

John C. Munro Hamilton International Airport 2023 – 2043 Airport Master Plan Final Technical Report

September 27, 2023

John C. Munro

HAMILTON
INTERNATIONAL AIRPORT

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September 27, 2023

BY EMAIL ONLY

Cole Horncastle
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RE: John C. Munro Hamilton International Airport
2023-2043 Airport Master Plan
Final Report
Ref: 22-0096-01

Dear Mr. Horncastle,

Please find attached our FINAL technical report entitled *the John C. Munro Hamilton International Airport 2023-2043 Airport Master Plan*.


The attached report presents the final primary and technical content of the master plan. In that regard, there remains opportunity to tailor the focus and emphasis of report sections and to develop additional information graphics to capture the importance of key messages that will be public facing. The enclosed exhibits are a refinement from the exhibits displayed to the public on May 10th and shared with the Board on June 1st to capture several edits that reflect the conversations we have had with the Airport and stakeholders.

We look forward to continuing to work with you as we build from this technical report that final version for public consumption. Should you have any questions in the meantime, please do not hesitate to contact me.

Sincerely,
AVIA NG INC.

Joshua Horst, MAVnMgt, AvMP
Practice Lead, Aviation Planning and Advisory

c: Greg Ballentine, Avia NG
Janine Maurice, Avia NG

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<https://aviang.sharepoint.com/sites/CYHM-Hamilton/Shared Documents/220096-00 2022 Airport Master Plan/7 - Reporting/CYHM 2023-2043 Airport Master Plan Update r0i 2023-06-05.docx>

EXECUTIVE SUMMARY

PREFACE

The 2023-2043 Airport Master Plan [the Master Plan] provides a 20-year vision for the development of the John C. Munro Hamilton International Airport [the Airport or Hamilton International], while updating the Airport's previous 2010 vision. The Airport is owned by the City of Hamilton and managed under an agreement with TradePort International Corporation, a wholly owned subsidiary of Vantage Airport Group – an industry leading investor, developer and manager of airport assets.

The primary purpose of an Airport Master Plan is to establish a rational development concept for an airport that supports long-term operational and business objectives, while accommodating short-term improvements. Flexibility to accommodate potential unpredictability in demand for air services and commercial development is key. An Airport Master Plan serves as a planning framework and management tool to assist airport management in making informed and strategic decisions about the need and timing for infrastructure improvements over the horizon of the Master Plan, while protecting land for future growth and development.

The Airport Master Plan is not a regulatory document, rather a long-term vision with flexibility to respond to changes in industry trends, socio-economic conditions, and regulatory requirements. Airport Master Plans are typically updated every five or ten years.

As a guiding document, TradePort is not bound to implement any recommendations herein and will assess implementation and phasing of recommendations with respect to several criteria, including operational necessity, financial capability and cost versus benefit.

PUBLIC AND STAKEHOLDER ENGAGEMENT

Various Airport stakeholders, including tenants, operators, government agencies and the City of Hamilton, were invited to participate in discussions regarding the future development of the Airport as part of the planning process. A public open house was held on May 10, 2023, where the public and stakeholders had an opportunity to view a draft of the Airport Land Use Plan and Airport Development Strategy. In addition, a project website was created to provide an overview of the planning process, present draft project materials and collect feedback and comments from the public and stakeholders.

HAMILTON INTERNATIONAL AT A GLANCE

Hamilton International serves as a global gateway for facilitating the movement of goods across the country and around the world. It is the largest domestic overnight express cargo airport, the third largest cargo freight airport in Canada and a key economic driver and vital transportation hub for the City of Hamilton and surrounding region. The Airport experienced a strong recovery in the latter half of 2022 in passenger volume, along with steady growth in cargo activity. Hamilton International is poised to continue that growth as outlined in this Master Plan, particularly as key challenges, such as access to serviced land, are considered and addressed.

Achievements from Hamilton International’s most recent fiscal year are highlighted below:

 <p>645,789 passengers flying to and from Hamilton International</p>	 <p>~90% of passengers reported a positive Airport experience¹</p>	 <p>877m kg in total landed cargo aircraft billable weight</p>
<p>\$100k+ </p> <p>of in-kind resources and financial support to various community partners and initiatives</p>	<p>Airport Ambassador Program </p> <p>celebrated 15 years of smiles and contributed over 3,300 hours of service</p>	<p>\$1.5m </p> <p>Payments to the City of Hamilton</p>
<p>\$11.1m </p> <p>Total investment in infrastructure made by TradePort and its partners in 2022</p>	<p></p> <p>Certificate of accreditation² earned for carbon management processes</p>	<p>Health and safety measures recognized with global health accreditation³ </p>
<p>\$5.0m </p> <p>Investment in infrastructure made by Tradeport in 2022</p>	<p>Certificate of accreditation² earned for carbon management processes</p>	<p>\$68.4m </p> <p>Capital committed through government funding initiatives over the next 5 years</p>

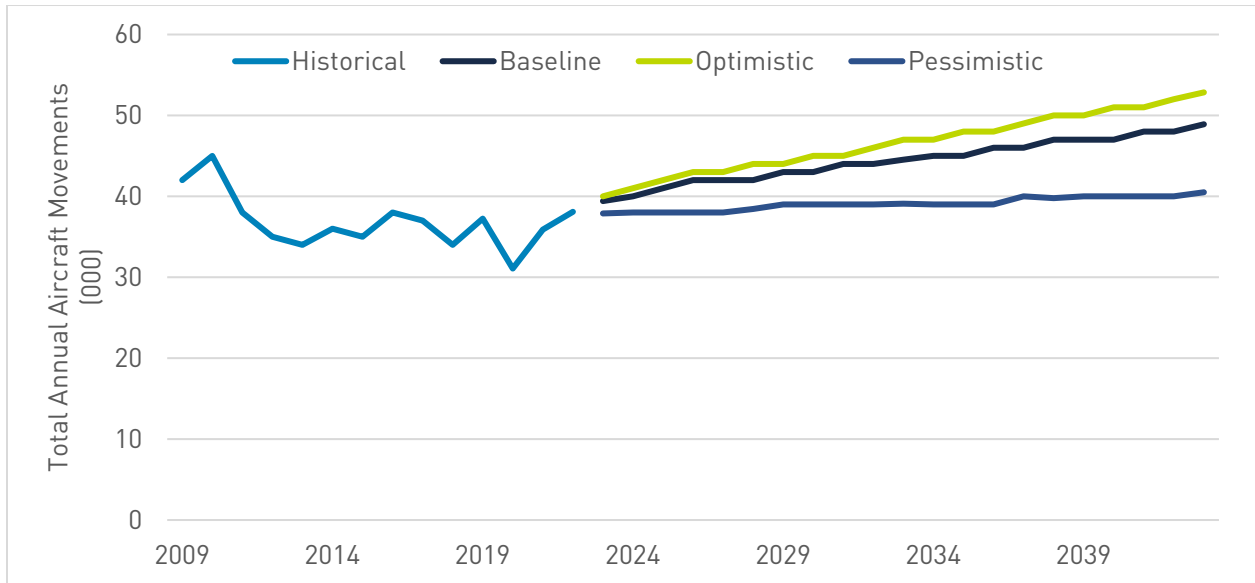
¹Source: 2022 Customer Satisfaction Survey results (from a total sample of ~11,000 respondents)
²Certificate of Accreditation earned under the Airports Council International Airport Carbon Accreditation Program
³Achieved accreditation under the Airports Council International Airport Health Accreditation Program

FORECASTS

Activity forecasts provide a prediction of future demand based on various socio-economic and industry trends and assist airport management in making rational and timely decisions regarding infrastructure improvements. Activity forecasts were prepared using baseline, optimistic and pessimistic scenarios.

Aircraft Movements

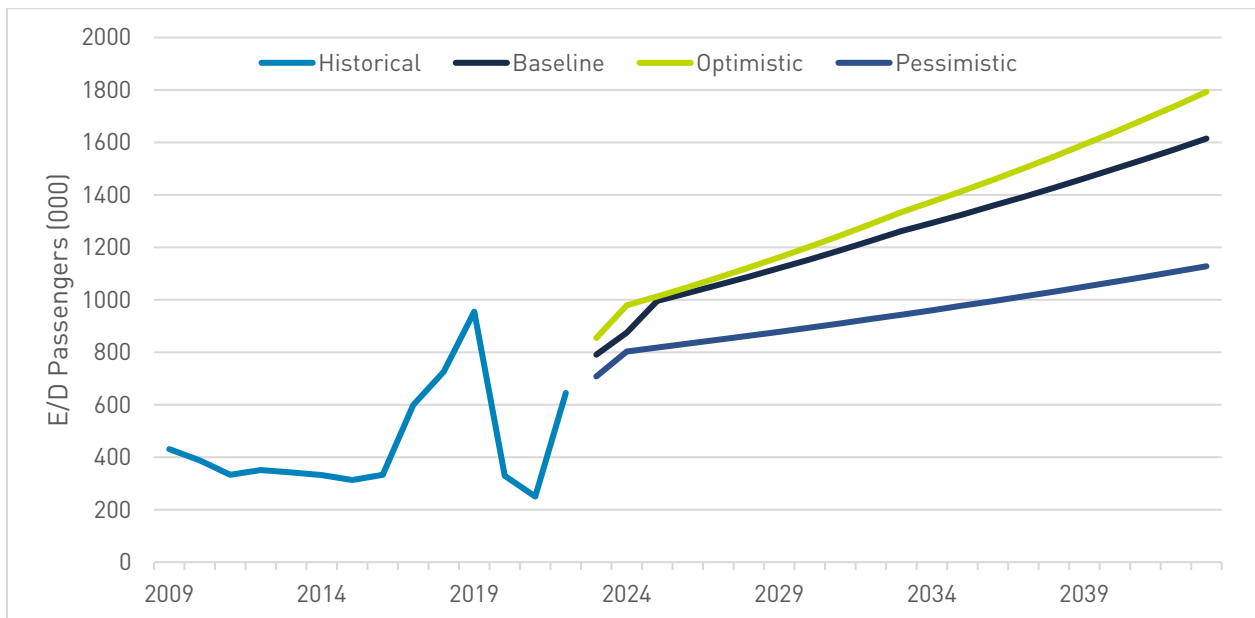
Future growth in aircraft movements will be directly related to growth in both passenger and cargo activity. Remaining activity will be related to more general socio-economic conditions. The following figure describes forecasted aircraft movement growth under baseline, optimistic and pessimistic scenarios.



Aircraft Movement Forecast

Passenger Activity

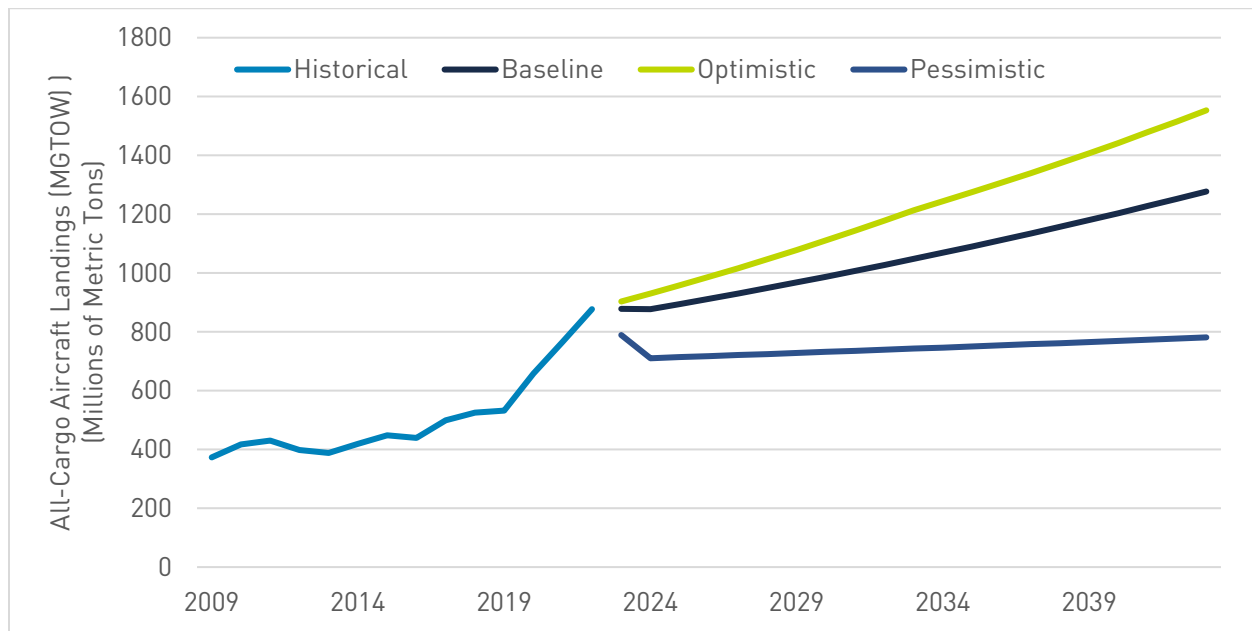
The consensus among most aviation economists is that leisure travel will surge in the short-term following the presumed end of the pandemic, due to two to three years of pent-up demand, before growth rates begin to stabilize. Business travel, however, may have been permanently affected by some of the longer-term effects of the pandemic, including a decrease in the requirement to work physically from an office and an associated increase in virtual meetings. The following figure describes forecasted passenger growth under baseline, optimistic and pessimistic scenarios.



Passenger Activity Forecast

Cargo Activity

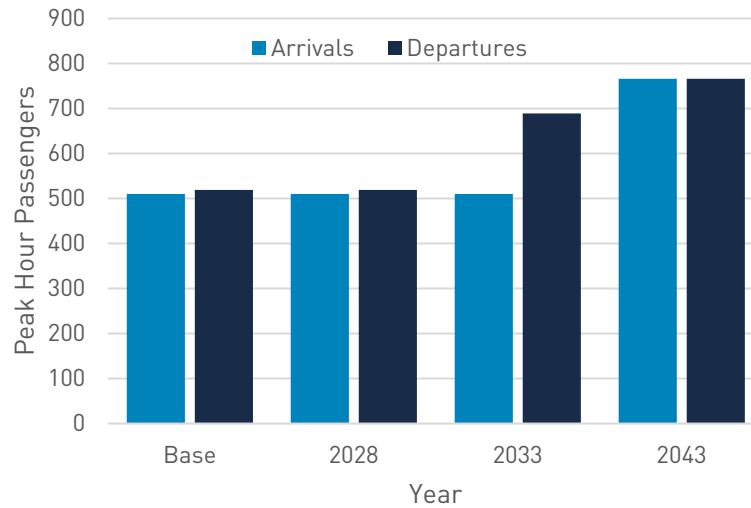
Cargo traffic increased sharply between 2019 and 2021, rising by 44%. Future growth in cargo activity will most likely depend on the extent to which these trends continue. Major cargo carriers in Canada continue to grow their fleets; however, cargo airlines in the United States are somewhat less optimistic, suggesting a decrease in activity in the short-term as business-to-business volume and consumer e-commerce spending stabilizes from the surge in demand resulting from the pandemic. The following figure describes forecasted cargo growth under baseline, optimistic and pessimistic scenarios.



Cargo Activity Forecast

Peak Hour Passenger Activity

Peak hour passenger demand has been derived through the development of nominal schedules that reflect peak planning days for the years 2028, 2033 and 2043. Typically, the winter schedule experiences greater peak hour demand for departures while the summer schedule experiences the greater peak for arrivals.



Peak Hour Passenger Activity

DEVELOPMENT OBJECTIVES

Key development objectives of the Airport Master Plan include the following:

- Provide an Airport Land Use Plan and Airport Development Plan that guides airport management in the long-term development of the Airport.
- Identify opportunities to accommodate the development of serviced airside commercial lots.
- Enhance operational redundancy and efficiency through improvements and expansion of airside infrastructure.
- Address forecasted activity demand through the improvement to or expansion of existing infrastructure and/or the provision of new infrastructure.
- Protect the Airport’s long-term operational and commercial viability through various safeguarding measures, including airport zoning regulations and the establishment of updated noise exposure contours.

OPPORTUNITIES AND CONSTRAINTS

Key **Constraints** that potentially impede the long-term growth and development of the Airport include the following:

Airside

- The growth of both scheduled passenger and air cargo service is increasing demand for apron stands. In the medium- to long-term, the demand for aircraft parking stands will likely exceed available capacity. The demand for remain-over-night (RON) parking stands for passenger aircraft could create a requirement for five additional remote apron stands bringing the overall passenger terminal aircraft stands to 13.

- Increased peak hour and planning day aircraft movements could benefit from the provision of additional taxiways to provide enhanced efficiencies, increase capacity and reduce the potential for ground delay.

Passenger Terminal

- Depending on passenger flight schedules in the future, there is a potential that peak hour passenger demand may exceed current terminal capacity if passenger carriers continue to build schedules at peak times of the day, not utilizing shoulder periods of the day when the terminal has available capacity.
- The existing international arrivals facility does not currently have digital passenger processing technologies as well as fixed processing capabilities. Facility improvements should be considered dependent on international travel increases and Canada Border Services Agency requirements under federal regulation.
- During peak periods, the existing terminal curbs are managed with third party contracts to reduce congestion. However, as passenger volume grows, there may be a requirement to create additional parking, improve parking technology, create cell phone lots and/or staging areas to ensure the supporting network for passenger growth is sufficient.

Landside

- In the past, car parking has exceeded capacity during peak periods, and this is managed through third party contracts, valet services. However, improvements either through additional technology or facility upgrades can be considered to accommodate projected parking demand.
- There is currently a lack of available land for truck staging and increases in cargo growth will require additional staging areas.

Commercial Development

- There is a lack of serviced airside accessible land available for commercial development to meet the projected growth.
- The existing NAV Canada radar site sterilizes a large tract of land that could be developed for commercial uses.
- Airport Road restricts the lands located south of the road to be developed for airside commercial use.

Operations Support Facilities & Services

- Depending on other airport development impacting maintenance of airport vehicles, the airport maintenance component of combined services building may require expansion.
- Servicing to the entire Airport, including the Terminal Building, presents challenges as commercial facilities look to grow to continue to meet demand.

Key **opportunities** include the following:

Airside

- Phased improvements to the taxiway system and expansion of aprons will facilitate improved efficiencies, capacity increases and optimal traffic management.
- Additional glidepath/localizer installations would increase the Airport's level of service and usability.
- Potential extension of Runway 06-24, on lands previously identified for such purposes, if required to increase redundancy and efficiency, though impacted by noise abatements.

Passenger Terminal

- Ability to work with carriers to adjust schedules to non-peak times of the day, optimizing terminal use daily and address peak hour demand.
- Terminal improvements or facility expansion can be accomplished in the current footprint or in alternative areas to meet forecasted peak hour passenger demand within the planning horizon.
- The terminal curb can have reduced congestions by providing additional lanes and creating a cell phone waiting area.

Landside

- Public parking capacity can be increased through land development and the provision of remote lots as passenger volumes/parking demand increases.
- Expansion of Highway 6 to a four-lane controlled access road would improve access to the 400 series highways, a critical requirement for cargo stakeholders.
- Reconfiguration of Airport Road would provide the opportunity to extend airside commercial development to the south side of Airport Road and allow for the potential extension of Runway 06-24.

Commercial Development

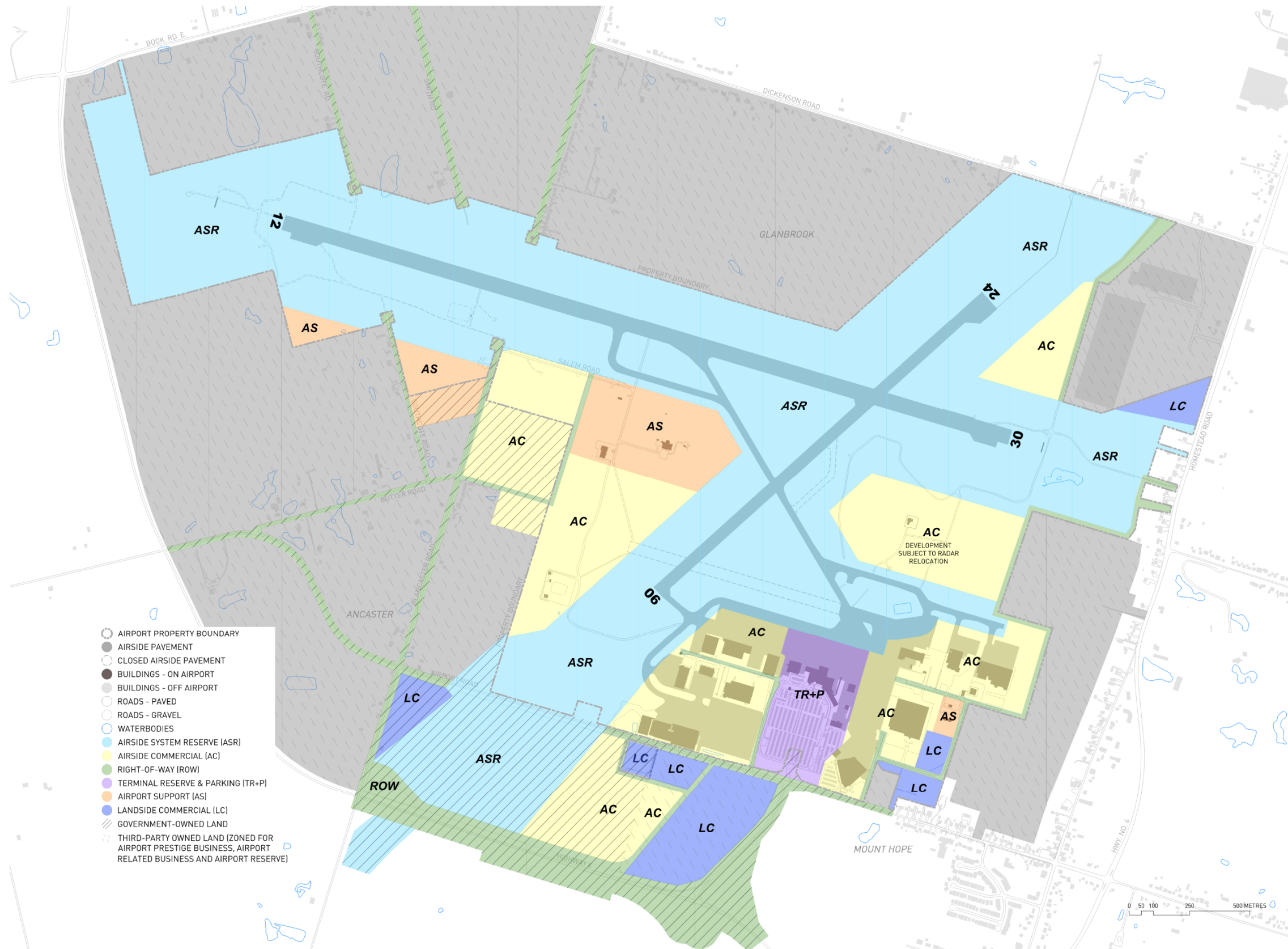
- Land purchased by the City of Hamilton for Airport commercial use is held on the west and south side of the Airport.
- The potential relocation of the NAV Canada radar would provide a significant area of land for commercial development.

Operations Support Facilities and Services

- There is ample land on which to expand the combined services building.

RECOMMENDED LAND USE PLAN

The purpose of an Airport Land Use Plan [Land Use Plan] is to identify the land areas by use and location within and beyond the current Airport Master Plan planning horizon. The Land Use Plan is designed to ensure continued operation, effective use of land and cost-effective development. Capturing the culmination of these land uses is the Recommended Land Use Plan illustrated in **Exhibit 6-9**.



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 AIRPORT MASTER PLAN 2023-2043

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RECOMMENDED AIRPORT
 LAND USE PLAN

EXHIBIT 6-9

RECOMMENDED DEVELOPMENT STRATEGY

The Airport Development Strategy provides a long-term, 20-year vision for Hamilton International. It informs planning decisions aligned to forecasted activity demand through the phased development of new and expanded infrastructure that provide operational efficiencies, increase in capacity and support of expanded airside commercial development. The proposed improvements are illustrated in the recommended Airport Development Plan (**Exhibit 7-1**) and the recommended phasing is illustrated in the Capital Phasing Plan (**Exhibit 7-2**).

Key elements of the recommended Development Strategy for expansion address growth risks and include ensuring land is available and serviced for commercial development and competing airside improvements with flexibility for long-term Passenger Terminal Building (PTB) expansions. Details of the proposed improvements include:

Airside

- Enhance taxiway system to improve runway capacity and traffic management with growth.
- Expand apron areas to support growth of both cargo and commercial passenger aircraft parking.
- Improve the Radio Navigational Aids and Electronic Communications including provision for future glidepath and localizer installations.
- Protect for potential future Runway 06-24 to a maximum of 9,500 ft. (2,895.6 m).

Passenger Terminal Building

- Provide an area for building expansion to improve the passenger flows and processing capacity as well as for CBSA services if flight schedules cannot be flattened.
- Included in the above would allow for expansion of check-in counters, holdroom domestic baggage reclaim area and international arrivals facility should long-term peak-hour passenger demand warrant such.

Landside

- Improve Ring Road to address terminal curb congestion and public transit services.
- Expand parking lot to support anticipated growth over the planning horizon.
- Re-align Airport Road to facilitate commercial development.
- Extend utilities to serve future commercial development areas.

Commercial Development

- Access, prepare, and service additional lands for expanded commercial development including cargo facilities and hangars. Including land to the west and south of the Airport.
- Dependent on assessment, remove/relocate NAV Canada radar to support commercial development and apron area expansion.
- Expand services and utilities including water, sewer, gas, and hydro.

Operations Support Facilities & Services

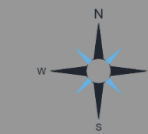
- Preserve the ATC line of sight to ensure airside surfaces can operate efficiently.
- Expand the existing combined services building to consolidate storage and maintenance operations, allowing for additional development near the restricted apron.
- Preserve land for the expansion for the fuel farm.
- Assess need for non-passenger vehicle screening facility.



- AIRPORT PROPERTY
- AIRSIDE PAVEMENT
- CLOSED AIRSIDE PAVEMENT
- BUILDINGS - ON AIRPORT
- BUILDINGS - OFF AIRPORT
- ROADS - PAVED
- ROADS - GRAVEL
- WATERBODIES
- PROPOSED GLIDE PATH PROTECTION AREA
- PROPOSED RUNWAY END SAFETY AREA
- PROPOSED AIRSIDE & LANDSIDE PAVEMENTS
- PROPOSED COMMERCIAL DEVELOPMENT AREAS
- PROPOSED TERMINAL & CURB EXPANSION
- FUTURE TERMINAL EXPANSION AREA
- PROPOSED COMBINED SERVICES BUILDING EXPANSION
- POTENTIAL NEW HANGAR

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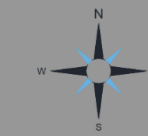
RECOMMENDED AIRPORT
DEVELOPMENT PLAN

EXHIBIT 7-1



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AIRPORT MASTER PLAN 2023-2043



PROPOSED CAPITAL PHASING PLAN

EXHIBIT 7-2

AIRPORT SAFEGUARDING

The Airport Safeguarding section of the Airport Master Plan has been established to preserve aviation safety and use for Hamilton International. This includes runway end safety area, obstacle limitation surfaces, airport zoning regulations and noise management.

Runway End Safety Areas

A Runway End Safety Area (RESA) is a surface that is intended to reduce severity of damage to the aircraft if it undershoots or overruns the runway. Transport Canada recently amended the regulations to specify which airports more clearly are required to implement RESA. The Hamilton International does not meet these thresholds. However, the Airport has met the threshold in the past and implemented RESAs on Runway 12-30. The Airport is expected to exceed the threshold soon and will be required to implement such on Runway 06-24.

Obstacle Limitation Surfaces

Obstacle Limitation Surfaces (OLS) are imaginary surfaces surrounding a runway that must be maintained free of objects to ensure safe aircraft operations at the Airport. The OLS for both runways are certified to meet regulations outlined in TP312 5th Edition Amendment 1. Since the OLS is already certified to the latest regulations, the Airport must maintain this protection for current and for future OLS characteristics with anticipation that Runways 30 and 06-24 could be upgraded to AGN VI Precision CAT II in the future.

Airport Zoning Regulations

The Obstacle Limitation Surfaces (OLS) previously described does not prevent landowners within the limits of the OLS from intruding into these surfaces. Therefore, as part of government regulations, Hamilton International has published Airport Zoning Regulations (AZR) through the federal Aeronautics Act that will ensure that the existing and future OLS characteristics that correspond to future runway extensions will be protected beyond the airport's boundaries.

A recent change in regulations has resulted in the transitional surface extending on each side of the approach surface. Therefore, the extent of the OLS extends beyond the limits of the existing AZR. The following figure illustrates those areas that are currently not protected by the existing AZR.

It is recommended a formal gap analysis is completed between the existing/future OLS and the existing AZRs to confirm all areas of under protection, and if it is determined there is an unacceptable risk of intrusion to the OLS and/or impact to instrument flight procedure use, the AZR's be updated.

Noise Management

In Canada, the only officially recognized model used for the analysis of aviation generated noise impact is the Transport Canada Noise Exposure Forecast Computer Program (NEFCALC). The latest version (2.0.6.1) was used to generate the contours presented herein. This has allowed for a comparison between those generated as part of this Master Plan and those presently adopted in the Urban Hamilton Official Plan¹.

¹ <https://www.hamilton.ca/build-invest-grow/planning-development/official-plan/urban-hamilton-official-plan>

Several Noise Exposure Forecast (NEF) contours were prepared that envision a timeframe well beyond 10 years for the ultimate capacity of the two-runway system. The selected scenario, illustrated in **Exhibit 8-5**, has been generated based on the long-term extension of Runway 06-24 by up to 3,000 feet towards the southwest and 500 feet towards the northeast. The scenario has been generated based on an adjusted runway distribution, one that assumes an increased usage of Runway 06-24 following its ultimate extension, and a continuation of increased use of both runways by heavier/larger aircraft, such as the Boeing 777F.

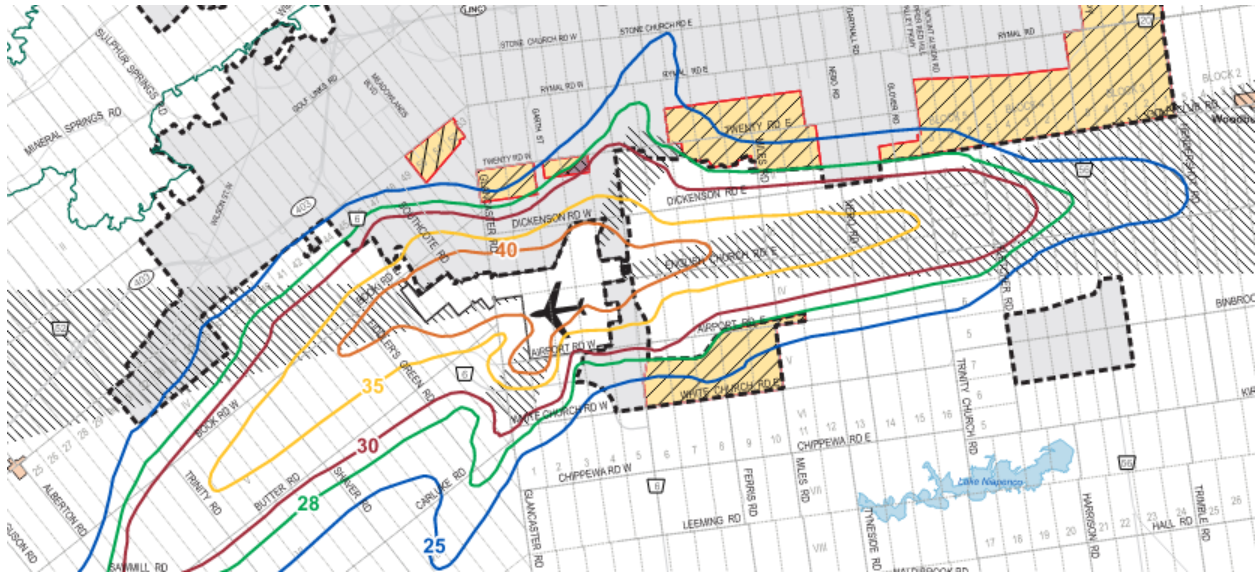
In summary, the Urban Hamilton Official Plan states that residential and other sensitive land uses are not permitted within NEF 28 contour and that any sensitive land uses, permitted to be developed between 25-28 NEF contours, will be required to implement noise mitigative measures in accordance with the Provincial and Federal guideline standards. Assessment for noise exposure is performed in accordance with Transport Canada's standards for land use in the vicinity of airports. The NEF contours help to ensure residential development and other sensitive land uses are developed within areas outside of the NEF 28 contour.

The NEF contours prepared as part of this Master Plan differ from the contours shown in the Official Plan. Such changes are due to the potential for runway extensions associated with Runway 06-24, the update of NEF Calc software, changes in runway distribution, the establishing of a practical maximum capacity for the Airport's runway system, and other considerations related to airport operations.

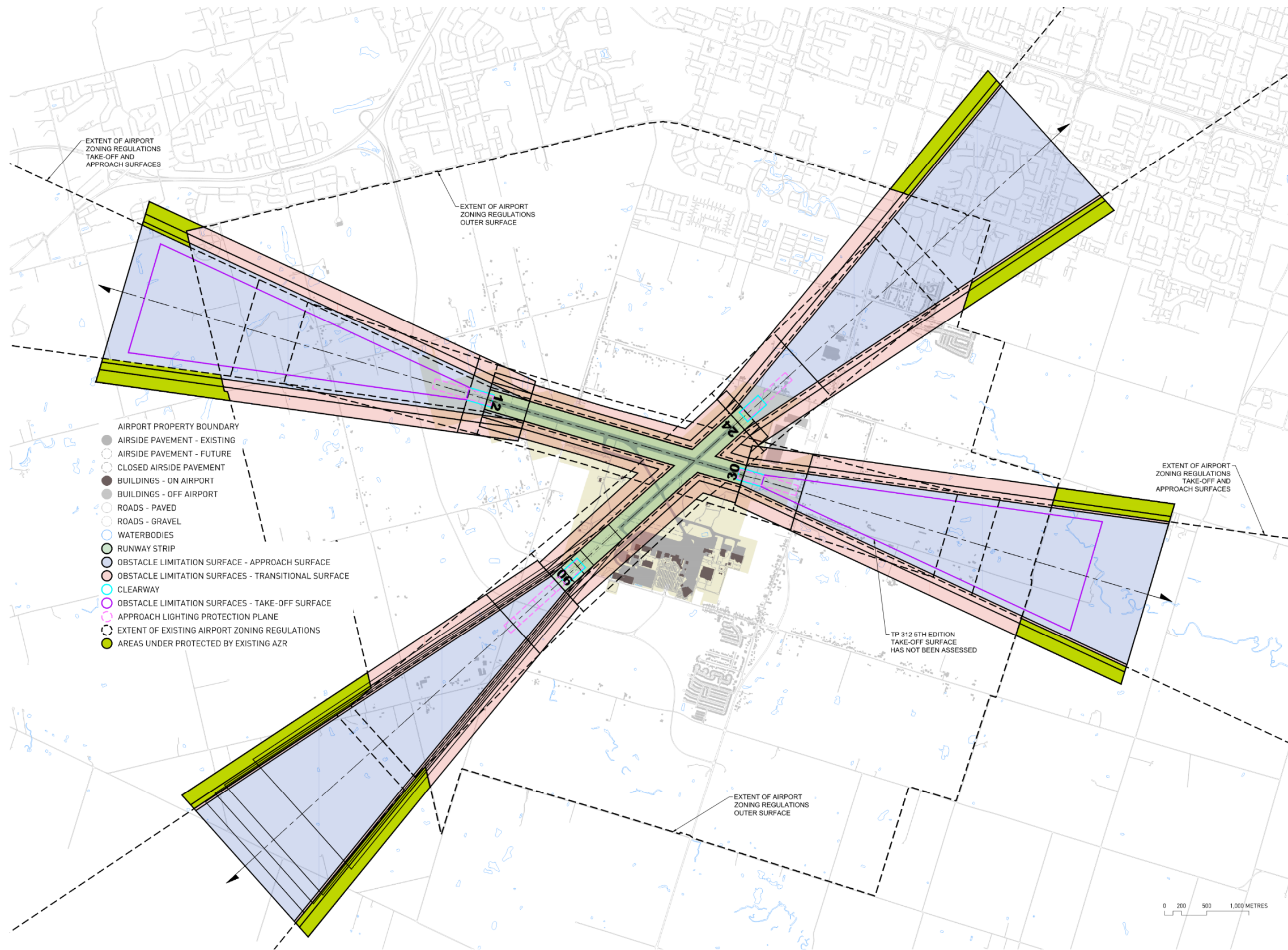
It is recommended that the City of Hamilton maintains its position in adhering to these current measures of using the NEF 28 contour to restrict residential development, as currently outlined in the Official Plan, and that the Official Plan NEF contours be updated to reflect those put forward in this Master Plan and as illustrated in **Exhibit 8-5**.

While the adoption of a new NEF 28 contour as prepared for this Airport Master Plan update is recommended, this is not to suggest that the existing NEF contours, as reflected in current policy and planning documentation at the City of Hamilton, be abandoned or replaced immediately with the new NEF contour, but rather that consideration be given and due process followed that would allow for the potential for inclusion in a future update to the City's Official Plan. In that regard, the recommended NEF contours that have been produced as part of this Airport Master Plan should be at minimum considered further in future planning and policy development at the City. As part of the City's future planning and policy development, the Airport should be consulted further in examination of policy that pertains to the potential for NEF contour changes to be adopted whether in part or full.

John C. Munro Hamilton International Airport
2023-2043 Airport Master Plan



Official Plan – NEF Contours



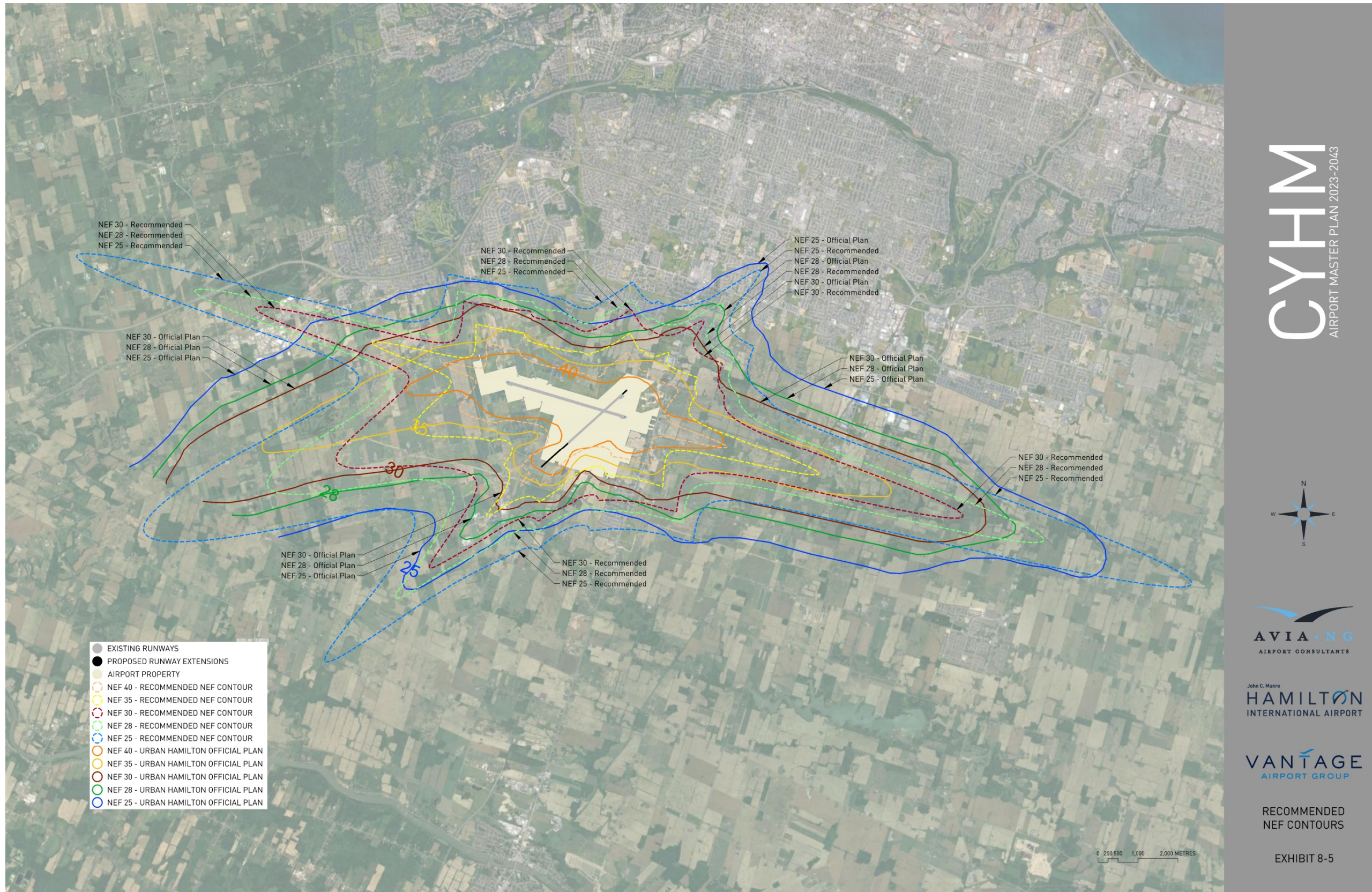
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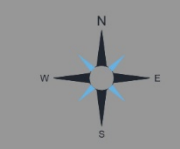


EXISTING AIRPORT ZONING REGULATIONS & FUTURE OBSTACLE LIMITATION SURFACES

EXHIBIT 8-2



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AIRPORT MASTER PLAN 2023-2043



RECOMMENDED
NEF CONTOURS

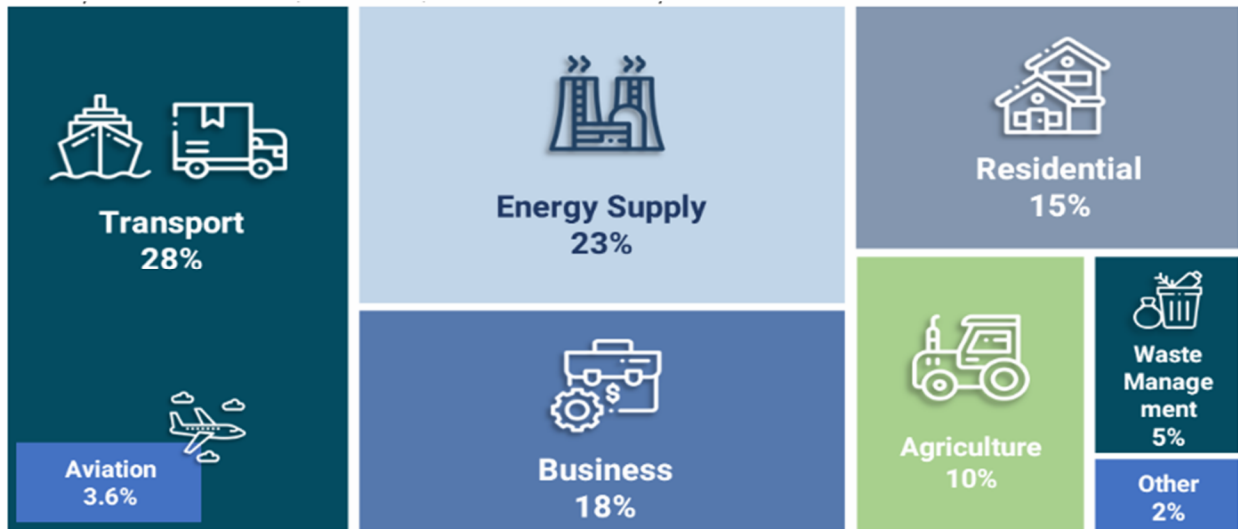
EXHIBIT 8-5

AIRPORT ENVIRONMENTAL STRATEGY

Monitoring and minimizing the environmental impact of airport operations is important to Hamilton International. The Airport's environmental mission statement is as follows:

Hamilton International Airport is committed to protecting the environment and safeguarding the health of its employees, business partners and the general public.

The following figure illustrates sources of greenhouse gas (GHG) emissions from various sectors.



Sources of Greenhouse Gas Emissions

Goals and Objectives

Hamilton International has in place environmental objectives, with the primary goal of ensuring the Airport operates in an environmentally responsible manner, including a reduction of the Airport's impacts on the environment, according to applicable laws and regulations, accepted management practices, and with sensitivity to community and public concerns.

The objectives are:

- To establish and maintain Hamilton International Airport as an environmentally responsible and sustainable facility.
- To ensure compliance of all environmental legislation and guidelines.
- To inform all Airport tenants and employees of their environmental responsibilities in order to achieve the above objectives.
- To familiarize the public with the Airport's environmental policies.
- To ensure that all parties understand the concept of sustainable growth.

Climate Resilience

Hamilton International recognizes the value of environmental principles that are core to the corporate culture and incorporated into the investment, development and operation throughout TradePort's history as investor, developer and manager. The Airport will assess its contribution to climate change, including

greenhouse gas emissions, measuring the burden of landfills and how well it is reducing that burden through waste diversion and evaluating water consumption. An Airport Environmental Strategy and Climate Resiliency Plan will be completed by 2026 that will include Federal goals and targets for the aviation industry, while being mindful of the City of Hamilton objectives. The Airport will integrate principles, standards, and measures to provide enhanced climate resilience, which may include:

- Carbon footprint reduction through a combination of upgrades to facilities, adjusting equipment usage, and implementing new policies or procedures.
- Decarbonization assessment and investment grade/net-zero energy audit to help support further decarbonization project development.
- Plan to construct and maintain infrastructure in a way that is resilient to these disruptive effects of more extreme weather events. For example, the moving bed biofilm reactor that is planned to be installed in 2024 will reduce the risk of community flooding by treating glycol residual stormwater onsite.
- Construct drainage systems and storm water ponds that can accommodate larger amounts of water.
- Reduce, where possible, non-permeable surfaces and maximize water uptake to minimize potential of flooding during periods of heavy precipitation.
- Build resilient structures immune to strong winds and storms, ranging from airfield signs to the Airport's CSB and PTB.

SUMMARY AND RECOMMENDATIONS

Hamilton International is well positioned to expand its role as Canada's largest overnight express cargo airport and as a growing focus for affordable low-cost and leisure passenger airlines. Challenges, such as the lack of serviced commercial land and a requirement to expand passenger terminal facilities and public parking, need to be addressed for the Airport to accommodate projected activity demand over the 20-year planning horizon.

Safeguarding the Airport through amendments to the Airport Zoning Regulations and placement of appropriate noise exposure forecasts is key to protecting the long-term operational and commercial viability of the Airport, and its significant role as a catalyst for regional economic development.

Recommendations

The following are key opportunities identified in Airport Master Plan that can have an impact on future growth and which are recommended:

- ***Creation of Additional Serviced Land*** – Multiple existing tenants have communicated the need to continue to grow their respective facilities on the Airport Property. Additional serviced land is required to support the future growth of the Airport, which includes optimizing, repurposing and servicing existing Airport lands as well as incorporating existing adjacent City owned lands into the Airport boundary today. With the inclusion of City owned lands into the Airport Development Plan, as well as the optimization and repurposing of existing lands, the Airport will be enabled to maximize its full potential.
- ***Radar Needs Assessment*** – The existing radar, which is under the jurisdiction of NAV Canada, requires refurbishment or replacement through the national replacement program. An opportunity exists to potentially relocate onsite and optimize land where the radar currently

resides. If the radar remains on Airport property, alternative locations will be assessed for preferred location and to reduce conflicts on other lands proposed for commercial development. The Radar Needs Assessment being performed by NAV Canada is expected to be completed in 2024 and may provide options for alternative sites and costing for potential relocation.

- **Capacity and Infrastructure Requirements** – Planned growth for both cargo and passenger traffic demand provides the opportunity for investments to be made in the short, medium, and long-term which is documented in the Capital Phasing Plan included in this Airport Master Plan, in order to ensure that stakeholders can continue to expand operations.
 - **Runway 06-24 Expansion** – Runway 06-24 Expansion is not recommended in the 20-year horizon. Expansion would not add capacity, rather provide improved overall system usability/redundancy and is not required based on future traffic forecasts. It is prudent to protect for the future beyond the term of the Master Plan and land should be held for expansion at that time in the future.
 - **Airport Zoning Regulations (AZR) Assessment** – Due to recent regulatory changes by Transport Canada, gaps in protection were expected and have been identified based on comparison to TP 321 5th Edition OLS requirements. It is recommended that a further study of risks and mitigations be performed in the next three years along with a feasibility study and cost/benefit analysis. The assessment of the AZRs to TP312 5th Edition is expected to begin in 2024, with mitigating procedures put in place by the City of Hamilton now, to ensure developments do not penetrate AZRs until such time that future growth requires adjustment of the AZRs.
 - **NEF Contour Adoption** – While the adoption of a new NEF 28 contour as prepared for this master plan update is recommended, this is not to suggest that the existing NEF contours, as reflected in current policy and planning documentation at the City of Hamilton, be abandoned or replaced immediately with the new NEF contour. The new NEF contours reflect an evolution of the Airport over the long-term and offers compatible land use planning guidance for the City of Hamilton and regional land use planning authorities related to aircraft noise. In this regard, the recommended NEF contours produced as part of this Airport Master Plan should be at minimum considered further in future short to medium term planning and policy updates by the City. To this end, it is further recommended to include the Airport as a special adviser to support the City as part of any review or implementation process related to changes to the existing NEF contours.
 - **City of Hamilton Plans** – The Airport Master Plan impacts other City of Hamilton plans, and as such, the following studies are recommended to be undertaken by TradePort, specific only to the impacts that the Airport has on such plans, and completed by 2026 to assist the City in its long-term planning of lands at and around the Airport:
 - **Master Servicing Plan** to identify the site servicing requirements for the proposed commercial development areas over the next twenty years, for commercial lands included in the current lease line, or proposed to be included in the next twenty years.
 - **Ground Transportation Study** to evaluate ground traffic demand that could be expected on surrounding road networks based on the forecast of aviation activity.
 - **Stormwater Master Drainage Study** that accounts for existing and proposed commercial developments.
- Airport Environmental Strategy and Climate Resiliency Plan** that incorporates Federal goals and targets for the aviation industry, while being mindful of City of Hamilton objectives.

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1 JOHN C. MUNRO HAMILTON INTERNATIONAL AIRPORT 2023-2043 AIRPORT MASTER PLAN

PREFACE

The 2023-2043 Airport Master Plan [the Master Plan] provides a 20-year vision for the development of the John C. Munro Hamilton International Airport, while updating the Airport's previous 2010 vision.

Significant events have occurred since the previous Airport Master Plan was undertaken that must be addressed as part of the current Plan. Some of these events interjected a high degree of uncertainty within the aviation industry that, until very recently, warranted a focus on near-term initiatives rather than long-term planning, and consequently resulted in deferring a master plan update until 2023. These events included:

- A global pandemic that dramatically decreased air transportation demand, while increasing cargo requirements at the Airport with increased dedicated cargo freighter usage.
- Increased competition between air carriers within Canada, particular between low-cost and ultra-low-cost carriers serving a specific segment of the aviation industry.
- Changes within the Canadian aviation regulatory environment that resulted in a substantial change to the standards applicable to aerodrome planning and design as presented in transition from TP 312 4th Edition to TP3 12 5th Edition.
- Heightened demand for serviced commercial lots with airside access appropriate for large-scale aviation development.

1.1 THE MASTER PLANNING PROCESS

The primary purpose of an Airport Master Plan is to establish a rational development concept for an airport that supports long-term operational and business objectives, while accommodating short-term improvements. Flexibility to accommodate potential unpredictability in demand for air services and commercial development is key. An Airport Master Plan serves as a planning framework and management tool to assist airport management in making informed and strategic decisions about the need and timing for infrastructure improvements over the horizon of the Master Plan.

Preparation of the 2023-2043 Airport Master Plan followed a prescriptive process aligned with industry recommended practices and the process is listed in **Figure 1-1**. The planning process began with collecting relevant background data, including activity statistics, existing condition reports, and consultation with key airport stakeholders. This was followed with the preparation of activity forecasts that identified potential demand with respect to passenger and cargo activity, as well as aircraft movements. From this, AVIA NG was able to identify potential opportunities and/or constraints in the Airport’s ability to accommodate the projected demand and prepare a needs assessment that resulted in the preparation of a draft Airport Land Use Plan and Airport Development Strategy options. Draft development options were then evaluated based on several criteria and a preferred Airport Land Use Plan and Airport Development Plan were generated.

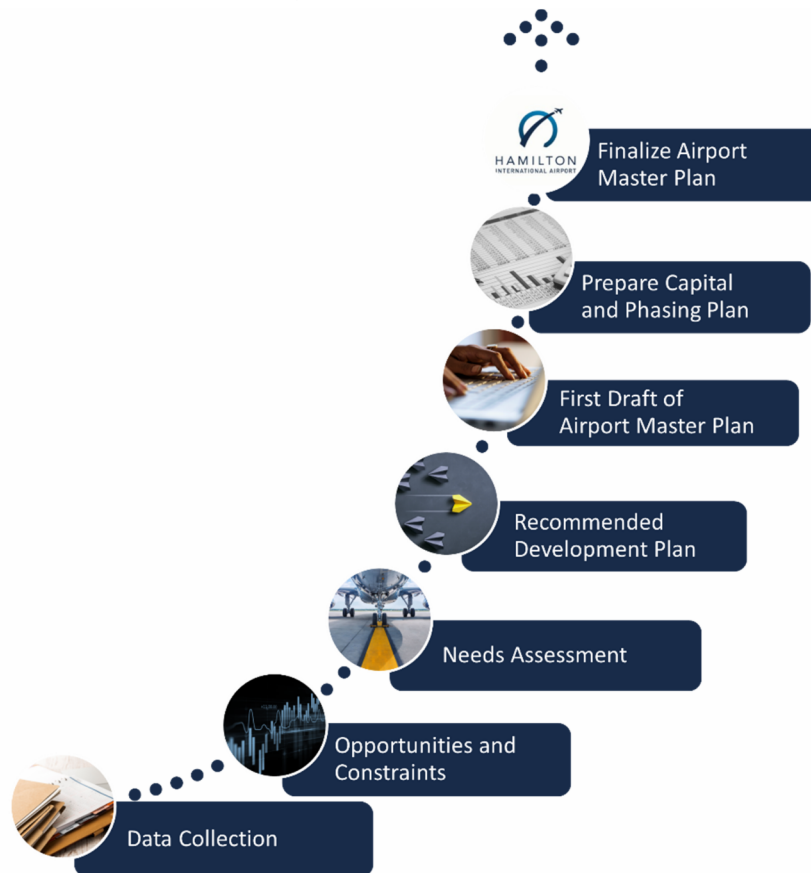


Figure 1-1 The Master Planning Process

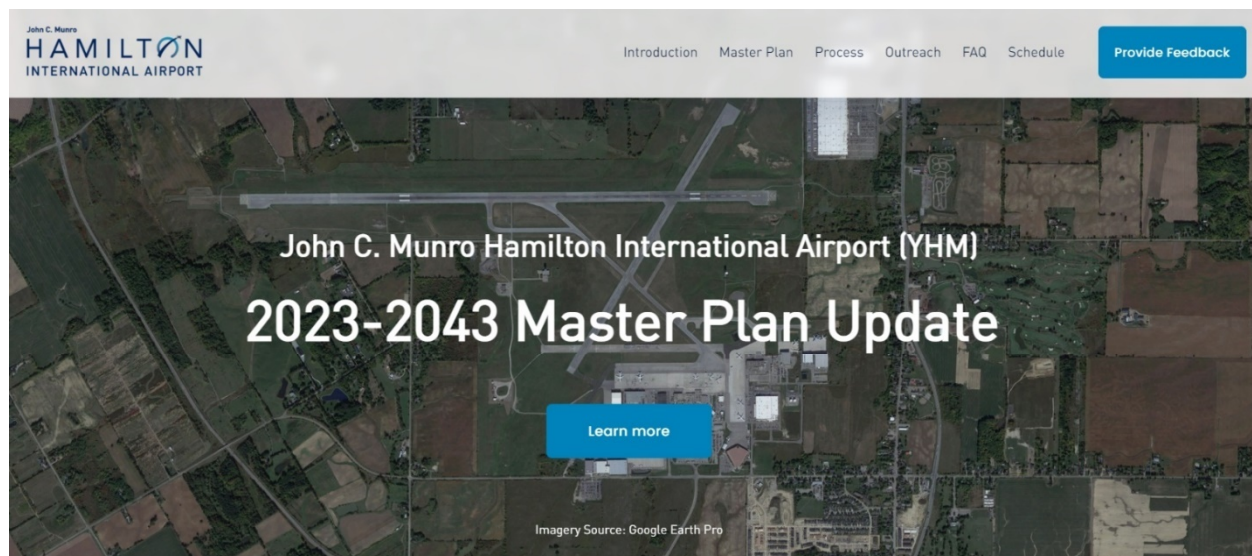
The Airport Master Plan is not a regulatory document, rather a long-term vision with flexibility to respond to changes in industry trends, socio-economic conditions, and regulatory requirements. Airport Master Plans are typically updated every five or ten years.

As a guiding document, TradePort is not bound to implement any recommendations and will assess implementation and phasing of recommendations with respect to several criteria, including operational necessity, financial capability, and cost versus benefit.

1.2 COMMUNITY ENGAGEMENT AND PARTNERSHIP

PUBLIC ENGAGEMENT

A 2023-2043 Airport Master Plan website was created to engage with the public, providing a forum for updates to be providing while also obtaining feedback. The website introduced the Master Plan, described the preparation process, provided draft airport drawings and figures, compiled a list of frequently asked questions and provided status updates on the stage of the process that was currently underway. The website also included a public input section, where public and stakeholders could submit feedback, suggestions and/or questions related to the Airport Master Plan. **Figure 1-2** captures a snapshot of the Airport Master Plan website and **Figure 1-3** illustrates the website activity.



Introduction

Welcome to the John C. Munro Hamilton International Airport (YHM) 2023 Master Plan website. This website was created to provide publicly available information about the Airport Master Plan currently being prepared for Hamilton International Airport (the Airport). It also provides an opportunity for anyone to leave feedback, comments

Figure 1-2 Snapshot of the Airport Master Plan Website

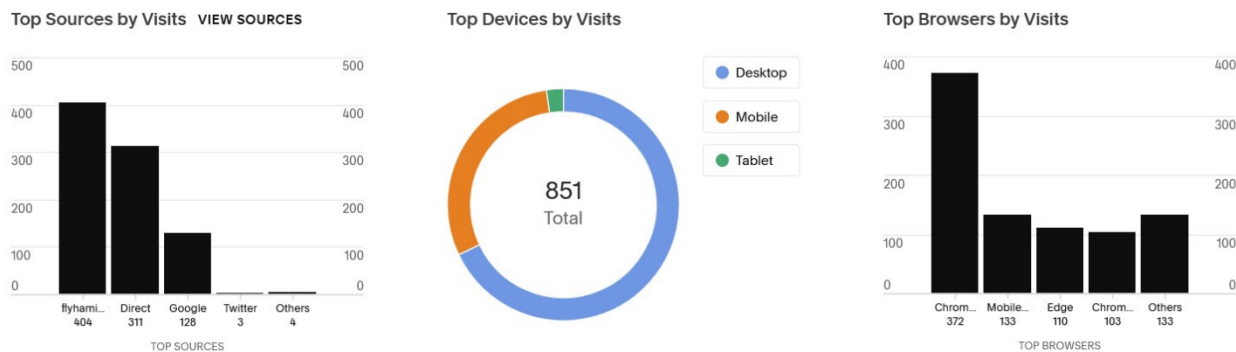


Figure 1-3 Summary of Website Activity

A public open house event was held at the Airport on May 10, 2023, where the public and stakeholders were invited to review the draft Airport Land Use Plan, Airport Development Plan and proposed Noise Management Contours. Participants could provide their comments at the event or through the website.

A total of 33 responses were received through the website and open house from a mix of private individuals and stakeholders, such as development corporations and municipal government agencies. The website remained active until the Airport Master Plan was officially released to the public.

Domain Name: yhmaairportmasterplan2023.com

STAKEHOLDER CONSULTATIONS

Hamilton International and its consultants reached out to various stakeholders, including tenants, airline operators, government agencies, jurisdictional authorities, and the City of Hamilton, in a consultative process to receive input into the planning process.

Three separate workshops were held with City of Hamilton staff. Two were held at the beginning of the planning process and a final workshop was held to present the recommended Airport Land Use Plan, Airport Development Strategy, and NEF contours.

Other stakeholders, including KF Aerospace, Jetport, Purolator Inc., Latitude Air Ambulance, NAV Canada, and Canada Border Services Agency responded to the stakeholder consultation invitation. Airport management also engaged directly with the major operators, such as the air cargo and scheduled passenger air carriers, prior to the start of the planning process.

2 WELCOME TO YHM

2.1 OVERVIEW

HAMILTON INTERNATIONAL AT A GLANCE

Hamilton International serves as a global gateway for facilitating the movement of goods across the country and around the world. It is the largest domestic overnight express cargo airport, the third largest cargo freight airport in Canada and a key economic driver and vital transportation hub for the City of Hamilton and surrounding region. The Airport experienced a strong recovery in the latter half of 2022 in passenger volume, along with steady growth in cargo activity. Hamilton International is poised to continue that growth as outlined in this Master Plan, particularly as key challenges, such as access to serviced land, are considered and addressed.

Achievements from Hamilton International's most recent fiscal year are highlighted below:

 <p>645,789 passengers flying to and from Hamilton International</p>	 <p>~90% of passengers reported a positive Airport experience¹</p>	 <p>877m kg in total landed cargo aircraft billable weight</p>
<p>\$100k+ </p> <p>of in-kind resources and financial support to various community partners and initiatives</p>	<p>Airport Ambassador Program </p> <p>celebrated 15 years of smiles and contributed over 3,300 hours of service</p>	<p>\$1.5m </p> <p>Payments to the City of Hamilton</p>
<p>\$11.1m </p> <p>Total investment in infrastructure made by TradePort and its partners in 2022</p>	<p></p> <p>Certificate of accreditation² earned for carbon management processes</p>	<p>Health and safety measures recognized with global health accreditation³ </p>
<p>\$5.0m </p> <p>Investment in infrastructure made by Tradeport in 2022</p>	<p>\$68.4m </p> <p>Capital committed through government funding initiatives over the next 5 years</p>	

¹Source: 2022 Customer Satisfaction Survey results (from a total sample of ~11,000 respondents)
²Certificate of Accreditation earned under the Airports Council International Airport Carbon Accreditation Program
³Achieved accreditation under the Airports Council International Airport Health Accreditation Program



82 km
to the **CN Tower** (Toronto, ON)



28 km
to the **Niagara Escarpment**



84 km
to **Niagara Falls** (Niagara Falls, ON)



210 km
to **Bruce County / Lake Huron**



530 km
to **Parliament Hill** (Ottawa, ON)

2022 Activity Numbers



647,000 E/D Passengers



38,085 Aircraft Movements



877,000 Metric Tonnes of Cargo



-32%



+02%



+65%

Change Since 2019 (Pre-COVID)



2.2 AIRPORT GOVERNANCE, LEADERSHIP AND OPERATION

ABOUT VANTAGE AIRPORT GROUP

Hamilton Airport is owned by the City of Hamilton and managed under an agreement with TradePort International Corporation, a wholly owned subsidiary of Vantage Airport Group – an industry leading investor, developer and manager of airport assets.

We Know Airports

For more than 25 years, Vantage Airport Group has invested in, developed and managed airports around the world – making them more efficient, profitable, sustainable, and connected to the communities they serve. Vantage’s current network includes airports in locations ranging from large capital cities and tourist destinations to smaller destinations across the United States, Canada, the Caribbean and Europe.

We Make Airports Better

Throughout its history, Vantage has worked with more than 30 airports worldwide. Whether that is improving airport operations and developing customized commercial programs, leading large-scale infrastructure developments, or helping an airport grow its air services, Vantage creates customized solutions that deliver results.

We’re Airport People

Guided by the principals of People, Place and Performance, Vantage’s integrated global team of talented airport professionals draws on industry best practices to build and operate world-class airports that deliver an exceptional experience to passengers, airlines, stakeholders and the local community.

We Ensure Better Futures

Vantage is committed to being a market leader in the implementation and management of innovative and effective environmental, social and governance programs to ensure **BETTER FUTURES** for their partners and the communities in which they operate. The projects and operations are most successful when they incorporate the values, priorities and needs of the local communities.

CORPORATE GOVERNANCE & LEADERSHIP

→ Mission

As an international gateway in Southern Ontario facilitating the efficient movement of people and goods, we are an economic engine and a responsible community partner focused on environmental, social and governance leadership across all our business and management practices.

→ Vision

Recognized by the world as the best global gateway in Canada for affordable travel and goods movement.

→ Values

Safety & Security – Taking immediate action to ensure we achieve the highest standards.

Quality & Operational Excellence – Constantly striving to exceed expectation by providing high quality airport services and infrastructure while minimizing our impact on the environment.

Respect & Integrity – Embracing a diverse, inclusive culture of integrity and accountability for our actions.

Improvement & Innovation – Committing to grow our business through continuous learning to achieve cost leadership, implement innovative solutions and to deliver winning results.

Teamwork & Recognition – Creating a positive experience everyday by being friendly, having fun and recognizing achievements.

→ **Governance**

Hamilton International’s Board of Directors is comprised of a team of professional connected to the local community and/or aviation industry, providing governance oversight to the Leadership Team and is complimented by the Canadian Network Vantage resources.

Board of Directors	Airport Leadership Team
Ron Foxcroft, C.M. Chairman of the Board	Cole Horncastle Executive Managing Director
Edward Minich Finance and Audit Committee Chair	Kelly Darling Associate Director, Human Resources & Corporate Administration
Hon. Stan Keyes Director	Justin De Caire Controller
Frank Scremin Director	Colleen Ryan Associate Director, Marketing, Communication & Customer Experience
Stewart Steeves Director	
Peter Tong Director	
Vantage Airport Group – Canadian Network	
Cathie Puckering Vice President, Head of Canada	
Dina Carlucci Director, Business Development & Marketing	

2.3 HISTORY

Hamilton International was initially constructed between 1940 and 1943 as part of the British Commonwealth Air Training Plan (BCATP) to support the Allied war effort. The airfield was originally configured with a triangular runway layout, each having a length of approximately 3,100 feet (945 m), as was typical of airfields at the time. In the late 1950's, following the introduction of jet aircraft into the Royal Canadian Air force, Runways 06-24 and 12-30 were extended to 6,000 feet (1,828 m) and 5,000 feet (1,524 m) respectively.

Military activities continued at the Airport until 1963, when the Department of National Defense declared the Airport surplus to its needs and the ownership was then transferred to the federal Department of Transport later named Transport Canada. Transport Canada continued to manage the operation of the Airport until 1967, at which time an agreement was reached with the City of Hamilton whereby the City would assume responsibility for the operation and maintenance of the Airport, while Transport Canada retained ownership.



In the mid-1980's several major capital projects were undertaken at the Airport, including the construction of a new runway, Runway 12L-30R with a length of 7,998 feet (2,438 m), an air terminal building, a control tower, and an equipment maintenance garage. With the construction of the new runway, Runway 16-34 was decommissioned and converted into what is today Taxiway "Charlie".

In July 1994, Transport Canada announced the National Airports Policy (NAP). Under NAP, Transport Canada proceeded to divest itself from the ownership of local and regional airports throughout Canada. On December 20, 1996, the ownership of Hamilton International Airport was transferred to the Regional Municipality of Hamilton-Wentworth, now the City of Hamilton. In the same year, TradePort International Corporation was selected through a competitive process to undertake the responsibility for the management, operation, and financing of the Airport. TradePort continues to operate the Airport today through a wholly owned subsidiary company named Hamilton International Airport Limited.

Since 1996, the Airport has realized numerous infrastructure improvements and commercial expansions with the addition of several cargo handling facilities and hangars, aircraft maintenance facilities, fixed-base operators, and institutional facilities, along with expansion to the PTB and apron areas.

In 1998 Runway 12R-30L was decommissioned and repurposed as a taxiway and apron area. The taxiway would later be abandoned and preserved only to accommodate irregular operations.

Today, the Airport has leveraged its 24-hour operations capability to position itself as a significant air cargo hub. The investments in cargo facilities have culminated into the Airport being able to facilitate

increasing cargo billable weight through primarily overnight express cargo and have positioned Hamilton International as the third largest cargo airport in Canada.

2.4 CURRENT ACTIVITY

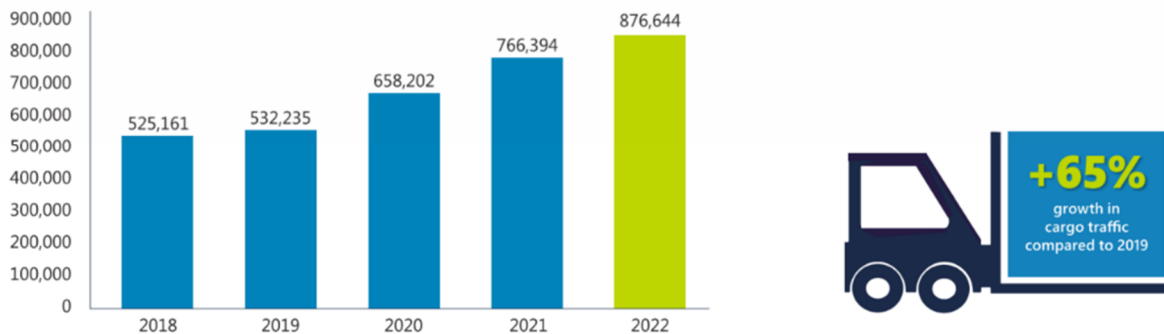
CARGO OPERATIONS

Hamilton International serves as a global gateway for facilitating the movement of goods across the country and around the world. It is the largest domestic overnight express cargo airport, the third largest cargo freight airport in Canada and a key economic driver and vital transportation hub. The Airport offers safe and secure facilities for its established 24/7 operation and proudly supports domestic and international trade by partnering with key cargo companies, including Cargojet, DHL Express, UPS, Canada Post, Purolator and Amazon (Prime Air) to ensure Canadians can ship and receive the goods they need reliably, safely and efficiently. These operators use Hamilton International as a base of operations and provide dedicated air cargo and courier service to several domestic and international destinations.

Hamilton International is a critical link in Canada’s supply chain. In 2022, the Airport facilitated 877 million kilograms in total cargo aircraft billable weight. This represented a 14% increase compared to the previous year and a notable 65% increase compared to pre-pandemic cargo activity in 2019. An accelerated shift towards e-commerce along with the transportation of high-value, time-sensitive goods, such as pharmaceuticals, automotive parts, and perishables, have contributed to double-digit growth in goods movement activity at the Airport. Hamilton International is also proud to facilitate ad-hoc cargo activity, including unique and oversized shipments.

Hamilton International offers cargo partners significant advantages, including strategic proximity to Ontario’s 400 series highways, the Greater Toronto Area and the United States border. The Airport also has 24-hour landing capability, dual runways of 10,000 feet and 6,000 feet, and dedicated Canada Border Services Agency (CBSA) staff on site, all of which support quick turnarounds for cargo carriers. The City of Hamilton was also designated as a Foreign Trade Zone Point in 2020 – providing businesses that import/export goods or manufacture products access to direct support on a range of duty deferrals and tax exemptions.

Cargo Aircraft Billable Weight (000s kg)



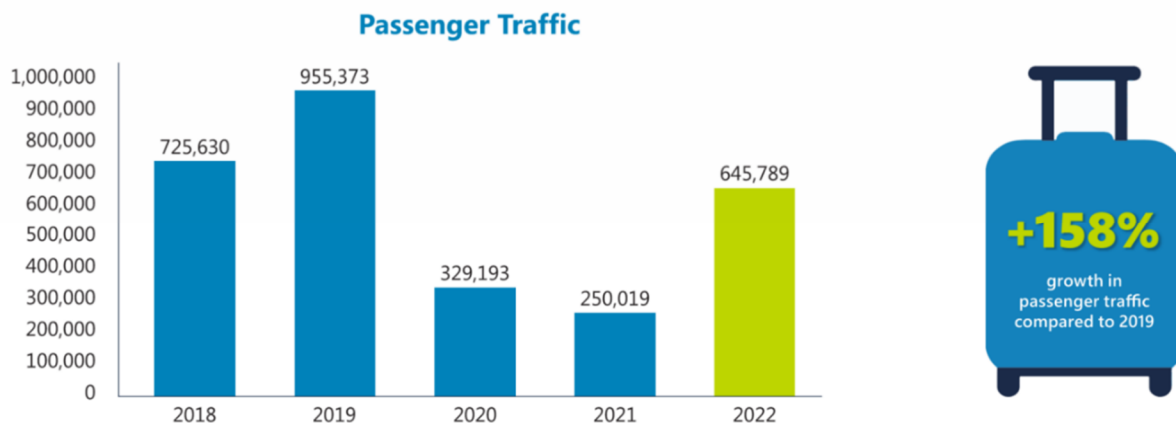
PASSENGER OPERATIONS

Hamilton International provides the traveling public within southern Ontario with an alternative to Toronto Pearson International Airport that is both affordable and convenient. Scheduled air service is provided to several domestic and international destinations. Air carriers currently include Swoop, WestJet, Lynx, PLAY, Air Transat, and Sunwing, flying to a variety of domestic, transborder and international locations.

Demand for air travel surged in 2022 as the pandemic restrictions eased and passenger operations at Hamilton International made a major comeback with 645,789 total passengers, a year-over-year increase of 158% and nearly 68% of the pre-pandemic levels in 2019. In 2019, the Airport saw a record-breaking nearly one-million passengers travel through its terminal, highlighting the near-term growth potential that remains.

The Airport’s 2022 Summer Program offered travellers affordable getaway options with destinations from across Canada and into the United States, including seasonal services to four new destinations in Atlantic Canada, continued service to Florida and the highly anticipated return of flights to Las Vegas. The Airport was also thrilled to welcome a new airline partner onboard as Lynx Air, Canada’s newest ultra-affordable airline, commenced operations from Hamilton International at the end of June, offering travellers affordable and convenient travel options to popular Canadian destinations. The momentum continued into the colder months with Hamilton International’s 2022/23 Winter Program, featuring snowy getaway destinations across Canada alongside popular sunny escapes in the United States, Cuba, the Dominican Republic, and Mexico, with year-round services operated by Swoop, WestJet, Lynx and the return of seasonal airline partners, Air Transat and Sunwing.

Beginning in June 2023, PLAY Airlines will fly twice weekly flights to Iceland with onward connections to multiple cities in Europe.



AIRCRAFT MAINTENANCE AND OVERHAUL

KF Aerospace, located on the Airport, is a significant Canadian MRO (Maintenance, Repair and Overhaul) operator providing engineering, maintenance and modification solutions to the airline industry. Facilities at Hamilton International include two large hangars, one of which can support widebody aircraft. Adjacent to the KF Aerospace facility is Mohawk College’s Centre for Aviation Technology that offers programs in aircraft and avionics maintenance. Also, Cargojet maintains an MRO facility, along with pilot training to ensure its fleet of over 30 aircraft and growing can meet current and future demand.

GENERAL AVIATION

General aviation operators based at the Airport include Jetport, a fixed-base operator and corporate charter company; Latitude Air Ambulance, specializing in patient medical evacuations and transfers; and, Onward Aviation, a fixed-base operator. Also located on the Airport is the Canadian Warplane Heritage Museum, a non-profit organization dedicated to the preservation of historic aircraft.

OTHER SUPPORTING SERVICES

Hamilton International has a substantial number of supporting services located at the Airport to ensure the successful delivery of passenger, cargo and general aviation on a daily basis. This includes the regional Canada Border Services Agency office that provides 24/7 immigration and customs support to all airport stakeholders, and Executive Aviation, a leading ground handler service provider. The Airport also has several passenger service providers located at or using Airport property, including rental car companies, food and beverage concessions, electronics and merchandise retail and ground transportation service providers. These support services work together to ensure people and goods are moved efficiently throughout the region.

2.5 ECONOMIC IMPACT

Hamilton International acts as a key driver of economic activity in the Hamilton Census Metropolitan Area ("CMA") and broader Ontario region. The Airport's capital investment, operational employment and visitor spending contribute directly to regional employment and industry activity. The Airport's direct economic activity has a multiplier effect on employment, labor income and industry activity across the region.

Vantage and TradePort are proud of the relationship it holds with the City, which began when the City first selected TradePort to manage and operate the Airport in 1996. Founded on mutual trust, commitment to continued growth, creative problem-solving, and alignment of goals, our relationship and development has established us as Canada's leading gateway for affordable travel and goods movement.

Through our 25-year operation, Vantage has demonstrated its commitment to the City and to the Airport through a track record of performance excellence, commencing with the original challenge to successfully reverse the Airport's deficit upon TradePort assuming the role of its operator, which was expeditiously accomplished.

Since then, capital investment has been at Vantage and TradePort's core values, developing the Airport to generate revenues from its various sources in the passenger, cargo, MRO (maintenance, repair, overhaul), land development and FBO (fixed-base operator) segments. Since 1996, **TradePort has invested \$139m** at the Airport. To date TradePort's notable infrastructure upgrades include:

- ➔ Extending Runway 12-30 to 10,000 ft, which is to a length exceeding our obligation in the lease;
- ➔ Designing, financing and project management of a **terminal expansion** in 2007 and 2008, which doubled the size of the departures lounge, international arrivals hall, outbound baggage facility, expanding car parking facilities and added passenger-friendly amenities, positioned Hamilton International Airport for future passenger growth;
- ➔ Accommodating the regional office of Canada Border Services Agency, to support both passenger and cargo screening;

- Investing strategically in the Airport's cargo facilities, including an \$11.9m multi-modal cross-dock facility positioning the Airport as a critical waypoint for goods movement across Canada and paving the way to meet the demands of booming e-commerce activity;
- Negotiating long-term occupancy agreements for tenant-facility investments;
- Advancing a \$38.9m strategic airfield rehabilitation and modernization project to fully upgrade the Airport's airfield while safely maintaining time-critical aircraft operations; and
- Obtaining strategic funding for \$46.9 million with respect to the Gateway Expansion and Sustainability Project, which will increase capacity, supply chain resilience, and improve the Airport's impact on the environment.

TradePort serves as a resilient partner for the City in an aviation industry that has proven to be both cyclical and financially volatile. Before the dramatic impact of the COVID-19 pandemic, TradePort's strategies delivered unprecedented passenger growth for the Airport, facilitating travel for 955,373 passengers in 2019, a remarkable 187% increase over three years. In fact, TradePort has demonstrated the ability for the Airport to reach approximately one million passengers several times before the disruption by macro world events - and we will do so again as TradePort is structured to absorb and rebound from these systemic shocks. TradePort continually works to strategically position the Airport and maintain key airline relationships, helping to ensure that the Airport is strongly positioned once any crisis is behind us, including the current pandemic.

As demonstrated by its most recent 2021 Economic Impact Study, Hamilton International and its business partners are proud to contribute \$536.7 million in gross domestic product (GDP), produce an economic output of \$1.5 billion and create over 4,720 jobs for Hamilton and the surrounding region. Since 1996, TradePort and its business partners have invested \$422.2 million, which has generated \$31.5 million in additional property tax revenue for the City of Hamilton.

Looking ahead, Vantage and TradePort will continue to serve as the responsible and sustainable community partner with the City of Hamilton and enabler of a growing and leading low-cost gateway for air cargo and passenger traffic. Working collaboratively with the City, Hamilton International will continue to deliver an excellent passenger experience, further invest in infrastructure and ensure the Airport fulfills a role as an economic engine. This investment and development will maximize the value of the City's critical asset and the community it so proudly serves.

2.6 AIRPORT FACILITIES, AND INFRASTRUCTURE

The long-term success of an airport is closely tied to the facilities and infrastructure it provides. Hamilton International has facilities that support operations in all-weather conditions, 24/7 and 365 days a year, with an ability to accommodate aircraft of all sizes. Hamilton International provides a service level appropriate for its current activity demands. As demand increases, so will stakeholder expectations and the requirement of the Airport to meet those operational and services needs. The following subsections provides a description of the existing facilities and key infrastructure, and they are illustrated in **Exhibit 2-1**. Sections 5, 6 and 7 of this Master Plan aim to address potential gaps and opportunities by identifying recommended land uses, and facility and infrastructure improvements that can be anticipated and/or required over a 20-year planning horizon.




- ① PASSENGER TERMINAL BUILDING (PTB)
- ② HANGAR 5
- ③ ONWARD AVIATION
- ④ CARGO CENTRE
- ⑤ AIC (PRIVATE)
- ⑥ APRON I (RESTRICTED)
- ⑦ APRON II
- ⑧ JETPORT FBO
- ⑨ TRANSPORT CANADA
- ⑩ PUROLATOR / CANADA POST
- ⑪ MOHAWK COLLEGE
- ⑫ KF AEROSPACE
- ⑬ PUROLATOR / CANADA POST APRON
- ⑭ CANADIAN WARPLANE HERITAGE MUSEUM
- ⑮ APRON III
- ⑯ DHL
- ⑰ UPS APRON
- ⑱ UPS
- ⑲ CARGOJET
- ⑳ CARGOJET
- ㉑ FIRE HALL
- ㉒ NAV CANADA AIR TRAFFIC CONTROL TOWER
- ㉓ FIELD ELECTRIC CENTRE
- ㉔ GLIDE PATH 12
- ㉕ LOCALIZER 30
- ㉖ LOCALIZER 12
- ㉗ NAV CANADA RADAR
- ㉘ GLYCOL BUILDING
- ㉙ UPS STORMWATER POND
- ㉚ PUMPHOUSE
- ㉛ HAMILTON AIRPORT FUEL FACILITY CORPORATION (FUEL FARM)
- ㉜ PRIMARY PARKING LOT
- ㉝ CANADA BORDER SERVICES AGENCY
- ㉞ CARGOJET GROUND SERVICES EQUIPMENT MAINTENANCE
- ㉟ CARGOJET GROUND SERVICES EQUIPMENT MAINTENANCE
- ㊱ AUTOMATED WEATHER OBSERVATION SYSTEM

- AIRPORT PROPERTY
- AIRSIDE PAVEMENT
- CLOSED AIRSIDE PAVEMENT
- BUILDINGS - ON AIRPORT
- BUILDINGS - OFF AIRPORT
- ROADS - PAVED
- ROADS - GRAVEL
- WATERBODIES

CYHM

AIRPORT MASTER PLAN 2023-2043



AVIA · NG
AIRPORT CONSULTANTS

John C. Munro
HAMILTON
INTERNATIONAL AIRPORT

VANTAGE
AIRPORT GROUP

EXISTING
CONDITIONS PLAN

EXHIBIT 2-1

RUNWAYS

The Airport's primary runway, Runway 12-30, is equipped with infrastructure that supports low and reduced visibility operations. Runway 12 provides the greatest capability with approaches permitted in inclement weather conditions with ceiling and visibility as low as 101 feet (31 m) and 1,200 feet (366 m) respectively. Departures from Runway 12 are permitted in visibility as low as 600 feet (183 m). Runway 12-30 at 10,006 feet (3,050 m) in length is well suited to continue supporting operations of both narrow and widebody aircraft on domestic and international routes.

Runway 06-24 at 6,010 feet (1,832 m) in length provides a secondary runway for use by lighter business aviation, and ad-hoc passenger and cargo aircraft, including corporate jets, medevac aircraft, and smaller aircraft used by various freight forwarding operators.

TAXIWAYS

The runway system and apron areas are currently supported by eight (8) taxiways. These taxiways provide connections at strategic locations to facilitate the flow of traffic between runways and apron areas. Neither runway is currently served by a full-length parallel taxiway. The existing taxiway configuration works well to serve the current needs of the Airport and its users; however, improvements are anticipated to be required as future increases in aircraft movements will dictate a need to improve runway throughput by reducing runway occupancy times.

APRONS

Hamilton International currently has thirteen (13) designated apron areas, each serving a different purpose and segment of aviation activity on the Airport. These aprons provide a mix of common-use and dedicated ramp areas for the parking and servicing of passenger, cargo, and general aviation aircraft. Expansion of Apron II is currently underway and will provide additional space for the servicing of cargo aircraft. Like taxiways, as the demand for aircraft parking increases, the need for additional apron areas will increase to avoid costly congestion and aircraft servicing delays.

PASSENGER TERMINAL BUILDING

The Passenger Terminal Building (PTB) was originally constructed in 1985 by Transport Canada and has been subsequently expanded over the years with the latest expansion occurring in 2008 that saw an enlargement of the holdroom bringing the size of the facility to approximately 8,500 m². This most recent expansion to the PTB is designed to support a second floor over the existing holdroom, should future demand result in the need to expand vertically in addition to growing the overall terminal footprint.

Elements of the existing building, as illustrated in **Figure 2-1**, include:

- Check-in area with 19 check-in positions.
- Pre-board passenger screening function with 4 screening lanes.
- Departures lounge with the capacity to accommodate over 600 passengers.
- An outbound baggage make-up area with a hold bag screening system and common use make-up carousel.
- Domestic baggage reclaim area with two flat plate reclaim devices.
- International arrivals area with Canada Border Services Agency (CBSA) functions, and an international baggage reclaim area with a single flat plate reclaim device.

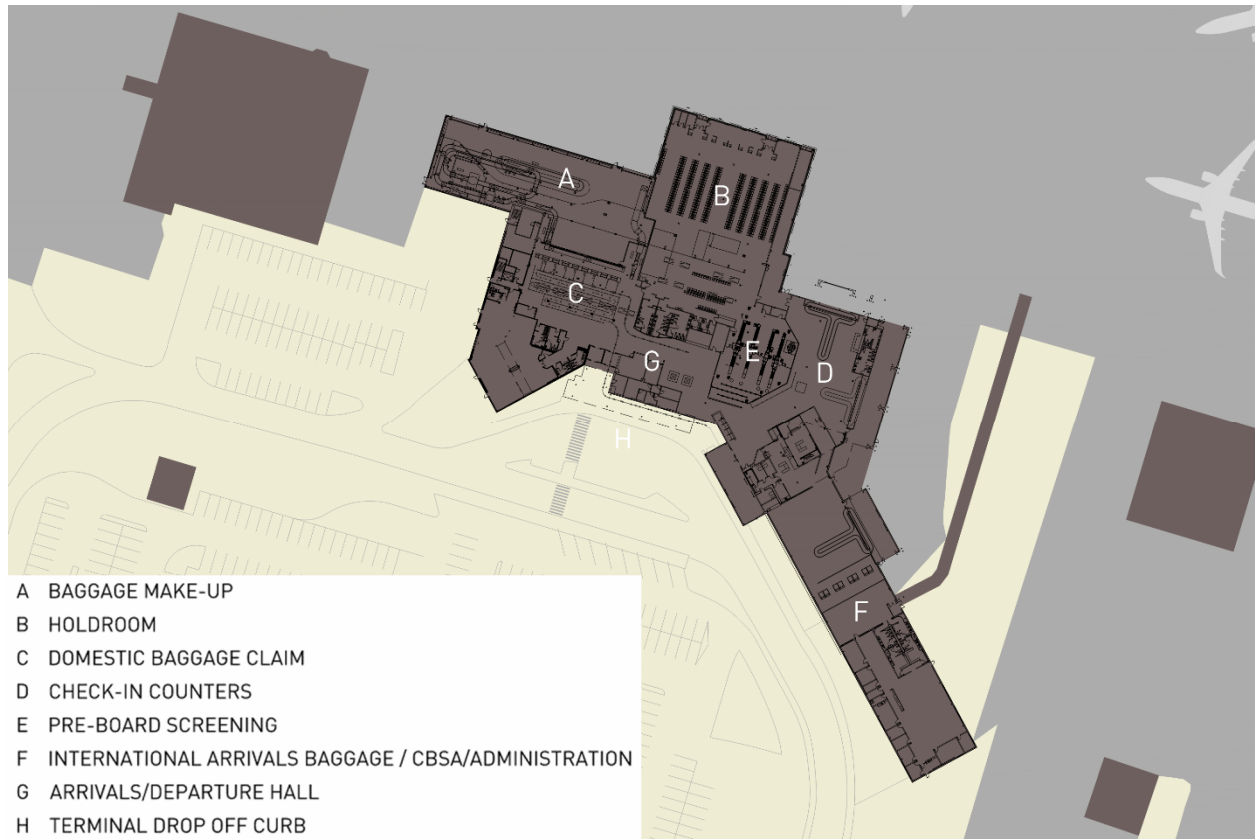


Figure 2-1 Existing Passenger Terminal Building

VEHICLE PARKING

The capacity of the existing public parking lot is 2,272 stalls. However, an area representing 369 stalls can be used for truck staging, as needed, reducing the capacity of the public lot to 1,903 stalls.

Rental car parking, as identified in **Figure 2-2**, is located in the northwest corner of the public car park with a capacity of 44 stalls. A second larger car park, with a capacity of 138 stalls, is located north of the employee lot and south of the glycol management facility.

There are three employee parking lots with a total capacity of 190 stalls, which includes a 60-stall executive/contractor lot located west of the PTB, a 17-stall lot leased to CBSA located to the southeast of the PTB, and a 113-stall lot located west of the Canadian Warplane Heritage Museum (CWHM).

Increases in passenger traffic will result in the need to expand parking capacity.

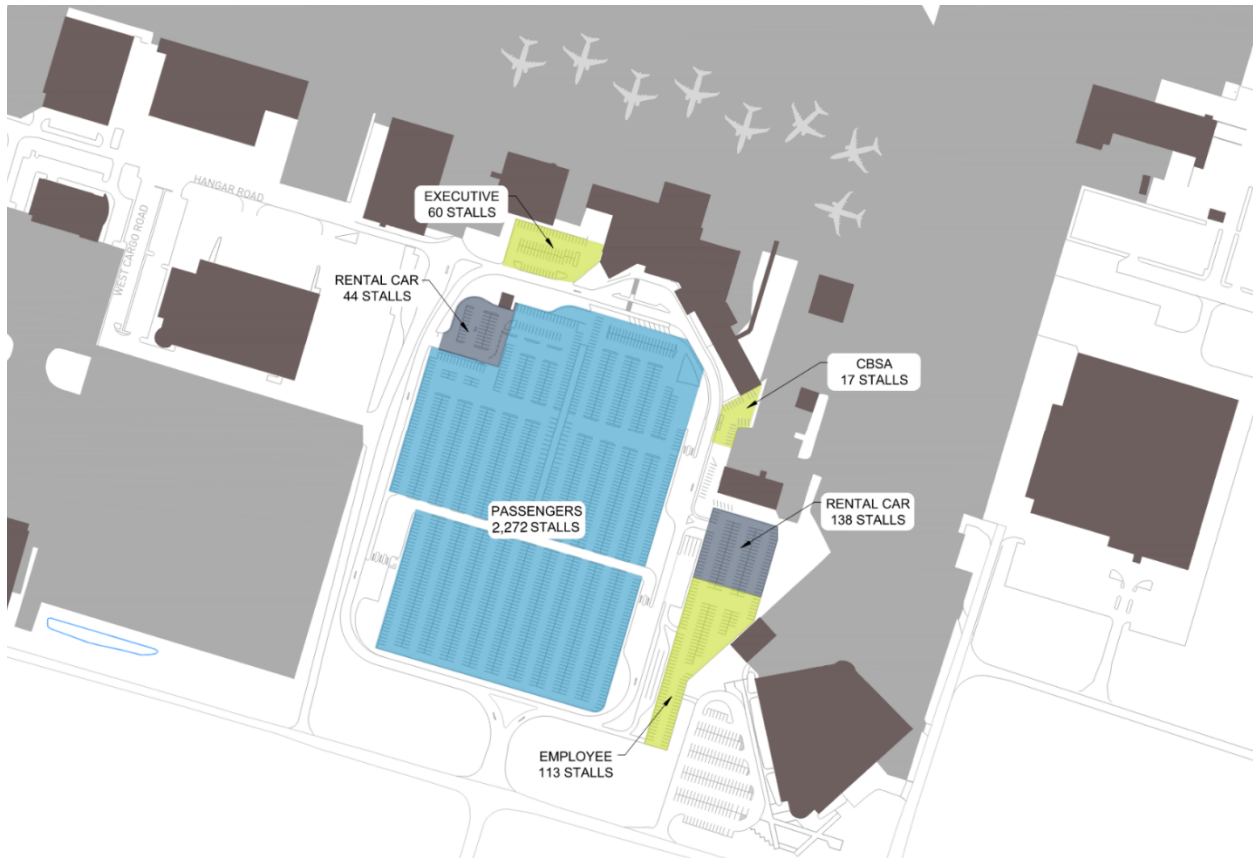


Figure 2-2 Existing Parking Lot

OPERATIONS SUPPORT FACILITIES & SERVICES

Air Traffic Control Facilities

Ensuring the smooth management of traffic, NAV Canada operates and maintains an Air Traffic Control Tower (ATCT) and several radio navigational aids, including VHF transmitters and receivers, a glide-path and two localizers, and the surveillance radar systems on the Airport. The ATCT was constructed in 1987 and continues to serve the needs of the Airport. No replacement of the facility is currently planned.

Combined Services Building

A Combined Services Building (CSB) is located west of Runway 06-24 near the ATCT and houses the Airport's emergency response services and airport maintenance functions. The existing facility was originally constructed in 1990 and, depending on other Airport infrastructure improvements that may occur, it could require an expansion to accommodate additional maintenance functions and the storage of airport maintenance vehicles. A separate study has been undertaken to better understand the needs for the CSB facility and examine the options available for expansion. The outcome from this study has been considered in the development of this Master Plan and is further addressed in Sections 5, 6 and 7.

Aviation Fuel Storage

Aviation fuel storage at the Airport is consolidated in a facility located off East Cargo Road. The fuel farm has a storage capacity of 1.8 million litres of Jet A-1 fuel and the site has the capacity for future expansion for both regular and sustainable aviation fuels. No 100LL “avgas” is stored or supplied by the consortium; however, is available at other locations.

Aircraft Deicing

Aircraft de-icing is undertaken at several locations, including Apron I/Apron III, UPS Apron, and Purolator Apron. High concentrated runoff from these aprons during de-icing is collected using vacuum trucks, where residual storm water is directed to holding ponds or underground storage facilities and from there discharged to the sanitary sewer or the natural environment dependent on meeting specific quality criteria.

TENANTS

Existing tenants located on the Airport include, but are not limited to:

- Cargojet – air cargo operator.
- UPS – air cargo operator.
- DHL – air cargo operator.
- Purolator / Canada Post – mail and courier operator, including regional ground operations.
- Jetport – Fixed-Base Operator (FBO) and corporate charter operator.
- KF Aerospace – aircraft maintenance and overhaul.
- Mohawk College – aviation technology college.
- Latitude Air Ambulance – medical air transfer operator.
- Onward Aviation – Fixed-Base Operator (FBO).
- Transport Canada – regional office and hangar.
- Canadian Warplane Heritage Museum (CWHM) – museum and event centre.
- NAV CANADA – air traffic control tower navigational aids support.
- Canada Border Services Agency – passenger and cargo port of entry functions.

2.7 URBAN CONTEXT

Hamilton International is located within the City of Hamilton, approximately 10.5 kilometres southwest of the downtown and surrounded in part by the Airport Employment Growth District (AEGD)². This AEGD area has approximately 551 net developable hectares of land intended for employment-related uses, including light and prestige industrial, and airport-related businesses that may benefit from the proximity to the Airport, and is supported by a road network allowing for the efficient movement of goods and people.

Figure 2-3 illustrates of the extent of the AEGD Secondary Plan as found in the Urban Hamilton Official Plan. This Plan allows for landowners, located adjacent to the Airport property to potentially have direct access to airport infrastructure via a “through-the-fence” agreement, providing opportunities for airport-

² <https://www.hamilton.ca/build-invest-grow/planning-development/official-plan/secondary-plans-progress/airport-employment>

related commercial development, such as air cargo facilities or hangars, to be located off airport property while being able to access taxiways and runways.

Complementary to the AEGD Secondary Plan, the City of Hamilton has prepared a series of supporting maps³ that identify natural heritage systems, district road classifications, proposed transit routes, and a phasing plan. The Airport Development Strategy, put forward as part of this Master Plan, aligns with the AEGD Secondary Plan Policies and mapping which constitute the AEGD Secondary Plan.

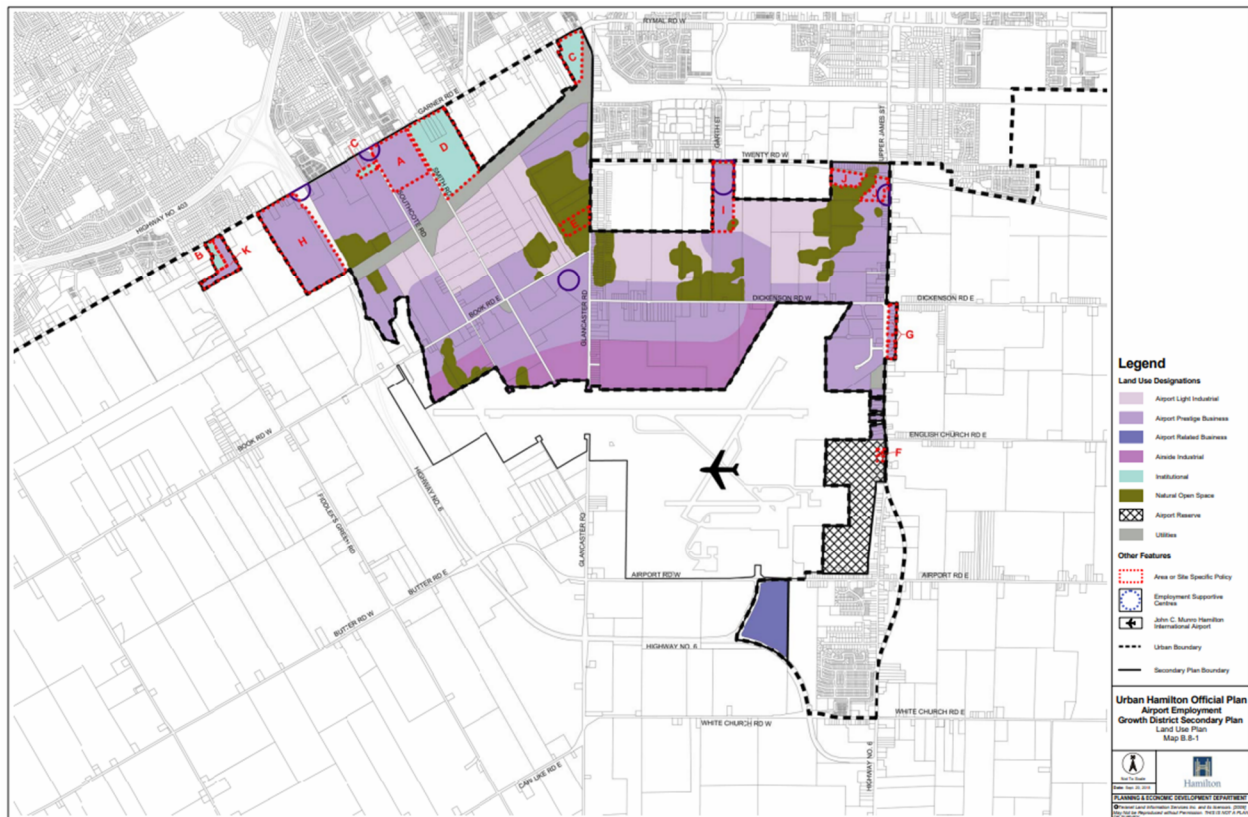


Figure 2-3 Airport Employment Growth District

³ <https://www.hamilton.ca/build-invest-grow/planning-development/official-plan/secondary-plans-progress/airport-employment>

3 SOCIOECONOMIC CONTEXT

CATCHMENT AREA

Hamilton International is currently one of four (4) scheduled air carrier airports serving the Greater Toronto and Hamilton Area region, along with Toronto Pearson, Billy Bishop Toronto City Centre, and Region of Waterloo International. The Hamilton Census Metropolitan Area⁴ (CMA) is adjacent to major CMAs for Toronto, St. Catharines-Niagara and Kitchener-Waterloo-Cambridge.

The population growth rate for the Hamilton CMA has averaged less than 1% per year, although this has increased over the last five years. **Table 3-1** describes the historical growth of the Hamilton CMA.

Table 3-1 Historical Population Growth

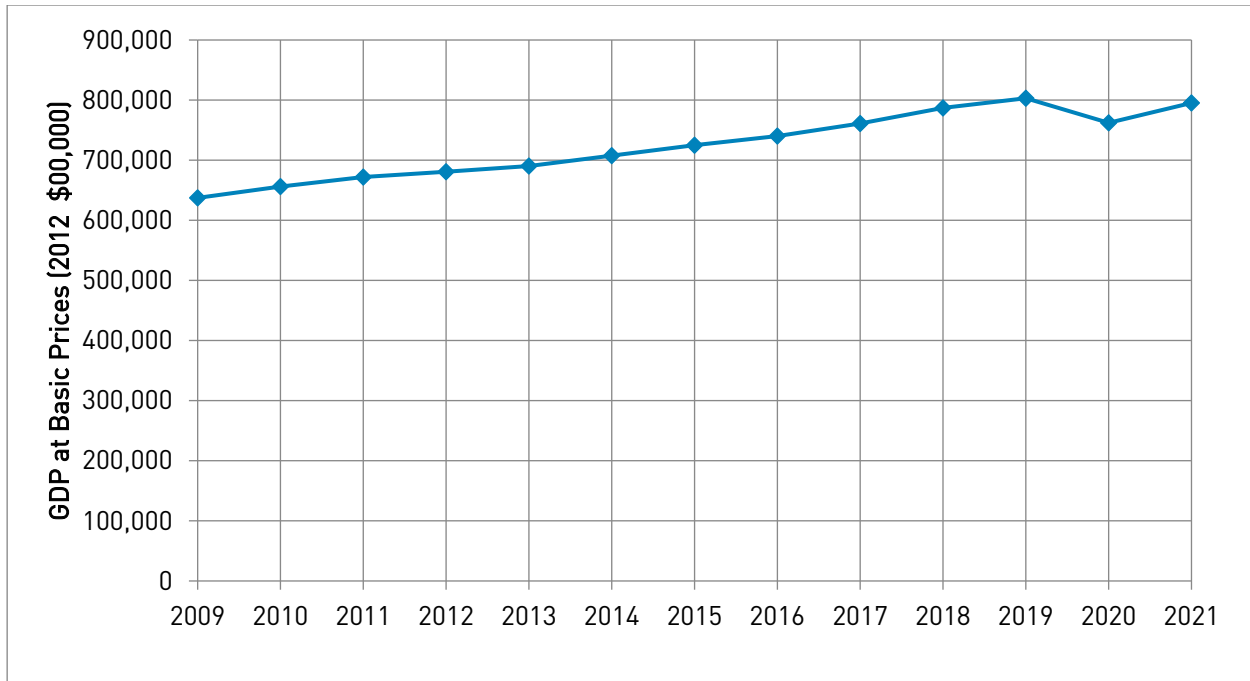
Year	Population	Increase Over Previous Census Year
2006	692,911	
2011	721,053	4.0%
2016	747,545	3.7%
2021	785,184	5.0%
Source: Statistics Canada		

Understanding the characteristics of this growth, and in particular changes in population demographics, is important to determining the characteristics of passenger demand over the long-term. The growth of passenger activity will, in part, be a product of the increase in the population within the census metropolitan area. However, the presence of the low-cost and ultra low-cost air carriers at Hamilton International will draw in passengers from outside the immediate Hamilton CMA area.

GROSS DOMESTIC PRODUCT

Provincial GDP has increased substantially since 2009, as noted in **Figure 3-1**, with an average annual growth rate through 2019 of just about 2.3%. The data for 2020 and 2021 was negatively affected by the pandemic.

⁴ The Hamilton CMA includes Hamilton, Burlington, Dundas, Flamborough, Ancaster, Glanbrook, Stoney Creek and Grimsby



Source: Office of Economic Policy, Ontario Ministry of Finance and Statistics Canada

Figure 3-1 Historical Ontario GDP

The Conference Board of Canada, in a 2022 report⁵, estimated annual GDP growth for Hamilton at 4.0% for 2021, and forecasted a slight drop to 3.9% in 2022 and 3.5% in 2023.

Situated in the heart of Ontario’s industrial belt, the Hamilton CMA is the third largest in Ontario, and the ninth largest in Canada. Hamilton has above average concentration of employment in the finance, insurance, post-secondary education, and home health care services sectors, as well as major industrial areas such as iron and steel, motor vehicles and railroad equipment.

The characteristics of employment within the catchment area for Hamilton International and specifically, the strength of different employment sectors, will have an influence on air travel and in general the propensity to travel. Therefore, obtaining an understanding of these characteristics and monitoring for industry changes now and into the future are important to both forecasting air travel demand and the need for expanded Airport services.

⁵ <https://www.conferenceboard.ca/product/major-city-insights-hamilton-october-2022/>

4 ACTIVITY FORECAST

Aviation activity forecasts are an integral component of the master planning process. The forecasts provide insight into future airport activity, which is used to identify infrastructure projects that are required to meet future demand. The forecasts consider changing market trends and assist with appropriate sizing of future capacity. A series of activity forecasts were prepared to estimate potential demand on airport infrastructure and identify potential capacity constraints. Activity forecasts were produced for the years 2023 through 2043, and considered the following segments of activity:

1. Total enplaned and deplaned (E/D) passengers.
2. Scheduled cargo activity based on maximum take-off weight.
3. Total movements by itinerant commercial aircraft movements, itinerant cargo aircraft movements and itinerant and local general aviation (GA) aircraft movements.
4. Peak hour passenger activity for the PTB, peak hour scheduled aircraft movements through the development of nominal gating schedules and the review of historical peaks in cargo and general aviation activity.

The forecasts presented were initially developed during the second half of 2022 and updated in early 2023 to reflect changes in demand for international travel. The prepared forecasts of traffic are also considered unconstrained, meaning the capacity of current airport facilities and infrastructure has not been allowed to influence the characteristics of demand.

4.1 HISTORICAL ACTIVITY

AIRCRAFT MOVEMENTS

Annual aircraft movements at Hamilton International have been declining slightly over time due to the phasing out of smaller aircraft in favour of larger more efficient aircraft, which resulted in the Airport experiencing an overall increase in the total weight of arriving aircraft. The pandemic also seems to have had little effect on total aircraft movements in recent years. The majority of aviation activity is commercial in nature, including both passenger and cargo flights, as shown in **Figure 4-1**. Commercial movements have consistently accounted for between 80% and 90% of the itinerant total for the past decade.

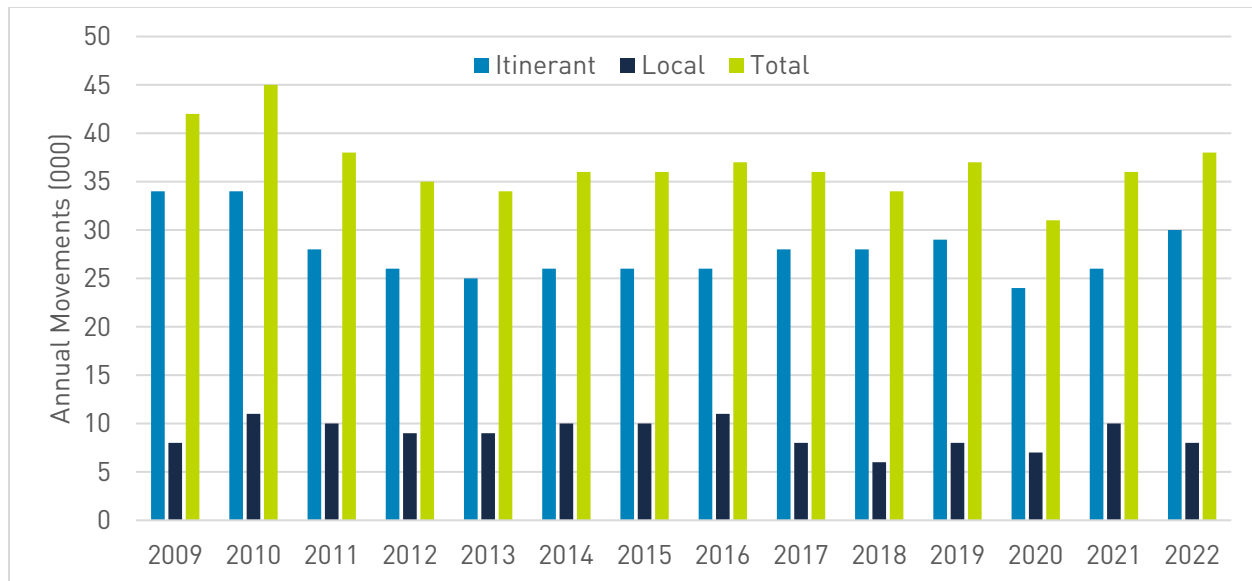


Figure 4-1 Historical Aircraft Movements

PASSENGER ACTIVITY

Historical passenger traffic at Hamilton International is shown in **Figure 4-2**. Passenger traffic was either flat or declining until 2017, when it grew by 80%. Robust growth continued in both 2018 (21%) and 2019 (31%) when it peaked at 955,000. Traffic dropped to 250,000 in 2021 following the onset of the pandemic in 2020. Traffic began to recover in 2022, reaching a new post-pandemic high of 645,789 representing 68% of 2019 traffic. The majority of passenger traffic has been domestic; however, the transborder and the international share of overall traffic grew substantially in 2019.

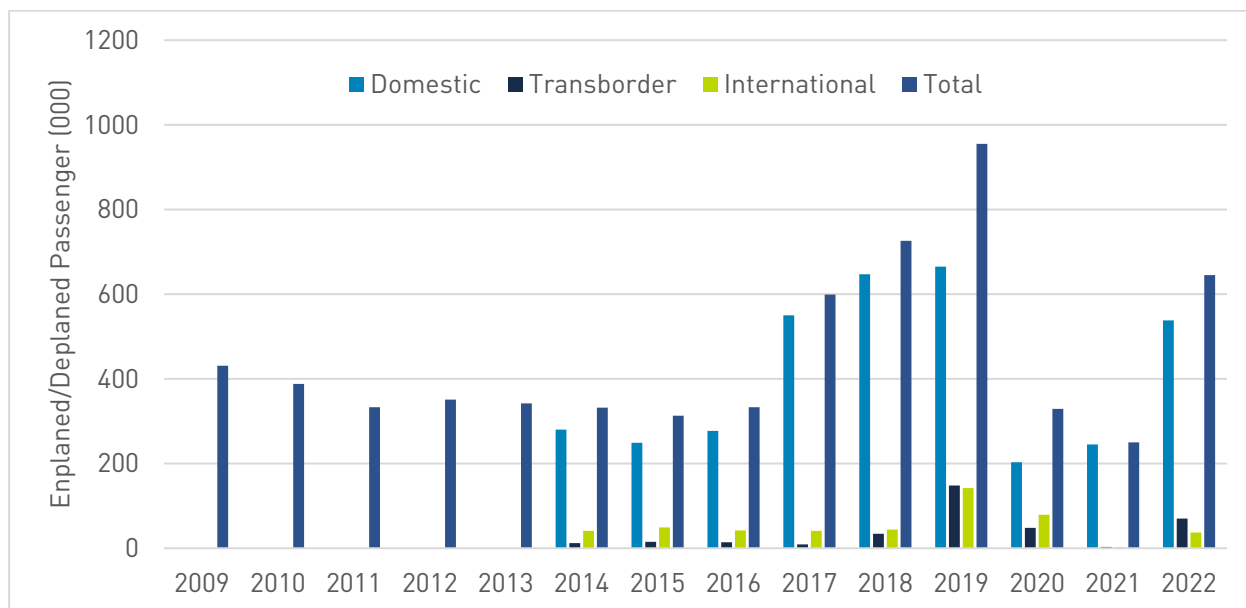


Figure 4-2 Historical Enplaned/Deplaned Passenger Traffic

CARGO ACTIVITY

Hamilton International determines cargo activity based on the billable weight of arriving all-cargo aircraft. This technique does not allow for the inclusion of belly cargo carried in passenger aircraft, which was not insignificant at the time of this forecast.

Historical cargo activity at Hamilton International is shown in **Figure 4-3**. Growth was consistently strong through 2019 (3.6% annual average) and surged during the pandemic with increases in 2020 (24%), 2021 (16%) and 2022 (14%).

Statistics Canada data indicates that approximately 75% of cargo traffic is domestic, 20% is transborder, and 5% is other international.

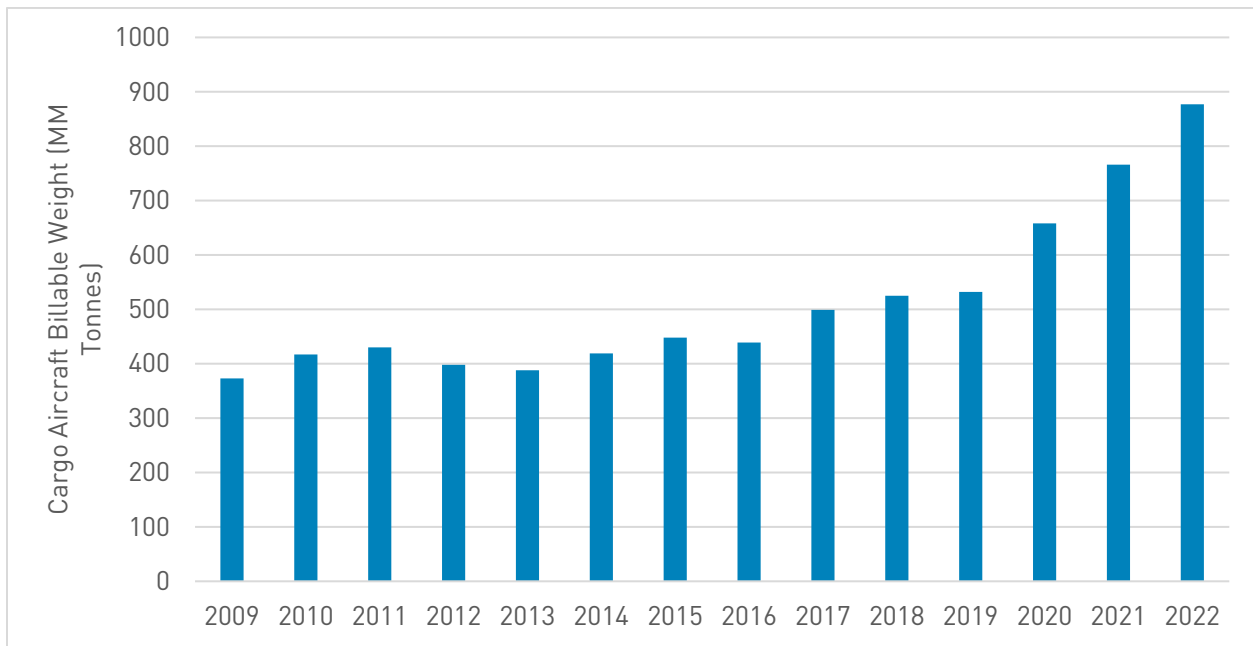


Figure 4-3 Historical Cargo Traffic

4.2 FORECAST

In its 2022 overview of Hamilton’s economy, the Conference Board of Canada (the Conference Board) summarized the overall economic outlook as follows:

“Although the highly infectious COVID-19 Omicron variant likely took some steam out of economic activity at the start of 2022, it is not expected to throw Hamilton’s expansion off course. High vaccination rates, booster shots, and vigilance in preventive measures have paid off, as Ontario lifted most of its COVID-19 restrictions by the end of March 2022. The removal of most public health and safety measures brings the economy closer to a state of normalcy.

“But COVID-19 is still present, and if the last two years have taught us anything, curveballs in the form of new variants and waves can still appear at any time.

Nevertheless, the worst is likely behind us, thereby allowing most industries to get back on track over the near term.

“Hamilton is expected to surpass its pre-pandemic GDP levels in the second half of 2022. After expanding by 4.0 per cent last year, real GDP in Hamilton is forecast to advance by 3.9 per cent in 2022 and by 3.5 per cent in 2023.”

The Conference Board also predicts GDP growth beyond 2023 at annual rates of between 1.7% and 1.9% through 2026. Population growth should rise to reach about 1.1% by 2023 and the unemployment rate is also expected to stabilize between 5.3% and 5.4% through 2026.

Major banks do not provide economic forecasts at the level of CMAs, however they do provide projections by province, and these range from forecasts that are consistent with the Conference Board’s analysis of the Hamilton CMA to those that are more pessimistic, particularly in view of the Bank of Canada’s policy of sharply increased interest rates.

AIRCRAFT MOVEMENTS

Future growth in aircraft movements will be directly related to growth in both passenger and cargo activity. Remaining activity will be related to more general socio-economic conditions.

The largest aircraft in regular service at Hamilton during the forecast period is expected to be the Boeing B777-300F or equivalent in relation to cargo activity. With respect to passenger activity, airlines are expected to continue operating Boeing B737 and Airbus A320/321 families or equivalent and it is unlikely that widebody passenger aircraft will be required over the forecasted period. **Table 4-1** and **Figure 4-4** describe forecasted annual aircraft movements under baseline, optimistic and pessimistic scenarios.

Table 4-1 Total Aircraft Movement Forecast

Year	Total Annual Movements		
	Baseline	Optimistic	Pessimistic
2019	37,241		
2020	31,077		
2021	35,886		
2022	38,085		
2023	39,417	40,208	37,886
2028	42,414	43,613	38,440
2033	44,525	46,653	39,091
2038	46,606	49,559	39,778
2043	48,903	52,847	40,503
Source: Consultants analysis.			

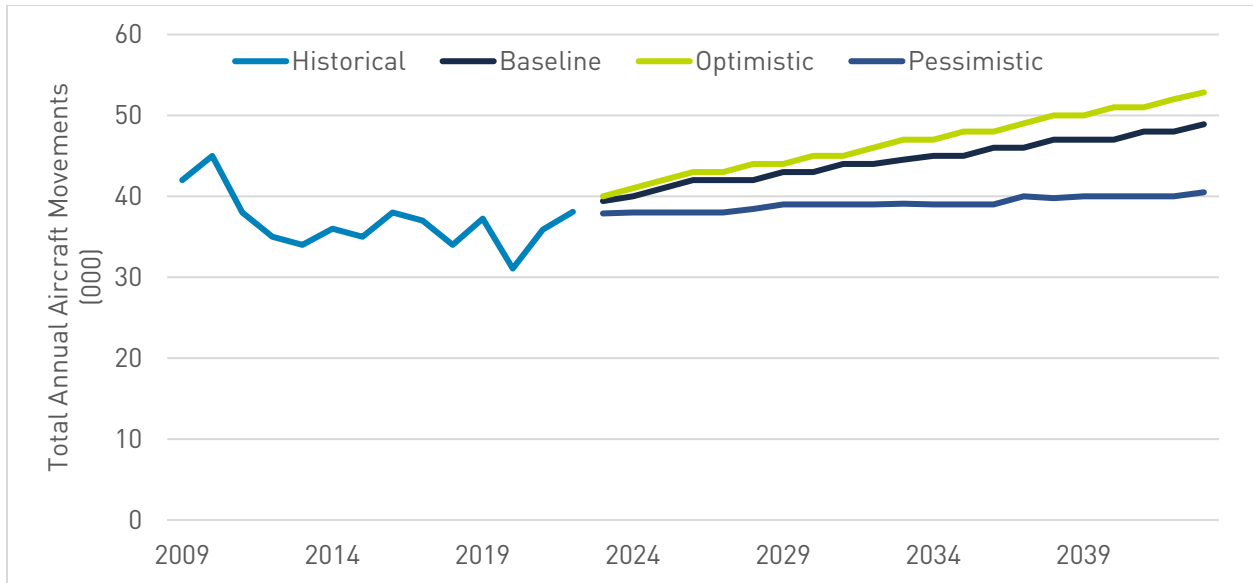


Figure 4-4 Aircraft Movement Forecast

PASSENGER ACTIVITY

The consensus among most aviation economists is that leisure travel will surge in the short-term following the presumed end of the pandemic due to two to three years of pent-up demand, before growth rates begin to stabilize. Business travel, however, may have been permanently affected by some of the longer-term effects of the pandemic, including a decrease in the requirement to work physically from an office and an associated increase in virtual meetings. Recent passenger surveys at Hamilton International have suggested that about 90% of their traffic is personal in nature and, therefore, not expected to be negatively impacted by such change in business travel.

The 'baseline' passenger traffic forecast has been developed from the following assumptions:

- The COVID pandemic will have less impact on travel and domestic passenger traffic for 2023 will revert to the levels experienced in 2019, as demonstrated in the summer of 2022.
- Transborder and other international travel will take longer to recover and levels experienced in the peak year of 2019 will not return until about 2025.
- There will be no new health crisis sufficiently serious to warrant any further travel restrictions; however, some individuals will still be reluctant to travel unnecessarily.
- The long-term growth rate will be approximately 3% per year for the next decade, and 2.5% for the decade following. These rates are slightly above comparable forecasts.

The 'optimistic' passenger traffic forecast has been developed from the following assumptions:

- Transborder and other international traffic will recover more quickly than contemplated in the baseline forecast.
- The effects of COVID will become fully controlled within the next year or two.
- The long-term growth rates will be 0.5 percentage points above those in the baseline forecast.

The 'pessimistic' passenger traffic forecast has been developed from the following assumptions:

- COVID will continue to be a problem for several years, potentially affecting the transborder and other international sectors where border restrictions may be reinstated in some form and some individuals will be more worried about leaving Canada.
- Annual traffic growth rates will be reduced to the level of GDP growth at a rate of about 1.8%.

Table 4-2 and Figure 4-5 describe the annual enplane/deplane passenger forecast under baseline, optimistic and pessimistic scenarios.

Table 4-2 Annual E/D Passenger Forecast

Year	E/D Passengers (000)		
	Baseline	Optimistic	Pessimistic
2019	955		
2020	329		
2021	250		
2022	645		
2023	791	855	708
2028	1,088	1,123	863
2033	1,262	1,334	943
2038	1,427	1,546	1,031
2043	1,615	1,793	1,128

Source: Consultants analysis.

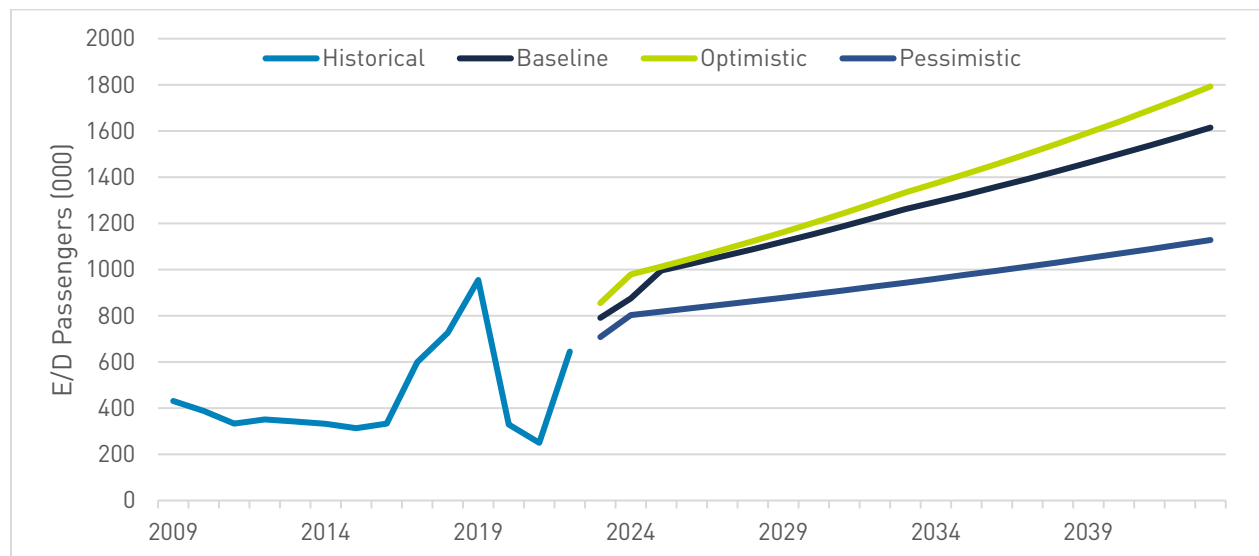


Figure 4-5 Passenger Forecast

CARGO ACTIVITY

Cargo traffic increased sharply between 2019 and 2021 by 44%. There are two major reasons for this.

- Passenger flight frequency was reduced sharply during the pandemic, which led to a reduction in belly-cargo capacity on passenger flights and, shifting capacity to dedicated freighters.
- Consumers began to purchase increased goods online rather than shopping personally, and these e-commerce goods had to be delivered.

Future growth in cargo activity will most likely depend on the extent to which these trends continue. Major cargo carriers in Canada continue to grow their fleets; however, cargo airlines in the United States are somewhat less optimistic, suggesting a decrease in activity in the short-term as business-to-business volumes and consumer e-commerce spending stabilizes from the surge in demand resulting from the pandemic.

The 'baseline' cargo traffic forecast has been developed from the following assumptions:

- Cargo activity will remain flat for a year or two while demand and supply recalibrate. The resurgence of passenger flights will increase belly cargo capacity which implies relatively reduced demand for all-cargo flights.
- The long-term growth rate will be approximately 2% per annum beyond 2024. This rate is slightly above comparable forecasts and considers the projected expansion of cargo activity at Hamilton International.

The 'optimistic' cargo traffic forecast has been developed from the following assumptions:

- Cargo traffic will grow at faster rates than contemplated in the baseline forecast.
- The long-term growth rate will be 1.0 percentage points above that in the baseline forecast for the first decade, and 0.5 percentage points above it for the second decade.

The 'pessimistic' cargo traffic forecast has been developed from the following assumptions:

- The COVID-related traffic surge will decline in 2023/2024 as conditions revert to pre-pandemic levels.
- Annual traffic growth rates beyond 2024 will be reduced a nominal level of approximately 0.5% per year.

Table 4-3 and **Figure 4-6** describe forecasted cargo growth under baseline, optimistic and pesimistic scenarios.

Table 4-3 Cargo Forecasts

Year	All-Cargo Landed MGTOW (thousands of metric tonnes)		
	Baseline	Optimistic	Pessimistic
2019	532		
2020	658		
2021	766		
2022	877		
2023	877	903	789
2028	949	1,047	724
2033	1,048	1,213	743
2038	1,157	1,373	761
2043	1,277	1,553	781

Source: Consultants analysis.

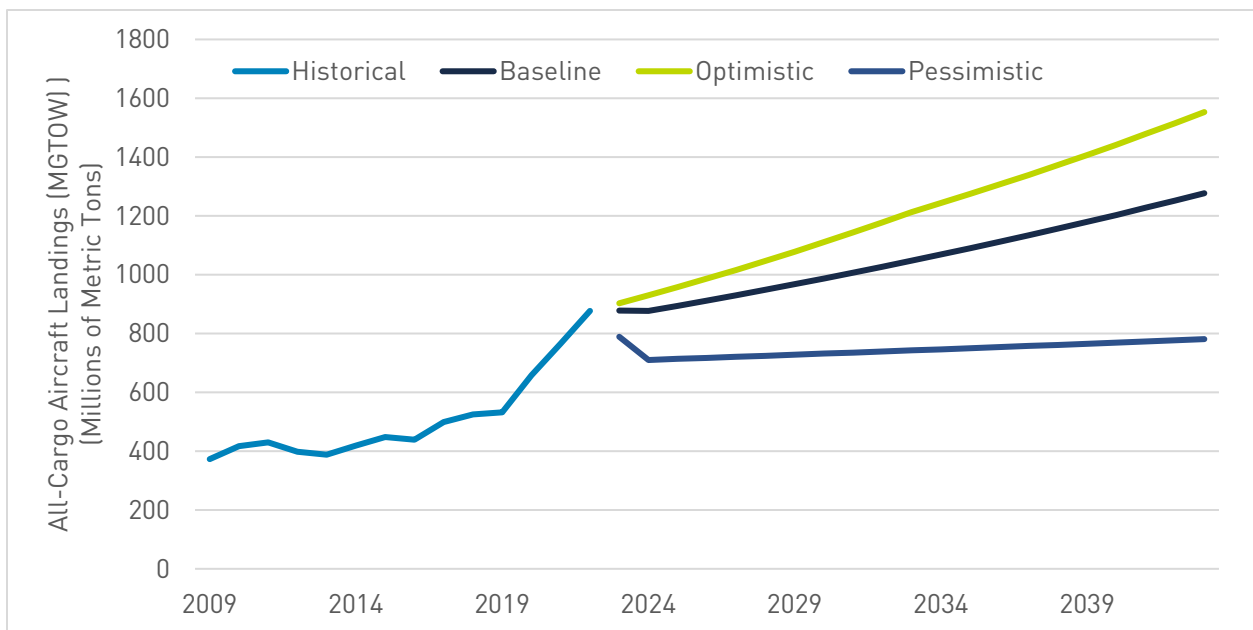


Figure 4-6 Baseline Cargo Forecasts

PEAK HOUR PASSENGER ACTIVITY DEMAND

Peak hour passenger demand has been derived through the development of nominal schedules that reflect peak planning days for the years 2028, 2033 and 2043. Nominal schedules are derived from the current flight schedules and then grown as necessary to accommodate the peak planning day passenger activity associated with the forecasted annual passenger activity for a given year. Typically, the winter

schedule experiences greater peak hour demand for departures, and the summer schedule experiences the greater peak hour demand for arrivals.

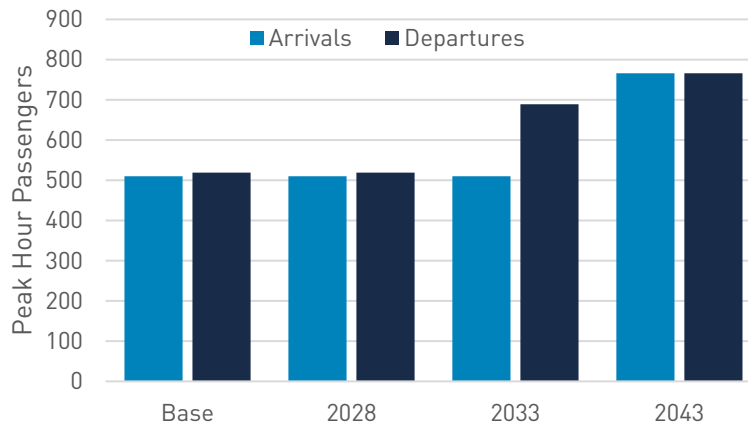


Figure 4-7 Peak Hour Passenger Forecasts

PEAK HOUR AIRCRAFT MOVEMENT ACTIVITY DEMAND

Peak hour aircraft movement demand has been derived from the combination of nominal schedules that reflect peak planning days for 2028, 2033 and 2043, as well as review of historical peak hour movements for passenger, cargo and general aviation activity.

For comparison, the peak hour aircraft movement demand for 2022 has been evaluated as the base condition from which growth can be applied. Several definitions of peak hour have been evaluated to better convey the variability that may be experienced over the planning horizon. The definitions of peak hour have been adopted from guidance produced by the International Civil Aviation Organization (ICAO), the Federal Aviation Administration (FAA) and the International Air Transport Association (IATA). For example, ICAO’s definition of peak hour is “the peak hour of the week average for one year”. However, generally speaking and in most cases the peak hour coincides closely with the 90th or 95th percentile of demand.

In 2022, three (3) distinct peaks in demand were observed. These peaks are representative of the typical peak hour aircraft movement demand that can be observed separately for Cargo, Scheduled Passenger and Other movements:

- Peak Hour for Cargo Aircraft is between 6 to 12 movements and typically occurs in the early morning between the hours of 0000 and 0300 local time.
- Peak Hour for Scheduled Passenger Aircraft is between 3 to 5 movements and typically occurs between the hours of 1600 and 1800 local time.
- Peak Hour for Other Aircraft is between 7 to 15 movements, including general aviation (fixed and rotary-wing), government and military aircraft. Peak demand for other aircraft movement varies significantly throughout the year but occurs most frequently during the daytime between the hours of 0800 and 2100 local time, contributing routinely to the peak that occurs for schedule passenger aircraft.

Examination of all movement data for the year 2022 indicated that the Peak Hour demand for All Aircraft combined was observed to vary between 10 and 17 movements, depending on the definition of peak hour that was selected. The combination of movements occurring within this overall peak hour comprised mainly of ad-hoc cargo, general aviation charter and air taxi, and schedule passenger aircraft movements. The composition of this peak is in line with what was expected given the limited overlapping schedules between cargo and passenger service, with general aviation contributing most significantly to the scheduled passenger peak hour demand.

Growth in cargo traffic is projected to grow by 2% per annum if the baseline forecast is realized. Due to the upgauging of aircraft that is expected to continue, the growth in cargo aircraft movements is only expected to increase on average 1% per annum. Assuming a strong correlation between annual and peak hour cargo movements, it can be expected that the existing cargo peak hour movements of between 6 to 12 will increase to between 7 to 13 by 2033 and 7 to 15 by 2043.

Growth in scheduled passenger movements contributing to peak hour movement demand has been derived from the nominal schedules that were prepared as part of the baseline forecast for passenger traffic. Based solely on the nominal schedules, the peak hour for scheduled passenger aircraft movements is expected to increase by 1 movement by the year 2028 and remain consistent through 2043. Volatility in demand and variations in schedule that may inevitably occur will contribute to this peak hour demand fluctuating. A peak hour of between 4 and 6 movements can therefore be reasonably expected to occur. The peak hour will start to reoccur with greater frequency as demand increases over the planning horizon. It is expected that the peak hour may occur up to twice daily between the hours of 0800 and 0900 local time and 1700 and 1800 local time.

Using the baseline forecast and recognizing a limited expectancy for growth in Other Aircraft movements within the planning horizon, the overall Peak Hour demand for All Aircraft is expected to grow from between 10 and 17 movements to between 11 and 18 movements by the year 2028 and remain relatively consistent through the remainder of the planning horizon. While consistent, the peak hour is expected to occur in greater frequency in the medium to long-term, contributing to a growing need to add taxiway infrastructure aimed at reducing runway occupancy time.

Although the growth in peak hour aircraft movements appears to be low, this is based on the expectation that air carriers will upgauge their aircraft and increase frequency outside of peak periods to accommodate higher passenger and cargo demand over the planning horizon. Beyond the planning horizon can be expected that the peak hour will grow more significantly.

Peak hour and peak planning day demand projections can be translated into planning for potential facility and infrastructure requirements. IATA and ICAO provide guidance on when infrastructure is required based on the existing and forecasted peak hour, peak planning day and annual operations. Together, this information shaped the recommendations for infrastructure improvements that are presented throughout Section 7 of this Master Plan.

5 DEVELOPMENT OBJECTIVES

5.1 OVERVIEW

The intent of the Master Plan is to align and reinforce the Airport's strategic objectives, vision and mission in providing a long-term development concept for the Airport that will guide airport management in making informed decisions regarding future airport development, ensure land is held for expansion and address perceived constraints that could impede future growth.

The vision statement for the Airport reads:

"Recognized by the world as the best global gateway in Canada for affordable travel and goods movement."

This vision places emphasis on the quality of the Airport in terms of the level of service it provides and its value proposition. It also highlights two primary focuses being cargo and passenger travel, while describing the Airport's aspirations.

The mission statement for the Airport reads:

"As an international gateway in Southern Ontario facilitating the efficient movement of people and goods, we are an economic engine and responsible community partner focused on environment, social and governance leadership across all our business and management practices."

This mission statement reaffirms the Airport's focus and purpose. Both the Vision and Mission are reflected in the long-term development concept for the Airport. This is accomplished by relating the Master Plan back to a series of objectives or strategic focuses that work together to further the mission of the Airport and help in realizing the Vision.

The Airport Master Plan acknowledges TradePort's strategic corporate values, which include the following:

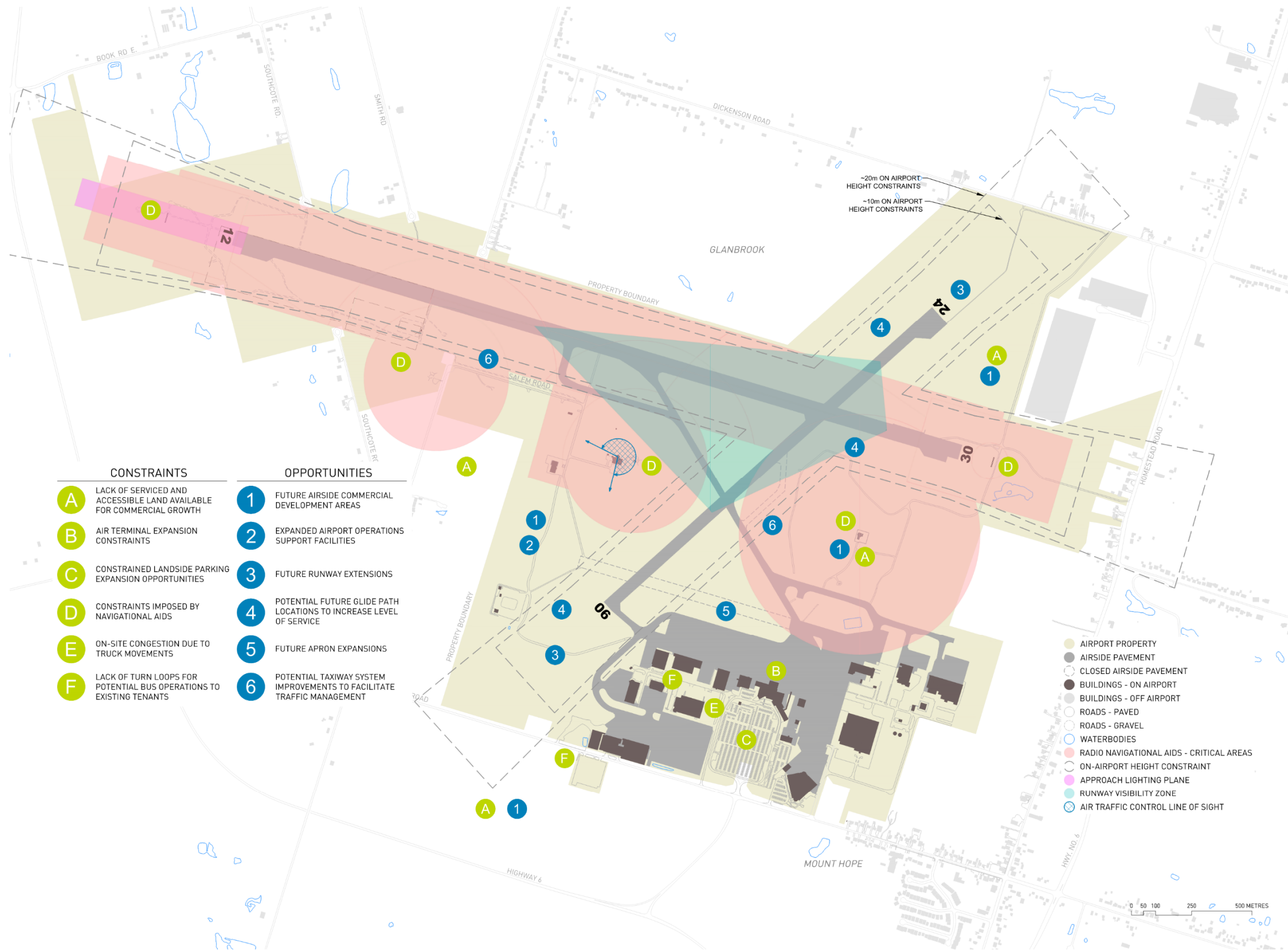
- **Safety & Security** – Taking immediate action to ensure we achieve the highest standards.
- **Quality & Operational Excellence** – Constantly striving to exceed expectation by providing high quality airport services and infrastructure, while minimizing our impact on the environment.
- **Respect & Integrity** – Embracing a diverse, inclusive culture of integrity and accountability for our actions.
- **Improvement & Innovation** – Committed to grow our business through continuous learning to achieve cost leadership, implement innovative solutions and deliver winning results.
- **Teamwork & Recognition** – Creating a positive experience everyday by being friendly, having fun and recognizing achievements.

5.2 DEVELOPMENT OBJECTIVES

The primary goal of the Airport Master Plan is to identify an optimum development concept for the Airport that will accommodate short term operational and functional demands, while preserving the flexibility to

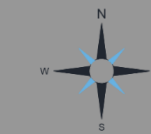
meet long term expansion opportunities utilizing sustainable development strategies. Specific objectives include:

- Assess the adequacy of the existing airport infrastructure to meet current and potential demand.
- Provide an Airport Land Use Plan and Airport Development Plan that guides airport management in the long-term development of the Airport.
- Identify land areas to be reserved for specific land uses including airside commercial development.
- Identify opportunities to accommodate the development of serviced airside commercial lots.
- Enhance operational redundancy and efficiency through improvements and expansion of airside infrastructure.
- Address forecasted activity demand through the improvements to or expansion of existing infrastructure and/or the provision of new infrastructure.
- Protect the Airport's long-term operational and commercial viability through various safeguarding measures, including airport zoning regulations and the establishment of updated noise exposure contours.
- Harmonize airport development objectives with those of the City of Hamilton.



CYHM

AIRPORT MASTER PLAN 2023-2043



CONSTRAINTS AND OPPORTUNITIES

EXHIBIT 5-1

5.3 CONSTRAINTS AND OPPORTUNITIES

CONSTRAINTS

Key **Constraints** that potentially impede the long-term growth and development of the Airport include the following:

Airside

- The growth of both scheduled passenger and air cargo service is increasing demand for apron stands. In the medium- to long-term, the demand for aircraft parking stands will likely exceed available capacity. The demand for remain-over-night (RON) parking stands for passenger aircraft could create a requirement for five additional remote apron stands bringing the overall passenger terminal aircraft stands to 13.
- Increased peak hour and planning day aircraft movements could benefit from the provision of additional taxiways to provide enhanced efficiencies, increase capacity and reduce the potential for ground delay.

Passenger Terminal Building

- Depending on passenger flight schedules in the future, there is a potential that peak hour passenger demand may exceed current terminal capacity if passenger carriers continue to build schedules at peak times of the day, not utilizing shoulder periods of the day when the terminal has available capacity.
- The existing international arrivals facility does not currently have digital passenger processing technologies as well as fixed processing capabilities. Facility improvements should be considered dependent on international travel increases and Canada Border Services Agency requirements under federal regulation.
- During peak periods, the existing terminal curbs are managed with third party contracts to reduce congestion. However, as passenger volume grows, there may be a requirement to create additional parking, improve parking technology, create cell phone lots and/or staging areas to ensure the supporting network for passenger growth is sufficient.

Landside

- In the past, car parking has exceeded capacity during peak periods and this is managed through third party contracts, valet services. However, improvements either through additional technology or facility upgrades can be considered to accommodate projected parking demand.
- There is currently a lack of available land for truck staging and increases in cargo growth will require additional staging areas.

Commercial Development

- There is a lack of serviced airside accessible land available for commercial development to meet the projected growth.
- The existing NAV Canada radar site sterilizes a large tract of land that could be developed for commercial uses.
- Airport Road restricts the lands located south of the road to be developed for airside commercial use.

Operations Support Facilities & Services

- Depending on other airport development impacting maintenance of airport vehicles, the airport maintenance component of the combined services building may require expansion.
- Servicing to the entire Airport, including the Terminal Building, presents challenges as commercial facilities look to grow to continue to meet demand.

OPPORTUNITIES

Key **opportunities** include the following:

Airside

- Phased improvements to the taxiway system and expansion of aprons will facilitate improved efficiencies, capacity increases and optimal traffic management.
- Additional glidepath/localizer installations would increase the Airport's level of service and usability.
- Potential extension of Runway 06-24, on lands previously identified for such purposes, if required to increase redundancy and efficiency, though impacted by noise abatements.

Passenger Terminal Building

- Ability to work with carriers to adjust schedules to non-peak times of the day, optimizing terminal use daily and address peak hour demand.
- Terminal improvements or facility expansion can be accomplished in the current footprint or in alternative areas to meet forecasted peak hour passenger demand within the planning horizon.
- The terminal curb can have reduced congestions by providing additional lanes and creating a cell phone waiting area.

Landside

- Public parking capacity can be increased through land development and the provision of remote lots as passenger volumes/parking demand increases.
- Expansion of Highway 6 to a four-lane controlled access road would improve access to the 400 series highways, a critical requirement for cargo stakeholders.
- Reconfiguration of Airport Road would provide the opportunity to extend airside commercial development to the south side of Airport Road and allow for the potential extension of Runway 06-24.

Commercial Development

- Land purchased by the City of Hamilton for Airport commercial use is held on the west and south side of the Airport.
- The potential relocation of the NAV Canada radar would provide a significant area of land for commercial development.

Operations Support Facilities & Services

- There is ample land on which to expand the combined services building.

6 LAND USE

6.1 OVERVIEW

The purpose of an Airport Land Use Plan (Land Use Plan) is to identify the land areas by use and location within and beyond the Master Plan planning horizon. The Land Use Plan is designed to ensure continued operation, effective use of land, and cost-effective development.

ADJUSTMENTS FROM THE 2010 AIRPORT MASTER PLAN


The proposed Land Use Plan follows similar land use designations as were contained within the 2010 Airport Master Plan Land Use and Development Plan. However, the following adjustments were made to better capture the intended land uses and redefinition of certain lands:

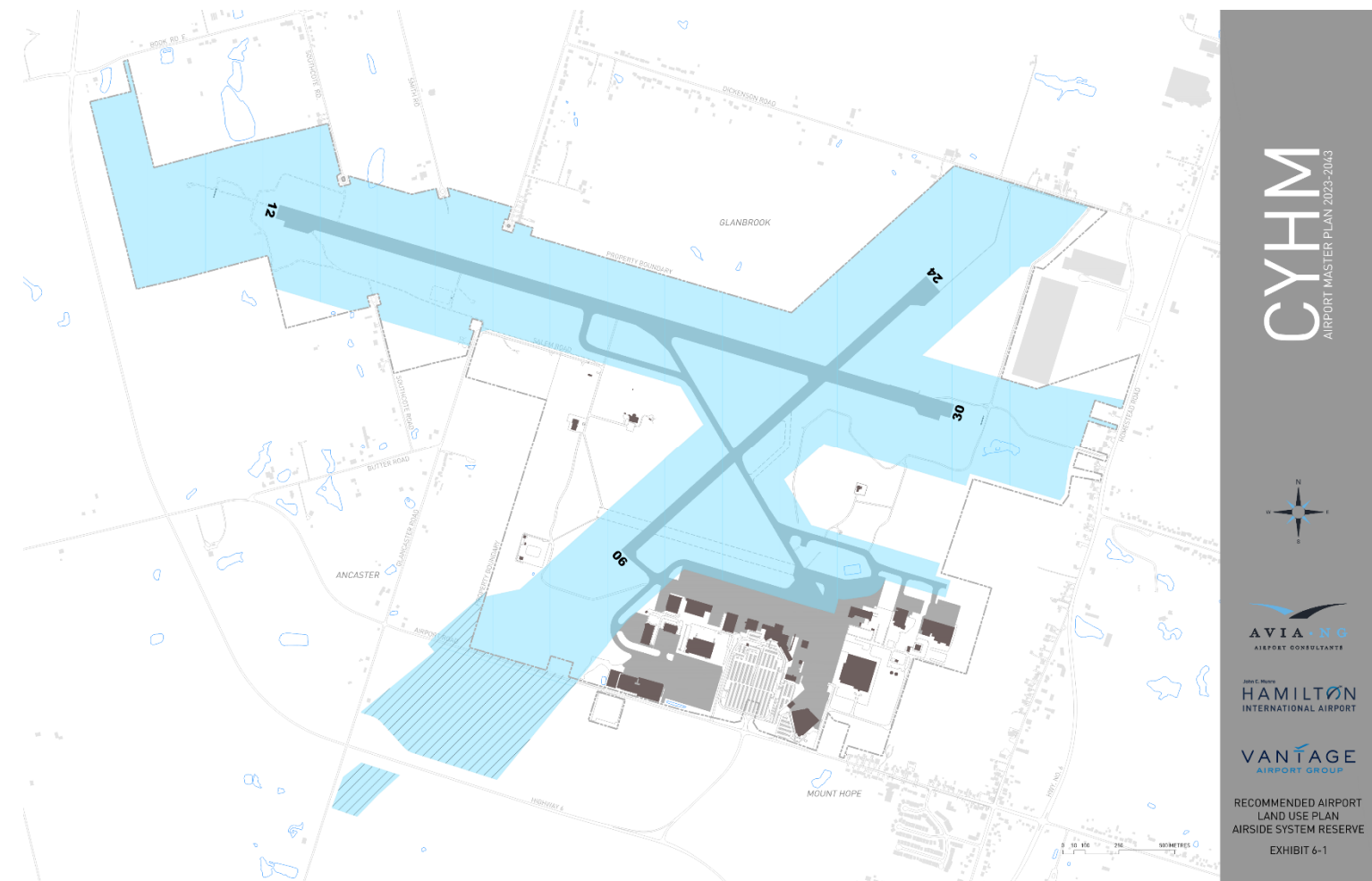
- The Land Use Plan intentionally does not illustrate the proposed infrastructure requirements to allow the focus to be on the lands and their uses rather than the specifics infrastructure that is proposed which is further presented in Section 7. Presentation of land use in this manner is inline with other contemporary Land Use Plans.
- Airside systems have been refined based on the newly proposed taxiway infrastructure requirements.
- Redesignated land surrounding the radar site for commercial purposes as the equipment may be relocated elsewhere on the Airport or offsite depending on future assessments.
- Redesignated land west of Runway 06-24 to better reflect future Airport needs.
- Highway 6 and Airport Road alignment has been updated to take into consideration the future connections, as identified by the province.
- Expanded the Land Use Plan to include the Development Opportunity Areas as listed in the Land Optimization Plan and some land within the Airport Employment Growth District.

6.2 MANAGING LAND USE

The land designations identified in the Airport Land Use Plan include the following:

AIRPORT SYSTEM RESERVE (ASR)

 Airport System Reserve (ASR) land is airport land which needs to be protected from encroaching development and ensure the safe operation of aircraft. The land includes the existing and future runway and taxiway systems, aprons, navigational aids, and approach lighting plane based on the existing and forecasted demand within the planning horizon. The land use also includes protection areas for navigational aids and the obstacle limitation surface clearance of up to approximately 10 metres above the threshold elevation. Approximately 392.72 ha (970.39 ac) of existing airport land has been reserved for Airport System Reserve, meanwhile 39.71 ha (98.13 ac) of off-airport land has been reserved for ASR. The recommended Airport System Reserve land is illustrated in **Exhibit 6-1**.



AIRPORT SUPPORT (AS)



Airport Support (AS) land are areas that need to be protected for facilities related to airport operational support facilities and services. These facilities include the existing air traffic control tower, some radio navigational antennas, an Automated Weather Observation System (AWOS), the existing and proposed expanded Combined Services Building (maintenance garage, and fire hall). The existing fuel farm has been designated as airport support land use including additional lands that would support the expansion of this facility in the future. Approximately 30.24 ha (74.72 ac) of existing airport land has been reserved for Airport Support, meanwhile 3.92 ha (9.69 ac) of off-airport land has been reserved for AS. The recommended Airport Support land uses are illustrated in **Exhibit 6-2**.

TERMINAL RESERVE & PARKING (TR+P)



Terminal Reserve and Parking land are areas that are designated for existing, expanded or a new PTB, apron and parking lots. Main parking lots, portions of terminal access roads and terminal curb are also included within the TR+P. Approximately 18.32 ha (45.27 ac) of existing airport land has been reserved for Terminal Reserve and Parking, meanwhile 0.79 ha (1.96 ac) of off airport land has been reserved for TR+P. The recommended Terminal Reserve and Parking land areas are illustrated in **Exhibit 6-3**.



AIRSIDE COMMERCIAL (AC)



Airside Commercial (AC) land is dedicated to commercial development such as air cargo, aircraft servicing and storage that requires access to the airside system. This would include aviation related uses such as hangars, aircraft maintenance facilities, fixed-base operators, commercial aprons, and aircraft tie-down areas.

These lands include Hamilton International’s existing commercial areas, east and west of the existing PTB. The proposed airside commercial areas are located north of Runway 30 and east of Runway 24 (North Commercial Development Area), south of Runway 30 and east of Runway 06-24 (East Commercial Development Area), west of Runway 06-24 and south of Runway 12-30 (West Commercial Development Area) and near the airport entrance road and Highway 6 (South Commercial Development Area).

Approximately 129.06 ha (318.90 ac) of existing airport land has been reserved for Airside Commercial, meanwhile 33.03 ha (81.61 ac) of off-airport land has been reserved for AC. The recommended Airside Commercial land areas are illustrated in **Exhibit 6-4**.

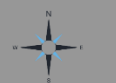
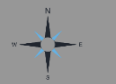
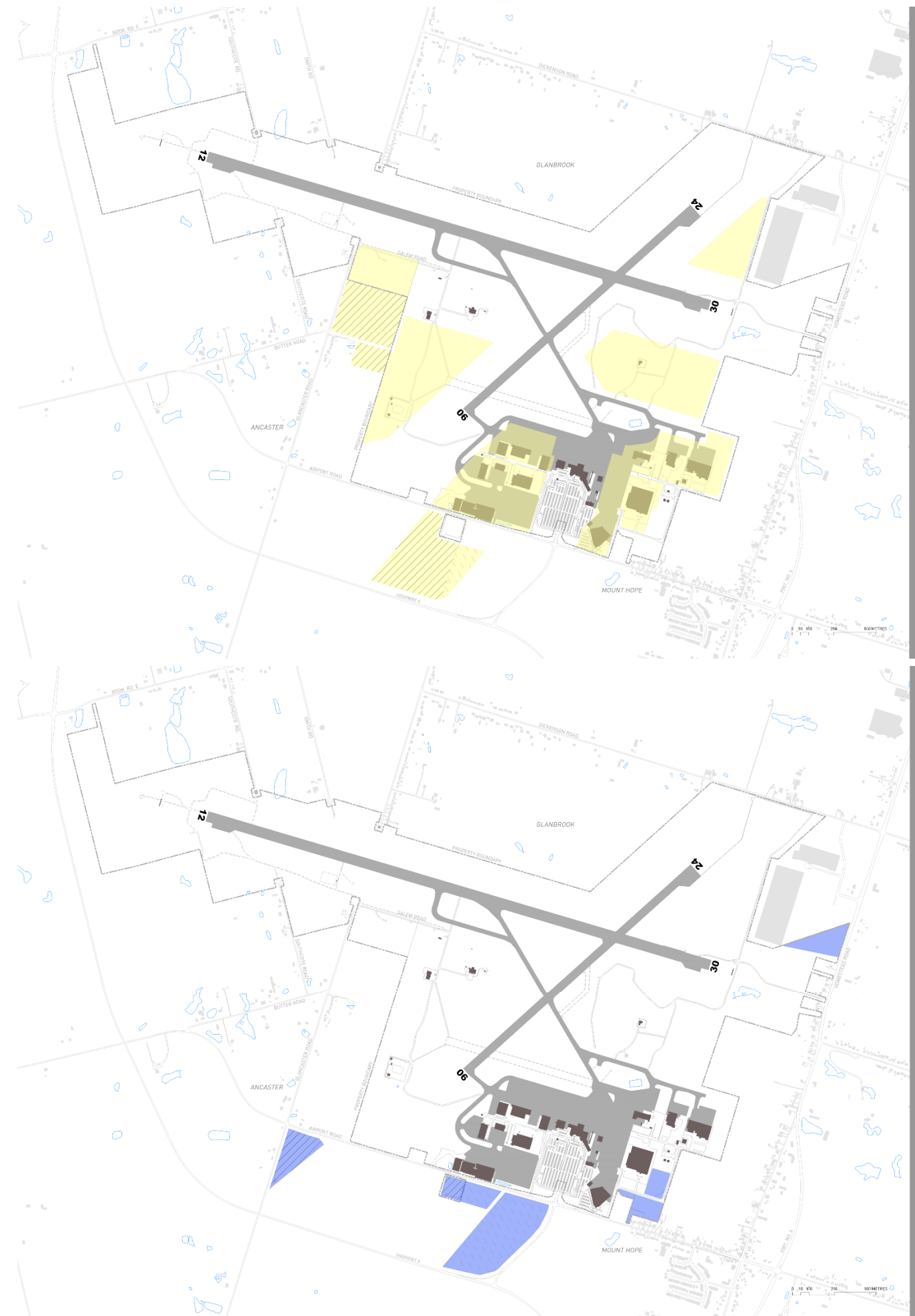
LANDSIDE COMMERCIAL (LC)



Landside Commercial (LC) land is reserved for commercial uses that do not require direct access to the runway or taxiway system and do not pose a risk to the continued operation of the Airport or aviation safety. The uses include warehousing and storage, light industrial, ground transportation, car rental facilities/parking, and office facilities. This type of land use is also important for airports as they can be a strong revenue generator that can help to offset airport operating costs.

The majority of the existing lands are recommended to be reserved for parking to serve the PTB until such time that the Airport may decide to convert the existing lot to a parking structure.

Approximately 8.11 ha (20.05 ac) of existing airport land has been reserved for Landside Commercial, meanwhile 24.02 ha (59.36 ac) of off-airport land has been reserved for LC. The recommended Landside Commercial land areas are illustrated in **Exhibit 6-5**.



RIGHT-OF-WAY (ROW)



The Right-of Way (ROW) land use is reserved for the ground transportation system, including access roads not included as part of the Terminal Reserve and Parking. This land focuses on various airport access roads or roads accessing lands adjacent to the Airport, including land reserved for the Highway 6 expansion and connector.

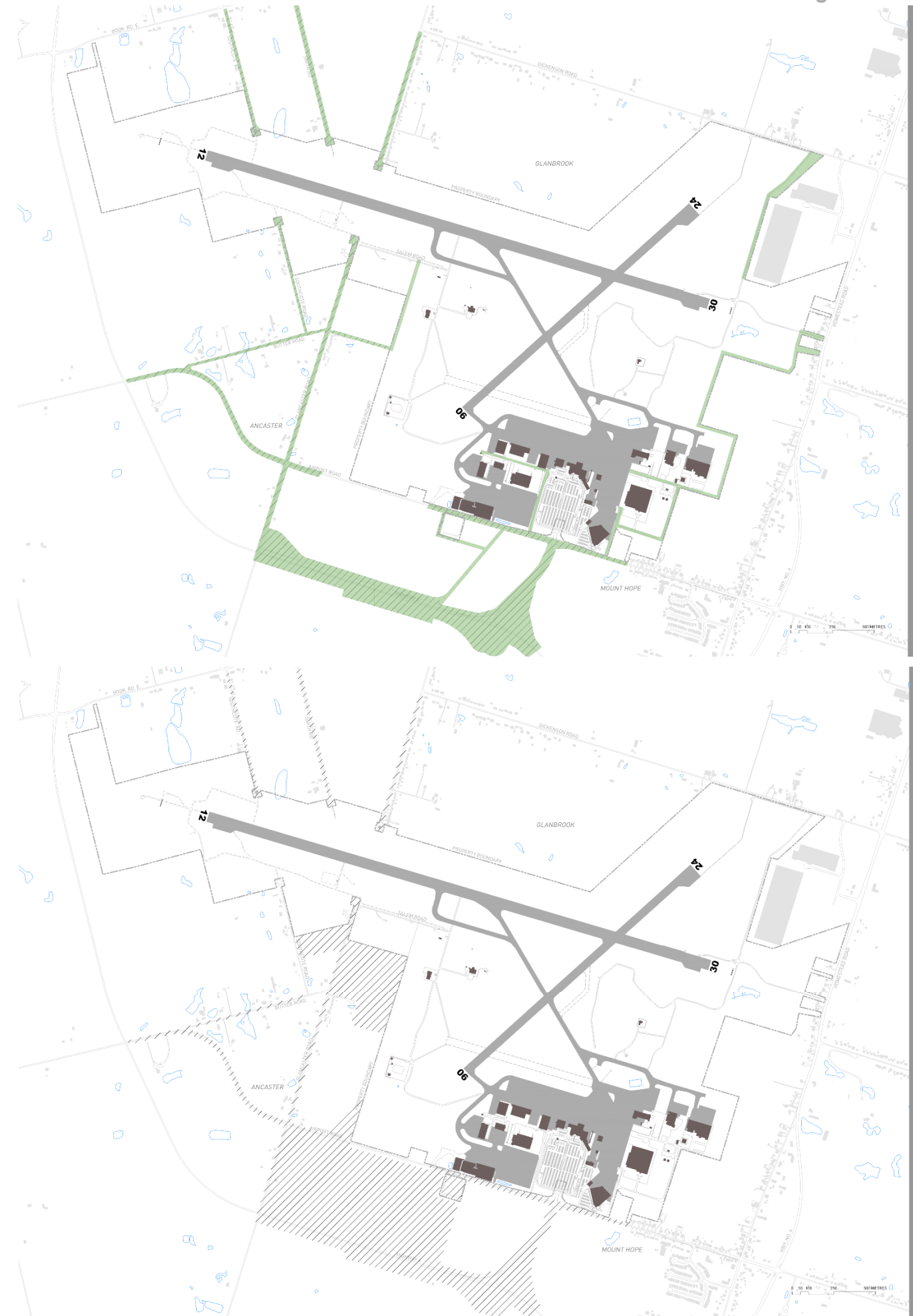
Approximately 13.11 ha (32.40 ac) of existing airport land has been reserved for ROW, meanwhile 59.47 ha (146.96 ac) of off-airport land has been reserved for ROW. The recommended Right-of-Way land areas are illustrated in **Exhibit 6-6**.

GOVERNMENT-OWNED LAND

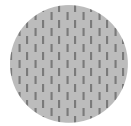


Government-Owned lands that are located outside the Airport's property boundary and leased area. Some land is owned by the Government of Ontario for Highway 6 and future expansion. The remaining land is owned by City of Hamilton and has been designated for future airport use. Although the land is currently not within the existing Airport's lease boundary, it is important to designate these lands to ensure lands are or will be protected for future airport-related purposes.

Approximately 148.52 ha (366.98 ac) of off-airport land has been identified as government-owned land. The government-owned land areas are illustrated in **Exhibit 6-7**.



THIRD-PARTY OWNED LAND

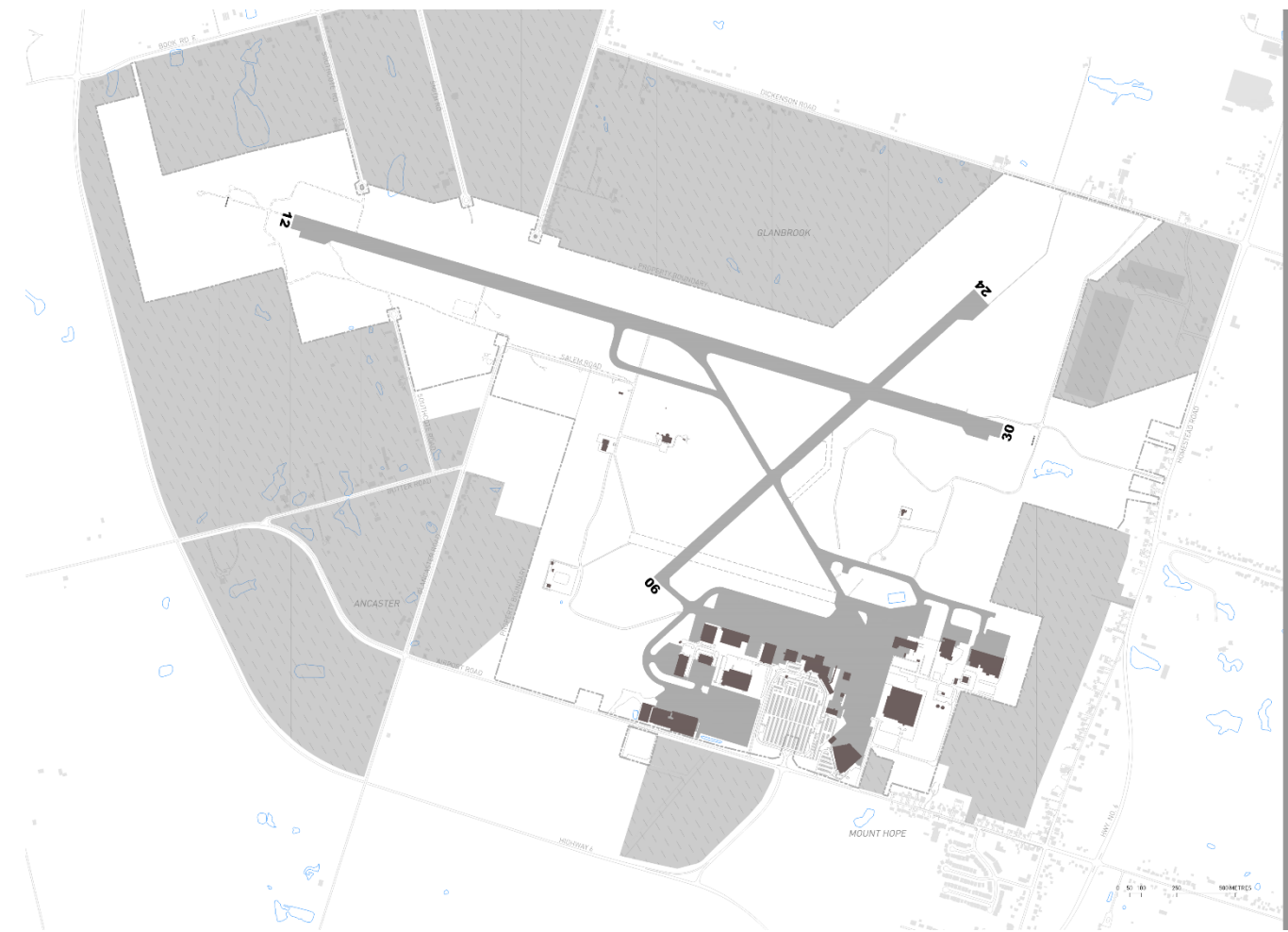


Third-Party Owned Land includes lands that have been designated by the City of Hamilton as Airport Prestige Business, Airport Related Business and Airport Reserve within the Airport Employment Growth District.

Approximately 579.73 ha (1,432.49 ac) of off-airport land, not including Vantage owned land, has been identified as third-party owned land of particular relevance to the Airport within the AEGD. The third-party owned land areas are illustrated in **Exhibit 6-8**.

6.3 RECOMMENDED AIRPORT LAND USE PLAN

Capturing the culmination of these land uses is the Recommended Airport Land Use Plan (ALUP) as illustrated in **Exhibit 6-9**. The Recommended ALUP has been developed with consideration to the opportunities and constraints that were discussed in Chapter 5. The ALUP balances the needs of the Airport over the short, medium, and long-term while also taking a longer-term outlook to preserve the flexibility to adapt to the growing needs of the Airport beyond what can be anticipated by 2043. In that regard, the Recommended ALUP leaves room for a development strategy that allows the Airport the ability to cater to what may become necessary or needed in the future.



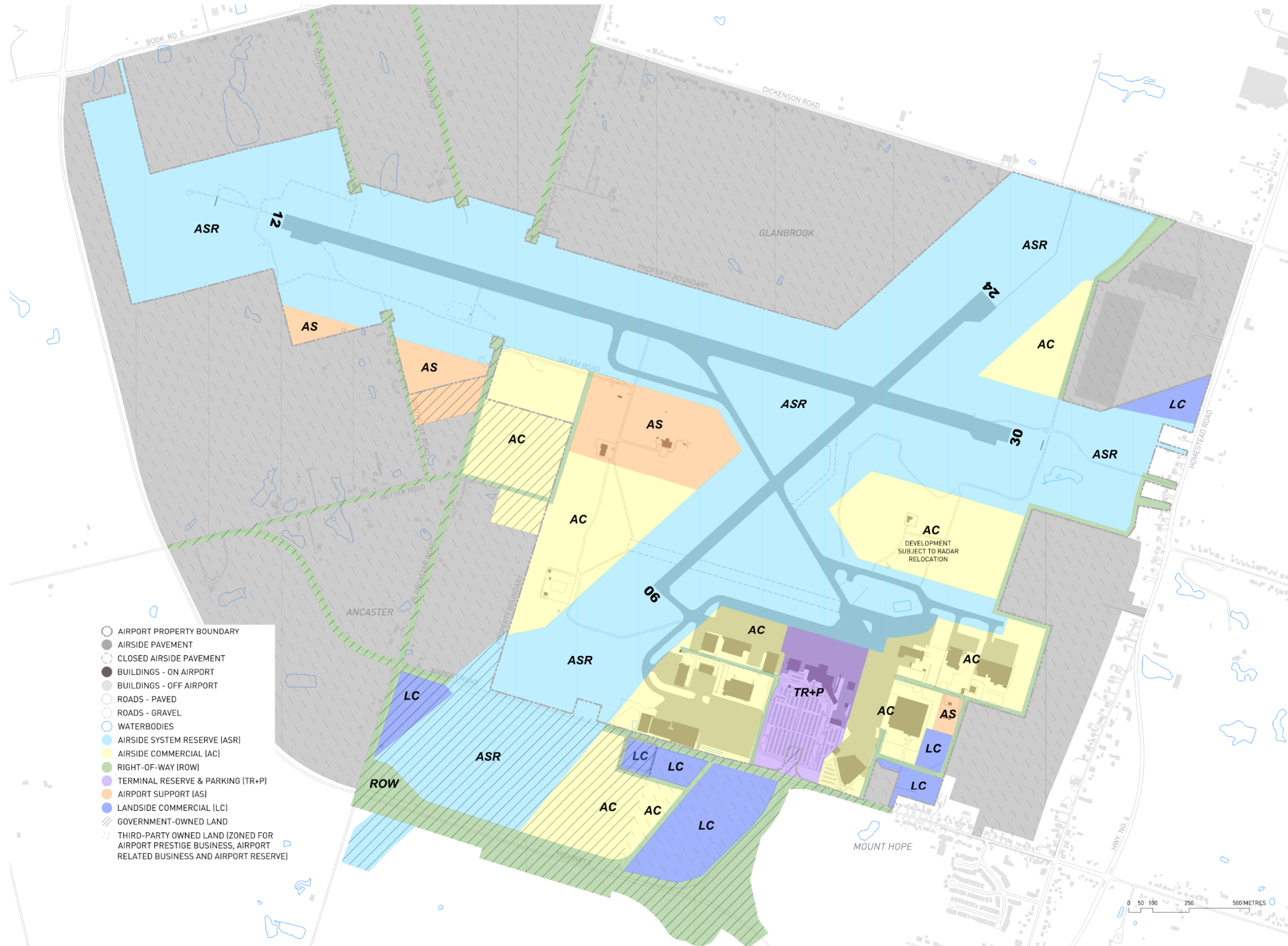
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AIRPORT CONSULTANTS

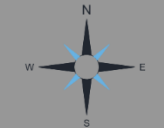
HAMILTON
INTERNATIONAL AIRPORT

VANTAGE
AIRPORT GROUP

RECOMMENDED AIRPORT
LAND USE PLAN
THIRD PARTY OWNED LAND
EXHIBIT 6-8



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 AIRPORT MASTER PLAN 2023-2043


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 AIRPORT CONSULTANTS

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HAMILTON
 INTERNATIONAL AIRPORT

VANTAGE
 AIRPORT GROUP

RECOMMENDED AIRPORT
 LAND USE PLAN

EXHIBIT 6-9

7 AIRPORT DEVELOPMENT STRATEGY

7.1 OVERVIEW

The Airport Development Strategy provides a long-term, 20-year vision for the Airport and positions the Airport in addressing forecasted activity demand through the phased development of new and expanded infrastructure that provides operational efficiencies, increased capacity and supports expanded airside commercial development. The proposed improvements are illustrated in the Recommended Airport Development Plan, **Exhibit 7-1**, the recommended phasing is illustrated in the Capital Phasing Plan, **Exhibit 7-2**, and the ultimate build out of the Recommended Airport Development Plan is illustrated in the **Exhibit 7-3**.

7.2 RECENT AIRPORT INITIATIVES

The Airport has completed several initiatives since the 2010 Airport Master Plan, including but not limited to the following:

- Runway 12-30, Taxiway Charlie and Golf Rehabilitation
- Runway 06-24 Partial Rehabilitation
- Threshold 30 Relocation
- Apron Capacity Assessment
- Taxiway Delta and Ground Servicing Equipment Road Feasibility Study
- Realigned East Cargo Road and Apron III access for new DHL
- Apron III Reconfiguration Assessment
- Groundside Parking Study

7.3 AREAS OF FOCUS

The information provided below highlights the key areas of focus as part of the Airport Development Strategy, including landside, PTB, airside improvements and operations support facilities and services as passenger, cargo and other activities warrant such.

Airside

- Enhance taxiway system to improve runway capacity and traffic management with growth.
- Expand apron areas to support growth of both cargo and commercial passenger aircraft parking.
- Improve the Radio Navigational Aids and Electronic Communications including provision for future glidepath and localizer installations.
- Protect for potential future Runway 06-24 to a maximum of 9,500 ft. (2,895.6 m).

Passenger Terminal Building

- Expand the Passenger Terminal Building to accommodate expanded CBSA services, improve the passenger flow and improve processing capacity, if flight schedules cannot be flattened.

- Included in the above would allow for expansion of check-in counters, holdroom domestic baggage reclaim area and international arrivals facility should long-term peak-hour passenger demand warrant such.

Landside

- Improve Ring Road to address terminal curb congestion and public transit services.
- Expand parking lot to support anticipated growth over the planning horizon.
- Re-align Airport Road to facilitate commercial development.
- Extend utilities to serve future commercial development areas.

Commercial Development

- Access, prepare and service additional lands for expanded commercial development, including cargo facilities and hangars. Including land to the west and south of the Airport.
- Dependent on assessment, remove/relocate NAV Canada radar to support commercial and apron area expansion.
- Expanded services and utilities including water, sewer, gas, and hydro.

Operations Support Facilities & Services

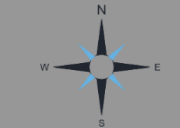
- Preserve the ATC line of sight to ensure airside surfaces can operate efficiently.
- Expand the existing combined services building to consolidate storage and maintenance operations, allowing for additional development near the restricted apron.
- Preserve land for the expansion for the fuel farm.
- Assess need for non-passenger vehicle screening facility.



- AIRPORT PROPERTY
- AIRSIDE PAVEMENT
- CLOSED AIRSIDE PAVEMENT
- BUILDINGS - ON AIRPORT
- BUILDINGS - OFF AIRPORT
- ROADS - PAVED
- ROADS - GRAVEL
- WATERBODIES
- PROPOSED GLIDE PATH PROTECTION AREA
- PROPOSED RUNWAY END SAFETY AREA
- PROPOSED AIRSIDE & LANDSIDE PAVEMENTS
- PROPOSED COMMERCIAL DEVELOPMENT AREAS
- PROPOSED TERMINAL & CURB EXPANSION
- FUTURE TERMINAL EXPANSION AREA
- PROPOSED COMBINED SERVICES BUILDING EXPANSION
- POTENTIAL NEW HANGAR

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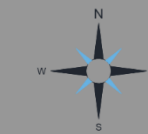
RECOMMENDED AIRPORT
DEVELOPMENT PLAN

EXHIBIT 7-1



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AIRPORT MASTER PLAN 2023-2043



PROPOSED CAPITAL PHASING PLAN

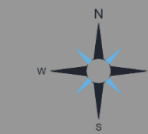
EXHIBIT 7-2



- AIRPORT PROPERTY
- AIRSIDE PAVEMENT
- CLOSED AIRSIDE PAVEMENT
- BUILDINGS - ON AIRPORT
- BUILDINGS - OFF AIRPORT
- ROADS - PAVED
- ROADS - GRAVEL
- WATERBODIES
- PROPOSED GLIDE PATH PROTECTION AREA
- PROPOSED RUNWAY END SAFETY AREA
- PROPOSED AIRSIDE & LANDSIDE PAVEMENTS
- FUTURE AIRSIDE & LANDSIDE PAVEMENTS - ULTIMATE
- PROPOSED COMMERCIAL DEVELOPMENT AREAS
- PROPOSED TERMINAL & CURB EXPANSION
- FUTURE TERMINAL EXPANSION AREA
- PROPOSED COMBINED SERVICES BUILDING EXPANSION
- POTENTIAL NEW HANGAR

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DEVELOPMENT PLAN
(ULTIMATE)
EXHIBIT 7-3

PART I: AIRSIDE IMPROVEMENTS

RUNWAYS

The existing two-runway configuration could accommodate an annual service volume of up to between 200,000-287,000 depending on the methodology applied and with several conditions and assumptions concerning the improvements that would ultimately be implemented to the runway and taxiway system.

While achieving these high volumes would require a full-length parallel taxiway system and optimized runway exits to reduce overall runway occupancy times and achieve optimal runway throughput.

The baseline forecast estimates that the Airport has sufficient capacity with aircraft movements potentially increasing to 48,903 by 2043 while the optimistic forecast projects movements potentially increasing to 52,847. Both forecasts fall well short of the runway system's ultimate capacity, meaning no need has been identified that would justify the addition of a parallel runway at the Airport over the foreseeable future.

Runway 12-30

Runway 12-30 recently has undergone some surface rehabilitation but will require a full depth reconstruction by 2030. The Airport's existing tenants have purchased larger AGN V aircraft, including the Boeing 777 Freighter. Therefore, the Airport will see an increase in Code E/AGN V aircraft traffic and are working to update some of the infrastructure to accommodate such. One of the most critical elements that will be addressed is the expansion of the runway turn pads to accommodate AGN V traffic. It is anticipated that these turn pads will be constructed in 2023/2024.



Figure 7-1 Runway Length Compositions

Runway 06-24

At present, this runway is capable of handling general aviation, charter and commercial traffic, including larger aircraft such as the Boeing 737, that are weight restricted due to the runway length. The expansion of Runway 06-24 is not recommended at this time. However, it is recommended that lands be reserved for a possible future extension of the runway to provide redundancy and flexibility in the use of Runway 12-30. Consequently, a review of the runway length was completed and several runway extension possibilities were considered. The runway extension options are shown in **Figure 7-1** and possible runway length listed in **Table 7-1**.

A runway length and payload range analysis were completed to determine the ideal runway length for Runway 06-24 based on a few key objectives. The objectives are as follows:

- Unrestricted utilization for a Boeing 737-800
- Unrestricted utilization for a Boeing 737 Max 8
- Unrestricted utilization for a Boeing 767-300F
- Considerations for a Boeing 777F with some payload/range restrictions

This runway length and payload range analysis resulted in recommendation that any future extension of Runway 06-24 consider a proposed length of 8,500 feet to 9,500 feet to accommodate the aircraft listed above, though understanding that a noise abatement is in effect from 2300 to 0700 local time for departures from Runway 06, and arrivals on Runway 24. At the same time, it is recommended the runway to be widened to 60 metres from its current 45 metres.

Table 7-1 Runway Length Considerations

Runway Length	Extensions
6010'	Existing (A-1)
6500'	A-2
7000'	A-3
7500'	B-1
8000'	C-1 B-2
8500'	D-1 C-2 B-3
9000'	E-1 D-2 C-3
9500'	E-2 D-3
10,000'	E-3

Runway Use and Traffic Distribution

When prioritizing the infrastructure improvements, it is important to determine the historic runway usability. Runway 30 is the most used runway for take-off and landing as it serves 50% and 44% of traffic, respectively. Next Runway 12 is the second most utilized runway with 20% of take-offs and 32% of landings. Runway 24 is third with 19% of take-offs and 16% of landings. Lastly, Runway 06 sees the least take-offs at 11% and least landings at 8%. Refer to **Figure 7-2** for illustration of the runway utilization based on 2019 movements.



Figure 7-2 Runway Distribution (2019)

TAXIWAYS

The Airport expects an increase in Boeing 777 movements, thus requiring taxiway fillet improvements to accommodate such within the runway and taxiway system. These improvements are currently underway starting with improvements to Taxiway Golf, Taxiway Charlie at the intersection of Runway 06-24 and widening the turn pads on Runway 12-30. The first round of improvements will be constructed in 2023 to immediately provide a taxi-route for the Boeing 777. Other fillet improvements and taxiway widening will occur in the near-term.

The existing taxiway system does not include taxiway connectors from or near the threshold, nor full parallel taxiway system for either runway; therefore, aircraft are required to backtrack on each runway, except Runway 06, increasing the runway occupancy time and decreasing available capacity.

Stakeholder consultation provided some insight that the Airport runway and taxiway system does not provide flexibility during the peak hours. If the Airport reaches the top range of the aircraft passenger peak hour, delays may occur since the runway and taxiway system does not allow for efficient throughput.

When traffic increases, the throughput of a runway (i.e.: the ability to accommodate a higher number of arrivals and departures) becomes of greater importance as supporting infrastructure may be put under pressure, creating need to provide additional taxiways. The proposed taxiway improvements will be of strategic importance to reduce taxi times between runways and apron areas and, when connecting directly to a runway threshold or common exit point, will improve the overall capacity of the runway system.

According to the International Civil Aviation Organization (ICAO), an airport with over 50,000 annual operations and/or 20+ peak hour movements typically requires full-length parallel taxiways to maintain an acceptable level of service. The Airport is forecasted to reach such by the end of the planning horizon resulting in the need for parallel taxiways. These improvements can be built in phases, including partial parallel taxiways in accordance with volume/demand. The first partial parallel taxiway proposed is east of Runway 06-24 connecting Taxiway Bravo to Taxiway Charlie to reduce congestion through Apron I/II via Taxiway Alpha. Such improvement is proposed to occur in the medium-term, pending volume/demand. The remaining segments of the parallel taxiways are recommended to occur before the end of the planning horizon, pending volume/demand and the timing and need for such should be revisited with future update of the Master Plan to re-examine the composition of traffic occurring in the peak hour. Priority should be given to taxiway improvements that serve Runway 12-30 and add improvements to low-visibility infrastructure.

The minimum taxiway setback required for AGN V CAT II operations is 153 metres. The parallel taxiway separations illustrated in **Exhibit 7-1** are proposed greater than the minimum for multiple reasons. First, the runway to taxiway separation considers the need to preserve additional distance for larger aircraft to taxi behind smaller aircraft that would be holding for departure or a runway crossing. Second, the proposed taxiway setbacks preserve for inclusion of future rapid exit taxiways that may be needed beyond the planning horizon to further increase runway throughput. Third, the taxiway alignment ensures clearance from the proposed glide path sensitive areas.

Lastly, the proposed Taxiway Delta extension beyond the existing threshold of Runway 06 preserves required clearances from the Obstacle Limitation Surfaces (OLS) with flexibility to accommodate different runway extension lengths, while making lands south of the Airport airside accessible. Since the extension of Taxiway Delta is proposed in the medium-term and the runway extension proposed afterwards, there is a need to deviate from the parallel alignment to ensure OLS clearance is achieved and avoid introducing a holding position that would be otherwise restricted of future private apron use. When Taxiway Golf is extended to the threshold of Runway 12, it will have similar issues due to the threshold displacement. In this case, aircraft will be required to hold adjacent to the displaced threshold location to remain clear of the approach surface and transitional surface.

APRONS

An apron capacity study was completed in 2022 to undertake an assessment of airside apron demand and capacity from 2022 to 2026 and compare each year to determine gate deficiencies in various growth scenarios. The takeaway from the assessment was that the demand over the next 5 years will exceed the existing apron capacity. The demand for cargo stands may double the existing capacity. The study also determined that the passenger apron will require up to two additional aircraft stands. The demand was reassessed as part of the Master Plan to determine the demand within the planning horizon. To facilitate

the future PTB expansion and future demand for stands, an additional five remote passenger stands are required to accommodate the forecasted demand for remain-over-night parking.

Understanding this shortcoming identified in the Capacity-Demand Assessment from 2022, the Airport submitted for funding to expand Apron II and was successful. The apron design is currently underway for the first phase of the apron expansion project and construction is expected to be completed by 2024. The apron project includes four Boeing 777 parking positions or five Code 'C'/AGN III stands, head and tail of stand roads, that will be located north of Apron II and Taxiway Alpha. The apron area will mostly be used to accommodate the near-term cargo growth.

Apron II could be further expanded to accommodate the future cargo demands and could include up to three additional phases of expansion. A summary of the apron expansion stand capacity is documented in **Table 7-2** and illustrated in **Figure 7-3**. The second phase would accommodate one additional Code 'C'/AGN III stand inline with the first apron expansion. The third phase has the flexibility to accommodate two Boeing 777s or two Code 'C'/AGN III stands.

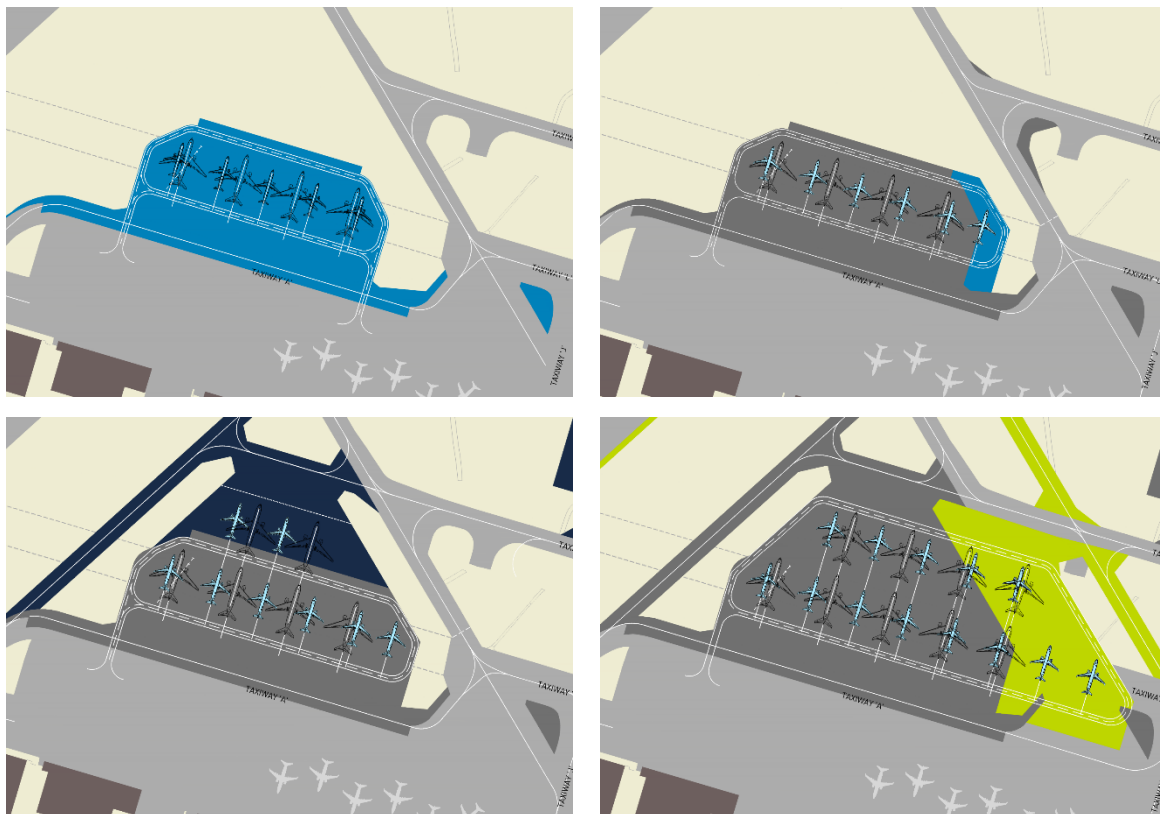


Figure 7-3 Apron II Expansion (Phase 1 to 4)

The fourth phase would extend towards the east and will overtake a portion of Taxiway Charlie which would trigger the need for a partial parallel taxiway to Taxiway Charlie and building such would help reduce the congestions to and from Runway 12-30. This expansion could accommodate an additional four Boeing 777 or five Code 'C'/AGN III stands.

Table 7-2 Apron II Expansion and Stand Capacity

Apron Expansion	Additional Stands	Total Stands
Phase 1 (Underway)	4 B777, 5 Code 'C'	4 B777, 5 Code 'C'
Phase 2 (Short-Term)	1 Code 'C'	4 B777, 6 Code 'C'
Phase 3 (Medium-Term)	2 B777, 2 Code 'C'	6 B777, 8 Code 'C'
Phase 4 (Long-Term)	4 B777, 5 Code 'C'	10 B777, 12 Code 'C'

RADIO NAVIGATIONAL AIDS AND ELECTRONIC COMMUNICATION

RAMP Radar

Hamilton Airport is currently equipped with a RAMP radar located north of the existing PTB and south of threshold for Runway 30. The existing radar requires refurbishment or replacement per NAV Canada's National Replacement Program. Several sites are being considered to date, including off-airport property and elsewhere on the Airport. It would be ideal, from the Airport's perspective, to relocate this facility off the Airport property boundary to relieve some land for potential commercial development, including its existing site. If the radar facility needs to remain within the Airport's property boundary, several locations have been considered, mostly on parcels of land on the west side of the Airport. As such, a Radar Needs Assessment performed by NAV Canada is expected to be completed in 2024 and may provide options for alternative sites and costing for potential relocation.

Instrument Landing System

An instrument landing system most commonly consist of two components, localizer array and glide path transmitter. The localizer array is located off the threshold and is provides aircraft horizontal guidance as it approaches the runway. Meanwhile, the glide path is located roughly 300 metres from the start of the runway, and it provides the aircraft with vertical guidance. Since this equipment is providing signals to the aircraft, to inform their position and align themselves according to the flight path, it is crucial that these signals are not interfered.

Hamilton International currently has both components for Runway 12 and localizer only for Runway 30. It is recommended that protections should be maintained for future glide path and localizers for Runway 06-24 and the addition of a glide path on Runway 30. Furthermore, considerations should be made to relocate the existing glide path for Runway 12 to the north end of the runway to accommodate a full parallel taxiway south of Runway 12-30. If the glide path can not be relocated, the parallel taxiway could be reconfigured to reduce conflict with the protection areas. Refer to **Figure 7-4** for illustration.

Radio Communications Equipment

There is a transmitter and receiver antenna located near the existing ATC and near the glide path for Runway 12. There are no plans to relocate such facilities within the planning horizon.

Meteorological Equipment

The Airport currently has an AWOS located north of the existing Air Traffic Control Tower. The AWOS appears to be in good condition and there are no plans to relocate this facility.

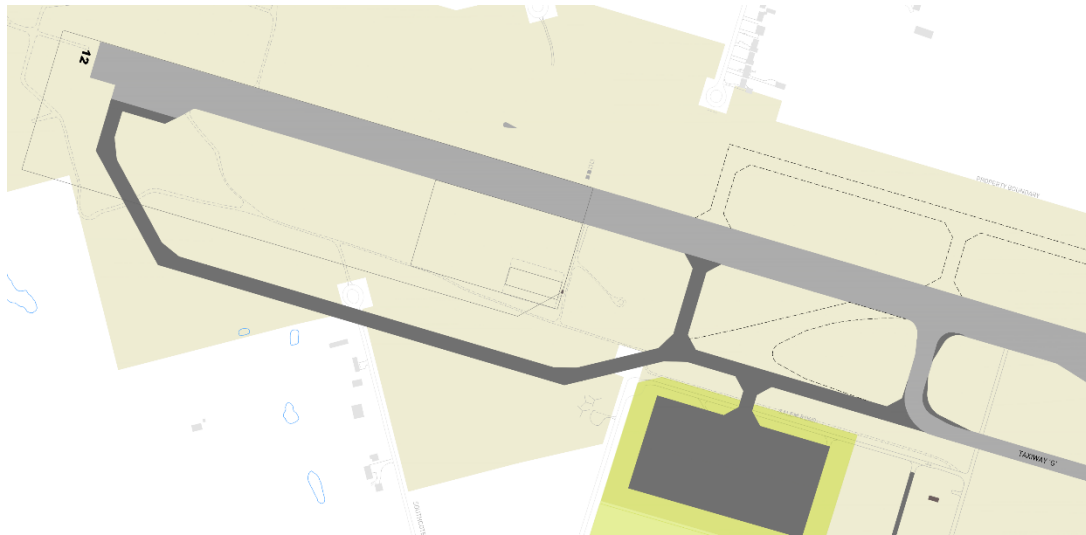


Figure 7-4 Alternative Taxiway Alignment Based on Existing Glide Path 12

AIRSIDE ROAD NETWORK

The Airport currently has several airside roads to provide a road network for airport operations staff to access key infrastructure without continuously occupying the runway and taxiway system. For instance, the Airport provides gravel and paved roads to the localizer, approach lighting system, glide path, radar site and more.

The Airport previously identified that there are often conflicts between the ground support equipment and aircraft on Taxiway Delta getting to and from the Purolator Apron. An interim solution has been identified to deconflict the congestions on Taxiway Delta, while a new airside road that runs from the apron area, extending northwards and maintains clearance of the Taxiway Delta strip, and connects with the existing airside road is expected to be built in 2023. When Taxiway Delta is extended to the south to access the South Commercial Development Area, this airside access road may need to be reconfigured to ensure taxiway crossings occur at a sufficient location or a new road alignment is to be provided without crossing Taxiway Delta.

PART II: PASSENGER TERMINAL BUILDING IMPROVEMENTS

To meet the projected peak hour passenger demand over the 20-year horizon of the Master Plan, an expansion of the Passenger Terminal Building (PTB) will be required. **Table 7-3** describes functional requirements for the year 2043 compared to existing facilities. Future requirements are based on a forecasted peak hour passenger demand of approximately 800 passengers in either arrivals or departures. Expansion of the international arrivals facility is, in part, based on requirements provided by Canada Border Services Agency (CBSA) and includes passenger processing functions and back-of-house administrative and support space that serves international traffic and goods moved through the Airport. It is important to note that temporary measures are being implemented to manage CBSA's current needs. Additionally, there are mitigation measures that can be implemented to flex and manage capacity during peak period, including but not limited to flattening peak schedules, introducing/utilizing slot restrictions, introduction of emerging technologies at various checkpoints.

Table 7-3 Projected Terminal Requirements

Function	Existing	Required (2043)
Check-in Queue	186 m ²	375 m ²
Check-in Counters	19 Counters	23 Counters
Pre-Board Screening Queue	62 m ²	217 m ²
Pre-board Screening Lanes	4 Lanes	6 Lanes
Holdroom Seating Area	1035 m ²	1768 m ²
Domestic Baggage Reclaim	336 m ²	590 m ²
Baggage Reclaim Devices	62 lineal m (Two Devices)	110 lineal m (Two Devices)
International Arrivals	1619 m ²	3856 m ²

The proposed terminal expansion can be accommodated on the current site without significant impact on adjacent land uses, or expansion could occur at other areas of the Airport if a new build is preferred (i.e.: north portion of the parking lot). The expansion would be phased in a manner that would allow the terminal to remain operational during construction. As an example, the outbound baggage make-up function would be relocated as a first phase to accommodate the expansion of the holdroom under a second phase of construction.

Figure 7-5 illustrates the proposed expansion of the PTB. Major elements of the proposed expansion, dependent on passenger growth, would include:

- Expanded departures/arrivals lobby with improved passenger flows to eliminate the need for passengers to backtrack and provide additional queuing space for pre-board passenger screening.
- Expanded check-in area with four to six additional check-in counters and queuing area.
- Expanded pre-board passenger screening area with two additional screening lanes and expanded queuing area.
- Relocated and expanded baggage make-up area.
- Expanded holdroom with additional retail concessions and gate podiums.
- Expanded domestic baggage reclaim area with two reclaim devices, each sized to support a 200-seat aircraft.
- Expanded international arrivals area with expanded baggage reclaim area supporting two reclaim devices each sized to support a 200-seat aircraft.
- Expanded CBSA passenger processing functions and administration and support space.
- Relocated and expanded airport administration area.
- Expanded terminal curbs including dedicated layby positions for public transit vehicles.

The PTB would continue to function as a single storey facility, with ground loaded gates. There is the potential for airport administration functions to be relocated to a second level, or an alternative site, to accommodate expansion of the check-in area. Within the area identified for Passenger Terminal and Parking Reserve, there also remains the ability to expand or redevelop the PTB differently that what has been illustrated conceptually, providing the flexibility to accommodate different development scenarios in the future.

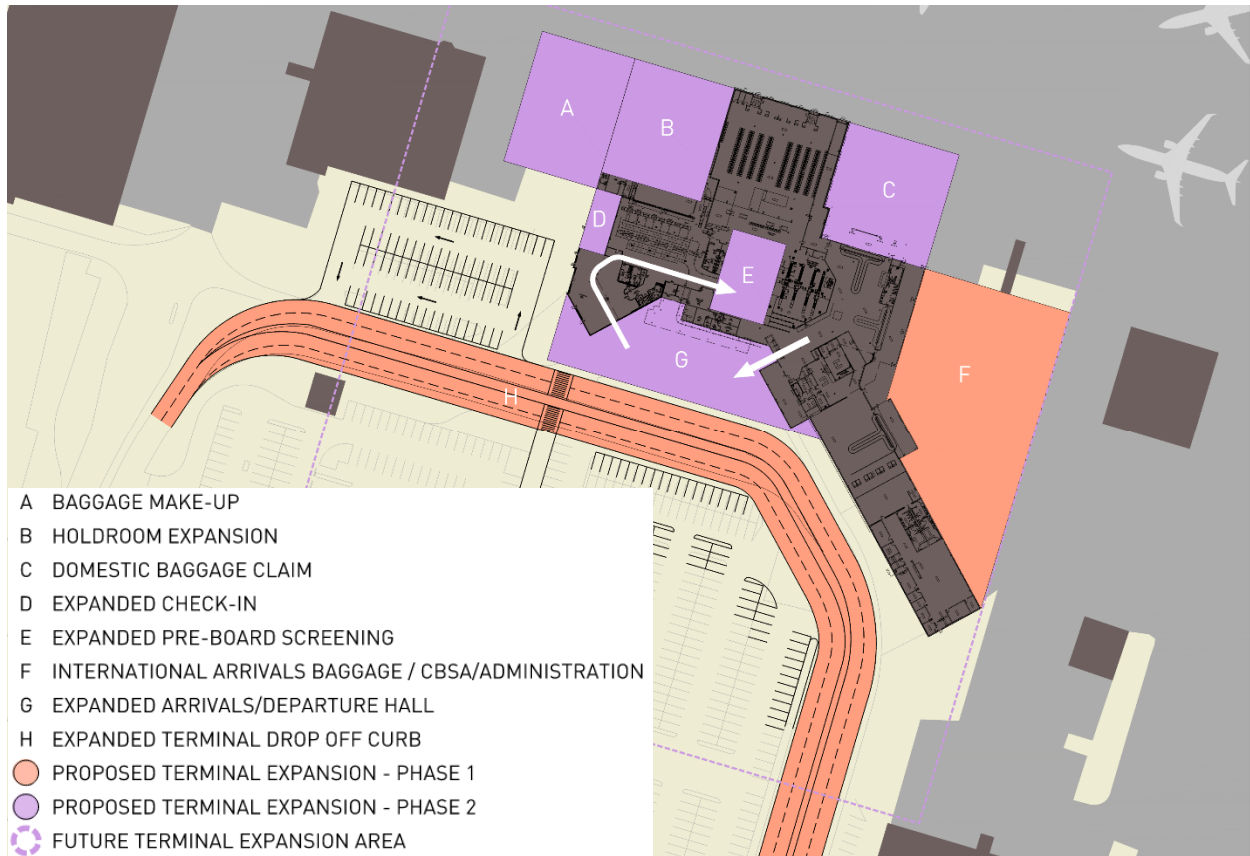


Figure 7-5 Proposed Terminal Expansion

PART III: LANDSIDE IMPROVEMENTS

Planning for the Airport goes beyond the fence as it is important to ensure that existing and future passenger and vehicle movements can be accommodated. The important elements include airport access by passengers, employees and cargo vehicles, including transport trucks, and how the terminal curb, airport roads and vehicle parking lots support the demand.

AIRPORT ACCESS

Reviewing whether the Airport is adequately accessible is an important element to conducting an Airport Master Plan update, ensuring it can meet the forecasted demand. In the case of Hamilton International, the Airport needs to be adequately accessible by cars and public transit for passengers, employees, tenants and by trucks for cargo operators.

Road Network

Primary access to the Airport is through Highway 6, which links the Airport to Highway 403 to the north and from there northeast to the Greater Toronto Area, west towards Woodstock and London and via the Lincoln Alexander Parkway to the QEW, east to the Niagara Region and the United States.

The Government of Ontario has committed to expanding Highway 6 from two lanes to a four-lane controlled access highway between Highway 403 and Upper James Road, including provision of a new interchange at the Airport. An online public information centre occurred on November 29, 2022, which presented three options for the new interchange. An environmental assessment is currently being undertaken and it will be followed up with an additional public information centre. There is no estimated completion date for this study. Consequently, a combination of the three options presented has been incorporated into the transportation reserve land use and the proposed commercial areas will not conflict with either option presented. **Figure 7-6** illustrates potential options for the new interchange at the Airport.

Access into Hamilton is via Upper James Street, a major arterial road that provides direct access into the downtown.

The existing commercial area east of PTB is currently accessible by East Cargo Road and the west area is accessible by Centre Road, both are accessible via Airport Road. Most commercial areas within this Master Plan are currently inaccessible and may require extension from the existing road network, including Upper James Road, Glancaster Road and Dickenson Road West. This, in turn, could potentially create the need for an additional intersection on Upper James Road that would connect traffic from East Cargo Road through Upper James and limit traffic on roads located in Mount Hope.



Figure 7-6 Proposed Highway 6 Widening and Airport Road Connector Interchange

Cargo Network

In addition to being a hub for air cargo, the Airport also serves as distribution centre for ground-based courier services that rely on the surrounding road network. The City of Hamilton has identified various truck routes that serve the Airport and businesses located in the Airport Employment Growth District (AEGD). **Figure 7-7** illustrates the surrounding truck routes as currently designated by the City of Hamilton.

The high volume of trucks that require access to these facilities result in a need for truck staging area. The existing staging area was located within the Airport’s existing main parking lot during the pandemic. However, as the passenger volumes increased, the demand for parking stalls increase accordingly, and truck staging was moved to an onsite private parking lot, albeit impacting employee parking. Therefore, the Master Plan proposes alternatives for a new truck staging area, which are captured within the vehicle parking section of the Master Plan.

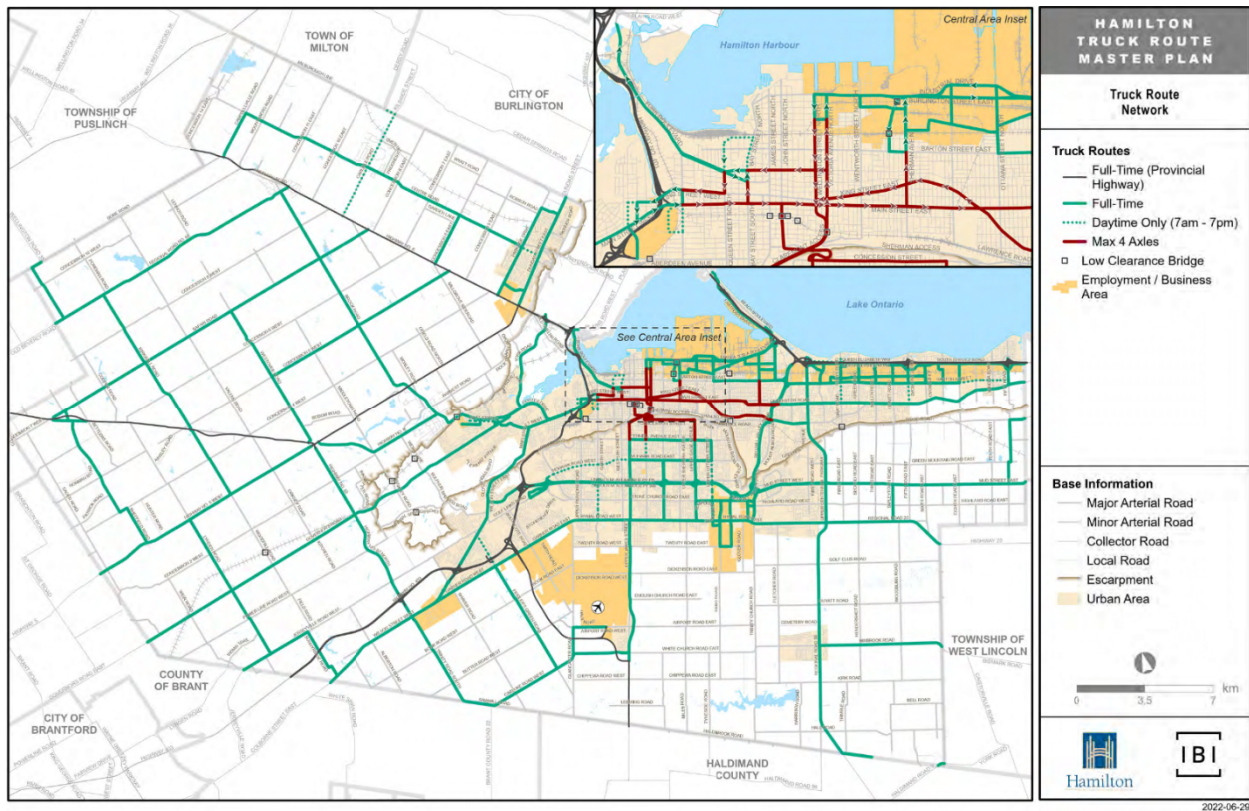


Figure 7-7 Truck Route Network

Public Transportation Network

The PTB is currently served by a single express City of Hamilton bus route (20 A-Line Express) that provides a connection between the Airport and downtown Hamilton via Upper James Street and James Street. During peak periods, the frequency is approximately every 10 minutes. The frequency reduces to every 30 minutes during off-peak periods. The busses servicing the Airport also regularly stage on the curb in front of the Air Terminal Building as an end/start point on the route.

It was indicated during stakeholder and public consultation that changes in the public transit schedule have already occurred in 2023, with additional Sunday service to be added in Fall 2023; however, additional service is required to provide 24/7 access to the Airport. It is anticipated that the bus demand will double due to an additional bus on an existing or new route. In particular, the bus schedule already sees two 40-foot busses using the curb at the same time throughout the day and this will likely be upgraded to two 60-foot bus in 2024. Furthermore, a new ride sharing program called "My Ride" will introduce an additional 30-foot bus. These potential overlapping bus schedules may not be supported based on the existing terminal curb.

It was also noted that no bus stops or routes serve the existing commercial area west of the PTB since the turn loop on Hangar Road does not accommodate the existing or future bus turn radii. Consequently, workers are required to walk from the PTB to their place of employment. The City of Hamilton did indicate it would add Hangar Road to the route if a turn loop could be provided. **Exhibit 8-1** illustrates a new dead-end turn loop designed to accommodate 60-foot bus turn radii.

TERMINAL CURB

It is proposed that the terminal curb may need expansion to provide two additional lanes, for a total of four lanes separated with a median to ease existing congestion, accommodate any future PTB expansion and in alignment with future passenger demand/growth.

The two short lanes that immediate abut the PTB will be replaced by the proposed terminal expansion. The existing two lanes will remain usable for curbside drop off and pick-up. The two new lanes would provide space for a dedicated layby positions for public transit, shuttles, and cabs. The two new lanes will overlap with the existing parking lot and serve as an extension of the existing shuttle/taxi lane.

The new parking lot footprint would require a reconfiguration of the existing stalls; however, it may be possible such could be achieved without losing the overall stall count.

Refer to **Figure 7-8** for illustration of the proposed new terminal curb layout that ties into other landside improvements recommended herein.

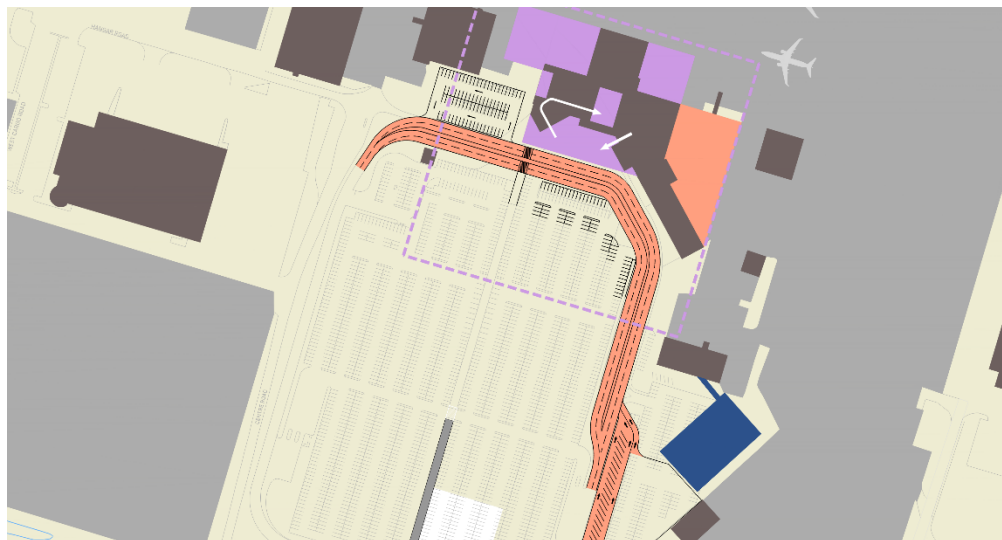


Figure 7-8 Proposed Terminal Curb

VEHICLE PARKING

The existing parking site is located between the PTB and Airport Road and consists of lots for passengers, Hamilton Airport employees and contractors, CBSA employees, rental cars and truck staging for cargo companies. All parking lots are accessible by the Ring Road, which intersects with Airport Road.

Primary Passenger Parking

The primary parking lot used for short- and long-term passenger parking is located in the centre of Ring Road. This primary passenger parking lot has the capacity to accommodate up to 2,272 vehicles. The parking lot can accommodate temporary transport truck staging when a portion of the lot is not in demand for passenger operations; however, it is unlikely that this will occur based on the forecasted passenger traffic.

July and August, historically, represent the peak with respect to parking demand and information provided by the Airport indicates the daily occupied stalls averaged to 1,436 (72.2%) with some occasional days where the lot is full.

The parking stall requirements were calculated based on the ratio of current parking stalls and existing passenger movements. The ratio was then applied to the passenger forecast volumes in the short-, medium- and long-term.

Based on the parking lot demand analysis, the existing park lot is forecasted to reach its capacity by 2025. Refer to **Table 7-4** for a summary of expected stall requirements for the short-, medium- and long-term.

Table 7-4 Parking Stall Requirements

Timeline	Parking Stalls Requirements
2025 (Short-Term)	2,143
2028 (Short-Term)	2,357
2033 (Medium-Term)	2,700
2043 (Long-Term)	3,429

A "Groundside" Parking assessment was completed in 2022 to assess potential parking lot locations to fulfil the Airport's parking requirements. The first proposed parking lot is located south of Airport Road on privately held land south. This overflow lot would have the capacity to accommodate up to 1,166 parking stalls and could be built in three phases. This proposed parking lot configuration is illustrated in **Figure 7-9**. The Airport would be able to use the alternative configuration that was prepared in 2022 that includes a truck staging area, through this is not the best location for such activity. The overflow parking lot also can expand (Phase 4) and accommodate an additional 906 stalls.

Alternatively, the Airport could also consider planning and designing a parking structure that could be built within the existing parking lot footprint. A parking structure would reduce demand for overflow parking on land that could be better served as landside or airside commercial areas.

Additionally, constructing a parking lot across the street would require provisions for passengers to safely walk and/or be shuttled from that new parking area to the terminal. This could include a walkway

across Airport Road and through the main parking lot and/or a shuttle service moving between the locations.

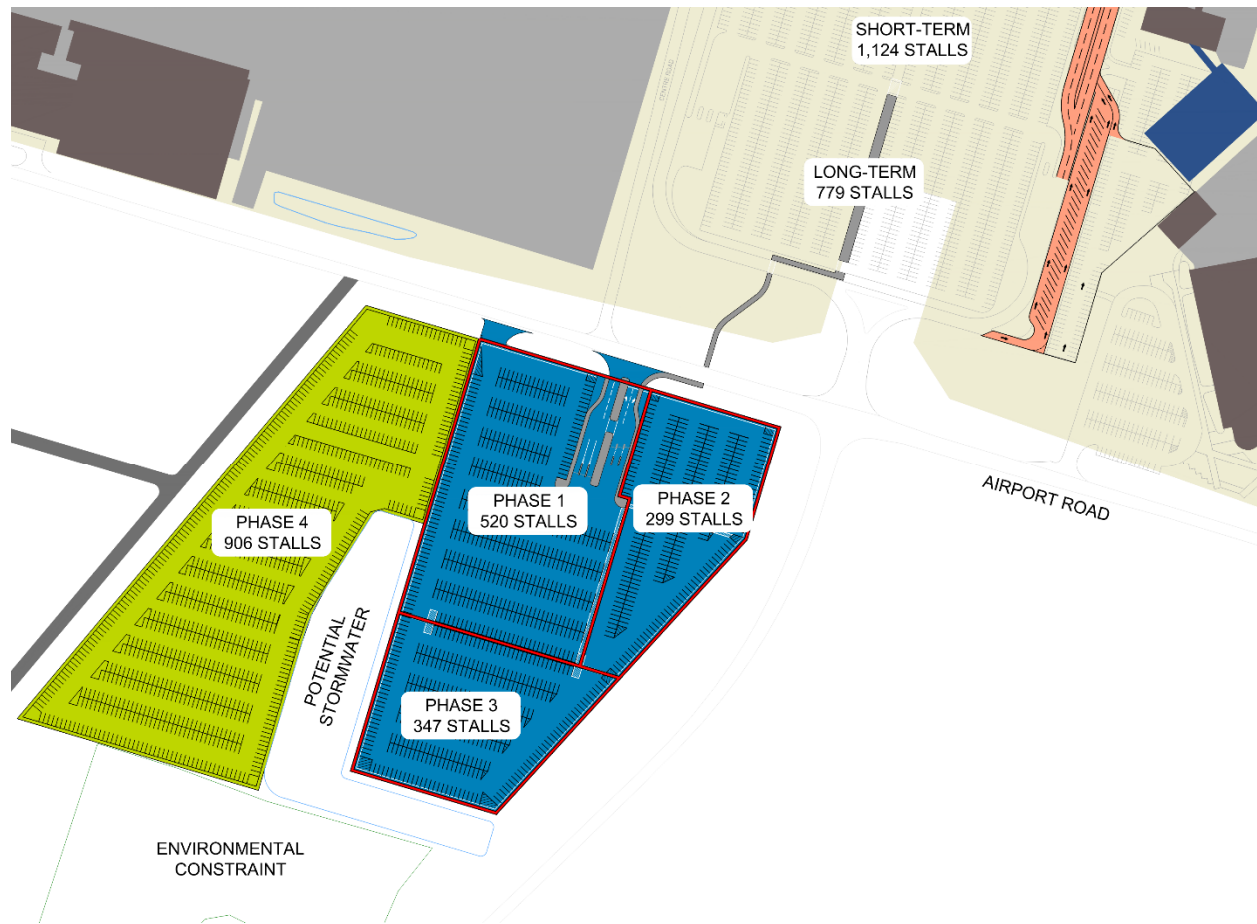


Figure 7-9 Proposed Overflow Parking Lot

Cell Phone Parking Lot

The Airport currently does not have a cell phone waiting lot to reduce the congestions on the terminal curb. The 2022 parking study identified an area west of the employee parking lot that could be reconfigured as a 33-stall cell phone lot to help alleviate congestion on the curb.

Employee Parking

The "Groundside" Parking assessment forecast that the existing employee parking lot would not accommodate the 'high growth scenario' within the 5-year forecast, suggesting demand of 260 stalls. Such a scenario would include increased parking requirements for CBSA staff. Employee parking is difficult to forecast in that it is not directly tied to increases in passenger activity, rather to expansion of commercial and administrative functions associated with the PTB and cargo operations. It is assumed that employee parking associated with the PTB will not likely exceed 300 stalls over the 20-year term of the Master Plan. A portion of this additional demand could be accommodated in remote lots located south of Airport Road.

Rental Car Parking

Rental car parking is currently accommodated in two lots; one in the northwest corner of the passenger short-term lot with a capacity of 44 spaces and a second located north of the large employee lot near the Canadian Heritage Warplane Museum (CHWM) with 138 spaces.

Discussions regarding the development of a new hangar suggest that it would conflict with the existing car rental lot. Although the details have not been finalized at this time, it was important to propose a new parking lot to accommodate existing and future rental car demand.

An additional parking lot option was suggested, as part of the "Groundside" Parking assessment, located south of the East Cargo Drive and east of the CWHM. The 397-stall parking lot was designed to accommodate rental car overflow, with a fuelling station and office building. During the public consultation, a stakeholder identified the potential need for a car washing facility to support passenger demand by creating efficiencies in operation and improving access to fleet. Such a facility could be accommodated within this parking area. Refer to **Figure 7-10** for a proposed parking lot layout and associated stormwater management pond.

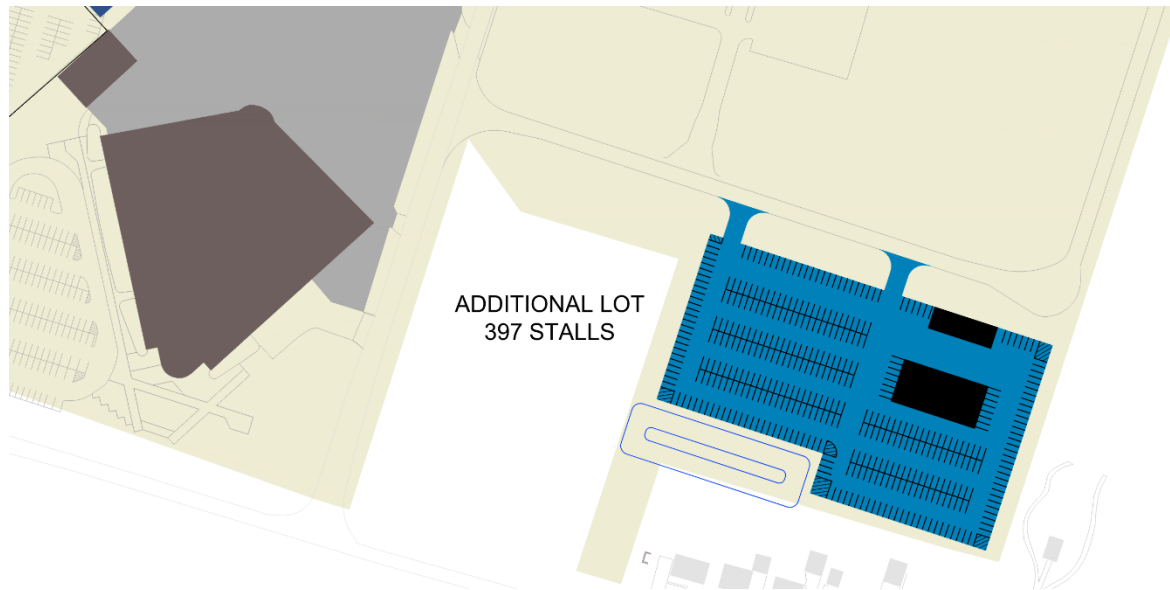


Figure 7-10 Proposed Additional Parking Lot

UTILITIES AND MUNICIPAL SERVICES

A preliminary review of the existing sanitary services was conducted, including consultation with the City of Hamilton regarding the extension of services to meet existing and future demand. Improvements have been made to the Airport since the 2010 Airport Master Plan, with several derived from new developments and some required due to maintenance or general capacity improvements. The following subsection addresses existing and proposed recommended improvements to utilities and municipal services at the Airport. Future study, through a Master Servicing Plan, is recommended to address the requirements more comprehensively on an as and when needed basis.

Sanitary Services

Existing:

Municipal sanitary service to the Airport is provided by the City of Hamilton through a 450 mm diameter trunk sanitary sewer located along Airport Road. This sewer flows easterly to a trunk sewer on Homestead Drive. According to the 2010 Airport Master Plan, the sewer was constructed with a slope of 0.2% and has a capacity of approximately 133 l/s. The sewer flows northerly on Homestead Drive to a sanitary pumping station located approximately 1,200 meters north of Airport Road. Due to the capacity of this pumping station, the City of Hamilton has placed a restriction for peak discharge from the Airport.

Given the potential for future commercial expansion on Airport property, the existing and future sanitary sewage demands and allocations should be reviewed in greater detail. The City of Hamilton, as part of the AEGD planning process that was conducted ahead of completion of the 2010 Airport Master Plan, identified a potential ultimate demand of approximately 2.4 -2.6 ML/d.

The Airport is drained by four separate systems which are all connected into the existing 450 mm diameter sewer line on Airport Road.

Sanitary System No.1 East Cargo Road Commercial Property

Sanitary System No.1 consists of a 300mm diameter sewer line on East Cargo Road, which drains the WestJet Hangar, the UPS building and effluent from the UPS glycol / stormwater management facility, Cargojet Hangar, fuel farms as well as provisions for future development of Airport lands east of the Cargojet hangar.

Sanitary System No.2 Canadian Warplane Heritage Museum

Sanitary system No.2 consists of a 150mm diameter sewer line, which drains the CWHM lot.

Sanitary System No.3 Passenger Terminal Building

Sanitary System No.3 consists of a 250mm diameter sanitary sewer line, which drains the existing PTB and the stormwater / Glycol Management Facility. Future expansion phases of the PTB will likely require upgrades to the sanitary system.

Sanitary System No.4 Commercial Property West of Passenger Terminal Building

Sanitary System No.4 drains all groundside buildings located west of the existing PTB by means of a 300mm diameter sanitary sewer line.

Proposed Improvements

At present, there are no municipal sanitary services provided to the Combined Services Building or Air Traffic Control Tower. Consideration should be given in the future to the provision of sanitary services to these facilities and the west commercial development area.

In the 2010 Airport Master Plan, it was anticipated that the existing sanitary sewer lines would be adequate to handle the previously proposed short-term expansion within the Airport's boundaries but provisions for upgrades should be considered for short-to long-term development of outlying lands as proposed within the Master Plan. Given the need to accommodate continued expansion of commercial development and airport support services, there is a near-term need to upgrade and extend these services to areas identified for development.

During stakeholder consultation, it was shared that the Dickenson Road is currently at or near capacity and the City of Hamilton has committed to extending the trunk sewer by 2026 to provide ultimate capacity. The proposed improvements could serve the North and East Commercial Development Areas.

The South and West Commercial Development Area could have sanitary services through 450mm diameter trunk sanitary sewer located on Airport Road derived from Upper James Street.

Therefore, existing and future sanitary sewage demands and allocations should be reviewed and upgrading of the City's sewage collection system or other innovative solutions (i.e., wetland treatment systems) will be required to accommodate future airport development. These requirements should be included in the City of Hamilton's Municipal Services Master Plan and AEGD secondary planning processes.

The City of Hamilton should provide the appropriate sanitary services to the key development areas to accommodate demands that will be imposed by future development as identified in the Master Plan. This includes the provision of new and upgraded services.

Municipal Water Services

Existing:

Municipal water servicing is provided for the Airport by the City of Hamilton through a 300mm diameter water main connected to a 400 mm diameter water main located on Airport Road. The 400mm diameter water main is fed from a water main located to the east on Homestead Drive.

The 300mm diameter water main on airport property in turn supplies the PTB fire protection distribution system through an electric pump with a diesel backup and supplies the domestic water services to the PTB, hangars and other buildings. The commercial areas that are fronting East Cargo Road receive water services through newly extended 250mm water mains from Airport Road.

To provide additional water supply to the Airport and surrounding area, the City of Hamilton constructed a 600mm water main routed south on Glancaster Road, passing under Runway 12-30 and then east on Airport Road to connect to the existing 400 mm diameter water main, which feeds the Airport. However, it has been observed that the PTB water supply does not always have sufficient pressure and additional upgrades should be considered.

Three existing water services feed the Airport and provide services for:

- East Cargo Road Commercial Property
- Canadian Warplane Heritage Museum
- PTB and Commercial Property West of PTB

Proposed Improvements

All future municipal water supply and conveyance of sewage from the Airport should be addressed by the City of Hamilton as part of the AEGD. A study should be conducted to evaluate the need to upgrade and/or extend water mains to the proposed commercial area and whether existing mains have the capacity to support the demand within the planning horizon.

The feasibility of servicing the West and South Commercial Development Areas by extension of the existing 400 mm and 600 mm diameter truck water mains that are located along Airport Road should be priority to meet commercial development needs.

Water services for the East Commercial Development Area will need to be extended from Upper James Street. Water services for the North Commercial Development Area will need to be extended from Dickenson Road West.

Fire Protection System

Existing

The existing fire protection distribution system for the PTB and commercial hangars area is provided by a 300mm diameter fire main fed through an electric pump with a diesel pump backup located in the fire pump house. Fire protection service for the existing PTB is provided by means of a 200mm and 250mm diameter fire service fed from the 300mm diameter fire main.

According to the 2010 Airport Master Plan, the hangars along East Cargo Road were protected by a new 600,000 USG water reservoir tank and pump house system capable of 10,000 US gallon/minute output, utilizing 4 diesel pumps.

Proposed Improvements

Improvements to the fire protection system are warranted when changes to facilities occur, and as such, a review of the existing fire protection system would be required to ensure the existing system could meet the demand and capacity requirements dependant on the improvement.

Natural Gas

Existing

An existing high-pressure natural gas main is located on Airport Road, with branch lines providing services for:

- Commercial Area East of the Terminal Building
- Commercial Area West of the Terminal Building
- Passenger Terminal Building
- Canadian Warplane Heritage Museum
- Combined Services Building

A 75 mm gas line feeds into the Airport from Airport Road, north along Center Road to the intersection of Hangar Road. From this point a 25mm diameter gas line provides service to the south side of the PTB. A 50 mm gas line services commercial property west of the PTB. A 50 mm line also services the commercial properties located along East Cargo Road. A line also runs from the west commercial area extending under Runway 06-24 to the Combined Services Building and the Air Traffic Control tower.

Proposed Improvements

The 2010 Airport Master Plan estimated that the total connected load of all existing and new equipment in the expanded PTB (Phase 1 & 2) would be 22,344 cubic feet per hour. Union Gas was proposed to carry out several reinforcement upgrades off site as well as construction of a new high-pressure 100mm service to the terminal from the 75 mm diameter gas main at Centre Road to provide adequate service for

the expanded PTB. It was proposed that the new service, meter and PRV will be located on the west side of the expanded PTB. These improvements were not completed and it is recommended that a new assessment should be completed to determine the services required to accommodate the anticipated development potential through the planning horizon as reflected in this Master Plan.

It was also previously recommended that the gas line along Centre Road just south of the intersection of Hangar Road be lowered and / or relocated as it conflicts with the drainage and pavement structure improvements contemplated for this area. This improvement has not yet been completed.

A capacity demand assessment should be undertaken to determine the estimated demand required to support the proposed PTB expansion and lowering and/or relocation of natural gas lines to the commercial areas if deemed appropriate with further study.

Stormwater Servicing

Existing

A Stormwater Management Study prepared in 2009 identified a total of 32 drainage areas and outlets associated with the Airport lands. The largest of these areas is approximately 142.5 ha in size, with the average area being approximately 15 ha in area. Most storm water runs directly off the Airport lands by means of open ditches. There are several storm water management ponds in areas of existing development designed to control the quantity and quality of runoff. These ponds include:

Pond 1 – Located in proximity to the KF Aerospace and Mohawk College hangar and has two separate facilities, one of which has been specifically designed to contain and treat glycol contaminated runoff from the KF Aerospace and Mohawk College apron. De-icing operations ceased in 2011 from this apron area resulting in no glycol run-off from the KF Aerospace and Mohawk College apron.

Pond 2 – Located northwest of the UPS site adjacent to Taxiway Whiskey. The pond is used for both stormwater retention and for the collection of glycol contaminated runoff from de-icing operations. Discharge from the pond can be directed to storm water or to sanitary, depending on the concentration of glycol and other effluent parameters specified by the Ministry of Environment.

Pond 3 – Located adjacent to the Canadian Warplane Heritage Museum and has been designed to control storm water coming from the parking lot to pre-development levels.

Ponds 4 and 5 – Located east of the East Cargo development area and have been designed to control post-development runoff to pre-development levels. A 2009 stormwater study did not identify any significant concerns with the existing storm water drainage system. However, it did recommend that ongoing maintenance and inspection activities be carried out to ensure that proper flows at culverts and outlets are maintained.

Ponds 6 and 7 - Since the 2009 study, new airside commercial development areas were added, including the expansion of the Purolator Apron north of Airport Road and a new DHL facility on East Cargo Road. A new stormwater ponds were constructed south of the Purolator Apron and South of the DHL parking lot to address the additional runoff.

Proposed Improvements

The 2009 Stormwater Management Study identified a series of storm water management ponds which could be located around the periphery of the Airport lands to provide quantity and quality controls associated with the future expansion of airport infrastructure. In addition, the study recommended that future development utilize rooftop and parking lot storage along with infiltration ditches to maintain groundwater recharge and reduce the size and number of storm water management facilities.

The Airport is also planning on installing a Moving Bed Biofilm Reactor (MBBR) to treat glycol residual onsite, allowing release to the natural environment. This will also impact any further studies and pond requirements.

With the proposed development of surrounding lands as part of the AEGD, it is important that the implementation of storm water management practices on the Airport be coordinated with those of the City of Hamilton. This could result in a reduction in the number and size of storm water ponds located on Airport property.

An update to the 2009 Stormwater Management Study is recommended to address the new long-term development plans for Airport lands.

Electrical Service

Normal Power

A project was undertaken in 2007 to upgrade the PTB power supply. A new 27.6 kV underground supply capable of providing up to 5 MVA of power was derived from the overhead line on Centre Road to a new 1500 kVA transformer to the front of the PTB. From there, 600 V secondary underground cables supply a 1600 A, 3 phase – 4 wire main switchboard in the main electrical room of the terminal. A study should be completed to determine if the power supply will be adequate for the potential PTB expansions within the short- to long-term. The existing Pump House is fed from a 200A, 600V, 3-phase, separately metered utility service from a 27.6kV utility pole located west of the pump house.

Emergency Power

A 160kW standby diesel generator has been provided to cover the existing life safety and essential loads, while affording some additional capability for the future facility improvements. The existing PTB generator has limited capacity, resulting in selective backup power to serve the existing PTB. It is recommended that the PTB generator is upgraded to accommodate existing and future PTB requirements.

The pump house is fed by a 70A, 600V, 3-phase, emergency service from the terminal's emergency splitter but this service does not serve the 60 HP electric fire pump which currently has no emergency service. There is however a diesel driven fire pump that provides backup fire protection. This diesel pump was replaced in 2004.

Communication Service

The Airport is currently served by adequate telephone and communication services. This service will suffice in accommodating the Airport's needs in the short-term, although some expansion of service may be required in the medium- to long-term; in particular, the expansion of fibre-optic cables.

Cellular coverage at the Airport appears adequate has not be identified as a concern.

Overall Utilities and Municipal Services Recommendations

In summary, there are several improvements and extension of the utilities and municipal services to service the proposed PTB expansion and proposed development areas identified within this Master Plan. The recommendations are as follows:

Sanitary Sewer

- Provide the appropriate sanitary services to the key development areas to accommodate demands that will be imposed by future development as identified in the Master Plan. This includes the provision of new and upgraded services.

Municipal Water Services

- Conduct a study to evaluate the need to upgrade and/or extend water mains to proposed commercial area and whether existing water mains have the capacity to support the demand within the planning horizon.

Fire Protection System

- Review existing fire protection system to ensure the existing system could meet the demand and capacity requirements when changes in facility occurs.

Natural Gas

- Assess the existing natural gas services to determine if it can accommodate the anticipated development potential within the planning horizon.
- Conduct a capacity demand assessment to determine the demand required to support the proposed PTB expansion and lowering and/or relocation of natural gas lines.

Stormwater Servicing

- Install Moving Bed Biofilm Reactor (MBBR) to treat glycol residual onsite.
- Update the 2009 Stormwater Management Study to address long-term development plans for airport lands.

Electrical Services

- Conduct a study to determine if the existing power supply will be sufficient for the future development within the planning horizon.
- Update the PTB generator to accommodate existing and future PTB requirements.

Communication Services

- Extend communication services, including fibre-optic cables to proposed development areas.

It is recommended a Master Servicing Plan be prepared. The study would include an analysis of the applicable City of Hamilton's drainage policy and standards and any other regulatory requirements relevant to the Airport's existing and proposed commercial development to ensure they comply with the

Provincial Act and Regulation. The study would also include an evaluation of the future utilities and service requirements for Airport lands over the next twenty years and provided recommendations on the timing of the upgrades and expansions based on the proposed development phasing contained within this Master Plan.

PART IV: COMMERCIAL DEVELOPMENT

The Airport is reaching its capacity when it comes to commercial airside land development opportunities, with only odd-shaped parcels remaining that limit large third-party investments. However, opportunities exist with abutting properties owned by the City of Hamilton or third parties through vesting of land or through-the-fence agreements to increase leasable land.

It is important that access to City-owned lands is considered for the Airport to meet its growth plans, which includes appropriate servicing to the proposed commercial areas discussed in the subsequent sections.

The potential commercial development areas have been divided into four sections, South, East, West and North Commercial Development Areas. These commercial areas demonstrate the potential to accommodate various types of aviation activity. The Airport could strategically allocate lands for several types of aviation activity, such as cargo, aircraft maintenance or general aviation, rather than focusing on one apron area. Therefore, it is recommended that the Airport prepare these commercial areas such that they could accommodate anticipated growth in the short-, medium- and long-term.

South Commercial Development Area

The South Commercial Development Area, as illustrated in **Exhibit 7-4**, is located outside of the Airport property boundary, south of Airport Road and west of the Airport Road / Highway 6 connector. The land is currently owned by the City of Hamilton and another third party. It is recommended that these parcels of land are considered for airport expansion. These lands are best suited to accommodate a taxiway extension that would help serve the commercial development area.

The lot is mostly vacant except for a parking lot for existing tenants located along Airport Road. It was shared during the stakeholder consultation that this parking lot expansion will be required within the planning horizon and therefore, the commercial area preserves a parking lot expansion that is double the existing footprint.

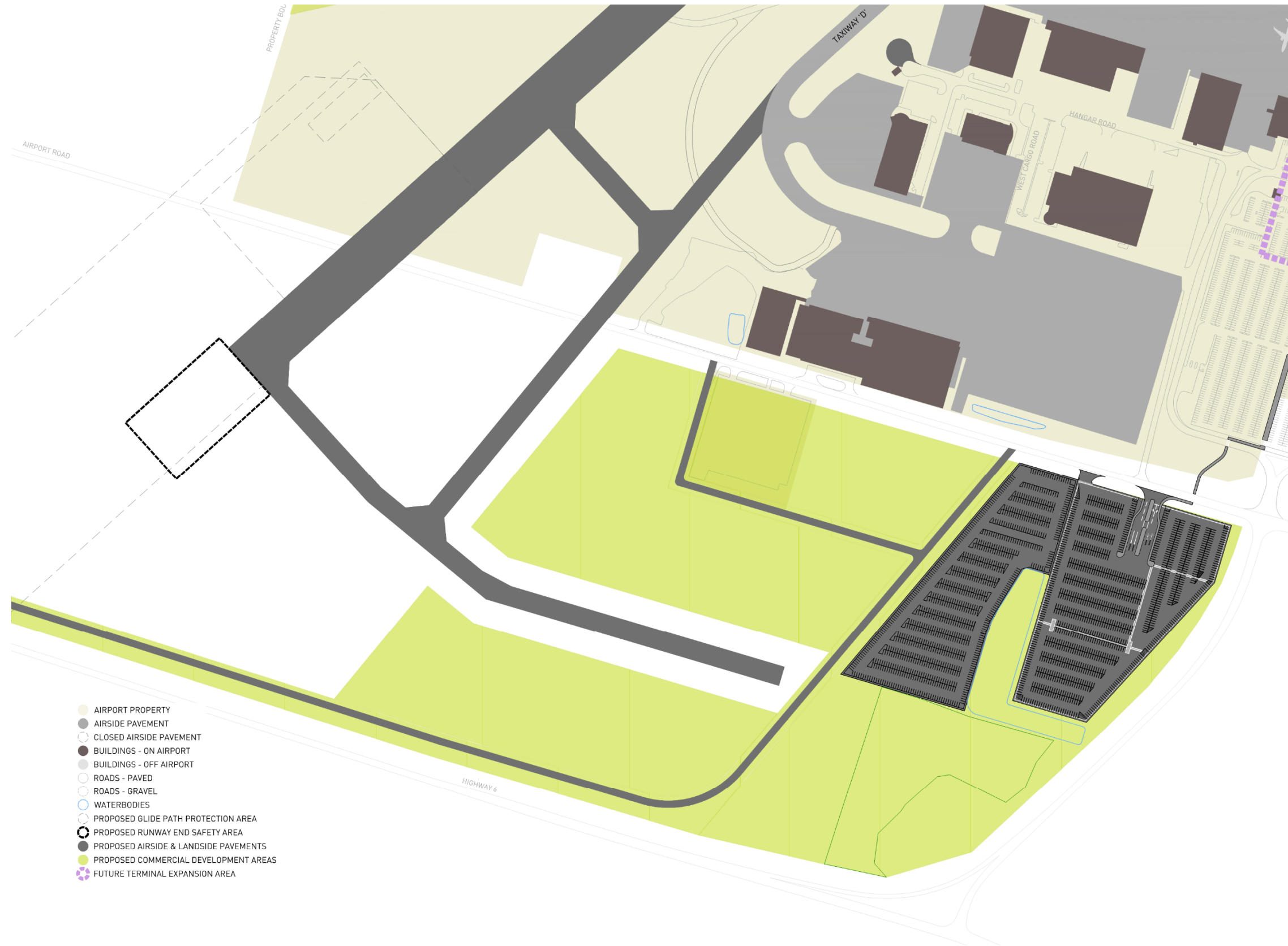
To accommodate the potential growth opportunities within the South Commercial Development Area, Airport Road would need to be relocated to allow for an extension of Taxiway Delta and potentially Runway 06. It is proposed that the road is terminated just beyond the existing tenant hangars off Airport Road and circle around the existing and future extended tenant parking lot. The road could then split into two; first, extend northwards to reconnect with Airport Road and second, extend southwards and westward to run parallel to Highway 6 until it jogs northwards to reconnect with Glancaster Road. The proposed realignment around the existing and future tenant parking lot would be ideal to provide circular flow for busing operations to serve the western tenants and provide a circular route for trucks, while providing optimal airside commercial land.

East of the proposed realigned Airport Road would serve as landside commercial lots that would be ideal for a remote overflow parking lot serving the passenger terminal and meet most of the short- to long-

term parking demand. The area south of the proposed parking lot is constrained by existing environmental concerns.

A portion of the proposed overflow parking lot could also be utilized as a potential truck staging area. Alternatively, the Airport has the flexibility to designate some of the airside commercial land for truck staging purposes which may be a more suitable location as an independent truck staging area.

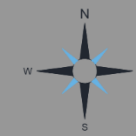
West of the proposed Airport Road realignment includes 13.64 hectares of land that would be available for airside commercial development. These lots would have the flexibility to accommodate various tenant possibilities. However, these lots require extension of site servicing and land infill prior to development.



- AIRPORT PROPERTY
- AIRSIDE PAVEMENT
- CLOSED AIRSIDE PAVEMENT
- BUILDINGS - ON AIRPORT
- BUILDINGS - OFF AIRPORT
- ROADS - PAVED
- ROADS - GRAVEL
- WATERBODIES
- PROPOSED GLIDE PATH PROTECTION AREA
- PROPOSED RUNWAY END SAFETY AREA
- PROPOSED AIRSIDE & LANDSIDE PAVEMENTS
- PROPOSED COMMERCIAL DEVELOPMENT AREAS
- FUTURE TERMINAL EXPANSION AREA

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SOUTH COMMERCIAL AREA

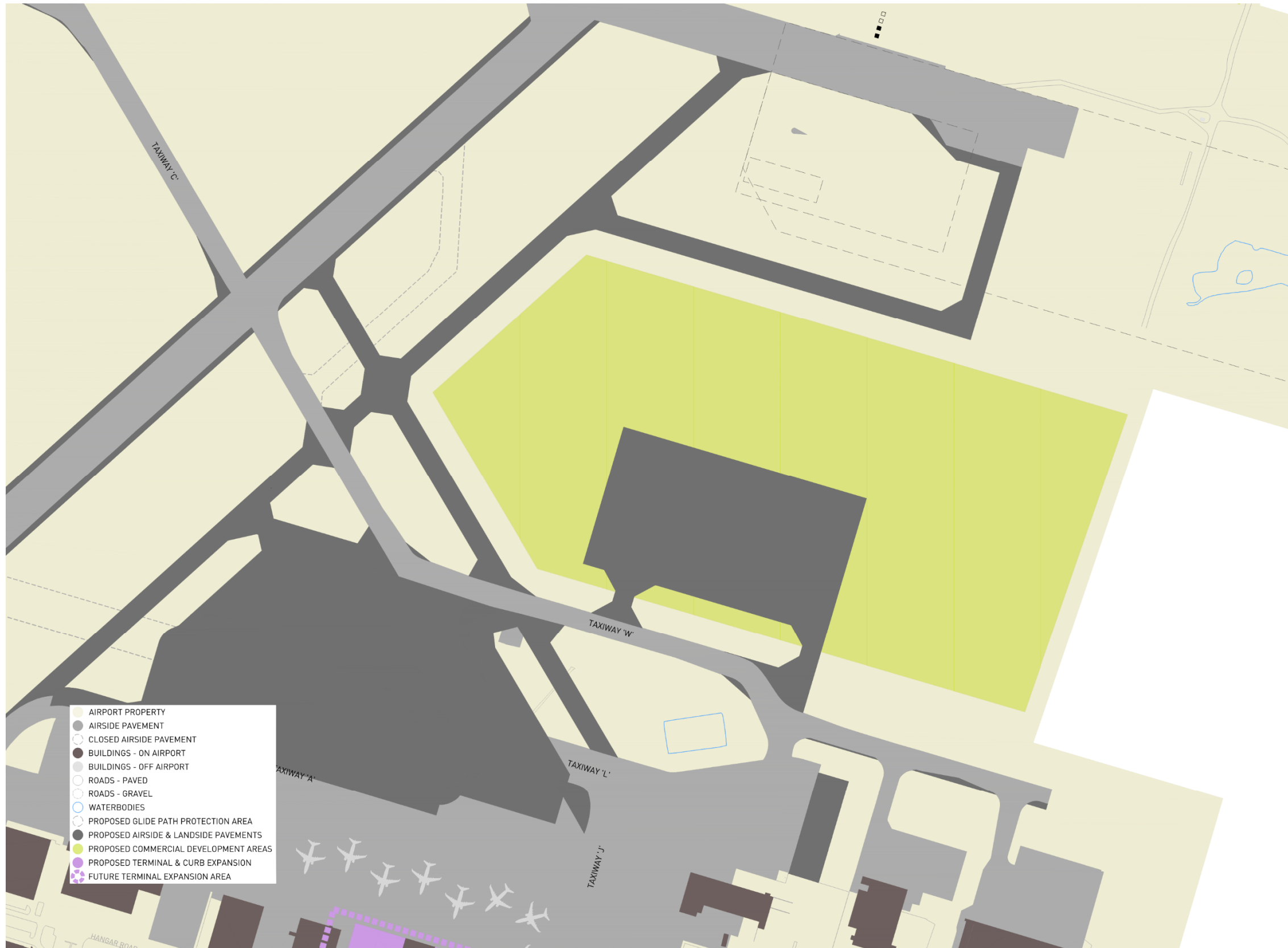
EXHIBIT 7-4

East Commercial Development Area

The East Commercial Development Area is located north of Taxiway Whiskey and south and southeast of the threshold for Runway 30. The land is currently in use by NAV Canada as a radar site. There have been several discussions regarding the potential to relocate such facility which would introduce an opportunity for airside commercial development. If the NAV Canada radar site can be moved, the land is ideal for airside commercial development as it connects to the existing taxiway infrastructure, and it can be used to fulfil the forecasted demand for remote passenger stands for the PTB. Refer to **Exhibit 7-5** for illustration of the East Commercial Development Area, including proposed terminal remote stand apron.

The commercial area could be further expanded to accommodate future airside commercial development, outside of the remote passenger terminal stand requirements. The lot provides sufficient depth for large apron and hangars. However, the airside commercial land is currently not accessible by the public and site servicing would need to be extended to such commercial area.

The vacant land located east of the southeast corner of the Airport property boundary was designated as Airport Reserve in the Airport Employment Growth District. These lands would be ideal for airside commercial development opportunities accessed from Taxiway Whiskey. The area is adjacent to third party held lands that border on airport property, thus allowing for potential 'through-the-fence' type of development.



- AIRPORT PROPERTY
- AIRSIDE PAVEMENT
- CLOSED AIRSIDE PAVEMENT
- BUILDINGS - ON AIRPORT
- BUILDINGS - OFF AIRPORT
- ROADS - PAVED
- ROADS - GRAVEL
- WATERBODIES
- PROPOSED GLIDE PATH PROTECTION AREA
- PROPOSED AIRSIDE & LANDSIDE PAVEMENTS
- PROPOSED COMMERCIAL DEVELOPMENT AREAS
- PROPOSED TERMINAL & CURB EXPANSION
- FUTURE TERMINAL EXPANSION AREA

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EAST COMMERCIAL AREA

EXHIBIT 7-5

West Commercial Development Area

The West Commercial Development Area is located west of Runway 06-24 and south of Runway 12-30, as illustrated in **Figure 7-6**. The land is currently occupied by the existing Air Traffic Control (ATC) tower, Combined Services Building (CSB), and Automated Weather Observation System (AWOS). This infrastructure provides some airfield constraints, as shown earlier in the Master Plan. Most critical is the ATC line-of-sight and proposed parallel taxiway system. Planning the development will be strategic to maximize the use, including lands within the ATC line-of-sight.

To accommodate growth from an operational and administrative perspective, the Airport completed a feasibility study for expansion of the CSB. The preferred expansion selected shows an extension towards the north to reduce impact to land that is not currently constrained. However, future analysis would need to be completed to ensure the expansion would not conflict with the AWOS.

Two areas of focus are the potential development area south and west of the CSB. The south area has the ability to support hangars and aprons that are inline with the CSB to avoid conflict with the ATC line-of-sight. This apron could be accessible with a connector from Runway 06-24 that would form part of the western parallel taxiway system. Next, the lot located west of the CSB and has potential that includes large apron areas and hangars. Similarly, the site would be constrained by the ATC line-of-sight. This apron area could connect to the future south parallel taxiway for Runway 12-30.

The existing facilities have limited services, except for a water line for emergency services and hydro. A study would need to be completed to determine the site servicing requirements for the future CSB expansion and commercial development.



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WEST COMMERCIAL AREA

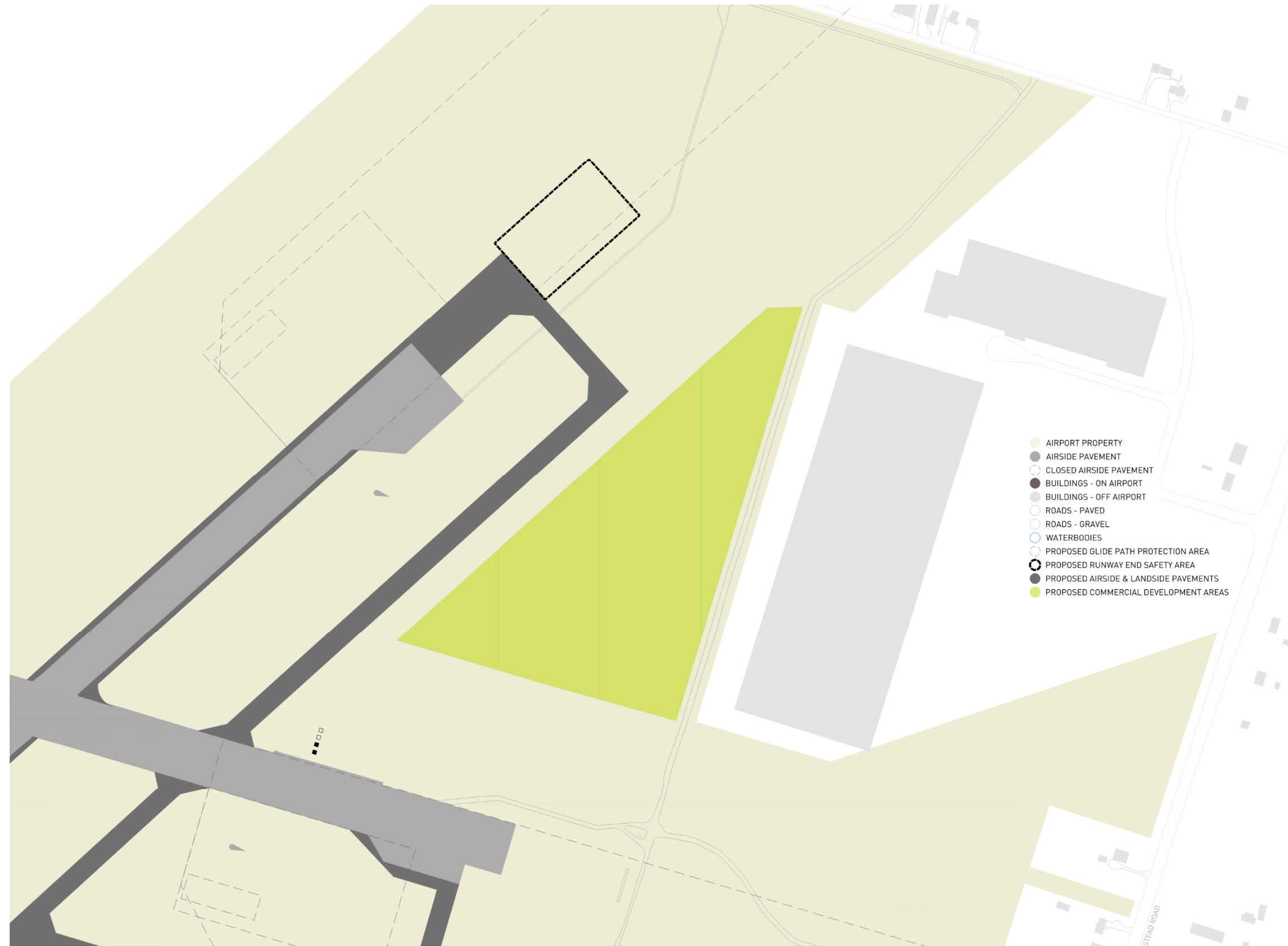
EXHIBIT 7-6

North Commercial Development Area

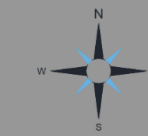
The North Commercial Development Area is limited for commercial growth opportunities as the site is constrained by the Obstacle Limitation Surfaces, land reserved for the future parallel taxiways and the existing proposed boundaries.

Exhibit 7-4 illustrates a parcel of land located east of the threshold of Runway 24 and is currently available for airside commercial purposes. The airside development could connect to threshold 24 or the future parallel taxiway and it will require a new landside access road and site servicing.

Lands located north of Runway 12-30 and west of Runway 24 has been designated as Airport Prestige Business, Airport Related Business and Airside Industrial. These large developable lands would be dependent on through the fence agreements. Ideally these lands would be used for airside commercial development which could occur with the construction of the northern parallel taxiway that could be built when these agreements are put in place.



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NORTH COMMERCIAL AREA

EXHIBIT 7-7

PART V: OPERATIONS SUPPORT FACILITIES & SERVICES

Hamilton International requires several operations support facilities and services that must adequately serve the existing and future traffic demand. This includes:

AIR TRAFFIC CONTROL

It is important to ensure the existing and future line-of-sights will not be compromised by future development. Although the facility was built in 1987, there are no need for expansion of the tower.

COMBINED SERVICES BUILDING

A Combined Services Building (CSB) is the main point of maintenance and emergency response for the Airport. Additional vehicle and equipment maintenance shop is also completed is a separate facility adjacent to the PTB.

In 2022, a CSB Feasibility Study was completed to provide options if the secondary maintenance shop and/or administration offices are required to be moved from their current locations. Three layouts were presented for expansion of the CSB facility, including up to 10 additional maintenance and storage bays and a new administrative facility. The expanded CSB facility is critical to the consolidation of airport maintenance, operations, and administrative functions.



Figure 7-11 Rendering of Preferred CSB (Option 1B)

A rendering of Option 1B is illustrated in **Figure 7-11** was identified as preferred as it presents minimal conflict with the potential commercial development area south and west of the CSB. The proposed CSB expansion is illustrated in blue and road/parking lot expansion is illustrated in dark gray in **Figure 7-12**. The proposed administrative building option is not illustrated since the Airport is still deciding on where to relocate such facilities.

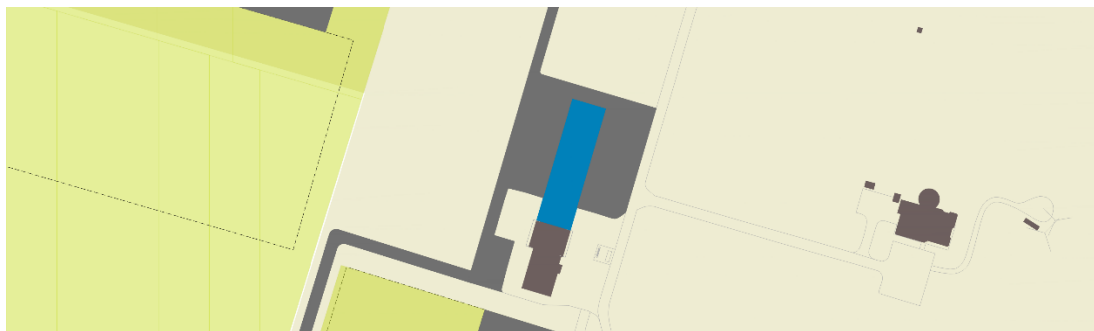


Figure 7-12 Layout of Preferred CSB (Option 1B)

EMERGENCY RESPONSE SERVICES

Emergency response services are accommodated in the CSB and provided on a 24/7 basis and provided on a 24/7 basis. Currently three bays exist for the parking of the ARFF apparatus and daily servicing. The three truck bays and associated equipment ensures the Airport can provide ARFF for up to Category 8 operations upon request. Currently Hamilton International provides Category 7 services, and it is not expected to increase based on Canadian Aviation Regulations during the term of this Master Plan.

No expansion of the emergency response services facility is contemplated within the horizon of the Master Plan.

FUEL FARM

The land south of the Fuel Farm has the potential for further expansion of the fuel farm, including additional Jet A-1 tanks or alternative Sustainable Aviation Fuels (SAF) should such fuels become readily available in the future.



AIRCRAFT DE-ICING FACILITIES

The proposed Apron II Phase 1 expansion towards the north will provide on-stand de-icing operations. The run-off will go to the new catch basins to existing stormwater management ponds. The future run off is represented by dark blue arrow in **Figure 7-13**.

A Glycol Management Facility Condition Assessment was completed in 2021. It was concluded that the glycol management building appears to be in good condition and meets the Airport's current need.

The existing de-icing operations, including future expansion, will be sufficient to accommodate the Airport's demand during the Master Plan and no central de-icing facility is required at this time. However, the future expansions of Apron II could provide an opportunity for a future central de-icing facility. Hamilton International has made a commitment to monitor and implement mitigations where appropriate to comply with the agreement the Airport has with the Ministry of Environment and Climate Change.

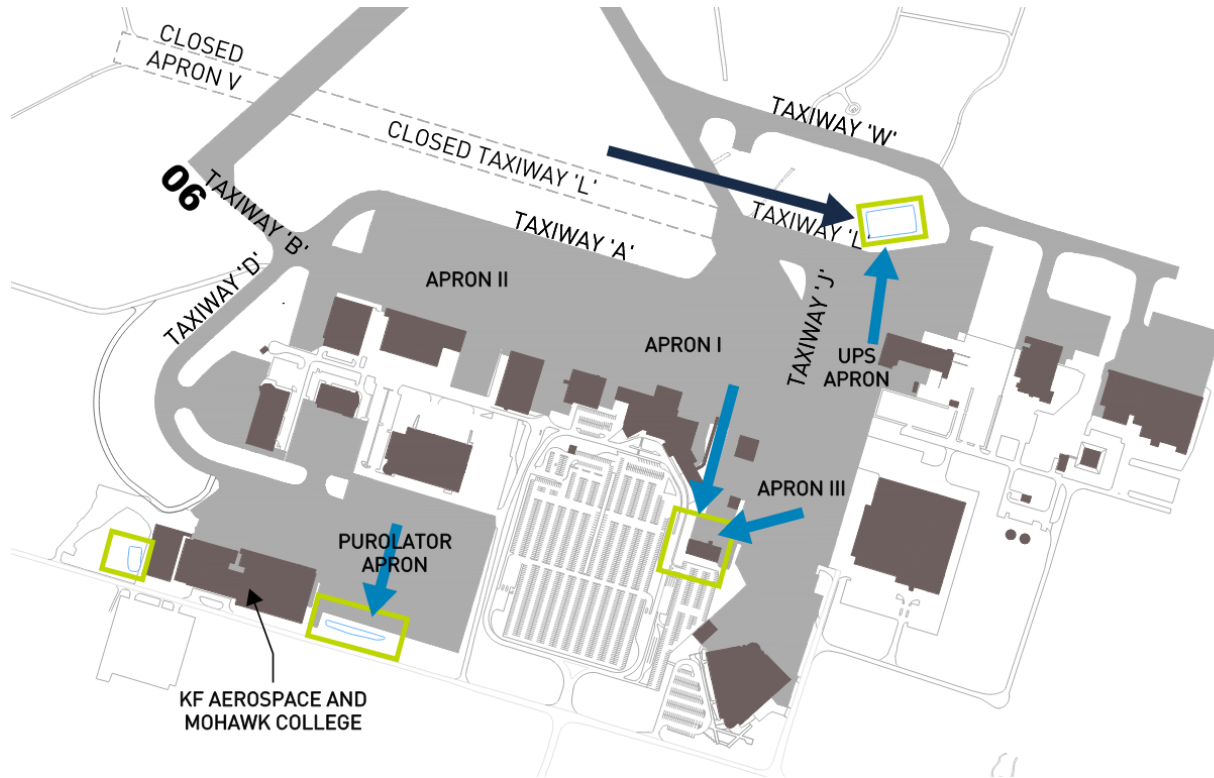


Figure 7-13 Existing and Future Deicing Facilities

NON-PASSENGER SCREENING

Transport Canada has mandated for certain airports that non-passenger screening must occur at restricted area access points and locations within the restricted area. It is anticipated that this requirement may be added to Hamilton International in the future. As such, this Master Plan has explored options for its location and identified three potential sites for a future NPS-V facility, as illustrated in Figure 7-14.

Site option A is located west of the existing terminal building, which would require demolition of Hangar 5. This option provides good landside and airside access to Hangar Road and Centre Road. However, this site may restrict the PTB from further expanding towards the west.

Site Option B is located within the existing Cargojet Ground Support Equipment (GSE) maintenance and storage area, provides access where it is already common for vehicles to make entry airside. Some landside reconfiguration and relocation of GSE maintenance and storage functions would become necessary to accommodate an NPS-V facility in this location.

Site Option C is located within a proposed hangar development area and within the existing car rental lot, provides an area that is further removed from the PTB and GSE maintenance and storage area. Accommodating an NPS-V facility in this location is anticipated to be less disruptive to terminal operations and provide greater flexibility for future terminal expansion.

In anticipation of a future requirement for NPS-V at Hamilton International by Transport Canada, it is recommended that feasibility study be completed to determine which location option or options should be preserved for an NPS-V facility in the future.

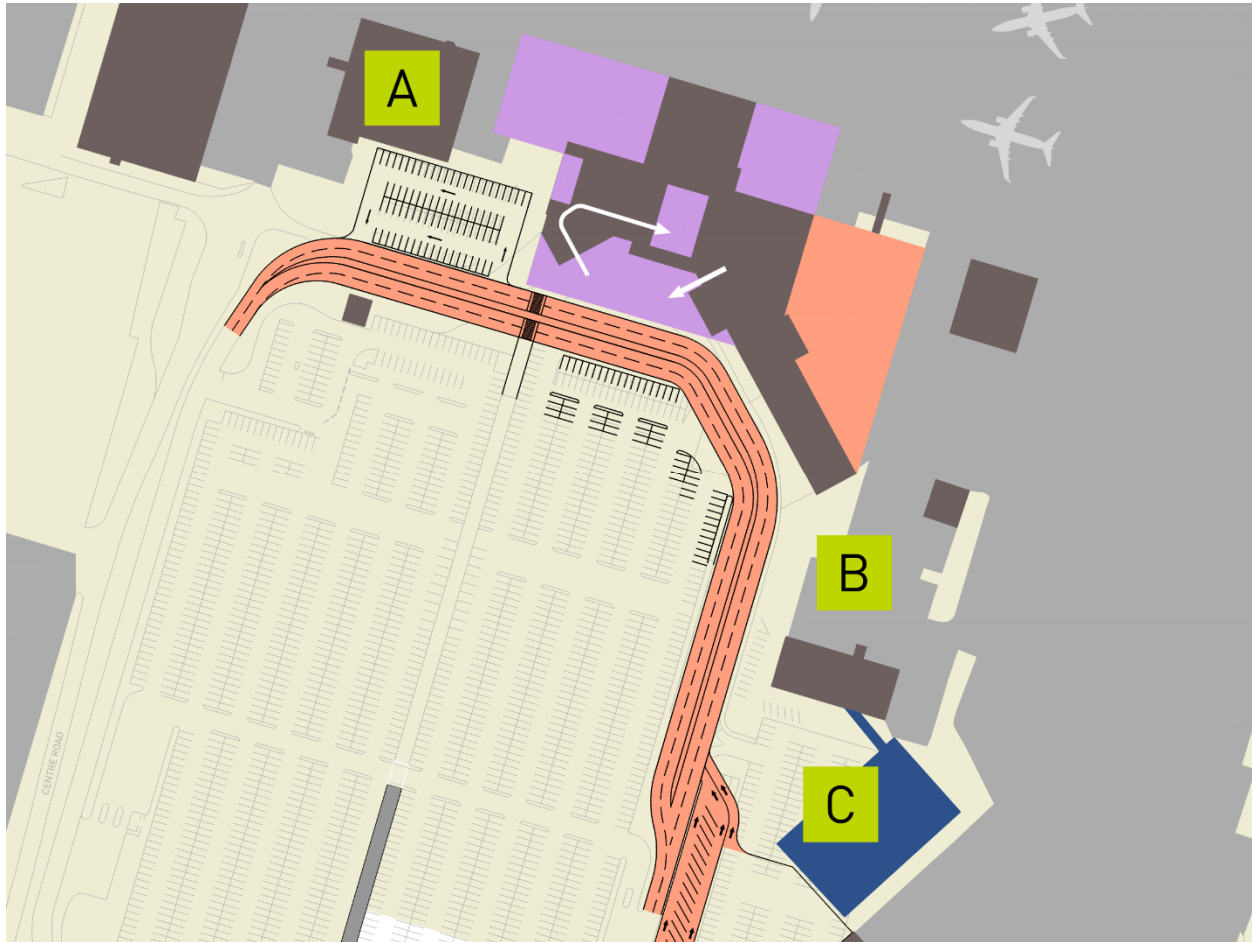


Figure 7-14 Potential NPS-V Locations

8 AIRPORT SAFEGUARDING

8.1 OVERVIEW

The Airport Safeguarding chapter of the Master Plan has been established to preserve aviation safety and use for the Hamilton International Airport. This Section includes runway end safety area, obstacle limitation surfaces, airport zoning regulations and noise management.

8.2 RUNWAY END SAFETY AREAS

A Runway End Safety Area (RESA) is a surface that is intended to reduce severity of damage to the aircraft if it undershoots or overruns the runway. Transport Canada recently amended the regulations to specify more clearly which airports are required to implement RESA. Airports that see a total of 325,000 for two consecutive years will be required to implement RESA. The Airport has already installed RESAs on Runway 12-30 and is expected to exceed the threshold in the future and will be required to implement RESAs on Runway 06-24.

The standards propose a minimum RESA length of 150 metres and the width must be double the runway width. In the case of Runway 12-30, it has an overall width of 61 metres, thus the RESA must be 122 metres wide and 150 metres long, minimum. Runway 06-24 is currently 45 metres; thus, the RESA must be 90 metres wide and 150 metres long. The RESA for Runway 06-24 will need to be widened to 120 metres should the runway widening to 60 metres occur.

Runway 12-30 is currently equipped with 122-metre by 150-metre RESA. RESAs will need to be implemented on Runway 06 and 24 based on regulations.

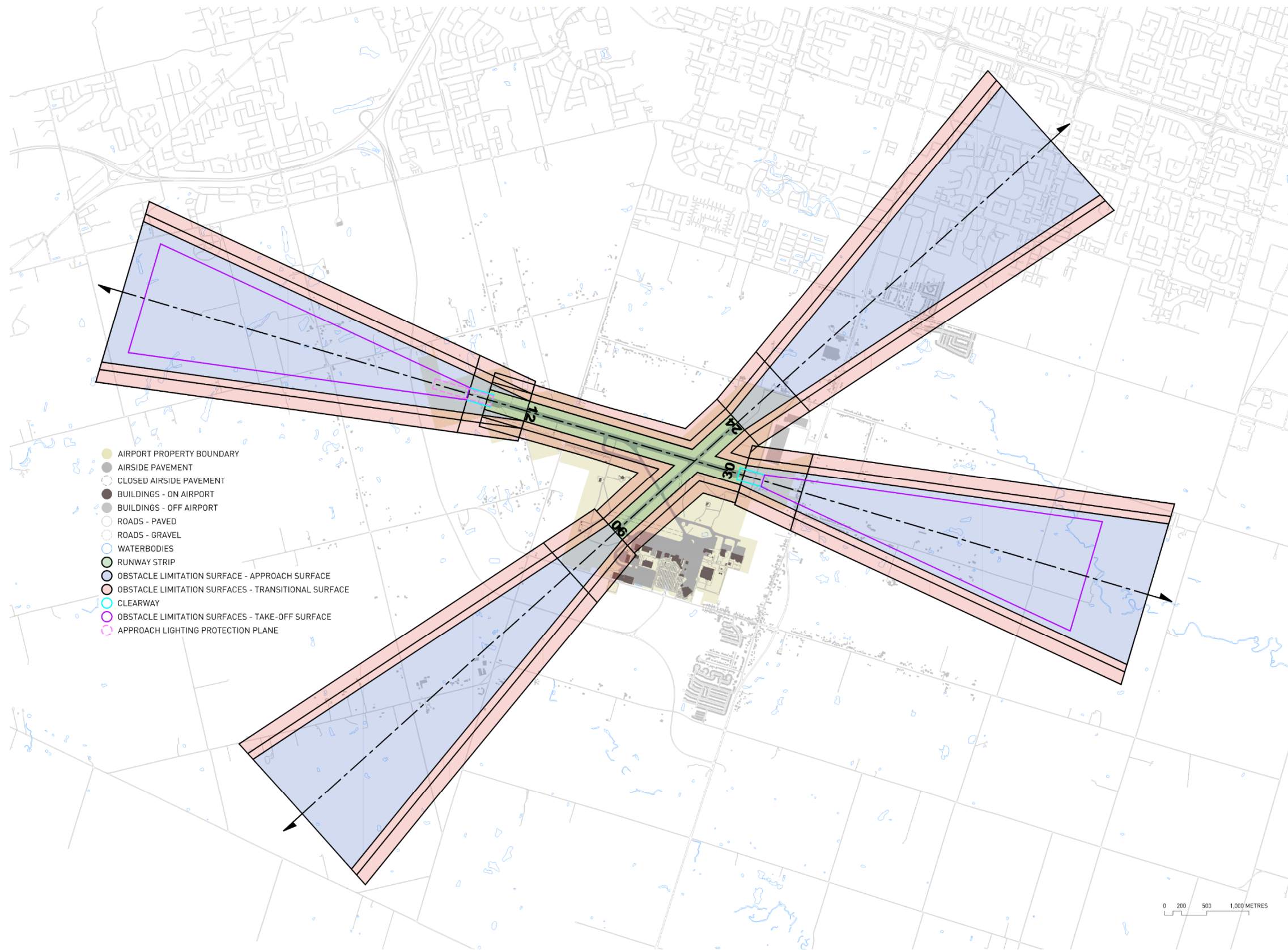
8.3 OBSTACLE LIMITATION SURFACES

Obstacle Limitation Surfaces (OLS) are imaginary surfaces surrounding a runway that must be maintained free of objects to ensure safe aircraft operations at the Airport. The OLS for both runways are certified to TP312 5th Edition Amendment 1. Refer to **Table 8-1** for the OLS characteristics for each runway.

Since the OLS is already compliant to the latest standards, the Airport will need to continue this protection and protect for the future OLS characteristics with anticipation that these runways may be upgraded to AGN VI Precision CAT II in the future.

Table 8-1 Existing Obstacle Limitation Surfaces

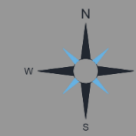
Approach Surface	12	30	06	24
Inner Edge Length (m)	244	244	244	244
Inner Edge Distance from Threshold (m)	61	61	61	61
Divergence	15%	15%	15%	15%
First Section				
Length (m)	720	720	720	720
Slope	2.0%	2.5%	2.5%	2.5%
Second Section				
Length (m)	4280	4280	4280	4280
Slope	2.9%	2.9%	2.9%	2.9%
Transitional Surface				
Slope First Section	25.0%	25.0%	25.0%	25.0%
Slope Second Section	14.3%	14.3%	14.3%	14.3%
Inner Transitional				
Distance from Centreline	61	61	61	61
Slope First Section (CAT I/II)	Vertical	Vertical	Vertical	Vertical
Slope Second Section (CAT I/II)	16.7%/20.0%	N/A	N/A	N/A
Slope Third Section (CAT II)	16.7%	N/A	N/A	N/A
Take-Off Surface				
Length	4,000	4,000	4,000	4,000
Slope	20%	20%	20%	20%
Divergence	15%	15%	15%	15%
Clearway				
Length (m)	300	300	300	300
Width (m)	75	75	75	75
Slope	1.25%	1.25%	1.25%	1.25%



- AIRPORT PROPERTY BOUNDARY
- AIRSIDE PAVEMENT
- CLOSED AIRSIDE PAVEMENT
- BUILDINGS - ON AIRPORT
- BUILDINGS - OFF AIRPORT
- ROADS - PAVED
- ROADS - GRAVEL
- WATERBODIES
- RUNWAY STRIP
- OBSTACLE LIMITATION SURFACE - APPROACH SURFACE
- OBSTACLE LIMITATION SURFACES - TRANSITIONAL SURFACE
- CLEARWAY
- OBSTACLE LIMITATION SURFACES - TAKE-OFF SURFACE
- APPROACH LIGHTING PROTECTION PLANE

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EXISTING OBSTACLE
LIMITATION SURFACE

EXHIBIT 8-1

8.4 AIRPORT ZONING REGULATIONS

The OLS that were previously described do not prevent landowners within the limits of the OLS from intruding these surfaces. Therefore, as per regulation, Hamilton International has Airport Zoning Regulations (AZR) through the federal Aeronautics Act that are intended ensure that the existing and future OLS characteristics, that may also correspond to contemplated future runway extensions, will be protected. Furthermore, the AZR also includes clauses to protect the Airport from interference with communications, natural growth and wildlife hazards.

The John C. Munro Hamilton International Airport Zoning Regulations, SOR/2017-200 was implemented and updated in 2017. SOR/2017-200 currently includes clauses regarding interference with communication, natural growth and wildlife to ensure these elements will not impact the safe aircraft operations to and from the Hamilton Airport.

The AZR characteristics are listed in **Table 8-2** illustrated in **Exhibit 8-1**.

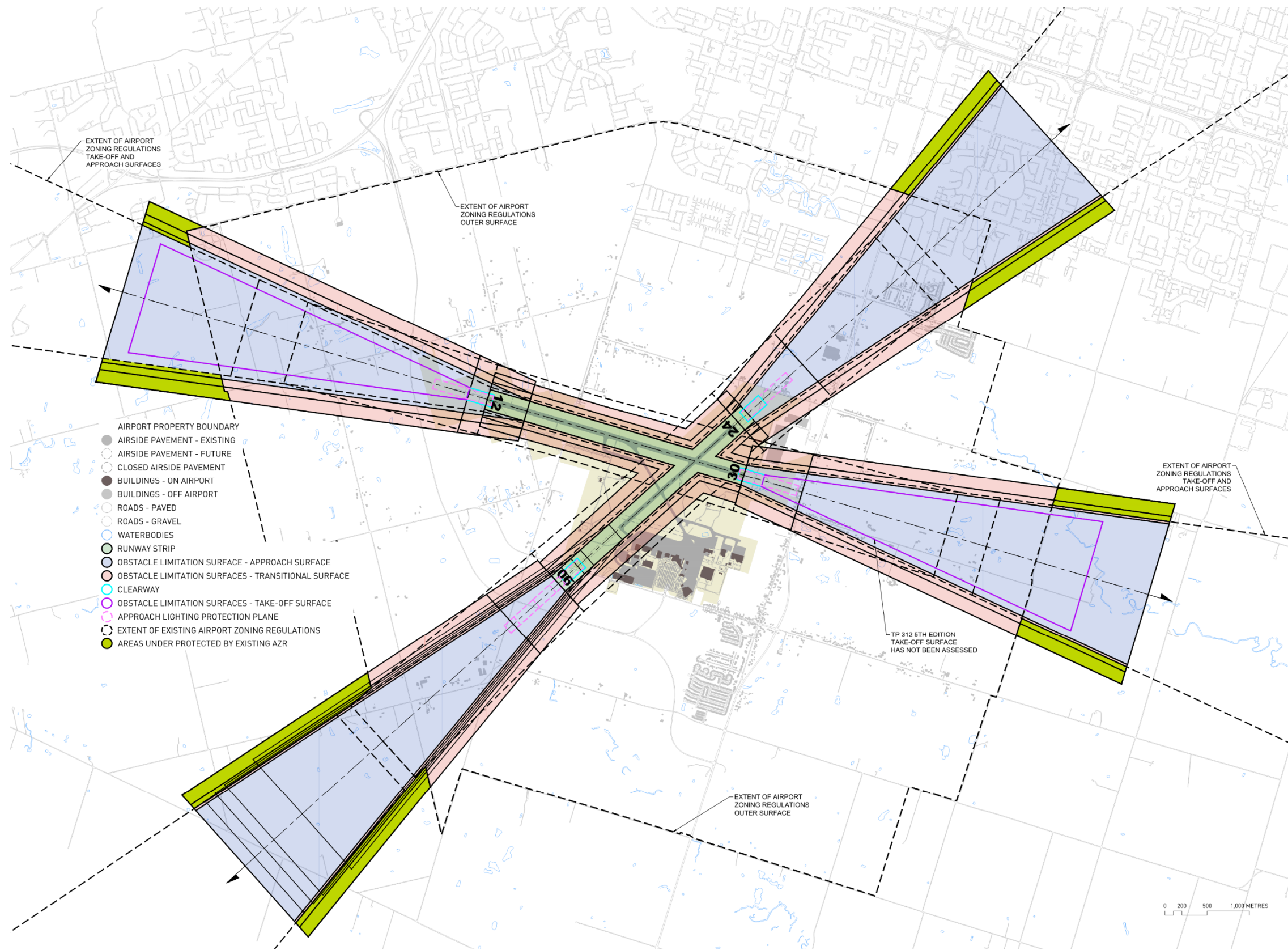
Table 8-2 Existing Airport Zoning Regulations Characteristics

Approach Surface	12	30	06	24
Inner Edge Length (m)	300	300	300	300
Inner Edge Distance from Threshold (m)	60	60	60	60
Divergence	15%	15%	15%	15%
Length (m)	15,000	15,000	15,000	15,000
Slope	1:60	1:60	1:60	1:60
Transitional Surface				
Slope	1:7	1:7	1:7	1:7

A cursory review was conducted to determine whether extent of the existing AZRs would adequately protect for the OLS required to maintain existing runway classifications and protect for future runway extensions.

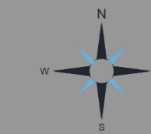
Usually, one of the reasons that AZRs is either under or over protecting the airport’s existing or future OLS is due to change in regulations. For example, the recent change in TP 312 Aerodrome Standards and Recommended Practices resulted in the transitional surface extending further on each side of an approach surface. Therefore, in Hamilton International’s case, the existing and future OLS required by TP 312 extends beyond the existing AZR protections. The areas that have been identified as under protected outside of the limits of the existing AZR, are shown in bright green within in **Exhibit 8-3**.

Based on the foregoing, it is recommended that an Airport Zoning Regulations (AZR) Assessment be completed, within the next three years, comparing the existing and future OLS requirements to the existing AZRs with the objective to confirm all areas of under protection, identify potential gaps, and to better qualify the risk of intrusion. The analysis would include a review of the existing restrictions on these land parcels to inform whether there is a need to update the AZR to address areas of heightened risk of OLS intrusion. If areas remain under protected and at unacceptable risk of intrusion to the OLS, it would be recommended that the AZRs be updated accordingly. Assessment of the AZRs to TP 312 5th Edition is expected to occur by 2025, with mitigating procedures put in place by the City to ensure developments do no penetrate the OLS until such time the AZRs are potentially adjusted.



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EXISTING AIRPORT ZONING REGULATIONS & FUTURE OBSTACLE LIMITATION SURFACES

EXHIBIT 8-2

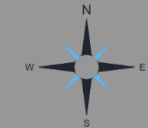
PROTECTION FROM INTERFERENCE WITH RADIO NAVIGATIONAL AIDS & ELECTRONIC COMMUNICATIONS

An important component to air navigation area the radio navigational aids, radars and telecommunication systems required. Each equipment requires certain protection to ensure no conflict with obstacles, metallic surfaces or other communication equipment. Transport Canada and the International Civil Aviation Organization defines these equipment and characteristics of the associated protection surfaces.

The existing radar, ILS, radio communications equipment and meteorological equipment associated protection areas are illustrated in **Exhibit 8-3**. The future protection areas, including the potential relocation of the radar south of the existing CSB and additional ILS equipment, are shown in **Exhibit 8-4**.



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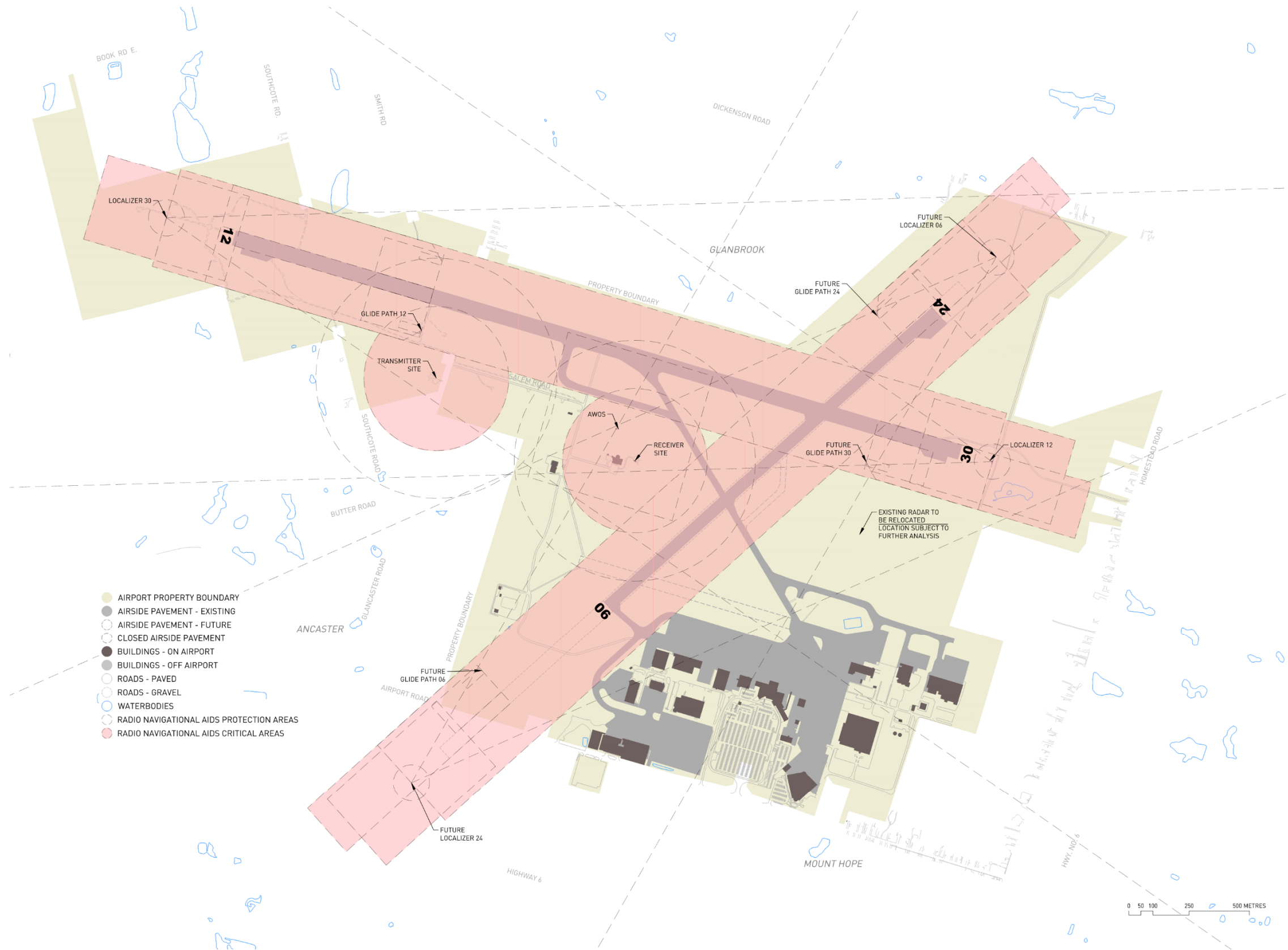

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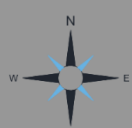
VANTAGE
 AIRPORT GROUP


EXISTING RADIO
 NAVIGATIONAL AIDS

EXHIBIT 8-3




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 AIRPORT GROUP

FUTURE RADIO
 NAVIGATIONAL AIDS

EXHIBIT 8-4

8.5 NOISE MANAGEMENT

NOISE ABATEMENT

In 2020, a Noise Exposure Forecast (NEF) study was commissioned to confirm the NEF contours adopted by the City of Hamilton adequately represents the contours based on current and future operations. The study has been summarized herein, including a brief description of noise impact, generated NEF contours, Transport Canada recommendations, summary of requirements adopted in the City of Hamilton Official Plan and recommendations for the Airport and City.

Noise Impacts

Measuring noise at an airport is not solely focused on the decibel level but also the annoyance of such noise to be inflicting on land surrounding the Airport. The annoyance levels are dependent on the frequency of the event. Transport Canada created a NEF system that generates NEF contours from noise of all aircraft types operating at a specific airport based on actual and forecasted demand. The contours take into considerations several factors, including runway orientation, flight paths, noise abatement procedures, flight time of day, and aircraft fleet mix.

The NEF system considers the additional level of annoyance of night flights, weighing nighttime operations with 12dB penalty over the similar equivalent daytime operations. Therefore, a single nighttime event will be recording 16.7 times a daytime operation. Hamilton International is a 24-hour operation and has many cargo activities in the evening, with most of these flights occurring between 2200 and 0700.

It is commonly known that aircraft engine technology includes new turbine aircraft that are substantially quieter, resulting in the public becoming more sensitive to noise.

In Canada, the only officially recognized model used for the analysis of noise impact is the Transport Canada Noise Exposure Forecast Computer Program (NEFCALC) and the latest version (2.0.6.1) was used to generate the contours presented herein.

Types of Noise Exposure Contours

There are three types of noise exposure contours that could be produced at an airport:

Noise Exposure Forecast (NEF): Contours that are generated based on the existing Airport geometric layout and aircraft movements within 5-10 years into the future.

Noise Exposure Projection (NEP): Contours generated based on proposed runway configuration (i.e.: runway extensions, new runways, etc.) and includes projection of aircraft movements 10 years into the future.

Planning Contours: Contours generated to investigate planning alternatives. In the same manner as the NEF and NEP, the Planning Contours are the property of the sponsoring aerodrome operator or airport authority.

For the purpose of the Master Plan several NEF contours that would envision a timeframe well beyond 10 years for the ultimate capacity of the two-runway system were prepared. The selected scenario, illustrated in **Exhibit 8-5**, has been generated based on the long-term extension of Runway 06-24 by up to 3,000 feet towards the southwest and 500 feet towards the northeast. The scenario has been generated on the basis of an adjusted runway distribution, one that assumes an increased usage of Runway 06-24

following its ultimate extension, and a continuation of increased use of both runways by heavier/larger aircraft, such as the Boeing 777F.

To generate these contours, a peak planning day must be determined for day and night use. The NEF contours were based on a peak planning day of 631 movements during the day and 222 movements between the hours of 2200 and 0700 local time. The recommended NEF contours were also generated based on an ultimate runway system capacity of between 200,000-287,000 annual movements.

Transport Canada Recommended Practices

Transport Canada does not support or advocate incompatible land use, especially residential housing, in areas affected by aircraft noise. Refer to **Table 8-3** for a summary of the community response predictions provided by Transport Canada.

TP1247 – Land Use in the Vicinity of Aerodromes by Transport Canada shows that residential development should not be permitted within the NEF 30 contours. It is important to note that Transport Canada also recommends that no new noise sensitive land use should be permitted within the NEF 25 contours for a new airport. Although this does not apply to Hamilton Airport, it is an important consideration in determining the contours appropriate for land use planning.

Table 8-3 Community Response Prediction (TP1247)

Response Area	Response Prediction
1 (over 40 NEF)	Repeated and vigorous individual complaints are likely. Concerted group and legal action might be expected.
2 (35-40 NEF)	Individual complaints may be vigorous. Possible group action and appeals to authorities.
3 (30-35 NEF)	Sporadic to repeated individual complaints. Group action is possible.
4 (below 30 NEF)	Sporadic complaints may occur. Noise may interfere occasionally with certain activities of the resident.
* It should be noted that the above community response predictions are generalizations based upon experience resulting from the evolutionary development of various noise exposure units used by other countries. For specific locations, the above response areas may vary somewhat in accordance with existing ambient or background noise levels and prevailing social, economic and political conditions	

Official Plan

The City of Hamilton’s, Urban Hamilton Official Plan (UHOP)⁶, has adopted NEF contours that were last updated in 2006 as part of the 2006 NEF Study. The existing NEF contours, as shown in Appendix D of the UHOP are illustrated in **Figure 8-1**. The existing Airport Influence Area as described below are illustrated in **Figure 8-2**.

⁶ <https://www.hamilton.ca/build-invest-grow/planning-development/official-plan/urban-hamilton-official-plan>

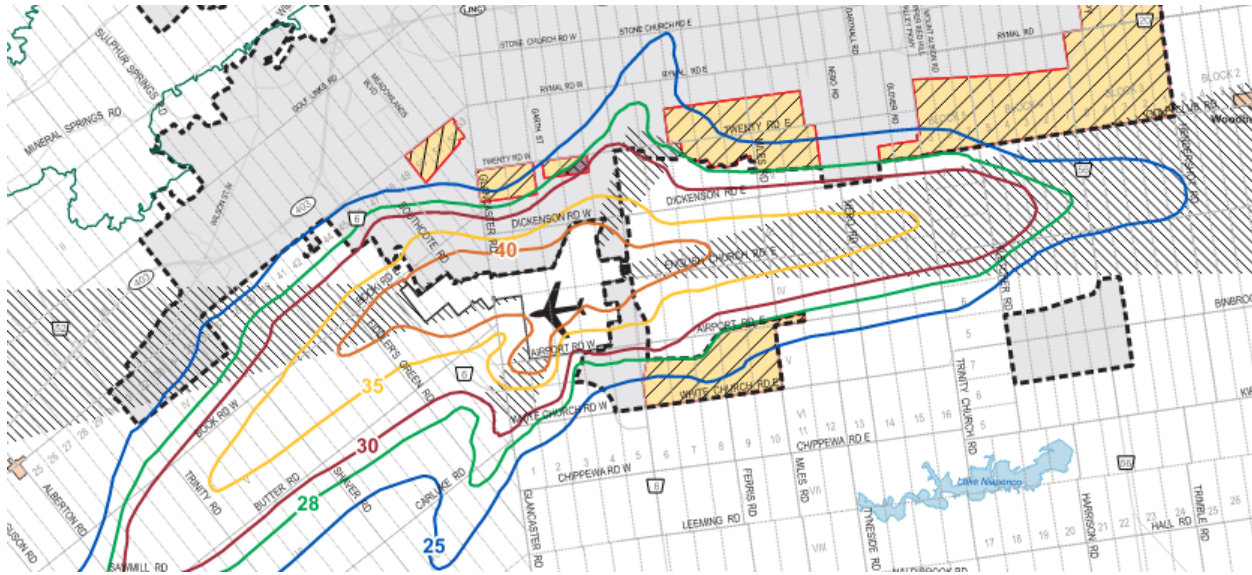


Figure 8-1 Official Plan

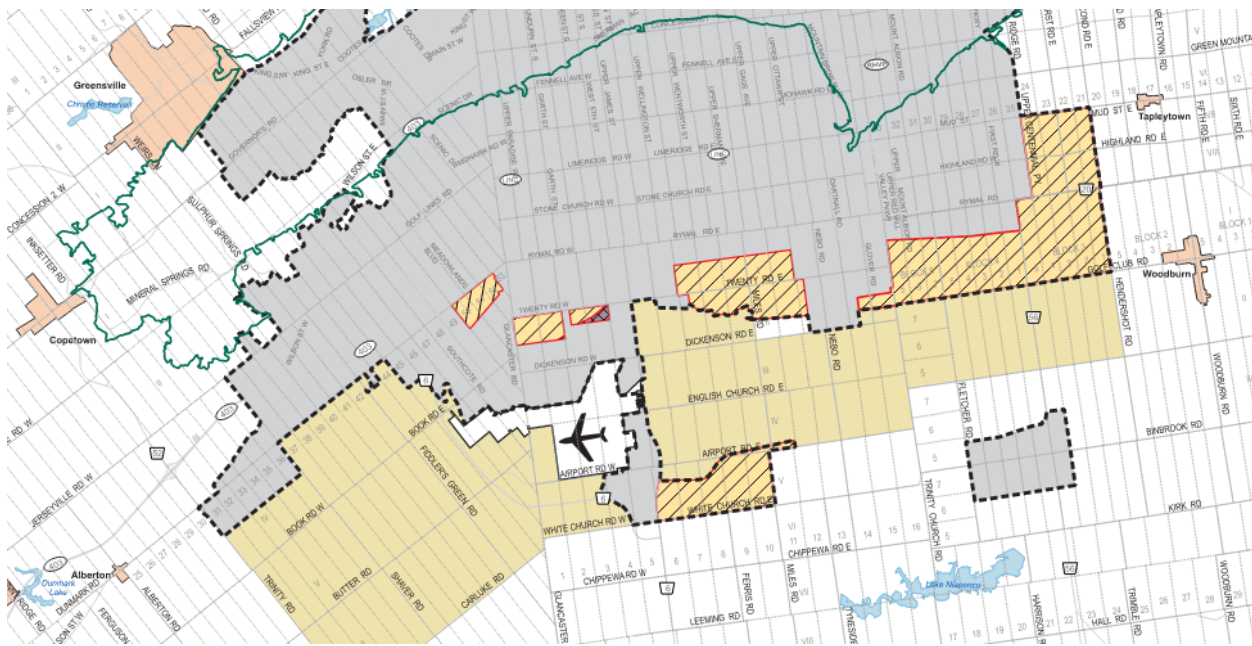


Figure 8-2 Airport Influence Area

The UHOP also states the following regarding development within the NEF contours:

All development and redevelopment shall comply with all provincial and municipal standards, criteria and guidelines regarding noise and vibration from air traffic sources, including Section B.3.6.3 – Noise, Vibration and Other Emissions.

Proposals for development of residential or other sensitive land uses shall comply with the following requirements [Table 8-4].

Table 8-4 UHOP NEF Compliance Requirements

	<i>Locational Criteria</i>	<i>Requirements</i>
1	<i>35 NEF and greater, and/or within the Airport Influence Area</i>	<ul style="list-style-type: none"> <i>a) All new development of residential and other sensitive land uses, including infill development and redevelopment, shall be prohibited.</i> <i>b) New land uses which may cause a potential aviation hazard shall be prohibited.</i>
2	<i>28 NEF and greater, but less than 35 NEF</i>	<ul style="list-style-type: none"> <i>a) All new development of residential and other sensitive land uses, including infill development and redevelopment, shall be prohibited.</i> <i>b) New land uses which may cause a potential aviation hazard shall be prohibited.</i> <i>c) All development applications approved prior to approvals of this Plan may proceed.</i>
3	<i>25 NEF and greater, but less than 28 NEF</i>	<ul style="list-style-type: none"> <i>a) All development and redevelopment proposals for residential and other sensitive land uses shall be required to submit a detailed noise study, employ noise mitigation measures, and include appropriate warning clauses in accordance with Section B.3.6.3 – Noise Vibration and Other Emissions, and Policy C.4.8.6.</i> <i>b) New land uses which may cause a potential aviation hazard shall be prohibited.</i>

Any permitted development, redevelopment, or infill development at or above 25 NEF or within the Airport Influence Area shall be required to submit a detailed noise study, implement noise mitigative measures in accordance with provincial and federal guidelines/standards or municipal approaches that achieve the same objective, and include appropriate warning clauses in lease or rental agreements, agreements of purchase and sale, and within development agreements.

NEF Recommendations

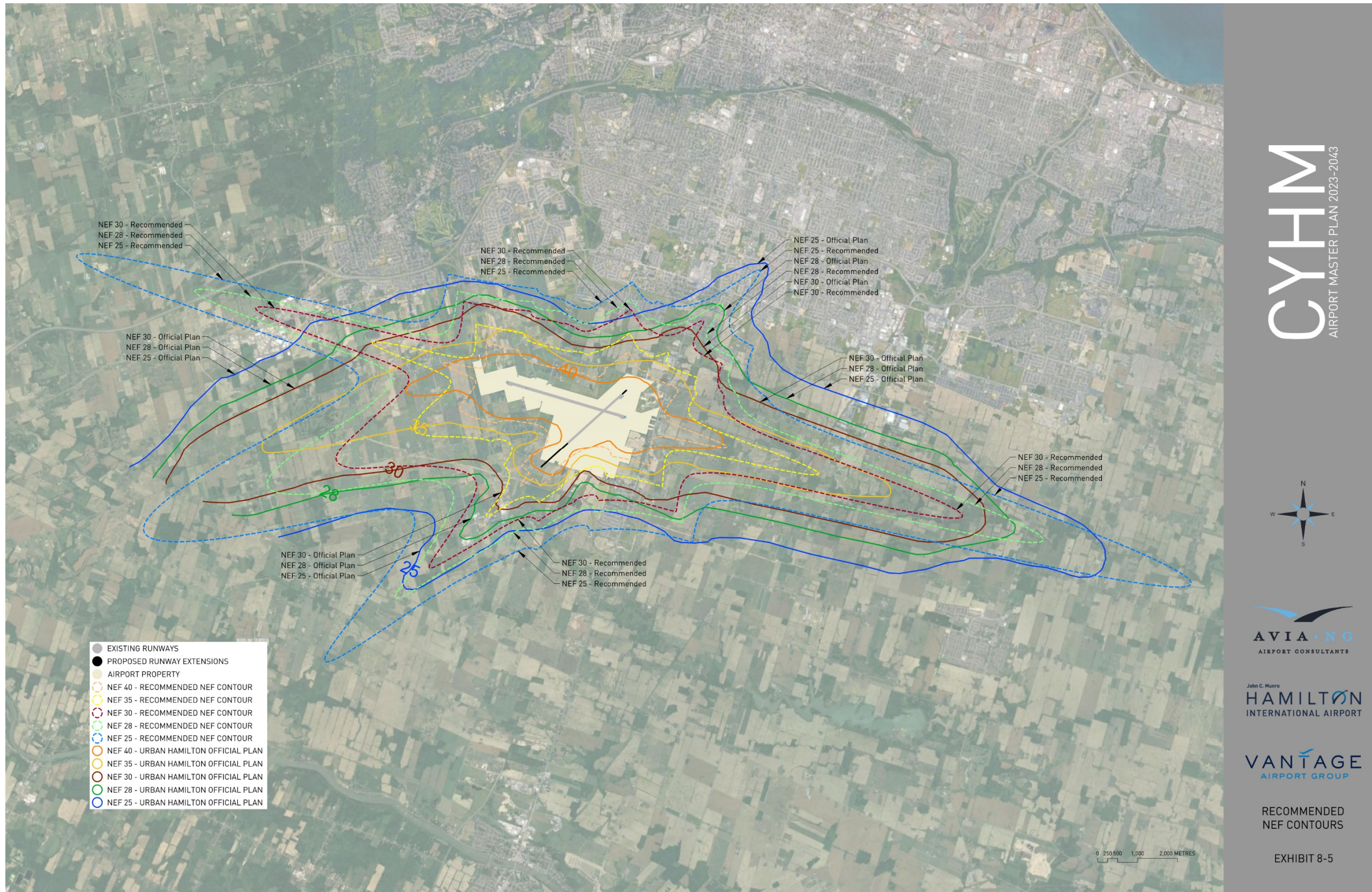
In summary, the Urban Hamilton Official Plan states that residential and other sensitive land uses are not permitted within NEF 28 contour and that any sensitive land uses, permitted to be developed between 25-28 NEF contours, will be required to implement noise mitigative measures in accordance with the Provincial and Federal guideline standards. Assessment for noise exposure is performed in accordance with Transport Canada’s standards for land use in the vicinity of airports. The NEF contours help to ensure residential development and other sensitive land uses are developed within areas outside of the NEF 28 contour.

The NEF contours prepared as part of this Master Plan differ from the contours shown in the Official Plan. Such changes are due to the potential for runway extensions associated with Runway 06-24, the update of NEF Calc software, changes in runway distribution, the establishing of a practical maximum capacity for the Airport’s runway system, and other considerations related to airport operations.

It is recommended that the City of Hamilton maintains its position in adhering to these current measures of using the NEF 28 contour to restrict residential development, as currently outlined in the Official Plan, and that the Official Plan NEF contours be updated to reflect those put forward in this Master Plan and as illustrated in **Exhibit 8-5**.

While the adoption of a new NEF 28 contour, as prepared for this Airport Master Plan update, is recommended, this is not to suggest that the existing NEF contours, as reflected in current policy and planning documentation at the City of Hamilton, be abandoned or replaced immediately with the new NEF contour. The new NEF contours reflect an evolution of the Airport over the long-term and offers compatible land use planning guidance for the City of Hamilton and regional land use planning authorities related to aircraft noise.

In this regard, the recommended NEF contours produced as part of this Airport Master Plan should be at minimum considered further in future short- to medium-term planning and policy updates by the City. To this end, it is further recommended to include the Airport as a special adviser to support the City as part of any review or implementation process related to changes to the existing NEF contours.



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RECOMMENDED
NEF CONTOURS

EXHIBIT 8-5

9 AIRPORT ENVIRONMENTAL

9.1 ENVIRONMENTAL MISSION STATEMENT

Monitoring and minimizing the environmental impact of airport operations is important to Hamilton International. The Airport's environmental mission statement is as follows:

Hamilton International Airport is committed to protecting the environment and safeguarding the health of its employees, business partners and the general public.

Specifically, Vantage Airport Group is committed to being an industry leader and change agent in delivering Environmental, Social and Governance (ESG) outcomes through an integrated business strategy. In doing so, Vantage will develop and implement industry best practices with respect to planning, measuring, achieving, and transparently reporting its ESG performance.

Vantage aims to create sustainable value for its stakeholders and to set objectives that ensure ongoing management of all aspects of ESG. This commitment is embodied in Vantage's Mission Statement:

To make airports and the communities they serve better through a focus on People, Place, and Performance.

Vantage will track its ESG performance through several indicators, based on the United Nations Sustainability Development Goals, the standards of the Global Reporting Initiative, and industry-wide guidance provided by Airports Council International. It will also use widely recognized standards such as LEED, Envision, and SITES to measure sustainability performance of specific locations and projects.

9.2 GOALS AND OBJECTIVES

The Airport's primary goal is to ensure operations occur in an environmentally responsible manner according to applicable laws and regulations, accepted management practices, and with sensitivity to community and public concerns.

The primary objectives are:

- To establish and maintain Hamilton International Airport as an environmentally responsible and sustainable facility.
- To ensure compliance of all environmental legislation and guidelines.
- To inform all airport tenants and employees of their environmental responsibilities to achieve the above objectives.
- To familiarize the public with the Airport's environmental policies.
- To ensure that all parties understand the concept of sustainable growth.

The following figure illustrates the percentage of greenhouse gas (GHG) emissions from various sources.

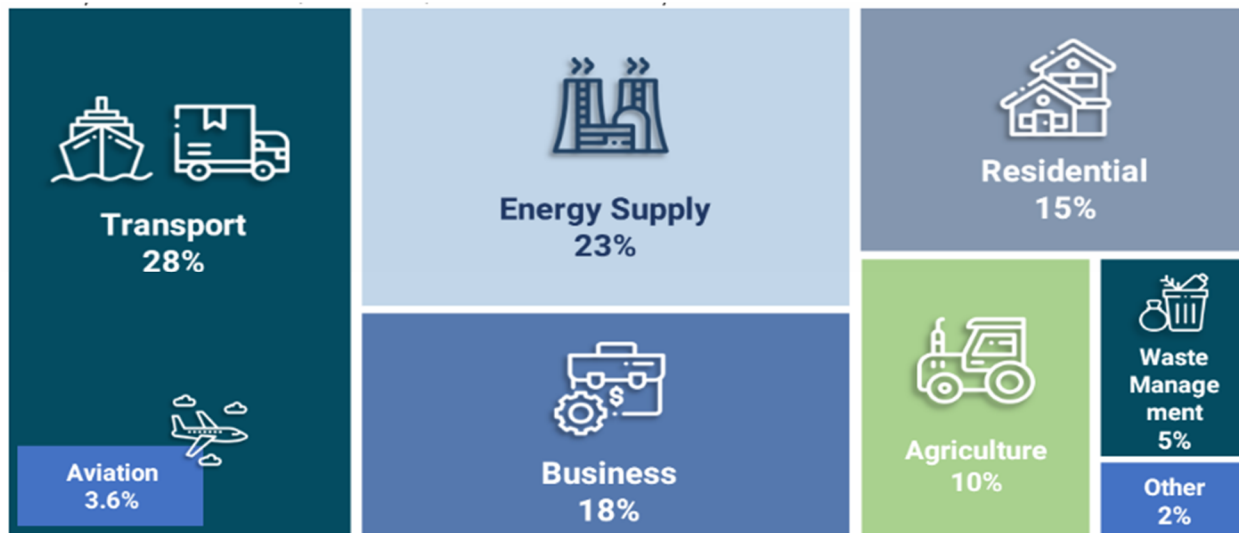


Figure 9-1 Sources of Greenhouse Gas Emissions

9.3 ENVIRONMENTAL MANAGEMENT PRACTICES AND PROCEDURES

The Airport plans, manages and implements strategies associated with ESG considerations at the Airport. In addition, the Airport’s contingency procedures ensure a response to irregular operations or an environmental emergency.

Airport environmental studies and assessment are performed on qualifying projects prior to implementation of infrastructure expansion with scenarios considered and reviewed as and when necessary per the Impact Assessment Act (IAA).

9.4 CLIMATE RESILIENCE

Hamilton International recognizes the value of environmental principles that are core to the corporate culture and incorporated into the investments, development and operations throughout TradePort’s history as investor, developer and manager of the Airport. The Airport will assess its contribution to climate change, including greenhouse gas emissions, measuring the burden on landfills and how well it reduces that burden through waste diversion and evaluating water consumption. An Airport Environmental Strategy and Climate Resiliency Plan will be completed by 2026 that will include Federal goals and targets for the aviation industry, while being mindful of the City of Hamilton objectives. The Airport will integrate principles, standards, and measures to provide enhanced climate resilience, which may include:

- Carbon footprint reduction through a combination of upgrades to facilities, adjusting equipment usage, and implementing new policies or procedures.
- Decarbonization assessment and investment grade/net-zero energy audit to help support further decarbonization project development.
- Plan to construct and maintain infrastructure in a way that is resilient to these disruptive effects of more extreme weather events. For example, the moving bed biofilm reactor that is planned to

be installed in 2024 will reduce the risk of community flooding by treating glycol residual stormwater onsite.

- Construct drainage systems and storm water ponds that can accommodate larger amounts of water.
- Reduce, where possible, non-permeable surfaces and maximize water uptake to minimize potential of flooding during periods of heavy precipitation.
- Build resilient structures immune to strong winds and storms, ranging from airfield signs to the Airport's CSB and PTB.

10 SUMMARY AND RECOMMENDATIONS

10.1 IN SUMMARY

Hamilton International is well positioned to expand its role as Canada's largest overnight express cargo airport and as a growing focus for low-cost, ultra low-cost and leisure passenger airlines. However, challenges, particularly the lack of serviced commercial land, as well as potential need to expand passenger terminal facilities and public parking may need to be addressed for the Airport to accommodate projected activity demand.

Safeguarding the Airport through amendments to the Airport Zoning Regulations and placement of appropriate Noise Exposure Forecasts is key to protecting the long-term operational and commercial viability of the Airport, and its significant role as a catalyst for regional economic development.

The Master Plan provides a 20-year vision for the Airport that will assist airport management in the implementation and phasing of infrastructure improvements with respect to several criteria, including operational necessity, financial capability and cost versus benefit.

10.2 RECOMMENDATIONS

The following are key opportunities identified in Airport Master Plan that can have an impact on future growth and which are recommended:

- ***Creation of Additional Serviced Land*** – Multiple existing tenants have communicated the need to continue to grow their respective facilities on the Airport Property. Additional serviced land is required to support the future growth of the Airport, which includes optimizing, repurposing and servicing existing Airport lands as well as incorporating existing adjacent City owned lands into the Airport boundary today. With the inclusion of City owned lands into the Airport Development Plan, as well as the optimization and repurposing of existing lands, the Airport will be enabled to maximize its full potential.
- ***Radar Needs Assessment*** – The existing radar, which is under the jurisdiction of NAV Canada, requires refurbishment or replacement through the national replacement program. An opportunity exists to potentially relocate onsite and optimize land where the radar currently resides. If the radar remains on Airport property, alternative locations will be assessed for preferred location and to reduce conflicts on other lands proposed for commercial development. The Radar Needs Assessment being performed by NAV Canada is expected to be completed in 2024 and may provide options for alternative sites and costing for potential relocation.
- ***Capacity and Infrastructure Requirements*** – Planned growth for both cargo and passenger traffic demand provides the opportunity for investments to be made in the short, medium, and long-term which is documented in the Capital Phasing Plan included in this Airport Master Plan, in order to ensure that stakeholders can continue to expand operations.
- ***Runway 06-24 Expansion*** – Runway 06-24 Expansion is not recommended in the 20-year horizon. Expansion would not add capacity, rather provide improved overall system usability/redundancy and is not required based on future traffic forecasts. It is prudent to protect for the future beyond the term of the Master Plan and land should be held for expansion at that time in the future.

- ***Airport Zoning Regulations (AZR) Assessment*** – Due to recent regulatory changes by Transport Canada, gaps in protection were expected and have been identified based on comparison to TP 321 5th Edition OLS requirements. It is recommended that a further study of risks and mitigations be performed in the next three years along with a feasibility study and cost/benefit analysis. The assessment of the AZRs to TP312 5th Edition is expected to begin in 2024, with mitigating procedures put in place by the City of Hamilton now, to ensure developments do not penetrate AZRs until such time that future growth requires adjustment of the AZRs.
- ***NEF Contour Adoption*** - While the adoption of a new NEF 28 contour as prepared for this master plan update is recommended, this is not to suggest that the existing NEF contours, as reflected in current policy and planning documentation at the City of Hamilton, be abandoned or replaced immediately with the new NEF contour. The new NEF contours reflect an evolution of the Airport over the long-term and offers compatible land use planning guidance for the City of Hamilton and regional land use planning authorities related to aircraft noise. In this regard, the recommended NEF contours produced as part of this Airport Master Plan should be at minimum considered further in future short to medium term planning and policy updates by the City. To this end, it is further recommended to include the Airport as a special adviser to support the City as part of any review or implementation process related to changes to the existing NEF contours.
- ***City of Hamilton Plans*** – The Airport Master Plan impacts other City of Hamilton plans, and as such, the following studies are recommended to be undertaken by TradePort, specific only to the impacts that the Airport has on such plans, and completed by 2026 to assist the City in its long-term planning of lands at and around the Airport:
 - ***Master Servicing Plan*** to identify the site servicing requirements for the proposed commercial development areas over the next twenty years, for commercial lands included in the current lease line, or proposed to be included in the next twenty years.
 - ***Ground Transportation Study*** to evaluate ground traffic demand that could be expected on surrounding road networks based on the forecast of aviation activity.
 - ***Stormwater Master Drainage Study*** that accounts for existing and proposed commercial developments.***Airport Environmental Strategy and Climate Resiliency Plan*** that incorporates Federal goals and targets for the aviation industry, while being mindful of City of Hamilton objectives.