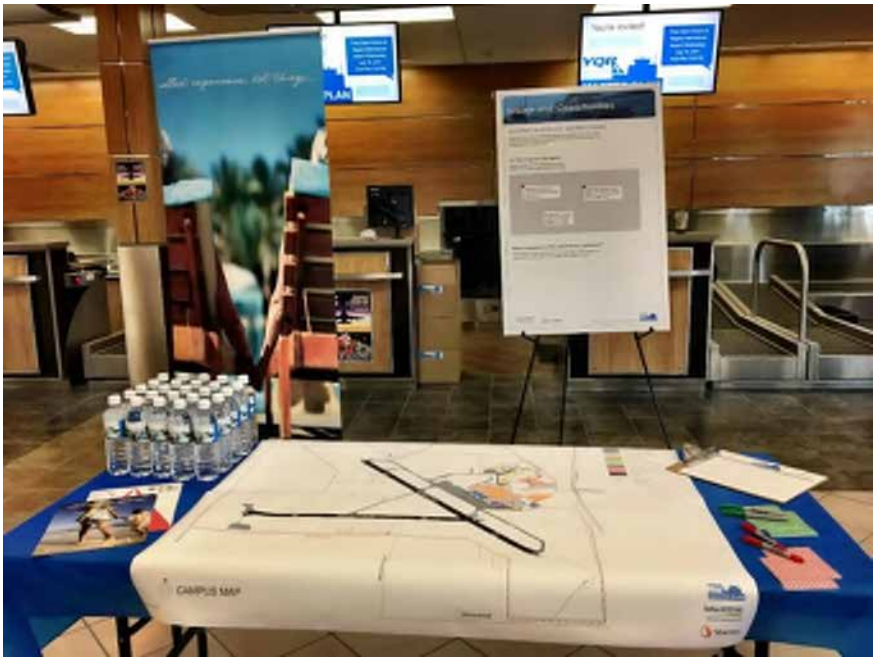
Open House #1

Date & Time: July 19th, 2017 – 5:00 to 7:30pm, Ticketing Lobby in the Air Terminal Building

This open house provided an introduction to the Master Plan. The information was presented on large poster boards and covered the following: what a Master Plan is (and what it is not); the Master Planning Process; and drawings of the existing site and buildings. This process gave the attendees a chance to identify issues and opportunities within the existing airport.

Approximately 62 people attended the open house to ask questions, learn about the planning process, and provide feedback on issues and opportunities.

Figure 13-1. Layout at Open House #1



Open House #2

Date: September 14th, 2017 – 5:00 to 7:30pm, Ticketing Lobby in the Air Terminal Building

Large poster boards were used to communicate information to approximately 55 attendees regarding:

- What We Heard from Engagement #1;
- Aviation Demand Forecast;
- Airfield Requirements;
- Two Short-Term Options for the Terminal;
- Five Long-Term Alternatives for the Terminal;
- Four Ground Transportation Options;
- Utility requirements and an overview of existing infrastructure; and,
- High-level Environmental information.

A Questionnaire was used as the format in which attendees were asked to provide their input on the holdroom expansion options, PBS screening locations, long-term expansion options, and ground transportation alternatives. They were provided an opportunity to provide general comments related to the Master Plan. The results of the Questionnaire (in addition to the input from Airport staff, Board members, and the community) provided direction to narrow down the options to provide a phased approach. The project team synthesized the information to create the development phases.

Open House #3

Date: March 13th, 2018 – 5:00 to 7:30pm, Ticketing Lobby in the Air Terminal Building

The final open house is often a conduit to present the findings and proposed options development of the Airport over the next 5 – 20 years. Over 82 people attended the open house to review the Master Plan information and the three phases of development options for the terminal and the Airport area. Feedback gleaned from this open house was in verbal format and centered around the following four themes:

1) Airfield;
2) Air Terminal Building;
3) Collaboration; and,
4) Groundside.

Overall, the comments from attendees were positive and supportive of the three phases of development for the Regina International Airport over the next twenty years.

Conclusion

There were no major concerns or issues that were expressed at the committee meetings or open houses. The committee members and open house attendees were supportive of the planning process, the phased approaches to ATB development, the overarching concepts of the Master Plan, and the proposed Land Use Plan.