Kingston Norman Rogers Airport
Kingston, Ontario

2007 Master Plan Study

Prepared By:

In Association With:

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Executive Summary

Background

In July 2006, the City retained the services of MMM Group / InterVISTAS “Project Team” to prepare a comprehensive Master Plan for the Kingston (Norman Rogers) Airport, which would act as the overall vision for the airport and the systematic, controlled development of the airport’s infrastructure to its fullest potential. This report is the culmination of an in depth analysis and a comprehensive stakeholder consultation process resulting in a series of recommendations to help guide the continued growth of this important component of the City of Kingston.

The airport was built in the early 1940’s in support of the war effort. It is bounded on the south by a combination of residential development and open space with Lake Ontario frontage, Lemoine Point Conservation Area on the west, Collins Bay Marina with dockage into Collins Bay on the north and residential development known as West Park and Auden Park on the east. Road access to the site is provided via Front Road and Bayridge Drive. The airport's location within the regional context is illustrated on Figure 2.1. Adjacent Airports located within 100 km of Kingston Airport are shown on Figure 2.2.

Situated on approximately 275 hectares, the Airport currently serves daily scheduled air service to Toronto Pearson International Airport (YYZ) operated via Air Canada Jazz / Georgian Air, fixed based and itinerant general aviation traffic, flight training operations, flying club, corporate and charter traffic and both airport related and unrelated businesses.

The Airport’s major facilities include; primary Runway 01-19 (1,524 metres x 30.5 metres, asphalt), secondary Runway 07-25 (1,199 metres x 30.5 metres, asphalt), taxiways, an asphalt surfaced aircraft apron, passenger terminal building (PTB), a Nav Canada operated Flight Service Station (FSS), aircraft hangars, public parking facilities and aviation fuel facilities. The existing airport layout and the location of its major facilities is illustrated on Figure 4.1.
Land Use Planning

The applicable Official Plan for the lands comprising Kingston (Norman Rogers) Airport is the “Official Plan of the Township of Kingston” which was passed by Township Council on March 21, 1995 and was given final approval by the Minister of Municipal Affairs on April 12, 2000.

Section 3-16 of the Official Plan deals specifically with the lands designated as “Airport”. This is the land use designation for the majority of the site. The existing Official Plan policies state that:

i) “the airport shall be used for landing and taking off of aircraft and ancillary uses necessary for the adequate and proper functioning”;

ii) “upgrades and improvements to the airport to serve the needs of the Greater Kingston area and beyond, will be permitted”;

The applicable Zoning By-Law for the lands comprising Kingston (Norman Rogers) Airport is Township of Kingston Restricted Area By-Law No. 76-26.

The airport itself has four basic zoning categories including:

- **Airport Zone (AP):** which permits; an airport, an existing racquet and fitness club and a professional office;

- **Special Airport Zone (AP-1):** which permits; a golf course, a driving range, an existing professional office and a golf clubhouse;

- **Business Park Zone (BP-H):** which permits; data processing and related services; business offices; professional offices; a hotel; laboratory, research, development facilities carried out within enclosed buildings; financial institution; public use; and, uses permitted in the AP and AP-1 Zones. This property is subject to an ‘-H’ Holding Symbol that will not be removed until such time as detailed design and landscaping guidelines have been approved by City Council for the property;

- **Residential Type 1 Zone (R1):** which permits; a single-family dwelling house, a converted dwelling house, a home occupation or a public use.

The location of these zones is shown on Figure 3.1.

The City of Kingston is currently in the process of preparing a new Zoning By-Law for the entire City of Kingston. It is anticipated that the existing Airport, Golf Course and Business Park Industrial zones and permissions will continue. The new Zoning By-Law will also be amended as necessary to incorporate the land use recommendations contained within the Airport Master Plan as adopted by City Council.

Airport zoning requirements have been established by Transport Canada, as documented in TP312E (4th Ed., March 1993), to ensure a satisfactory level of safety at an aerodrome, and are enforced pursuant to Section 4.4 and 5.4 of the Federal
Aeronautics Act (1985). The zoning requirements serve to establish a set of imaginary surfaces which extend beyond the boundary of the airport, the penetration of which represents an obstacle to air navigation. In general, airport zoning is comprised of a primary (or runway strip), takeoff/approach, transition and outer surfaces.

Currently, there is one known infringement located within the OLS; a crane located approximately 0.5 nautical miles north of the Runway 19 threshold. The crane is used regularly throughout the spring, summer and fall as part of the Collins Bay Marina operation. The Canada Flight Supplement flags this obstruction for pilots using the Runway 19 approach.

Inventory Assessment

As part of the work of this study, the Project Team conducted an indepth inventory assessment of the Airport’s facilities and services. This information was obtained through on-site investigations, interviews with airport management, tenants and users, and from a review of available documents and studies concerning the Airport.

Generally it was found that while certain infrastructure components within the airport boundary were in poor operating condition, the overall property and its facilities are considered as valuable assets to the community and worthy of continued maintenance and ongoing development.

Passenger Market Research

Passenger market research was undertaken as a component of Master Plan process. The objective of the research was to establish the true size of the Kingston (Norman Rogers) Airport (YGK) passenger market, a region which includes the City of Kingston as well as surrounding communities in eastern Ontario. The total airport market includes both passengers who are currently using Kingston (Norman Rogers) Airport, as well as those passengers who reside in or who are destined to the region but divert to other airports outside of the region. Determining the total true size of the air travel market is a key factor in assessing the viability of any potential new scheduled air services for the airport.

In addition to the existing air travel market to/from the Kingston catchment area, a considerable competing surface travel market within the region is acknowledged. VIA Rail provides regular passenger service to Montreal, Ottawa, and Toronto, along the main Ontario-Quebec corridor line which passes through Kingston. Additionally, Highway 401 is the primary artery for vehicle and inter-city bus travel. While Kingston origin/destination information for surface travel modes cannot be readily quantified, the potential to shift some ground travellers to air modes is recognized, given ideal air service levels and competitive air ticket pricing.

In total, YGK’s catchment area generated over 228,000 O/D passengers in 2005/06. The vast majority (162,110 passengers or 71%) used an airport located outside the catchment area. The remaining 29% (66,530 passengers) used Kingston (Norman Rogers) Airport. The diversion rates by sector include:
• **Domestic sector:** This sector experienced the lowest levels of leakage/diversion (52%) to airports outside the catchment area, primarily Toronto Pearson Airport (48%).

• **Transborder sector:** Travel to/from the U.S. experienced the second greatest levels of diversion (84%). Toronto Pearson Airport and Syracuse Airport are among the most commonly used alternate airports with 49% and 28% shares, respectively.

• **International sector:** Diversion for this sector is 86%, the highest of all sectors. Airport usage for international travel itineraries are divided among Kingston (Norman Rogers) Airport (14%), Toronto (62%), Montreal (14%), Ottawa (5%) and Syracuse (5%).

The airport usage analysis was based on all inbound/outbound origin/destination tickets for the YGK catchment area. Charter and other non-BSP passengers were also incorporated into the analysis to provide a more representative reflection of airport usage within the region.

**Air Services Development Opportunities**

Air Service Development was an integral part of the Kingston (Norman Rogers) Airport Master Plan process. The objective of this component of the work plan was to assess potential air routes between Kingston and points in Canada/USA/Sun destinations based on the air travel market size research and with no constraint on the type of aircraft that might be operated.

Network carriers typically serve smaller markets such as Kingston, Ontario by linking them with one or more of their major hubs with smaller-sized feeder-type aircraft, such as the 37-seat DH8 or 50-seat regional jets. For Kingston, with Air Canada Jazz service, the major international hub is Toronto Pearson International Airport (YYZ). This has proven to be the most efficient and cost-effective manner in which to connect a market like Kingston with as many other markets as possible. As air travel markets grow over time, non-stop links with additional hubs and/or new point-to-point service may be warranted.

Kingston suffers from substantial erosion of its core air travel market presently due to the existence of viable alternate airports within close driving/rail distance. These airports offer a wide array of non-stop flight options to the traveling public, from competing airlines at competitive prices. The other detriment to Kingston’s air service development is the airfield’s current lack of runway length. The existing 1,524 metre (5,000 ft) x 30 metre (100 ft) runway lacks sufficient landing and take-off length for all narrow body and many regional jet aircraft to utilize these facilities. Until the runway length is extended by a minimum additional 300 metres (1,000 ft), the airport will likely be restricted to primarily turbo-prop aircraft.

Kingston Airport (YGK) is fortunate to be linked with Air Canada’s sizeable hub at Toronto Pearson International Airport multiple times each day. This vital air link provides Kingston catchment area passengers with the ability to travel by air between Kingston and worldwide destinations through flight connections at YYZ. Over time, as the local Kingston region economy grows, the price of gasoline causes travellers to
reconsider flying instead of driving and Kingston air travel markets increase, there will no doubt be additional air services at Kingston. Non-stop air links between Kingston (YGK) and either Ottawa or Montreal have been attempted in the past, but have been discontinued for one reason or another. This does not mean that new direct air services between Kingston and other Canada/USA cities will not be introduced in the future.

It is highly appropriate and logical that Kingston (YGK) should aspire to attract a non-stop link with an additional airline hub in Canada such as Calgary or Montreal or even a focus city such as Winnipeg or Edmonton as well as one in the United States. Such a U.S. hub would further foster transborder commercial ties, and could provide an attractive competitive alternative to Air Canada’s existing Toronto service for the traveling public.

**Aviation Forecasts**

Forecasts were undertaken to gauge aviation traffic growth from 2005-2026. Aviation forecasts deal with different traffic components – including the number of passengers, aircraft movements and amount of cargo transported. Factored into the forecasts are outlooks for the regional socio-economic environment including population and economic growth, tourism developments, as well as potential market and air services expansion.

In recent years, the world airline industry has been experiencing significant changes. Even before the terrorist attacks on the U.S., the world economic slowdown had impeded air travel growth and airline profitability. The tragic events of September 11th prompted a sharp downturn in passenger traffic in many markets. However, by 2003 world airline traffic had recovered to 2000 levels, and in 2005, traffic levels were approximately 21% higher than in 2000.

As economies improve, and the fear factor subsides, the airline industry adjusts and ultimately air travel resumes and continues to grow. It is likely that for the longer-term, basic airline dynamics will prevail. The globalisation of world economies and societies will continue. There will be increased air travel for business transactions, visiting friends and relatives, as well as for leisure and educational experience only available abroad.

Passenger traffic growth at YGK will largely be driven by regional economic and population growth, influenced by market and air services development.

Low, Medium and High forecasts were generated. The Medium forecast represents the most likely scenario based on the socio-economic outlook and market development potential. The Low forecast assumes slower economic growth for the region and stagnant market growth, while the High forecast reflects a more optimistic economic outlook plus increased tourism and market development.

For the short-to-medium term, the Medium passenger forecasts indicate passenger traffic growth of 2.8% per annum, reaching 93,500 passengers by 2016. By 2026, YGK is projected to handle 116,000 passengers a year.
Given the nature of economic activity in the Kingston region and available convenient access by ground transportation (both rail and highway) to the region, the potential for air cargo growth at YGK is not expected to be significant.

Aircraft movement forecasts are based on a combination of factors, including: historical movement activity, passenger forecasts and average flight loads, air service development as well as the recovery of general aviation activity and local flight training.

In the short-to-medium term, the medium forecast projects total aircraft movements to increase on average by 3.7% per annum, reaching 44,500 operations by 2016. Aircraft movements are expected to reach 53,000 by 2026, growing on average by 2.8% per annum over the entire forecast period (2005-2026).

It is interesting to note that based on this projection, aircraft traffic volumes in twenty years are expected to be back to the level experienced at the airport in 1998.

**Facility Requirements**

To properly plan for the future of Kingston Airport, it is necessary to translate forecast aviation demand combined with the state of the existing infrastructure, into the specific improvement requirements, as well as the types and quantities of new facilities needed to adequately serve this identified demand.

The objective of this effort is to identify in general terms, the adequacy or inadequacy of existing airport facilities, outline what new facilities may be needed, suggest alternatives for meeting these needs, and establish the timing for implementation based on identifiable “trigger” points.

The ultimate development recommendations have been broken down into three timeframes:

**Short Term:** representing activities that are recommended to be undertaken immediately and up to approximately 5 years into the future.

**Mid Term:** activities that should be protected for now and could be required based on demand at any time but more likely in the 10 - 15 year time frame.

**Long Term:** activities that are considered as part of the airports overall vision and would be undertaken in the 15-20 year and beyond time horizon.

The current length of the primary runway, Runway 01-19 is considered adequate to meet the airport’s short term needs and potentially into the mid term planning horizon. However, over the mid - long term, and in conjunction with the growth of the City and its air traffic requirements, it is envisioned that there may be justification for an increase in aircraft requiring longer runway surfaces due to:

- Increased demand for business travel using faster aircraft with their attendant additional runway length requirements;
- Potential demand for scheduled air service routes using larger turboprop and / or regional jet aircraft with their corresponding longer runway requirements;
In order to allow for these potential future needs, it is recommended that the City protect Runway 01-19 for a maximum runway length of 1,829 metres (6,000 ft). It is suggested that this 305 metre (1000 ft) extension be completed in the mid term or as demand dictates, to best serve the needs of the airport’s longer term growth potential. This would necessitate extensions of varying length on both ends of this primary facility. The extension of Runway 01-19 is illustrated on Figure 8.3.

To accommodate the future Runway 01-19 extension, the existing Registered Aeronautical Zoning, implemented in 1988, will be retained in its current configuration by displacing the Runway 19 threshold. By doing so the airport will be able to offer the entire 1,829 metre (6,000 ft.) runway Take Off Run Available (TORA) without necessitating expensive and time consuming OLS zoning changes north of the airport or creating negative impacts on existing off site businesses such as the Collins Bay Marina. Figure 8.1 shows the Registered Aeronautical Zoning superimposed on the future extension of Runway 01-19.

The possibility of extending Runway 07-25 was reviewed to confirm its feasibility. It was found that there were a number of constraints that would make any significant extension of this runway difficult, if not impossible. As the maximum extension possible for this runway will not yield a much longer surface than current Runway 01-19 and the impacts of such expansion are quite significant, it is recommended that the current length of Runway 07-25 remain unchanged.

The condition of the taxiways at Kingston Airport is generally considered to be good given that they were rehabilitated between 2001 and 2003. No further taxiways are considered necessary in the short term. A new taxiway (Charlie) is however proposed for the mid to long term horizon in conjunction with the extension of Runway 01-19. It is suggested that this taxiway be connected from the apron to the threshold of extended Runway 01 and then northerly and parallel to the centreline of Runway 01-19. The proposed location and phasing of Taxiway Charlie is shown on Figures 8.3 and 8.4.

Improvements to the current aircraft apron surface in the short term are not considered warranted. In the long term, there is potential need to accommodate up to two Code C type aircraft directly in front of the passenger terminal building. To provide adequate clearance between these aircraft and apron Taxilane F, its centreline will need to be shifted north requiring a small filet to be added along the north side of the main apron and at the connection to Taxiway Alpha. The relocation of apron Taxilane F will also result in unusable apron space on the north side of the taxilane (currently used for remote aircraft parking). The layout and staging of these improvements is shown on Figure 8.7.

In order to assess the future requirements of the passenger terminal building (PTB) the traffic forecasts were reviewed in combination with the deficiencies identified. In the short term it was assumed that departing passenger loads would be limited to approximately 37 people per departure (based on a Dash 8 -100 type aircraft). As the passenger hold room currently contains 57 seats, building expansion in the short term is not deemed necessary. However a number of internal PTB enhancements are proposed to improve passenger flows, improve signage, enhance the interior aesthetic and
improve overall functionality of the space with the focus on customer service. These improvements are illustrated on Figure 8.8.

In the mid term, it is anticipated that the passenger hold room will need to support a peak hour volume equivalent to a single CRJ aircraft (CRJ 200 -50 seats or CRJ 705- 70 seats). In order to accommodate these increased passenger requirements a number of additional PTB enhancements including some minor building expansion is contemplated. These improvements are shown on Figure 8.9.

In the long term, it has been assumed that growth in scheduled air service could require the parking of up to two 70 seat aircraft (CRJ 705 type aircraft) and the need to accommodate up to 140 passengers during peak hour. In order to meet this additional demand additional building expansion at either end has been accounted for in the plan. These expansions are shown on Figure 8.10.

The area currently occupied by the former World War II hangars (Hangars 3, 4 and 5), designated as General Aviation Related Industrial/Commercial (GARIC)#1, is considered as valuable airport space given its central location relative to landside roads, airport buildings as well as airside facilities such as fuel, taxiways and runways. It is recommended that this area therefore be reserved for directly related aviation type usages requiring airside access. Such facilities include aircraft hangars, avionics facilities, fuel services, cargo facilities, time-sensitive/perishable distribution centres; aircraft manufacturing and aircraft repair/maintenance/refurbishment facilities amongst others.

The aviation community has generally agreed that the construction of several unheated T hangars would provide modern and functional hangar space for small privately owned aircraft. At Kingston inclusion of this type of inexpensive facility could spur on additional growth in this sector of the airport’s operation. T hangars have been installed at airports across the country because they allow easy access to a particular aircraft without the need to remove or relocate several other aircraft within a shared hangar space. In addition, the configuration lends itself to low cost construction materials and techniques. The installation of T hangars is proposed in the area currently occupied by Hangar 3. The redevelopment of this area is shown on Figure 8.5.

In order to provide for future uses such as aircraft maintenance, overhaul, painting and aircraft manufacturing for aircraft of varying sizes, it is recommended that Hangar 5, of which only a portion is currently occupied, be demolished in the short term and new hangar space be developed in its place. This space including Hanger 4 could be redeveloped over an extended time to accommodate new hangars, sufficiently sized and oriented to optimize their value to the airport. Redevelopment of the area currently occupied by Hangers 4 and 5 is illustrated on Figures 8.5 to 8.7.

The area located along the west side of Runway 01-19 (GARIC #2), which is surplus for airside operations in the long term, could provide additional prime land for the development of leasable building lots for aviation related industrial/commercial usage. Given its relatively close proximity to the airside manoeuvring areas, this area could provide essentially the same development opportunities as the area south of the main
apron area. This area would only be considered for general aviation related development after GARIC #1 is fully developed.

Lot sizes would be up to approximately 100 metres in depth and could be provided at virtually any width depending on individual tenant requirements. A 20 metre earth berm has been proposed between the planned north / south access road and the west property boundary of the airport adjacent to the Lemoine Point Conservation Area to help shield this development from the adjacent parklands. Figures 8.3 and 8.11 provide further detail related to the development of this area.

Access to the passenger terminal building is currently provided via Hampton Gray Gate and Len Birchall Way. It is deemed to be a rather circuitous route passing both non airport related uses and the existing well worn World War II hangars. A new direct access to the PTB is recommended in the short term in order to provide an easy straight forward and recognizable airport entrance. Initially it would connect directly into the existing roadway accessing the PTB and public parking lot.

In the mid term a traffic roundabout has been proposed to allow for free flowing traffic in and around the terminal area as well as acting as a central "Arrivals" focal point for the airport. The roundabout would include significant vegetation combined with applicable directional signage.

In order to accommodate the increased parking requirements commensurate with increased passenger demand, the existing parking lot would be expanded to the south and to the east in the mid term to provide additional parking spaces. This work cannot be completed until the Transport Canada property is acquired. As well, an overflow parking lot is proposed for construction immediately south of the Nav Canada FSS facility providing public parking for up to an additional 80 vehicles. It is anticipated that this overflow parking facility could be phased in during the mid to long term time horizons based on demand. The phasing of airport improvements related to access and parking are illustrated in Figures 8.5 to 8.7.

In order to provide adequate space for long term growth of airport facilities as well as protection of flight paths for future runway extensions, property easements or property acquisition will need to be undertaken.

Extension of Runway 01 as well as the need to upgrade the approach lights for this runway approach will require that at the very least an easement be established along the runway centreline through the properties between Front Road and Lake Ontario. Given the ability to provide improved access for control of obstacles, the eventual acquisition of these properties is recommended.

It should be noted that since the designated lands located south of Front Road are located within the extended Runway 01 approach zone, they will not be available for redevelopment. Accordingly, if acquired by the City, it is recommended that the use of these lands be offered to the Lemoine Point Conservation Area as a continuation of the current park property for their ongoing development, use and maintenance as compatible Open Space lands. Acquisition and use of these lands as interconnected open space is consistent with the City's Official Plan policies. Applicable controls will
need to be retained by the City to ensure the Obstacle Limitation Surfaces associated with the extended runway are however maintained.

To allow the approach lights for Runway 19 to be upgraded to Transport Canada standards in the future, an easement through the Collins Bay Marina will be required regardless of whether the runway is extended or not. It is recommended that any opportunities to acquire an easement in the short term should be evaluated seriously.

**Recommended Land Use Plan**

The recommended Airport Land Use Plan recognizes the current areas designated by the Official Plan and zoned by the Restricted Area By-Law No. 76-26 for existing and proposed aviation and non-aviation uses. In addition, future development areas for both aviation related and non-aviation uses are suggested. The proposed Land Use Plan divides the airport’s various compatible activities into a series of sub-areas in an effort to foster development synergies for the long term growth of the site with the goal of maximizing the economic development potential of the airport in a socially and fiscally responsible manner. It is intended that the Airport Land Use Plan, as approved by City Council, be reflected in the City’s consolidated planning documents (new Official Plan and Zoning By-Law), the preparation of which are currently underway.

The various areas and their recommended land use, as noted herein and as shown on Figure 9.1, comply with the overall Land Use designations included in the Kingston Official Plan.

In considering Non-Aviation Industrial/Commercial Area (NAICA) activities to further promote employment and economic activity at the airport, care should be taken to ensure that they do not interfere with aircraft operations, communications equipment and aids to navigation on the ground. Smoke and dust created from industrial applications can obscure visibility. Compatibility with adjacent land uses would also need careful consideration.

Three general areas are identified for Non-Aviation Industrial/Commercial development.

NAICA #1, a 33 hectare parcel of land located on the east side of the airport and fronting onto Bayridge Drive is considered as a prime development parcel. The area would ideally be associated with uses which gain a distinct advantage of being located at /or near the Airport or adjacent to specific Airport users or tenants. However any other compatible commercial / industrial use could also be implemented on these lands. Development of this area is anticipated in the long term horizon of the airport although it could be advanced at virtually any time should there be a specific demand for its use.

NAICA #2 is a 4.2 hectare parcel of land located immediately south of the PTB. This area is already designated and zoned for Business Park Development. Development of the first phase is anticipated in the short term of the Master Plan and would comprise the land bounded by Len Birchall Way, Front Road and the new Terminal Approach Road in the east. Development of the second phase is anticipated in the mid term. It would comprise the area bounded by Front Road, Len Birchall Way and Hampton Gray Gate.
Development of the 5 hectare NAICA # 3 at the northwest corner of Front Road and Bayridge Drive is anticipated for the mid to long term planning horizon. Development within this area would act as a stand alone unit without any connection to the remaining airport lands. While currently zoned for residential usage, it would be our recommendation that this development parcel be retained for non residential uses compatible with the surrounding area.

The south-eastern segment of the existing airport lands are currently being used as a golf course and associated driving range. Within the timelines of the Master Plan it is proposed that the golf course lands remain under this land use designation since significant other currently vacant lands remain on the airport site that are better situated for development purposes.

As noted previously, open space zones have been proposed around the airport site boundary to act as a natural buffer between airport and related activities and the adjacent land uses. These consist of 15 to 20 metre corridors to help shield the airport and related activity to the adjacent landowners. A portion of this buffer area could also be developed as part the Conceptual Plan for Lemoine Point Conservation Area or as a bikepath / walkway trail as suggested in the Kingston Cycling and Pathways Study (2003).

In order to ensure input is obtained prior to any of the recommended airport master plan developments proceed, the City of Kingston has also committed where appropriate, to undertake public consultations in conjunction with the site plan control process.

**Community Involvement**

The team solicited input from the community both informally and at scheduled events throughout the study duration in support of the Master Plan development.

As part of the site inventory assessment completed in the summer of 2006, the Project Team interviewed virtually all on site building owners / tenants in order to solicit their comments on the existing facilities as well as future aspirations for the airport.

Of the twenty representative community businesses contacted, nine responses were obtained. The information derived from these contacts was used to help explain the current high passenger diversion percentages as well as ascertain possible charter aircraft viability and the need for related services at the airport.

Discussions with the two major adjacent landowners including the operator of Collins Bay Marina and the Cataraqui Region Conservation Authority (regarding Lemoine Point Conservation Authority) were also held in order to ascertain input on the recommendations for future development of the airport.

Public Information Session #1 was held on November 08, 2006 to solicit input and comment from the community on their long term vision for the airport. It included both an informal opportunity for one on one discussion with members of the project team plus a formal presentation followed by questions and comments. A total of approximately
100 people attended including City of Kingston senior staff and local politicians. Of those attending 18 submitted detailed comments.

Public Information Session #2 was held on January 25, 2007 employing a similar format. At this meeting the Project Team presented their recommendations for the Airport’s Master Plan. A total of approximately 40 people attended the meeting including Kingston City senior staff and local politicians. A number of questions and comments were made at the meeting and thirteen written responses were received.

**Environmental Impacts**

Virtually all new airport developments invoke some form of impact on the adjacent lands and / or social environment. The key is to try to balance the specific negative impacts associated with such development with the positive long term benefits of the plan on the overall community.

Noise Exposure Forecast (NEF) Contour Plans were developed for the Kingston (Norman Rogers) Airport – 2007 Master Plan Study. These NEF Contour Plans have been prepared for:

- the existing conditions (2005 peak planning day);
- 2026 conditions (using projected annual growth of the existing base of traffic) with no changes to existing runway length; and,
- 2026 worse case scenario assuming primary Runway 01-19 was extended to 1,829 metres (6,000 ft.) and some increased jet activity was included.

An increase in noise levels from those experienced currently is anticipated as the airport traffic continues to grow over the next 20 years. However even with the introduction of some jet aircraft activity on an extended runway of 1,829 metres (6,000 ft.), noise level impacts on the adjacent properties will continue to be within the Transport Canada guidelines. The noise impacts associated with each of these scenarios are shown on Figure 11.1.

**Implementation**

The total Short Term improvement costs have been developed based on current Kingston 2007 unit prices and include both engineering and contingency allowances. The costs quoted do not take into consideration the possibility of third party cost sharing options or any property acquisition or easement costs. The overall costs for the short term improvements are estimated to be $12.5M. It should be noted that approximately $9M could be allocated as third party development costs and $1.9M for possible ACAP funding of the runway 01-19 rehabilitation.

The total Mid and Long Term costs are based on the same premise as those used for the short term and are estimated to be $28.6M and $25.1M respectively. Of these costs approximately $20.0M could be considered in both cases as potential third party costs.
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Section 1.0 Introduction

1.1 BACKGROUND

In July 2006, the City retained the services of MMM Group / InterVISTAS “Project Team” to prepare a comprehensive Airport Master Plan which would act as the overall vision for the airport and the systematic, controlled development of the airport infrastructure to its fullest potential. This report is the culmination of an in depth analysis and a comprehensive stakeholder consultation process resulting in a series of recommendations to help guide the continued growth of this important component of the City of Kingston.

The Kingston (Norman Rogers) Airport (YGK) has been owned, maintained and operated by the City of Kingston since 1974. Categorized as a local/regional public aerodrome\(^1\) certified by Transport Canada, the Airport is conveniently situated in the south east sector of the City of Kingston urban boundary, referred to Lakside district.

The airport was built in the early 1940’s in support of the war effort. It is bounded on the south by a combination of residential development and open space with Lake Ontario frontage, Lemoine Point Conservation Area on the west, Collins Bay Marina with dockage into Collins Bay on the north and residential development known as West Park and Auden Park on the east. Road access to the site is provided via Front Road and Bayridge Drive.

Situated on approximately 275 hectares, the Airport currently serves daily scheduled air service to Toronto Pearson International Airport (YYZ) operated via Air Canada Jazz /

\(^1\) Refer to Appendix A – Glossary.
Georgian Air, fixed based and itinerant general aviation traffic, flight training operations, flying club, corporate and charter traffic and both airport related and unrelated businesses.

The Airport’s major facilities include; primary Runway 01-19 (1,524 metres x 30.5 metres, asphalt), secondary Runway 07-25 (1,199 metres x 30.5 metres, asphalt), taxiways, an asphalt surfaced aircraft apron, passenger terminal building (PTB), a Nav Canada operated Flight Service Station (FSS), aircraft hangars, public parking facilities and aviation fuel facilities.

The Airport includes its own small management and operating team directed by the Airport Manager (APM). The APM reports to the Director of Transportation, Public Works Department within the City. Additional support services specifically related to marketing and property lease negotiation are provided by other departments within the City.

Based on an Economic Impact Study completed in 2005 and updated in August 2006, the airport currently generates employment for more than 150 people and contributes approximately $39M in annual revenue into the local economy.

1.2 AIRPORT VISION AND MISSION STATEMENTS

The Airport’s long term vision is to provide the residents and businesses of the City of Kingston and the surrounding communities, with access to convenient and cost-effective air transportation services, in a socially and fiscally responsible manner while being progressive in its efforts to promote, develop and upgrade the Airport’s lands and facilities.

The Airport’s Mission statement reads:

“To operate, maintain and promote the Kingston Airport in a safe and efficient manner for the benefit of the regional travelling public and business communities”

1.3 STUDY GOALS AND OBJECTIVES

The primary goal of this study report is to provide the City with a comprehensive Master Plan which will serve as a framework for future development of the Airport’s lands and facilities necessary to satisfy aviation demands in a financially responsible manner while respecting socioeconomic and environmental concerns. The Master Plan is intended to make recommendations within a short, mid and long term (20 Year) horizon and complement and support local/regional initiatives and development.

The primary objectives of the Master Plan study report, consistent with the City’s Terms of Reference for the assignment, are as follows.

- Complete a background market research assessment to better quantify the extent of traffic diversion via other transportation modes and prepare an Air Services
Development Opportunities analysis to help the Airport to pursue new and / or expanded scheduled and charter operations.

- Conduct an inventory assessment of existing facilities, services, tenants and operational practices.
- Carry out a consultation process with community and business leaders, and Airport users and tenants that will be the foundation for the development of many other aspects of the plan.
- Review historical Airport activity levels and prepare forecasts for Airport demand, demographics and market trends.
- Identify and prioritize short-term requirements to meet current deficiencies.
- Determine future facility and service requirements to meet future demand.
- Identify and assess alternatives to addressing future facility deficiencies.
- Develop a land use plan and modify the current aeronautical and land use zoning controls for the Airport (if needed) which foster development opportunities while protecting the existing and future on-airport operations and surrounding land uses. This includes an analysis of the Airport’s land base to determine what if any future property acquisition should be considered to protect for future airport development.
- Create an ultimate development plan which optimizes the potential use of the lands without impacting aircraft operations and promotes new tenants/users in order to enhance Airport revenues.
- Prepare a final report listing the strategic action items and associated capital costs to continue to grow the airport within the community.

1.4 CONSULTATIONS AND INPUT

The Airport is a key and vital asset of the community. As such, its future is dependent on the community utilizing the facility and participating in its growth. Therefore, any future direction the City takes, with respect to the Airport, should reflect their input.

The Project Team was assisted and directed by the Airport Committee which was comprised of the following representatives.

- Mr. M. Segsworth - Commissioner of Public Works and Emergency Services
- Mr. D. Leger – Commissioner of Corporate Services
- Mr. M. Morris - Director Transportation
- Mr. G. Wallace – Director Community Development Services
- Mr. J. Garrah – Kingston Economic Development Corporation
As part of the overall assessment, the Project Team conducted numerous interviews with interested stakeholders, held two Public Information Sessions at critical junctures of the work to solicit input / comment on the planned initiatives and vetted all project recommendations through the Airport Committee.

The results of the consultation process are highlighted in Sections 5.0 and 10.0 of this report and the input obtained has been reflected in the final recommendations provided herein.
Section 2.0
Physical & Social Environment

2.1 AIRPORT SETTING

The Kingston (Norman Rogers) Airport is located within the City of Kingston, approximately 8 kilometres west of the downtown core. The Airport site is comprised of a total area of about 275 hectares (679.6 acres). Its location within the regional context is illustrated on Figure 2.1.

The Airport’s reference point, as listed in the current edition of Canada Air Pilot\(^1\), is North 44° 13’ 31”, West 76° 35’ 49” at an elevation of 92.99 metres (305 feet) ASL. The magnetic declination at the airport is 13° west.

2.2 AIRPORT HISTORY

The Airport was originally constructed in the 1940’s as a military flight training facility in support of the WW II effort. It consisted of three pair of parallel runways forming a triangular pattern along with associated taxiways, an aircraft apron and three large hangars.

In 1974 the City of Kingston purchased the airport from Transport Canada and has managed its operation ever since.

\(^1\) Canada Air Pilot – Instrument Procedures (Ontario, CAP4), Natural Resources Canada, 2006.
2.3 AIRPORT ROLE

The Airport is a Transport Canada certified public aerodrome and is generally classified as a General Transport Airport intended for day and night operations.

It includes a Nav Canada managed Flight Service Station (FSS) which provides low level (under 3,000 feet) advisory services to pilots within five miles of the airport. It operates between the hours of 06:15 and 23:00 hours.

The Airport provides both regular scheduled air services between Kingston and Toronto Pearson via Air Canada Jazz / Georgian Air, as well as serving the general aviation needs of the City of Kingston and surrounding communities. It also supports corporate and government aircraft activity including charters, Ontario Ministry of Health and Long-Term Care air ambulance transport services.

2.4 OTHER AIRPORTS

Table 2-1 lists the various airports located within a 100 kilometre distance from YGK. It summarizes each facility’s classification, point-to-point air distance to Kingston, and longest usable runway.

The locations of most of the listed airports are depicted on Figure 2.2.

<table>
<thead>
<tr>
<th>Airport Name</th>
<th>Classification</th>
<th>Air Distance To Kingston Airport</th>
<th>Longest Runway Dimensions (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trenton</td>
<td>Military</td>
<td>78 km (48 miles)</td>
<td>10,000 x 200 (Asphalt)</td>
</tr>
<tr>
<td>Bellville</td>
<td>Public Use, General Aviation</td>
<td>60 km (37 miles)</td>
<td>3,350 x 200 (Turf/Gravel)</td>
</tr>
<tr>
<td>Stirling</td>
<td>Public Use, General Aviation</td>
<td>74 km (46 miles)</td>
<td>2,350 x 150 (Turf)</td>
</tr>
<tr>
<td>Roslin</td>
<td>Private</td>
<td>60 km (37 miles)</td>
<td>1,800 (Turf)</td>
</tr>
<tr>
<td>Fernleigh</td>
<td>Private</td>
<td>80 km (50 miles)</td>
<td>2,489 (Turf)</td>
</tr>
<tr>
<td>Kennebec Lake</td>
<td>Private</td>
<td>64 km (40 miles)</td>
<td>1,500 (Gravel)</td>
</tr>
</tbody>
</table>
2.5 ONTARIO AIRPORTS WITH SCHEDULED SERVICE

Of a total of eighty five Transport Canada certified airports in Ontario, 14 (including Kingston) currently have regularly scheduled passenger service. They are summarized on Table 2-2.

<table>
<thead>
<tr>
<th>Airport Name</th>
<th>Classification</th>
<th>Air Distance To Kingston Airport</th>
<th>Longest Runway Dimensions (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ottawa</td>
<td>Class 1</td>
<td>140 km (87miles)</td>
<td>10,000 x 200 (Asphalt)</td>
</tr>
<tr>
<td>Toronto Pearson</td>
<td>Class 1</td>
<td>250 km (155 miles)</td>
<td>11,120 x 200 (Asphalt)</td>
</tr>
<tr>
<td>Toronto City Centre</td>
<td>Class 2</td>
<td>230 km (143 miles)</td>
<td>4,000 x 150 (Asphalt)</td>
</tr>
<tr>
<td>London</td>
<td>Class 2</td>
<td>400 km (248 miles)</td>
<td>8,800 x 200 (Asphalt)</td>
</tr>
<tr>
<td>Thunder Bay</td>
<td>Class 2</td>
<td>900 km (558 miles)</td>
<td>6,200 x 200 (Asphalt)</td>
</tr>
<tr>
<td>Windsor</td>
<td>Class 2</td>
<td>570 km (353 miles)</td>
<td>9,000 x 200 (Asphalt)</td>
</tr>
<tr>
<td>Sudbury</td>
<td>Class 2</td>
<td>420 km (260 miles)</td>
<td>6,600 x 200 (Asphalt)</td>
</tr>
<tr>
<td>North Bay</td>
<td>Class Other</td>
<td>320 km (198 miles)</td>
<td>10,000 x 200 (Asphalt)</td>
</tr>
<tr>
<td>Sarnia</td>
<td>Class Other</td>
<td>480 km (298 miles)</td>
<td>5,100 x 100 (Asphalt)</td>
</tr>
</tbody>
</table>
In terms of annual passenger throughput in 2005, Kingston was ranked 12th of 14 airports, ahead of Sarnia and Kitchener Waterloo.

2.6 AIRPORT MASTER PLAN 1997

The Airport’s most recent Master Plan was prepared in 1997 by AirPlan Technical Services Inc. Within the report it suggests that there was no requirement to expand the airport site to meet the future needs of the airport at that time.

The report did however propose that the following improvements be implemented:

- The airside operating area can be retained without change from its existing configuration and layout except the existing unused taxiway pavements should be removed to avoid confusion for itinerant pilots.

- The runways should remain at their current lengths with some upgrading of approach lighting suggested.

- The public apron should be widened to accommodate increased parking area for Code B and C aircraft.

- Development of airside lease lots to the east of the existing hangars should be implemented on an as required basis.

- Protect for future light industrial development, the “Northeast Commercial Area” located immediately adjacent to the existing West Park subdivision (+/- 33 ha.)

- The “West Commercial Area Reserve” (+/- 12 ha.) positioned immediately east of the west airport boundary be designated for future general aviation hangars T-hangars and tie downs.

- The “Landside Commercial Development”, a 7.4 ha. parcel of land located between Front Road and the existing airport buildings be developed for landside lease lots and / or recreational uses including soccer fields and baseball diamonds etc.
The recommendations from this Master Plan were never adopted by the City of Kingston.

2.7 TOPOGRAPHY AND DRAINAGE

The Kingston Airport is located on the Napanee Plain Physiographic Region that consists of a flat to undulating plain of limestone. Glacial activity has stripped most of the overburden and as a result, soils are only a few centimetres deep over much of the region with some deeper glacial tills occurring in the stream valleys toward the north (Chapman and Putnam, 1973).

From a topographic perspective, the Airport occupies a small triangular shaped plateau on the point formed by the shorelines of Collins Bay and Lake Ontario. For comparison, Lake Ontario lies at a mean elevation of 75.0 metres and topography rises steeply to the height of land on the airport plateau at approximate elevation 90.0 metres.

Runways generally sit between elevations 91.0 and 93.0 metres. Individual runways are served with drainage swales conveying local runoff northerly and southerly from the high point in the centre of Runway 01-19 and, easterly from Runway 07-25. Runoff then follows natural contours which drain radially from the runways. To the west of the Airport, three equally spaced creek systems convey drainage westerly to Collins Bay with one creek and gully system extending significantly onto Airport lands to the north of Runway 01-19.

There are no defined watercourses to the south of the Airport where sheet drainage to Lake Ontario is predominant. The easterly side of the Airport triangle is drained in that direction by sheet runoff and one small creek toward urbanized neighbouring lands.

2.8 METEOROLOGY

Kingston’s climate can be characterized as a cold continental climate.

According to Environment Canada data acquired between 1971-2000 for the site, the mean daily maximum during July (the hottest month) is plus 24.8°C and minimum during January (the coldest month) is minus 12.2°C. The mean annual total precipitation is 96.8 cm with a marginally higher proportion falling as rain during the spring and falls months.

2.9 VEGETATION

The description of vegetation was completed based on a review of background information including; Kingston Norman Airport: Airport Master Plan prepared by AirPlan Aviation Technical Services Inc., 1997; Central Cataraqui Region Natural Heritage Study June 2006; Conceptual Plan for Lemoine Point Conservation Area November 1999; City of Kingston: City Facts, City of Kingston, November 2000; Official Plan for the Kingston Planning Area, City of Kingston, January 2006; a review of aerial photography plus discussions with Cataraqui Region Conservation Authority (CRCA) staff.
As a result of the disturbed nature of the property, the majority of vegetation within boundaries of the Airport consists of herb and grass species typical of old field meadow habitats. Herb and grass species typical of the area include Queen Anne’s lace (*Daucus carota*), smooth brome grass (*Bromus inermis ssp. inermis*), orchard grass (*Dactylis glomerata*), timothy (*Phleum pratense*), common burdock (*Arctium minus ssp. minus*), tall goldenrod (*Solidago altissima var. altissima*), common milkweed (*Asclepias syriaca*) and yarrow (*Achillea* sp.). Various ornamental and native trees and shrubs are planted around airport buildings, roadways and infrastructure for landscaping purposes.

Two areas of natural vegetation occur within and adjacent to the study area:

i) Vegetation from the Lemoine Point Conservation Area extends over the western property limit and across the northern tip of airport lands.

ii) Along the north central property limits between Runways 01-19 and 07-25.

Vegetation in both areas generally consists of regenerating deciduous trees, shrubs and old field meadow vegetation.

**Lemoine Point Conservation Area**

The Lemoine Point Conservation Area is a 136 hectare public waterfront park adjacent to the western boundary of the property. The park is managed by the CRCA and is designated as Major Open Recreational Space in the Township of Kingston Official Plan. The park is managed as a natural environment site with limited facilities for group camping, picnicking and sports. A protected beach was created for the enjoyment of park visitors. Nature trails throughout the park are used by hikers, runners, cyclists and skiers with an estimated total of 100,000 visitors per year (Airport Master Plan, 1997).

Four primary ecological communities exist on the site; forest, old field meadows, wetlands and other. The wetlands have been degraded by fragmentation and invasion of non-native species (CRCA, 1999).

**Forest Habitats**

Forest size within the Lemoine Point property is approximately 72 hectares and is located primarily along the 2,500 metre shoreline boundary of the park. The majority of forest is a mature, mixed hardwood community with dominant tree species that include oak (*Quercus sp.*), beech (*Fagus grandifolia*), maple (*Acer sp.*) and white pine (*Pinus strobus*). Ground cover and shrub vegetation is sparse as a result of historic cattle grazing within the forest. There are also two conifer plantations of 10.2 hectares and 3.6 hectares located within the park boundary. Forest grows adjacent to the Lake Ontario shoreline for most of 2,500m (Airport Master Plan, 1997; CRCA, 1999).

The shoreline forest within the Conservation Area is considered significant as shoreline forest is rare in the Kingston bioregion where existing forest occupies less than 5% of the shoreline. As one of the few remaining forested areas along the north shore of Lake Ontario, the forest likely plays a significant role in providing stopover habitat for migrant birds and also supports a diverse population of game, small mammals and resident
birds. Along the Lake Ontario shoreline, woodlands as small as 2 hectares can be considered significant resources worthy of protection, therefore the Lemoine Point forest is significant due to its size. Forest in this location may also function as a natural corridor along the Lake Ontario shoreline and contribute to the aesthetic appeal of the Conservation Area’s entrance and Collins Bay (Airport Master Plan, 1997; CRCA, 1999).

The conservation Area’s trail system consists of both planned formal trails and random trials created through repeated human usage. This has resulted in fragmentation of the forest to the degree that forest interior habitat does not exist. Forest interior habitat is necessary for some bird species to have self-sustaining populations. Fragmentation leads to reduced reproduction in these species owing to increased predation by bird and wildlife species that frequent forest edges. Increased brood parasitism by the brown-headed cowbird (*Molothrus ater*) may also occur. Non-native vegetation species such as garlic mustard (*Alliaria petiolata*) are invading the forest and outcompeting native species. Tree harvesting and planting of non-native species has also been recorded. Prior cattle grazing has reduced ground cover, shrub density and diversity in the subject area. (CRCA, 1999; Freemark and Collins, 1989).

**Old Field Meadows**

Vegetation within old field meadows is not described in the Lemoine Point Conceptual Plan (CRCA, 1999). Generally, vegetation found within old field meadows is dominated by herb and grass species typical of the area including Queen Anne’s lace (*Daucus carota*), smooth brome grass (*Bromus inermis ssp. inermis*), orchard grass (*Dactylis glomerata*), timothy (*Phleum pratense*), common burdock (*Arctium minus ssp. minus*), tall goldenrod (*Solidago altissima var. altissima*), common milkweed (*Asclepias syriaca*) and yarrow (*Achillea sp*). Habitat quality in these vegetation communities has been reduced through vegetation mowing (CRCA, 1999).

**Wetlands**

Although aerial photography indicates that two wetland areas exist within the Lemoine Point property, vegetation within wetlands is not described in the Lemoine Point Conceptual Plan (CRCA, 1999). Habitat quality in the northern wetland has been reduced by insufficient water circulation and the southern wetland was reduced in size from fill placed to create a public beach.

**Other**

Sand and stone beaches and, limestone bluffs also occur within the conservation area (CRCA, 1999).

**2.10 TERRESTRIAL HABitat**

The habitats within and surrounding the airport likely support a variety of wildlife species typical of the region including raccoon (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), red fox (*Vulpes vulpes*) and white-tailed deer (*Odocoileus virginianus*). The Kingston Airport Master Plan (1997) reported that deer were considered a significant
safety hazard to aircraft using the runways. At that time two accidents and two near-misses had occurred between deer and aircraft using Runway 01/19. Deer found on airport property likely originated in the Lemoine Point Conservation Area adjacent to the property’s western boundary. A 1996 deer census estimated the population within the conservation area at 25 to 30 animals. In an effort to reduce or eliminate deer access to the airport, fencing was erected in 1991 and extended in 1996. Requests to the Ontario Ministry of Natural Resources (MNR) to relocate the deer herd or allow the elimination of deer when required by airport management were refused (Airport Master Plan, 1997). In 1997, access control and improvement of fencing to a height of 3 m around the entire airport was completed. According to the APM these improvements have eliminated deer from entering the airport property.

2.11 SOCIO-ECONOMIC PROFILE

2.11.1 Demographics

The new City of Kingston was created in 1998 by amalgamation of the former City of Kingston with the Townships of Pittsburgh and Kingston. Population data prepared by Statistics Canada addresses both the new City of Kingston and the Kingston Census Metropolitan Area (CMA). The following discussion draws from both sources. The new City’s demographic profile emulates the provincial statistics in terms of age distribution. Minor variations in ethnic composition occur.

Age Distribution – 2006 Statistics Canada data sets the City’s population at 152,358 people, a 3.8% increase from the 2001 census. Table 2-3 provides a breakdown by age group and sex as well as a comparison to provincial and national averages.

<table>
<thead>
<tr>
<th>Age Profile</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Kingston</th>
<th>Ontario</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>24,600</td>
<td>12,655</td>
<td>11,940</td>
<td>16%</td>
<td>18%</td>
<td>18%</td>
</tr>
<tr>
<td>15-24</td>
<td>21,380</td>
<td>10,695</td>
<td>10,685</td>
<td>14%</td>
<td>13%</td>
<td>13%</td>
</tr>
<tr>
<td>25-44</td>
<td>41,040</td>
<td>14,325</td>
<td>20,585</td>
<td>27%</td>
<td>28%</td>
<td>28%</td>
</tr>
<tr>
<td>45-64</td>
<td>41,980</td>
<td>20,245</td>
<td>21,730</td>
<td>28%</td>
<td>27%</td>
<td>26%</td>
</tr>
<tr>
<td>65+</td>
<td>23,365</td>
<td>10,135</td>
<td>13,225</td>
<td>15%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Total</td>
<td>152,358</td>
<td>74,175</td>
<td>78,185</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
### Median Age of Population

<table>
<thead>
<tr>
<th></th>
<th>40.7</th>
<th>39.4</th>
<th>41.8</th>
<th>39</th>
<th>39.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>% 15 years +</td>
<td>84%</td>
<td>83%</td>
<td>85%</td>
<td>82%</td>
<td>82%</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, Census of Population - 2006

The age groups between 15 and 64 are typically associated with more economically productive years and represent 69% of the total population. The youngest and oldest shoulder groups represent 16% and 15% respectively.

Geographic distribution of population within the new City shows that approximately one half of individuals reside in the City proper with the remaining population in the former Townships of Pittsburgh and Kingston (City Facts, 23).

**Family and Household Income** – Table 2-4 provides family and household incomes.

<table>
<thead>
<tr>
<th>Table 2-4: Median Family and Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Median Family Income</strong></td>
</tr>
<tr>
<td>All Census Families</td>
</tr>
<tr>
<td>Couple Families</td>
</tr>
<tr>
<td>Lone-Parent Families</td>
</tr>
<tr>
<td><strong>Median Household Income</strong></td>
</tr>
<tr>
<td>All Households</td>
</tr>
<tr>
<td>One-person Households</td>
</tr>
<tr>
<td>Two-or-more-persons Households</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, Census 2001

Income levels in Kingston are generally higher than the median for Canada but lower than those for Ontario. Median income for couple families is approximately twice that of lone-parent families for both family and household incomes. Such income levels are similar to those in comparatively sized Ontario cities.
According to the 2006 Census information, there were a total of 70,003 private dwellings in the Kingston Census Metropolitan Area, and a total population density of 79.9 people per square kilometre.

**Education Status** – The local presence of Queens University, the Royal Military College and St. Lawrence College significantly enhance Kingston’s education profile. Table 2-5 presents education levels achieved.

| Table 2-5: Highest Level of Schooling - Percentage of population with a university certificate, diploma, or degree, or college certificate or diploma |
|---------------------------------|-----------------|-----------------|-----------------|
| Kingston Total % | Ontario Total % | Canada Total % |
| Population aged 20 – 34 | 47% | 46% | 43% |
| Population aged 35 – 44 | 49% | 45% | 42% |
| Population aged 45 – 64 | 42% | 39% | 35% |

Seventy-three percent of residents in the overall 20-65 age group have postsecondary school education compared to the national average of 66%. Almost half of the individuals entering the work force (20-34 age groups) hold a university degree, certificate or diploma. Gertler and Vinodrai (2003) places Kingston’s education level at 7th out of 25 city-regions in Canada as a reflection of the presence of the above noted educational institutions.

**Ethnic Composition** – Recent Census data indicates that 5% of Kingston’s population is composed of visible minorities. This is significantly lower than the Ontario average of 28% and the national average of 19%.

**Population Projections** – Table 2-6 presents low, medium and high population projections for the new City of Kingston and for the Kingston CMA. The CMA represents the new City of Kingston, and secondary Townships (Loyalist, South Frontenac, and Frontenac Island). Statistics Canada (2001) reports a five-year population growth rate for the new City of 1.4%. Based on Table 2-6, the forecasted population for the City is 146,712 by 2026 (medium projection). The CMA counterpart is projected at 192,454.

<table>
<thead>
<tr>
<th>Table 2-6: Kingston and Area Population Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
</tr>
<tr>
<td>City of Kingston</td>
</tr>
<tr>
<td>Low Projection</td>
</tr>
<tr>
<td>Medium</td>
</tr>
</tbody>
</table>
2.11.2 Economy

Review of employment data in Statistics Canada (2001) indicates that the City of Kingston employment rates are highest in the following three sectors:

- Sales and service occupations,
- Business, finance and administration occupations, and
- Social science, education, government service and religion

Kingston Economic Development Corporation (Kedco) (2005) reports that Kingston has a balanced and diversified economy with a strong private sector, and a 60% employment rate. Tables 2-7 and 2-8 present the ranked private and public employers in the City.

In terms of private industries, the top employer (StarTek), a call centre operation, is followed by Invista Canada which specializes in manufacturing of fibers and polymers. Public sector employers are dominated by institutional and educational employers at the Canadian Forces Base and Queens University.

<table>
<thead>
<tr>
<th>Company</th>
<th>Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>StarTek</td>
<td>1,400</td>
</tr>
<tr>
<td>Invista Canada</td>
<td>1,100</td>
</tr>
<tr>
<td>Bell Canada</td>
<td>500</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, Census 2001
<table>
<thead>
<tr>
<th>Company</th>
<th>Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assurant Group</td>
<td>400</td>
</tr>
<tr>
<td>Alcan (Rolled products &amp; R&amp;D)</td>
<td>373</td>
</tr>
<tr>
<td>Empire Financial Group</td>
<td>360</td>
</tr>
<tr>
<td>Dupont Canada Inc R&amp;D Centre</td>
<td>173</td>
</tr>
<tr>
<td>Bombardier</td>
<td>150</td>
</tr>
<tr>
<td>Bosal Canada</td>
<td>150</td>
</tr>
<tr>
<td>Wal-Mart</td>
<td>150</td>
</tr>
</tbody>
</table>

Source: Kedco – Kingston Profile 2004: Economic Base

**Table 2-8: Top Ten Public Sector Employers**

<table>
<thead>
<tr>
<th>Company</th>
<th>Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian Forces Base, Kingston</td>
<td>5,277</td>
</tr>
<tr>
<td>Queens University</td>
<td>4,200</td>
</tr>
<tr>
<td>Kingston General Hospital</td>
<td>3,085</td>
</tr>
<tr>
<td>Limestone District School Board</td>
<td>2,794</td>
</tr>
<tr>
<td>Correctional Services of Canada</td>
<td>2,670</td>
</tr>
<tr>
<td>City of Kingston</td>
<td>1,500</td>
</tr>
<tr>
<td>Hotel Dieu Hospital</td>
<td>1,007</td>
</tr>
<tr>
<td>Providence Continuing Care Centre</td>
<td>1,000</td>
</tr>
<tr>
<td>Royal Military College</td>
<td>769</td>
</tr>
<tr>
<td>Ontario Ministry of Transportation</td>
<td>415</td>
</tr>
</tbody>
</table>

Source: Kedco – Kingston Profile 2004: Economic Base
Table 2-9 presents utilization of the experienced labour force in selected industries (Statistics Canada, 2001). Experience in the health and education and, the wholesale and retail fields dominate the list.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total Experienced Labour Force %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and other resource based industry</td>
<td>1.2 %</td>
</tr>
<tr>
<td>Manufacturing and Construction Industries</td>
<td>11.7 %</td>
</tr>
<tr>
<td>Wholesale and Retail Trade</td>
<td>14.2 %</td>
</tr>
<tr>
<td>Finance and Real Estate</td>
<td>4.6 %</td>
</tr>
<tr>
<td>Health and Education</td>
<td>26.4 %</td>
</tr>
<tr>
<td>Business Services</td>
<td>13.7 %</td>
</tr>
<tr>
<td>Other Services</td>
<td>28.0 %</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, 2001

Kingston’s central location and proximity to Toronto, Ottawa, Montreal and north eastern U.S.A. markets make it a good location for business establishment.

2.11.3 Social Elements of the Adjacent Community

Elements of the community adjacent to the Airport were highlighted in discussion with City of Kingston Planning Staff:

- The residential communities to the east and south of the study area are well established and have shown a high level of interest in local planning-related and development issues. The lakeshore community to the south is somewhat newer than the area to the east. Treed areas that serve as buffers between the airport and the adjacent neighbourhoods are reported to be highly valued by the residents and tree removal would not be received favourably by local residents.

- The Conservation Area is heavily used by the public and has an active “Friends of Lemoine Point” volunteer group that helps to protect, enhance and promote the natural environment of the Conservation Area. The Conservation Area is the largest natural area in the city that does not charge an entrance fee. It is also the major open space in the west end of the city.
2.12 AIRPORT NOISE

For complex noise sources, such as those produced by airport operations, the standard decibel scale is inadequate to measure noise, particularly the subjective reaction of people to different pitches and frequencies. This has led to the development and use of the Effective Perceived Noise Level (EPNdB) that takes into account factors which contribute to the annoyance of the listener, such as intensity, tonal characteristics, event duration and number of occurrences during day and night.

Typically in Canada, a Transport Canada developed procedure is used to quantify the expected EPNdB resulting from a forecasted level of aircraft operations. The procedure expresses the EPNdB as a Noise Exposure Forecast Index (NEF) and is a function of the projected peak day movements by category of aircraft, the airside configuration and distribution by runway approach. NEF contours are prepared using Transport Canada’s NEFCAL computer program or other compatible software.

The 1997 Airport Master Plan prepared NEF contours based on a projected traffic volume of 52,000 annual and 165 peak day aircraft movements. Based on using a number of runway utilization scenarios, the report identified the following noise related impacts on the adjacent lands.

“Review of the NEF contours for the 2007 air traffic forecasts shows that the higher levels of noise result from operations on the primary Runway 01-19, and will generally be confined to the airport site.”

“Residential lands north of Collins Bay under the approach and departures areas would be subject to aircraft noise at levels above 20 NEF but below 25 NEF. This is considered by Transport Canada and the CMHC to be an acceptable level of noise exposure for residential and recreational uses.”

“Aircraft noise can be expected to impact the residential Westpark Subdivision that borders the airport on the east side at the threshold of Runway 19. Under conditions when Runway 19 is active, with or without any of the other runways, the aircraft noise contours extend over the Westpark Subdivision. Areas exposed to the 20 to 25 NEF range for Runway 19 operations would be expected to be unaffected by aircraft noise in 2007. However parts of the subdivision close to the airport property line are expected to be affected by aircraft noise above NEF 25 and possibly well above 35 NEF as well.”

Transport Canada publication TP1247E “Aviation Land Use in the Vicinity of Airports” dated May 2005 recommends that “new residential development is not compatible with NEF 30 and above and should be not undertaken”.

Based on discussions with City of Kingston Planning staff, the Project Team was advised that all approved Plans of Subdivision for West Park included requirements for advising of potential buyers of possible excessive noise resulting from the airports operation as well as the need for additional insulating measures for certain lots.
It should be noted that changes in aircraft noise characteristics will continue to affect noise contours. Manufacturers world-wide have and continue to make significant advances in the design of quieter aircraft, primarily through quieter engines and improved aerodynamic design, which permits steeper and quicker ascents and descents. In fact, since January 1, 2000, the US Airport Noise and Capacity Act (1990) mandates that all commercial civilian aircraft in US airspace weighing more than 75,000 lbs. meet the ICAO Stage 3 noise certification standards. Air carriers are presently meeting the Stage 3 standard by installing new Stage 3 compliant engines, by installing approved engine “hush kits” or by observing certain power and flap setting restrictions. (Roughly five Stage 3 compliant aircraft equal the noise levels of one Stage 2 aircraft.). A Stage 4 standard is already in the works and may be implemented in North America within the next few years.
3.1 INTRODUCTION

This section of the report will serve to document the Airport’s aviation and municipal zoning, official plan designations, the existing land uses within the Airport property, and the relationship to surrounding environs.

3.2 EXISTING LAND USES

3.2.1 Airport Lands

The Kingston airport is located in the south western quadrant of the City. It occupies 275 hectares (679.6 acres) of land which is completely fenced to control wildlife and unauthorized entry. The southern boundary abuts Front Road, the northern boundary is located immediately south of Coverdale Drive and the easterly boundary is Bayridge Drive. On the west side, the airport adjoins the Lemoine Point Conservation Area.

Within the site, the land use varies between strictly aviation related functions to complementary uses including warehousing, private business activities, open space and a golf course and driving range.

3.2.2 Surrounding Lands

The airport is located on a section of land that is surrounded by water on virtually three sides. Since its original construction in 1940 the lands surrounding the site boundary have slowly transformed from open space and farmland into a mixture of residential, commercial and major recreational open space land uses.
Immediately adjacent Land Uses include:

- **South:** - residential and open space with Lake Ontario frontage. This area is designated Low Density Residential in the Official Plan and with vacant lands zoned Development (D), and existing residential lands zoned Type 1 Residential (R1, R1-4 and R1-21). Lake Ontario is zoned Environmental Protection Area (EPA);

- **West:** - Lemoine Point Conservation Area. This area is designated and zoned (OS) for outdoor recreation activities;

- **North:** - Collins Bay Marina with direct frontage onto Collins Bay. This area is designated and zoned (C4) for commercial uses; and

- **East:** - West Park and Auden Park residential subdivisions. This area is designated Low Density Residential and zoned (R1, R2, R2-19, R1-3) for predominantly one and two family dwellings.

### 3.3 CURRENT PLANNING STATUS AND LAND USE CONTROLS

#### 3.3.1 City of Kingston Official Plan

The applicable Official Plan for the lands comprising Kingston (Norman Rogers) Airport is the “Official Plan of the Township of Kingston” which was passed by Township Council on March 21, 1995 and was given final approval by the Minister of Municipal Affairs on April 12, 2000. The Official Plan outlines in detail the designated land uses within the westerly portion of the City of Kingston (former Township of Kingston).

Map 1 of Schedule “A” to the Official Plan identifies three land use designations for the Airport lands:

- **Airport** – This designation applies to the majority of the Airport lands and the predominant use of the lands shall be for the landing and taking off and servicing of aircraft;

- **Business Park Industrial** – This designation applies to lands adjacent to Front Road, the predominant use of which shall be for prestige non-intensive industrial development; and

- **Low Density Residential** – This designation applies to lands at the corner of Front Road and Bayridge Drive, the predominant use of which shall be for an appropriate blend of single detached, two, three and four unit dwellings.

The City of Kingston is currently in the process of preparing a new Official Plan for the entire City of Kingston. It is anticipated that the existing Airport and Business Park Industrial designations and permissions will continue. The policy framework will also be amended as necessary to incorporate the land use recommendations contained within the Airport Master Plan as adopted by City Council.
3.3.2 Township of Kingston Zoning By-Law No. 76-26

The applicable Zoning By-Law for the lands comprising Kingston (Norman Rogers) Airport is Township of Kingston Restricted Area By-Law No. 76-26. Figure 3.1 identifies the current land use zoning for areas both within and immediately surrounding the airport boundary.

The airport itself has four basic zoning categories including:

- **Airport Zone (AP):** which permits; an airport, an existing racquet and fitness club and a professional office.

- **Special Airport Zone (AP-1):** which permits; a golf course, a driving range, an existing professional office and a golf clubhouse.

- **Business Park Zone (BP-H):** which permits; data processing and related services; business offices; professional offices; a hotel; laboratory, research, development facilities carried out within enclosed buildings; financial institution; public use; and, uses permitted in the AP and AP-1 Zones. This property is subject to an ‘-H’ Holding Symbol that will not be removed until such time as detailed design and landscaping guidelines have been approved by City Council for the property.

- **Residential Type 1 Zone (R1):** which permits; a single-family dwelling house, a converted dwelling house, a home occupation or a public use.

The City of Kingston is currently in the process of preparing a new Zoning By-Law for the entire City of Kingston. It is anticipated that the existing Airport, Golf Course and Business Park Industrial zones and permissions will continue. The new Zoning By-Law will also be amended as necessary to incorporate the land use recommendations contained within the Airport Master Plan as adopted by City Council.

3.4 OFFICIAL PLAN POLICIES RELATING TO THE AIRPORT LANDS

3.4.1 Airport Designation

Section 3-16 of the Official Plan deals specifically with the lands designated as “Airport”. This is the land use designation for the majority of the site. The existing Official Plan policies state that:

i) “the airport shall be used for landing and taking off of aircraft and ancillary uses necessary for the adequate and proper functioning”;

ii) “upgrades and improvements to the airport to serve the needs of the Greater Kingston area and beyond, will be permitted”;

August 2007
iii) “buildings, equipment and activities on airport lands shall be sited and arranged subject to the Aeronautical Act to ensure aviation safety, and in a way that minimizes adverse effects from aircraft noise, vibration and / or fuel odours on adjacent lands and land uses, as it is recognized that airport uses may not be compatible at all times with other land uses, particularly residential uses”;

iv) “airport operations shall be conducted in a manner which minimizes the impact of aircraft noise on surrounding land uses without compromising aviation safety and conform with Airport Regulations under the authority of the Federal Aeronautics Act”;

v) “provision will not be made for the supply of water and sewer services to this area for other than airport uses, industrial uses, or uses complementary to the airport, situated on airport lands”;

vi) “care shall be taken in assessing development proposals on adjacent lands to protect the airport from encroachment by incompatible land uses and to ensure that proposals are in compliance with Provincial Policies or guidelines for noise effected land uses in the vicinity of airports…..”.

3.4.2 Business Park Industrial – Kingston Norman Rogers Airport

Section 3-13.1 of the Official Plan establishes special business park policies for that portion of the airport lands bounded by Front Road to the south, Hampton Gray Gate to the east and extended westerly along Len Birchall Way. The predominant land use in this area is intended to be prestige non-intensive industrial development.

Specifically, the Official Plan policies for this area state:

i) “permitted uses include a medical laboratory and equipment production facility, complimentary commercial uses (exclusive of retail) to the Business Park uses, uses permitted in the airport designation, a public pathway and the existing Landings Golf Course driving range”;

ii) “development of the lands within the Business Park Industrial Designation shall be subject to Section 3-16(3) respecting Noise Exposure Forecast (NEF) contours and Noise Exposure Projection (NEP) contours and interference with the performance of the airport’s navigation and landing equipment”

iii) “development shall be subject to a high standard of design, landscaping and sign control to be implemented through Site Plan Control ……”;

iv) “driveway and parking areas are to be developed to urban standards and development of the Business Park area shall be subject to site specific zoning provisions…”;

v) “adequate screening from adjacent residential uses, to minimize visual and auditory impact of the permitted uses shall be provided through the use of setbacks, and buffering mechanisms such as berms, fencing and planting strips”;

August 2007
vi) “the uses permitted shall be low in physical profile thereby minimizing the visual impact on the adjacent residential uses”;

3.4.3 Low Density Residential

The Official Plan designates the south east quadrant of the airport lands for low density residential use. The City acquired these lands in order to protect the airport from incompatible land uses. Over the past few years, development proposals for other possible use of these lands (e.g. business park) have been presented to the City however at this time it remains as open undeveloped area. Consideration of any future land uses for this area was deferred by the City until such time as the Airport Master Plan was completed.

3.4.4 Harmonized Noise By-law

While the Official Plan suggests that airport operations be conducted in a manner which minimizes the impact of aircraft noise on the surrounding land uses, the Harmonized Noise By-Law dated February 2004 “exempts a number of activities from the restrictions on making of noise, including the operation of emergency vehicles, aviation activities at Norman Rogers Airport and agricultural operations”.

The By-Law goes on to state that “noise will be prohibited in residential areas and after 07:00pm in other areas. To ensure this does not interfere with the operation of the City’s airport, aviation activities at Norman Rogers Airport are being exempted explicitly”.

3.5 AERONAUTICAL ZONING

3.5.1 Airport Zoning

Airport zoning requirements have been established by Transport Canada, as documented in TP312E (4th Ed., March 1993), to ensure a satisfactory level of safety at an aerodrome, and are enforced through the Federal Aeronautics Act (1985). The zoning requirements serve to establish a set of imaginary surfaces which extend beyond the boundary of the airport, the penetration of which represents an obstacle to air navigation. In general, airport zoning is comprised of a primary (or runway strip), takeoff/approach, transition and outer surfaces.

The City enacted federally registered Aeronautical Zoning provisions at the airport in 1988. Table 3-1 below summarizes the OLS characteristics for each of the two runways.
### Table 3-1: Obstacle Limitation Surfaces Characteristics

<table>
<thead>
<tr>
<th></th>
<th>01-19</th>
<th>07-25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Code</td>
<td>Precision Code 3C</td>
<td>Non-Precision Code 3C*</td>
</tr>
<tr>
<td><strong>Take-off / Approach Surface</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of Inner Edge (Total)</td>
<td>300.0 m</td>
<td>90.0 m</td>
</tr>
<tr>
<td>Distance from Threshold</td>
<td>60.0 m</td>
<td>60.0 m</td>
</tr>
<tr>
<td>Divergence</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Section Length (Minimum)</td>
<td>15,000 m</td>
<td>3,000 m</td>
</tr>
<tr>
<td>Slope (Maximum)</td>
<td>2.0% (1:50)</td>
<td>2.5% (1:40)</td>
</tr>
<tr>
<td>Transitional Surface Slope</td>
<td>14.3% (1:7)</td>
<td>14.3% (1:7)</td>
</tr>
<tr>
<td><strong>Outer Surface</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevation (ASL)</td>
<td>136.0 m</td>
<td>136.0 m</td>
</tr>
<tr>
<td>Radius</td>
<td>4,000 m</td>
<td>4,000 m</td>
</tr>
</tbody>
</table>

* it should be noted that while runway 07-25 is currently zoned as a Code 3C Non-Precision runway it is currently designated as a Code 2B non-instrument facility.

Currently, there is one known infringement located within the OLS; a crane located approximately 0.5 nautical miles north of the Runway 19 threshold. According to the Nav Canada’s Canada Flight Supplement dated April 2004 and confirmed by an independent survey conducted by the City of Kingston (November 2006), this crane has a top elevation of 107.95m (355) feet ASL when fully extended. At this height this structure penetrates into the OLS by approximately 3.0 metres. The crane is used regularly throughout the spring, summer and fall is used as part of the Collins Bay Marina operation. The Canada Flight Supplement flags this obstruction for pilots using the Runway 19 approach.

Prior to approving land use changes in the vicinity of the Airport, the City is obliged through the Aeronautics Act to enforce and/or have addressed, all issues which may be considered to be incompatible with airport operations.

### 3.5.2 Land Use Considerations in the Vicinity of an Airport

Transport Canada’s publication TP1247E: Aviation Land Use in the Vicinity of Airports (7th Ed., 1996) provides recommendations and guidelines to prevent lands adjacent to or in the vicinity of an airport site from being used in a manner that is incompatible with the operation of an airport.
The following are the areas covered by TP1247E which are relevant to this site:

- **Bird Hazards** – limiting land uses which may be attractive to bird species.

- **Restrictions to Visibility** – limiting land uses which can restrict visibility for aircraft operations by factors other than poor weather such as industrial/commercial process (which may generate large quantities of smoke, dust or steam).
Section 4.0  
Facility Inventory Assessment

4.1 INVENTORY PROCESS

This section presents an overview of Kingston (Norman Rogers) Airport’s existing physical facilities and operational characteristics. An accurate and complete inventory of the Airport is essential to the success of a viable strategic plan because the findings and recommendations made are highly dependant on information gathered about the existing Airport and its environs.

As part of the work of this study, the Project Team conducted an inventory assessment of the Airport’s facilities and services. This information was obtained through on-site investigations, interviews with airport management, tenants and users, and from a review of available documents and studies concerning the Airport. The Airport’s facilities and services were examined and assessed to determine whether they:

- Meet Transport Canada standards and recommended practices for aerodromes (Doc. No. TP312E, 4th Ed., March 1993) and related requirements for certified aerodromes (generally covered under applicable Canadian Aviation Regulations [CAR]);
- Are in good working condition and reasonable operation;
- Require significant maintenance, repair or replacement over the short term; and
- Have adequate operational capacity to accommodate existing Airport activity levels.

Figure 4.1 illustrates the existing airport layout plan including locations of all major buildings, pavements, visual aids and other features. The existing layout plan was
prepared using the City’s current digital base mapping for the Airport site and information collected from the inventory assessment.

The sections that follow summarize the results of the inventory assessment. They have been generally divided into two broad categories:

- Airside;
- Landside and airport services.

Airside facilities are those located in the Airport Operating Area (AOA) that accommodate aircraft manoeuvring and associated operations. They include runways, taxiways, parking aprons, airfield lighting, visual and navigational aids, fuelling facilities, etc. Landside facilities are those that primarily accommodate passengers, employees and automobiles, and include terminal buildings, hangars, parking lots, access roads, support buildings, incoming utilities and services, etc.

### 4.2 AIRSIDE FACILITIES

#### 4.2.1 Runway System

The original runway system at Kingston Airport was constructed in the early 1940’s in order to provide a military training facility for aircrew destined for the Second World War. The runway system developed during that period consisted of 3 pairs of runways each 30 m in width forming a triangular configuration. This layout offered the optimum airport runway usability index by allowing flight operations to continue independent of wind direction.

The Airport’s current runway system consists of two runways (01-19 and 07-25) located on their original alignments. The other runways have been removed with the exception of former Runway 12-30. It has been recently reconstructed as a taxiway (Bravo) to provide a connection between Runways 01-19 and 07-25 and the apron.

The Airport’s primary runway; Runway 01-19, consists of a 1,524 metre (5,000 ft) by 30.5 metre (100 ft) asphalt surfaced pavement. The Airport’s secondary runway; Runway 07-25, is also asphalt surfaced and is 1,199 metres (3,933 ft) in length by 30.5 metres (100 ft) wide.

The aerodrome reference code (per TP312E, Section 1.3) for the primary runway (01-19) is 3C corresponding to an aeroplane reference field length between 1,200 metres (3,937 ft) and 1,800 metres (5,904 ft) and airplane wingspan of 24 metre up to but not including 36 metres.

The aerodrome reference code for the secondary runway; Runway 07-25, is 2B corresponding to an aeroplane reference field length between 800 metres (2,625 ft) and 1200 metres (3,937 ft) and airplane wingspan of 15 metres up to but not including 24 metres.
Based on information contained in the 1999 Pavement Condition Rating and Load Testing report prepared by JEGEL, as well as more recent construction activities, the pavement load ratings (PLR) for the Airport’s various airside manoeuvring surfaces are as contained in Table 4-1 below.

<table>
<thead>
<tr>
<th>PAVEMENT AREA</th>
<th>PAVEMENT LOAD RATING (PLR)</th>
<th>ALLOWABLE TIRE PRESSURE (MPa)</th>
<th>PERMISSIBLE AIRCRAFT TYPES (@ MTOW)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>0.8</td>
<td>BAE146-200, CRJ200</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>0.7</td>
<td>Dash 8-300, Beech 1900</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0.4</td>
<td>DC-3, Learjet 55</td>
</tr>
</tbody>
</table>

4.2.2 Runway 01-19

Runway 01-19 was originally constructed in 1940-41 with “50 mm penetration macadam and 130 mm water bound macadam over compacted subgrade”. In 1972 the runway was scarified and replaced with 65 mm to 115 mm of “hot mixed asphaltic concrete” following by an extension to 1,392 metres (4,600 ft.) in 1975. In 1981 the runway was further extended to 1,524 metres (5,000 ft.) in order to accommodate the needs of expanded air service.

Table 4-2 below summarizes the current physical characteristics of Runway 01-19.

<table>
<thead>
<tr>
<th>Table 4-2: Runway 01-19 Physical Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
</tr>
<tr>
<td>Reference Code</td>
</tr>
<tr>
<td>Rwy. Dimensions &amp; Surface Type</td>
</tr>
<tr>
<td>Runway Slope</td>
</tr>
<tr>
<td>Touchdown Zone Elevation</td>
</tr>
<tr>
<td>Displ. Threshold</td>
</tr>
<tr>
<td>Runway Strip Dimensions</td>
</tr>
<tr>
<td>Graded Area Dimensions</td>
</tr>
<tr>
<td>Clearway Dimensions</td>
</tr>
<tr>
<td>Declared Distances</td>
</tr>
<tr>
<td>TODA</td>
</tr>
<tr>
<td>ASDA</td>
</tr>
<tr>
<td>LDA</td>
</tr>
</tbody>
</table>

In order to provide longer take-off distances available (TODA) for Runway 01, a clearway has been established in accordance with TP312E, Clause 3.2.

Based on airport drawings, the runway’s longitudinal slopes comply with TP312E requirements for Code 3, precision runways.

Within the February 8, 1999 Pavement Condition Rating and Load Testing report prepared by John Emery Geotechnical Engineering Limited (JEGEL), the runway condition was reported as follows:
“The general visual condition of Runway 01-19 is considered to be good. The most prevalent pavement surface distresses observed were extensive medium severity longitudinal and transverse cracking. There is evidence of some slight frost heave at most of the medium severity transverse cracks. The pavement is generally well maintained with cracks sealed to good quality using hot-poured rubberized asphalt sealant. The overall condition of rating (PCR) for the pavement is 7 (good).”

The report also confirmed through non destructive load/deflection tests and calculations that the pavement was in fair to good structural condition with a PLR rating of 7. This PLR rating is suitable for the DHC-8 aircraft using the runway.

The report also recommended as follows:

“A systematic program of routine pavement maintenance should be continued for this runway, consisting mainly of crack sealing using hot-poured rubberized crack sealants and patch repairs for minor potheled areas. Runway 01-19 should also be scheduled for a project level pavement evaluation to determine the most cost effective major rehabilitation methodology for the pavement within the next 3 to 5 years.”

In September 2002 an ACAP funding application was made to Transport Canada by the City of Kingston for the rehabilitation of Runway 01-19. Support documentation for this application was prepared by PSMI. It recommended that the runway be rehabilitated by surface milling and the placement of a 50 mm overlay of hot mix asphaltic concrete.

This application is currently under consideration by Transport Canada for the 2008 construction season. It is anticipated that the existing PLR rating of 7 would be maintained following reconstruction of this runway.

It should be noted that in order to meet the requirements of TP312E, the current width of the graded area for Runway 01-29 will need to be increased to 150 metres (75 metres either side of the runway centreline) by relocating the ditches along the east and west sides of the runway. This deficiency currently has a Transport Canada deviation exemption based on the understanding that it will be rectified shortly.

The full perimeter of the runway pavement is provided with a subsurface drainage collection system comprised of perforated concrete piping ranging in size from 150 mm to 450 mm in diameter. Access to these pipes for maintenance purposes is provided by manholes located along both edges of the runway surface at varying intervals. These pipes discharge to the adjacent ditches at various points. A camera inspection of the airport drainage system was undertaken in recent years and confirmed that the pipes are in fair to good condition.
4.2.3 Runway 07-25

Runway 07-25 serves as the Airport’s secondary runway and is capable of accommodating Code B type aircraft.

Table 4-3 below summarizes the current physical characteristics of Runway 07-25.

<table>
<thead>
<tr>
<th>Table 4-3 : Runway 07-25 Physical Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Code</td>
</tr>
<tr>
<td>Rwy. Dimensions &amp; Surface Type</td>
</tr>
<tr>
<td>Runway Slope</td>
</tr>
<tr>
<td>Touchdown Zone Elevation</td>
</tr>
<tr>
<td>Displ. Threshold Length</td>
</tr>
<tr>
<td>Runway Strip Dimensions</td>
</tr>
<tr>
<td>Graded Area Dimensions</td>
</tr>
</tbody>
</table>
Similar to Runway 01-19, Runway 07-25 was originally constructed in 1940-1941. In 1996 the runway was extended an additional 400 metres to a total length of 1,199 metres (3,933 ft). This extension was undertaken in order to accommodate larger aircraft and/or payloads when the primary runway was experiencing unfavourable wind conditions or was unserviceable. This runway is adequate to accommodate most general aviation type aircraft such as light singles and twins as well as the Dash 8-400.

<table>
<thead>
<tr>
<th>Clearway</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>304.8 m (1,000’)</td>
</tr>
<tr>
<td>TOR</td>
<td>1,199.0 m (3,933’)</td>
</tr>
<tr>
<td>TOD</td>
<td>1,503.5 m (4,933’)</td>
</tr>
<tr>
<td>ASD</td>
<td>1,199.0 m (3,933’)</td>
</tr>
<tr>
<td>LDA</td>
<td>1,199.0 m (3,933’)</td>
</tr>
</tbody>
</table>


**Figure 4.3 - Runway 07-25 looking West**

Each end of Runway 07-25 has a 300 metre (1,000 ft) long clearway, as indicated in Table 4-3.

Based on the February 8, 1999 Pavement Condition Rating and Load Testing report prepared by JEGEL, the extension of Runway 07-25 was considered in good condition. The remainder of the runway had regular low to medium severity longitudinal and transverse cracking. It was noted that there were several areas of significant slippage cracking.
Based on the recommendations of the JEGEL report this runway is now due for rehabilitation.

The full perimeter of the runway pavement is provided with a subsurface drainage collection system comprised of perforated piping ranging in size from 150 mm to 300 mm in diameter. Access to these pipes for maintenance purposes is provided by manholes located at varying intervals along both edges of the runway surface. A camera inspection of the airport drainage system was undertaken in recent years and confirmed that the pipes are in fair to good condition. These pipes discharge to the adjacent ditches at various points.

### 4.2.4 Taxiways

Taxiways Alpha and Bravo serve the two runways and aircraft parking aprons.

Taxiway Alpha connects the west side of the apron with the thresholds of Runways 01 and 07. This taxiway is approximately 107 metres in length with a pavement width of 23 metres.

In 2001 this taxiway was rebuilt and upgraded to a PLR 7 load rating.

Taxiway Bravo provides access from the east portion of the apron to Runway 07-25 as well as to Runway 01-19. Access to runway 07-25 is provided at a point approximately 390 metres (1,280 ft) west of the threshold of Runway 25 while access to Runway 01-19 is provided at a point approximately 640 metres (2,100 ft) south of the threshold of Runway 19. The section of Taxiway Bravo south of Runway 07-25 is 23 metres (75.5 ft) in width and approximately 170 metres (558 ft) in length. The section north of Runway 07-25, however, is 18 metres in width and is approximately 850 metres (2,789 ft) in length.

Taxiway Bravo south of Runway 07-25 was rebuilt in 2001 and upgraded to a PLR of 7.

The section of Taxiway Bravo between Runways 07-25 and 01-19 was built on the old Runway 12-30 alignment and was constructed in 2003 to a PLR of 7.

A 23 metre wide section of asphalt pavement, with a PLR rating of 7, was constructed and painted as an apron taxilane along the north edge of the original apron area, east of the terminal. This work was undertaken in conjunction with the reconstruction of Taxiways Alpha and Bravo south of Runway 07-25 in 2001.

This apron taxilane provides a connection between Taxiways Alpha and Bravo and as well as access to the terminal building and various airside buildings. The taxilane also helps to ensure that heavier aircraft accessing the terminal building do not cross the apron area to the south, which has lower pavement strength.
4.2.5 Aircraft Parking Apron

The aircraft parking apron is located parallel to Runway 07-25 and provides access to Taxiways Alpha and Bravo located at the west and east ends of the apron area. As previously indicated, an apron taxilane is located along the north side of the east portion of the apron while the west portion of the apron straddles the taxilane.

![Figure 4.4 – Apron Area looking East](image)

The west portion of the apron provides aircraft access and parking for the terminal building and FBO. In addition, two helipads are located at the northeast corner of this portion of the apron. This portion of the apron has approximate dimensions of 115 metres by 190 metres and was reconstructed in 2001 in conjunction with the reconstruction of Taxiways Alpha and Bravo as well as the connecting taxilane. These pavement surfaces all have pavement ratings of PLR 7.

The apron area east of the main apron offers aircraft parking as well as access to the front of Hangars 3, 4 and 5. This area is approximately 380 metres by 45 metres in area and is so designated through pavement markings. Parking in this area is restricted to aircraft less than 12,500 lbs GTOW.

This pavement area generally appears to be in fair condition with extensive longitudinal cracking and occasional transverse cracking. These cracks have been sealed over the years and generally appear to be well maintained. Based on the JEGEL report, the pavement along the north portion of this apron is in better condition than the pavement on the south side of this area. The overall general condition rating of the apron
(including the main apron) at the time of report preparation was considered to be poor with a calculated PLR rating of 4.0.

As a result of a change in the usage of Hangar 3 over the past ten years, there is no longer any paved access available to this hangar.

Aircraft access to Hangar 4 is provided by an approximate 90 metre by 30 metre asphalt pavement area on the east side of Hangar 4. The pavement appears to be in poor condition with extensive cracking. A portion of this area was recently repaved due to damage suffered during equipment mobilization related to the construction of Taxiway Bravo in 2003.

![Figure 4.5 – Apron Area East of Hangar 4](image)

It should be noted that drainage for this area is poor with water ponding on the surface during intense rainfall events or during spring run-off as there are no catchbasins or defined ditches to provide positive drainage outlets for this area. The tributary area for this area is quite large as it extends as far north as the apron taxi lane.

Aircraft access to Hangar 5 as well as the AOG hangar is provided by an approximate 80 metre by 35 metre asphalt pavement area. The condition of this pavement is in similar condition to the area between Hangars 3 and 4.
4.2.6 Navigational Aids

The navigational aids available for use in the instrument approaches approved by Transport Canada, consist of the Kingston non-directional beacon (YKG), the Watertown VORTAC (ART) as well as the localizer (IGK) and glidepath associated with the Runway 19 ILS approach.

The YKG NDB is located approximately 7 km (3.8 NM) north of the airport and is owned and operated by Nav Canada. The ART VORTAC is located in Watertown, New York.

The Instrument Landing System (ILS) is owned by the City of Kingston; however, it is operated and maintained by Nav Canada.

The ILS has been described as nearing the end of its useful life and it is becoming more challenging to find replacement parts. In correspondence received from Nav Canada, a positive business case does not exist for the replacement of the current ILS at their cost. It is their expectation, given the forecast availability of Wide Area Augmentation System (WAAS), that this facility will be replaced with precision approach procedures compatible with this technology in the future.

VHF Direction Finding (VDF) to the airport is provided to pilots by Nav Canada flight service over frequency 122.5 MHz. The VDF equipment is owned and operated by Nav Canada. As radar coverage to the airport is provided from Trenton and Ottawa, coverage at lower altitudes in the Kingston area is unreliable or non-existent. VDF provides a reliable way to provide guidance to the airport, particularly to aircraft at lower altitudes. As a consequence, Nav Canada anticipates that the VDF service will continue to serve Kingston Airport over the foreseeable future.

4.2.7 Airport Approaches

Approaches to Runway 01-19 are provided for both day and night operations under VFR and IFR conditions. Instrument approach procedures are published by Nav Canada in the Canada Air Pilot and currently provide the following procedures for this runway:

- **NDB RWY 19** – provides a Non-Precision Approach to Runway 19 to a minimum descent altitude of 840 ft ASL (540 ft AGL) with a minimum visibility of 1 3/4 miles, utilizing the YKG NDB.

- **LOC (BC) VOR RWY 01** – provides a Non-Precision Approach to Runway 01 to a minimum descent altitude of 700 ft ASL (397 ft AGL) to a minimum visibility of 1 1/4 miles, utilizing the localizer back course for Runway 19 as well as ART VORTAC for the intermediate and final approach fixes.

- **ILS RWY 19** – provides a Precision Approach to Runway 19 to a decision height of 500 ft ASL (200 ft AGL) to a minimum visibility of 3/4 of a mile, utilizing the IGK localizer and associated glidepath as well as the ART VORTAC and YKG NDB for intermediate and final approach fixes respectively.
Approaches for Runway 07-25 are provided for day and night VFR only. There are no published instrument approach procedures for this runway.

### 4.2.8 Visual Aids

#### 4.2.8.1 Pavement Markings

Pavement markings exist on all aircraft manoeuvring surfaces in accordance with TP312E and include runway designation, 0.9 metre wide centreline stripe, 1.8 metre wide threshold stripes, touchdown zone (01-19 only), runway aiming point (01-19 only), taxiway centreline, and taxi-holding position markings. In addition, centreline markings have been provided for the apron taxiway connecting taxiways Alpha and Bravo.

No additional markings are recommended or required from a safety or regulatory standpoint.

#### 4.2.8.2 Runway Approach Lighting

Both approaches to Runway 01-19 are served by a low intensity, centre row approach lighting systems that are reported to be in generally good condition. The approach lights for Runway 01 are approximately 310 metres in length and do not meet the minimum required length of 450 metres specified by TP312E for a simple approach lighting system (ODALS) required for a runway with a Non-Precision Approach. In order to provide the necessary length, approach lights would need to be installed on an adjacent property on the south side of Front Road.

The approach lights for Runway 19 do not meet the minimum required length of 720 metres specified for a Category 1 Precision Approach lighting system (MALSR). Upgrades to the existing lighting system to meet TP312E standards would require both the replacement of the existing lights and provision of additional light towers extending to the north. To meet the length requirement, the northernmost light would need to be placed approximately 10 to 15 metres into Collins Bay and the next light to the south would need to be placed on another property located on the north side of Cloverdale Drive. A ¼ mile visibility penalty has been applied to the ILS approach for this runway due to the approach lighting deficiencies.
4.2.8.3 Runway Lighting and Markers

Both ends of Runway 01-19 as well as Runway 07-25 are equipped with bi-directional threshold and runway end lights. Runway identification lights (unidirectional flashing strobe lights) have been placed at both ends of Runway 01-19.

Runway 01-19 is equipped with high intensity edge lighting (with 5 variable settings). These lights were installed in 1996 and are considered to be in good condition.

Runway 07-25 is equipped with medium intensity edge lighting (with 3 variable settings). The majority of the runway edge lighting was installed in the 1970’s and is considered to be in poor condition. The runway lights for the remainder of the runway which were installed in 1996 in conjunction with the extension of the runway are in good condition.

4.2.8.4 Taxiway Edge Lighting

The edge lighting system for Taxiway A and Taxiway Bravo (south of Runway 07-25) as well as the interconnecting apron taxiway were replaced in 2001 in conjunction with the apron and taxiway reconstruction. The edge lighting system for Taxiway Bravo north of Runway 07-25 was replaced in 2004 in conjunction with the construction of that section of taxiway. The condition of these lights is considered to be excellent.
4.2.8.5 Apron Edge Marking

The apron area is delineated with edge lighting along the north, west and east sides of the pavement surface.

4.2.8.6 Guidance Signs

Illuminated guidance signs, mounted on steel posts, exist along each of the taxiways and at the intersection to their respective runways. The sign legends and locations appear to be in accordance with TP312E.

4.2.8.7 Apron Floodlighting

Pole mounted apron flood lights are provided at each end of the terminal building as well on the west side of the FBO. The flood lights adjacent to the terminal are activated by photocell. Apron flood lights are also located on each end of Hangars 3, 4 and 5; however, these lights are turned off.

4.2.8.8 Wind Cones

Wind cones (or sometimes referred to as wind direction indicators) provide an accurate indication of wind direction and velocity to pilots during take-off and landing movements.

There are currently three (3) illuminated wind cones located at the Airport. One wind cone is situated at each end of Runway 01-19, and one is situated near the end of Runway 25.

4.2.8.9 Rotating Beacon

A rotating beacon is a visual device used to aid pilots in locating an aerodrome prior to commencing approach manoeuvres during night-time or reduced visibility conditions. The beacon is a flashing white light providing a continuous, evenly spaced frequency of between 20 to 30 flashes per minute.

The Airport’s rotating beacon is situated on top of the Flight Service Station and is activated by photocell. The beacon is considered to be in good condition.

4.2.8.10 Airfield Lighting Control

The Airport is equipped with a Type K Aircraft Radio Control of Aerodrome Lighting (ARCAL) system, which allows remote operation of all aerodrome lighting, from equipped aircraft, for about 15 minutes, at variable lighting intensity settings. The ARCAL system is located in the electrical room on the ground floor of the Flight Service Station (FSS) and is activated when NAV Canada shuts down their daily operations.

The control system is reported to be in good condition and no replacement or upgrading is expected during the planning period.
4.2.8.11 Airfield Power Supply

The runway and taxiway lighting is fed by a total of four 5 kV series lighting circuits powered by four 6.6A, constant current regulators located in the electrical room of the Flight Service Station. Runway 01-19 is fed from with two 7.5kW Siemens regulators while Runway 07-25 is powered from a single 10kW regulator. A separate 10kW regulator has been provided for taxiway and apron lighting and was recently replaced in conjunction with the taxiway upgrades.

4.2.9 Aviation Communications

Airspace within a 5 nautical mile radius of the airport at or below 1,000 metres (3,300 ft.) is designated Class E and requires pilots to operate using mandatory frequency (123.25 MHz) procedures between the hours of 0615 and 2300 hours. During these hours airport advisory services are provided by the Flight Service Station located at the airport. Outside of these hours, pilots must monitor the air traffic frequency (123.25 MHz) and make any necessary blind broadcasts to this frequency.

A remote communications outlet is provided at the airport to provide flight information services on 126.7 MHz.

4.2.10 Aviation Fuel Facilities

A number of fuel facilities are located at the airport to serve local and itinerant traffic. They are described below:

Central Airways

One 38,000 litre and one 69,000 litre below ground tank with dispensing cabinets are located on the north side of the Central Airways FBO and are available for 100 Octane Avgas and Jet A-1 refuelling respectively. In addition, a 16,000 litre truck is available for dispensing Jet A-1 fuel.

The Fuel tanks and trucks are owned by Esso while the dispensing service is provided by the FBO.

Ontario Fun Flyers

A 4,500 litre above ground tank and dispensing cabinet for 100 Octane Avgas is located on the east side of the Hangar 4 apron area. Fuel from this tank is available for Ontario Fun Flyers’ aircraft only.

Kingston Flying Club

A below ground fuel tank and dispensing cabinet for 100 Octane Avgas is provided at the northwest corner of Hangar 5. Fuel is available for purchase by club and non-club aircraft. An abandoned dispensing cabinet and underground tank, formerly used for 80 Octane Avgas, is also located at this site.
4.2.11 Aircraft De-icing

Aircraft de-icing is performed on the main apron adjacent to the terminal building. De-icing services including fluid recovery and system maintenance is performed by Central Airways Corp. under an agreement with the Corporation of the City of Kingston.

The de-icing fluid recovery system consists of a 13,638 litre underground tank that is buried in a landscaped area located immediately south of the main apron area. De-icing fluid is drained to the tank via the asphalt surface which is graded to a catchbasin located along the south edge of the apron. This catchbasin is connected to both the storm sewer system as well as the glycol recovery tank. During non-de-icing periods storm run-off drains into the catchbasin and into the storm sewer system. During de-icing operations a valve on the storm sewer outlet is closed and another valve is opened which allows glycol to be directed into the tank for subsequent off site disposal.

Central Airways has indicated that excess water has been getting into the glycol recovery tank which makes disposal more expensive. Reasons for the excessive amount of water in the tank are:

- The extent of the ramp area draining to the tank during de-icing operations; and,
- Water leaking into the tank through the closed valve.

4.2.12 Airside Fencing

The complete airside portion of the airport is fenced with 3.0 metre high chain link fencing. The fencing appears to be in generally good condition with a couple of small areas that need to be repaired as part of general maintenance activities. In order to minimize interface with the ILS glide path, a portion of the fence at the north end of the airport property has been installed with plastic fence fabric.

4.3 LANDSIDE FACILITIES

4.3.1 Airport Building Structures

Each of the buildings located on airport property is described below and is referenced to a building number shown on Figure 4.1.

4.3.1.1 Passenger Terminal Building – Building 2

The Passenger Terminal Building is a single storey facility with a second partial level for administration and airport management offices.

The PTB has a gross floor area (GFA) of approximately 1,360 m² and a footprint of approximately 1,020 m². The original PTB was built in 1995 and recently expanded toward the east adding approximately 142 m² (included in the GFA above) to the ground floor of the airport operations and passenger services level. The expansion was a result of the space needs to accommodate the new Canadian Air Transport Security Authority
(CATSA) enhanced passenger and baggage screening program and required that the check-in and all associated office space be relocated into the expansion portion of the PTB.

![Figure 4.7 – Passenger Terminal Building – Landside View](image)

**Level One**

The airport operations and passenger level contains all the parts and operations of an active air terminal and is described below.

The check-in hall (5 counter positions) and airline office; located behind the ticket counters, is served by a vestibule entrance.

A small passenger corridor is provided leading to the airside security portal. The same corridor connects to the meeter/greeter hall and is used as crush space for departing passengers and guests. Washrooms are also provided in this area.

CATSA screening operations are conducted in two separate rooms. Passengers with checked luggage must first take their baggage to a hold baggage screening (HBS) room located adjacent to the airline ticket counters. These bags are sent through an x-ray machine before being directed to the baggage make-up room via a powered conveyor. Baggage requiring additional screening is searched on an adjacent stainless steel table before being directed to the baggage make-up room. Pre-board screening (PBS) of passengers and their carry-on luggage is completed in the screening portal located just
inside the entrance to the passenger hold room. This facility includes an x-ray machine and stainless steel search tables for the screening of carry-on luggage as well as a walk-through-metal detector for passenger screening. In addition, private searches may be undertaken in a dedicated room located on the west side of this facility.

Passengers clearing this process are accommodated in an airside hold room with seating currently provided for 57 passengers. The only amenity within the hold room is a single unisex washroom located adjacent to the CATSA security portal. Passengers boarding aircraft do so via an airside vestibule and painted walkway leading to the apron parked aircraft.

*Figure 4.8 – Passenger Terminal Building – Airside View*

The west end of the Passenger Terminal Building (PTB) accommodates the arriving passenger’s needs. Passengers enter the PTB via a secure airside vestibule into the bag claim area. Baggage unloaded from the aircraft is put onto a flat plate circulating bag claim device, which delivers the baggage into the bag claim hall. The hall is partially open to the meeter/greeter area. Additional facilities in the meeter/greeter area include separate male and female washrooms with barrier free facilities and a former kitchen with servery that has been replaced with a number of food and beverage vending machines. The meeter/greeter area is the largest public landside area with higher space volumes and provides views to the apron and aircraft operations. Passengers and meeter/greeters use a second landside vestibule for connection to the
landside curb and parking lot. It is noted that the meeter/greeter hall is used as landside crush space for those passengers waiting for departure.

A car rental counter is located in the landside corridor between the arrivals and departures end of the terminal.

Mechanical and electrical systems are housed on Level 1 within a generator room that provides emergency power to the PTB and a separate mechanical/electrical room located along the landside façade. A separate fuel tank for the generator is located exterior to the emergency generator room.

Central to Level 1 are landside stairs that serve the Level 2 Offices. The stairs not only provide access to Level 2 but serve as an emergency exit. No elevator is provided to Level 2.

**Level Two**

Level 2 provides 330 m² of office space. The space is served by a single corridor to airport operations and management offices, and a meeting room. A separate barrier free unisex washroom is provided to serve this level. Located at the east end of Level 2 is the security office which has a separate washroom and storage office. It is from this office that terminal operations are monitored via a security camera system located through-out the interior of the building and mounted to the exterior of the building.

The PTB structural composition is a steel framed building with no basement level. Exterior cladding is a combination of brick, metal and glass cladding, and field applied stucco/insulation system. The interior includes brick, painted surfaces and tiled and carpeted flooring. Overall, the façade and the interior are in good condition and require only normal regular maintenance.

There are a number of space deficiencies that may require the addition of space or relocation or renovation in order to maximize the use of the overall PTB.

**4.3.1.2 Hangars – Buildings 3, 4 and 5**

Three hangar buildings are located along the apron area and are provided with landside access from Len Birchall Way. The hangars are World War II 1940’s vintage and were used at that time by the military for aircraft storage and maintenance. The hangars are in various states of repair and condition and are referred to as Hangars 3, 4 and 5 corresponding to their building reference numbers shown on Figure 4.1.

Each hangar has an overall GFA of approximately 4,000 m². Hangar Number 3 has had recent additions to the base hangar facility and has a GFA of approximately 4,300 m². Attached to the hangar’s airside high-bay structure is a low-bay annex structure. On the landside a similar low-bay annex has been constructed.

The general structural system of each hangar is a wood framed truss system, which has been modified in some of the hangars. The high-bay area is supported by exterior
columns and a central row of columns located perpendicular to the hangar doors. Each hangar is equipped with the original rolling-leaf hangar doors facing east. The condition of these doors varies for each building but generally they are in poor condition.

For all of the hangars, the facades have generally been re-clad with a metal siding system to various conditions of repair.

A hangar apron is located on the east side of Hangar 4 and 5 while the apron on the east of Hangar 3 appears to have been replaced at one time with clay surfaced tennis courts.

Structural assessments of all three hangars have been undertaken by consulting engineering firms over the past 5 years. While generally the buildings “remain acceptable for current use and occupancy… assuming repairs are completed”, the cost for rehabilitation and continued maintenance of these facilities is significant. According to the assessments, Hangar 3 requires the most costly repairs while Hangar 4 and 5 costs are comparable and much less.

Figure 4.9 – Typical Hangar Construction
4.3.1.2.1  Hangar 3

This hangar is presently unoccupied but was formerly retrofitted to be used as a sports club under a lease arrangement.

The cladding façade is typical, except for the landside modifications noted below and the east façade, which is clad in the original shake type shingles.

For the landside southerly low-bay annex, a major retrofitting was completed to upgrade the space to include an outside swimming pool, bar, change rooms, sauna, whirlpool, 5 tennis courts and, 4 racquet sport courts.

The building was insulated and gas fired heating was provided as part of the retrofit for the sports club. The floor of the high-bay building appears to be in good condition given that it’s former use was for tennis courts.

The exterior area to the east was developed as clay tennis courts. The courts appear to be in a poor state of repair.

**Condition:**

The condition of this hangar is as follows:

- The hangar has been unoccupied for a lengthy period of time; resulting in normal deterioration;
- The easterly façade is original wood shakes and would need replacement;
- Building has been specifically fitted out as a fitness club and the building has lost any potential use as a hangar facility unless substantial demolition and retrofit is performed;
- The hangar doors have been closed, modifications made and finished with insulation blankets to the interior;
- The airside low-bay annex from an interior perspective is in derelict condition and has evidence of deterioration, damp and mould; making this annex un-inhabitable without mitigation; and,
- The condition of the insulation assembly at the exterior envelope needs review as the air seal membrane is broken in a number of locations and insulation contaminants are able to filter into the interior environment.

**Summary of Previous Assessments:**

Over the last several years a number of assessments of this hangar have been undertaken at the request of the City of Kingston. These assessments are summarized below.
The roof structure was inspected in detail in 1984. At that time repairs to a total of 77 truss connection joints were recommended.

In 2002 the City requested a cursory inspection of the hangar structure at the time that “The Landings – Racquets and Fitness Club” occupied the building. This assessment was completed by McCormick Rankin Corporation (MRC).

- The inspection was not comprehensive since the ceiling area had been completely sealed as part of the fit out of the space for the racquet club.

- MRC stated that “…it is expected that the building will continue to require attention, in the future, in the form of inspections and repairs. However, based on the current random inspection of the roof framing… we see no reason to condemn the building at this time.”

- It was recommended that an inspection be completed every 5 years.

In 2004 the City requested that MRC complete a further assessment of Hangar 3 based on maintaining the building for a further four years. MRC suggested that the repair costs for the structure would be approximately $200,000 based on their 2002 inspections. They also estimated that roofing repairs, a new fire protection system as well as upgrades to the mechanical and electrical systems would cost between $940,000 and $1,316,000.

JL Richards completed a further assessment in Feb 2005 and estimated the cost of repair as follows:

- Architectural: $165,000 to $265,000
- Mechanical: $140,000 to $185,000
- Electrical: $142,000
- Structural: $129,000 to $205,000

A Phase 1 Environmental Site Assessment was completed by the City of Kingston in January 2005. The conclusions and recommendations of this report are summarized below.

- Potential soil contamination may be present in the sub-surface soils adjacent to the hangar due to former coal storage and waste oil storage. It was recommended that the waste oil be removed from site and that a shallow sub-surface soil investigation be undertaken to identify any environmental concerns.

- Although not observed, there is a potential that asbestos containing materials could be found in the hangar. Lighting ballasts containing PCB’s could also be present in the lighting system. It was recommended that a Designated
Substance Review be undertaken in the event that demolition of the building becomes a consideration.

4.3.1.2.2 Hangar 4

Hangar 4 is built from wood beams, columns and updated metal siding on all facades including the low-bay annexes located on both the landside and the airside.

The hangar provides facilities for the Ontario Fun Flyers, a private flight school operating at Kingston Airport since 1995. Currently the hangar accommodates six aircraft that are available for flight training. They include three Cessna 150’s, one Cessna 152, one Cessna 172 and one Piper Aztec.

The flight school lease a portion of the south half of the high-bay Hangar while the City leases a portion of the remaining space to individuals for aircraft storage and maintenance.

A part of the landside southerly low-bay annex is occupied and leased by an office tenant while the balance of the annex is occupied by the Ontario Fun Flyers for purposes of office use, training and business operation.

As part of the flight school and located between Hangars 4 and 5, a small single storey rectangular wood frame cottage building is located, which is used for formal student flight training examinations.

Condition:

The condition of this hangar is summarized as follows:

- The overall façade is in a reasonable state of repair; however, this may be masking more complex issues beneath the surface materials;
- The hangar doors will not close due to concrete surface heaving. As a result, heating of the space is impossible the various nuisances such as wind blown snow, dirt, rodents and birds may enter the hangar;
- Roof water leakage has occurred to the interior.
- The concrete hangar floor has significant cracking but appears suitable to support light aircraft loads.
- The northerly low-bay annex is unoccupied and is in derelict condition.

Summary of Previous Assessments:

Previous assessments of this hangar undertaken at the request of the City of Kingston are summarized below.
A structural assessment of this hangar’s condition was completed by Stantec Consulting Inc. in December 2000. Their recommendations are summarized as follows:

- “...the structural safety factors, while estimated to be lower than new construction, are acceptable for the building’s current use and occupancy. This is contingent upon carrying out the recommended repairs.”

- It was estimated that $115,000 worth of repairs needed to be undertaken within a year of the study while an additional $115,000 in maintenance repairs could be undertaken over the following four years.

- A thorough structural assessment should be carried out every 5 years.

A Phase 1 Environmental Site Assessment was conducted by the City in January 2005. Recommendations included in this report are summarized as follows.

- Due to visible staining on the concrete floor under two above ground storage tanks located against exterior walls, an investigation into the contamination of surrounding soils should be undertaken.

- Any remaining asbestos containing materials should be assessed and properly abated.

### 4.3.1.2.3 Hangar 5

Hangar 5 is occupied by a not-for-profit club organization; The Kingston Flying Club. The flying club provides flight training, charter (sightseeing) and aerial photo services. The club also provides Avgas 100 for sale.

The high-bay hangar provides accommodation for two Cessna 172’s plus six rented inside storage locations for Flying Club members only.

The Kingston Flying Club operates their office and training program from the airside low-bay annex and utilizes the northerly half of the high-bay hangar for their aircraft storage. The airside single storey low-bay annex building is used as a heated club room with lounge area, offices and washrooms. A barrier wall is located perpendicular to the hangar doors demising the hangar in two sections with no man door access between the tenant spaces.

The demised south half of the high-bay hangar is used by airport operations for general storage, which is accessed from the apron area to the east.

The landside southerly low-bay annex is leased and used as a storage and repair garage for the Golf Course field equipment. Access to the southerly annex is from the landside via man-doors and garage type overhead doors. Also within the annex, office(s) space is occupied and leased by the Golf Course administration (no air conditioning).
Hangar 5 is of the same construction, plan configuration and cladding façade as described for Hangar 4, except for fire related modifications noted below.

As a result of a fire a few years ago some roof boards and support beams have been added. In addition, new steel central columns have been installed for extra strength. This structural retrofit has made access to the various parts of the hangar more difficult, generally requiring that a number of aircraft be moved in order to get one in or out. The building is not insulated or heated, except for the airside low-bay annex.

**Condition:**

The condition of Hangar 5 is summarized as follows:

- The size and configuration of the hangar is not conducive to optimum operations given the new fire related structural columns. In comparison with Hangar 3, Hangars 4 and 5 are in the best overall state of repair given their age;
- The hangar doors will not close due to the uneven floor below caused by frost action over the years. As a result, heating of the space is impossible and various nuisances such as snow, dirt, rodents and birds may enter the hangar;
- A lip on the floor (caused by frost heave) makes it difficult to move airplanes in and out of the hangar without assistance by another person;
- The condition of the roof is unknown and on-going repairs of the building will be required as part of the maintenance program.

**Summary of Previous Assessments:**

Previous assessments of this hangar undertaken at the request of the City of Kingston are summarized below.

- A structural assessment of this hangar’s condition was completed by Stantec Consulting Inc. in December 2000. Their recommendations are summarized as follows:
  - “…the structural safety factors, while estimated to be lower than new construction, are acceptable for the building’s current use and occupancy. This is contingent upon carrying out the recommended repairs.”
  - It was estimated that $115,000 worth of repairs needed to be done within a year of the study while an additional $65,000 in maintenance repairs could be done over the following four years.
  - A thorough structural assessment should be carried out every 5 years.
- A Phase 1 Environmental Site Assessment was conducted by the City in January 2005. Recommendations included in this report are summarized as follows:
  - Complete a shallow sub-surface investigation adjacent to underground and above ground storage tanks in the vicinity of the hangar to identify any
environmental concerns. Due to ground storage tanks located against exterior walls, an investigation into the contamination of surrounding soils should be undertaken.

- Although not observed, there is a potential that asbestos containing materials could be found in the hangar. Lighting ballasts containing PCB’s could also be present in the lighting system. It was recommended that a Designated Substance Review be undertaken in the event that demolition of the building becomes a consideration.

4.3.1.3 Central Airways Building - Building 1

Central Airways has operated as a FBO since 1986 and provides traditional FBO services including ground handling and fuelling for the scheduled service provider. The FBO facility building is owned by Central Airways and is located on leased airport land. Central also provides a kitchen / restaurant facility for pilots and the public.

Tenants within Central's building include Brock Air Services Ltd. and Air Creebec. Brock provides Medivac and corporate charter services using a Cessna 721 aircraft. Air Creebec provide ferry services to First Nation patients and medical staff between Kingston and Moosonee every Monday, Wednesday and Friday.

The Central Airways building is a single level steel framed and metal clad structure and is comprised of a full span high-bay hangar area and an attached low-bay office annex. The façade consists of insulated metal cladding. The building includes a landside access as well as an airside apron access. The high-bay hangar area is served by sliding overhead doors which open onto an asphalt apron area to the east. The combined high-bay and low-bay portions of the building have a gross floor area of approximately 1,340m².

The hangar area is used for general aviation aircraft storage while the low-bay annex is used for reception, offices, staff facilities, and a small restaurant. The high-bay heated space accommodates eight hangar parking positions (seven singles and one twin) served by hangar doors leading to an apron area located to the east.

**Condition:**

The building is in good condition for its age and is well maintained.

4.3.1.4 Nav Canada Flight Service Station – Building 7

The Nav Canada Flight Service Station (FSS) is a relatively new multi-storey building with 3 levels and no basement. It has a brick façade with metal and glass cladding and has a footprint of approximately 220 m².

The first and second levels of the building support the tower cab at the third level. The first level contains a diesel generator room, tower equipment and base building services and systems (mechanical and electrical room), a washroom, and a janitor's closet.
There is no leased occupancy space on the first level. Access to the building at the landside vestibule is via an electrically controlled door lock which is monitored by intercom and camera from the tower cab. The FSS spans the line between the landside and the apron.

The second level provides leased office space but is not occupied. One exit stair serves the second level. Access to the tower cab is via the primary exit and access stair. Exit from the tower is provided via the primary access stair and a secondary exit which is provided via an access door and a ladder from the second floor roof leading to grade.

Access to the antenna and exterior equipment bay on the roof of the tower is via a drop-down folding ladder located in the tower ceiling.

Barrier free access is provided to the first floor only.

The FSS operates between 06:15 and 23:00 hours, with two staff on site at all times. The FSS provides airside vehicular control as well as flight advisory and information services to pilots. When the FSS is closed, pilots obtain the altimeter settings from Trenton Airport. Instrument approach minimums are accordingly raised by 30 metres (100 ft.) during these times.

Nav Canada has indicated that Automatic Weather Observation System (AWOS) equipment is available for Kingston at no cost but that the cost of installation would need to be further defined. Related costs would include a concrete pad plus AWOS setup and calibration.
**Condition:**

- The overall façade and interior of the building are in good condition;
- Minor maintenance and an update to the interior painting should be accommodated during routine maintenance;
- It was noted that there are some HVAC issues with the tower level. Although new controls have been installed recently, there remains the need for portable heaters;
- The exterior wood deck and egress stair from the cab level should be reviewed for structural integrity and be re-surfaced with a proprietary rot protection product.

### 4.3.1.5 Transport Canada Building – Building 6

The Transport Canada Building is located on the west side of the operating FSS building. The building is an aged single storey building clad in metal with steel frame construction (typical butler-type building). The building has an approximate GFA of 375 m². The building is not occupied and is in a poor state of repair. The value of this building to the airport and to a perspective tenant is minimal.

### 4.3.1.6 Airport Maintenance Building – Building 8

The maintenance building is a heated single storey landside building originally constructed as a four bay garage but was recently expanded to six maintenance bays. A low-bay annex is attached on the west side of the building and provides office, supplies, and staff facilities. The combined high-bay and low bay structure has a GFA of approximately 510 m².
In the building, bay number six (most easterly) is used to store urea for snow clearing operations. All six bays are served by overhead doors. Bay numbers one to four are interconnected internally while bay five and six are separately demised and are interconnected internally by man doors. Internal steel framed open mezzanine storage areas are located within the high-bay area.

Netting has been installed on the exterior of the building to protect it from possible damage caused by the adjacent golf driving range.

The building is located on the south side of Len Birchall Way requiring the equipment to access airside via the gate located on the east side of the ATB.

**Condition:**

The building is in good condition and is well maintained.

### 4.3.2 Other Airport Buildings

#### 4.3.2.1 AOG Helicopter Facility – Building 11

AOG Helicopters is a privately owned business that repairs and rebuilds helicopters. AOG’s operation presently employs 9 full time staff. The AOG facility includes two buildings which have been privately constructed on leased airport property. These buildings are the most easterly buildings along the apron airside frontage.

Both buildings are single storey medium bay height structures, clad with an insulated metal façade. Operations in the main building includes maintenance and re-building of helicopters with adjacent offices, storage of parts, tools and related equipment all of which is specific to the operation. Access to the facility is provided via a controlled airside vehicular gate and a man door opening through the airside fence. The initially constructed maintenance building has a gross floor area that is approximately 630 m². Heating is provided by a gas heating system.

The second building has a smaller footprint and is generally used for parts storage.

**Building Condition:**

- The buildings are in reasonably good condition and do not appear to need any significant maintenance.

#### 4.3.2.2 The Landings Club House – Building 12

The Landing Club House and related 18 hole golf course is located in the southeast corner of the airport property and is based on a land lease arrangement with the City. This facility has been active since 1999 while the single level modern club house building was constructed in 2004. The facility is located landside at the east end of Len Birchall Way and includes a dedicated parking area. The building has a gross floor area that is estimated at approximately 620 m².
Figure 4.12 – Landings Golf Clubhouse

All activities for the golf club are located on airport leased land including the golf course, clubhouse and driving range/putting area. The Golf Club also leases space in the south end of Hangar 5 for their course maintenance equipment and some office activities.

**Condition:**

The building is in good condition and is well maintained.

### 4.3.2.3 RCAF Building – Building 10

This is a vintage building comprised of a single story wooden structure with aluminium or steel clap-board style cladding. It includes an outside bar, and recreation facilities (horseshoes). The facility is located landside with a dedicated parking area.

The building has a gross floor area of approximately 530 m².

**Condition:**

- The building is in fair to poor condition and appears to be in need of some general maintenance and refurbishment.

### 4.3.2.4 Brian Reid Building (McGugan Real Estate Appraisers) – Building 9

This building is a single level early 1970’s bungalow type brick structure with no basement. It is privately owned and rented by McGugan Real Estate Appraisers. The
facility is located landside with a dedicated parking area. The building has a GFA of approximately 145 m².

McGugan Real Estate has 5 full time staff providing real estate appraisal services. The building houses business type occupancy with offices, reception and storage areas.

The building is connected to a dedicated septic system as well as the airport water system.

**Condition:**

- The sloped roof is asphalt shingled and overall the facades and roof show some minor signs of aging.
- The building is in reasonable condition and requires some very minor maintenance of the exterior.

### 4.3.3 Parking and Road Access

Public access to the airport is provided from Front Road, an urban asphalt surfaced, two-lane road which is owned and maintained by the City of Kingston.

Airport circulation and access to the landside facilities and buildings is provided via Hampton Gray Gate and Len Birchall Way. Both Hampton Gray Gate and Len Birchall Way are two-lane asphalt surfaced roads with concrete curb and gutter. Surface drainage for both of these roads is directed to various ditches through the use of gutter outlets and culverts.

The pavement surface generally appears to be in good condition except in localized areas. The concrete curb and gutter appears to have spalled in a number of areas and appears to be showing more wear than the road surface.

A total of 121 public parking spaces are provided directly in front of the PTB. These are divided into both a long term (108 spaces) and short term lot (13 spaces). Pay on foot machines are provided at the north end of the parking lot. A taxi waiting area capable of storing 3 to 4 taxis is provided immediately east of the PTB along the Terminal Frontage Road. The parking lot has longitudinal and traverse cracking but appears to be in generally good condition.

The road and parking lot area for the Transport Canada building and the Flight Service Station has extensive longitudinal, lateral and alligator cracking and is considered to be in poor condition.
4.3.4 Airport Utilities

4.3.4.1 Water Supply

Fire flows and domestic water supply are provided by a watermain installed along the north side of Len Birchall Way. All buildings located along Len Birchall Way are connected to this watermain.

Some concerns have been expressed that the capacity and available water pressure from this main trunk services may be insufficient to accommodate the longer term development opportunities at the airport site. Accordingly a further analysis of the trunk watermain is recommended in advance of initiating any new building construction.

4.3.4.2 Sewage Collection and Disposal

A sanitary sewer has been extended to the airport property and along Len Birchall Way in recent years in order to provide sanitary service for the various buildings along this road. At this time, the PTB, maintenance garage, RCFA Wing and Golf Course Club House are the only buildings connected to this sewer. The remaining buildings are currently connected to individual septic systems.

4.3.4.3 Power Supply

The various buildings at the Airport are supplied from several pole-mounted transformers installed at the primary overhead line extending along the north side of Len Birchall Way.

4.3.4.4 Communications

Telecommunications service for the Airport buildings is provided via an underground Bell Canada cable located along Len Birchall Way.

4.3.4.5 Natural Gas

Natural gas is available to the various airport buildings via a gas main located along Len Birchall Way.
Section 5.0
Airport Passenger Market Research 2006

5.1 INTRODUCTION

Passenger market research was undertaken as a component of the Kingston (Norman Rogers) Airport Master Plan process. The objective of the research was to establish the true size of the Kingston (Norman Rogers) Airport (YGK) passenger market, a region which includes the City of Kingston as well as surrounding communities in eastern Ontario. The total airport market includes both passengers who are currently using Kingston (Norman Rogers) Airport, as well as those passengers who reside in or who are destined to the region but divert to other airports outside of the region. Determining the total true size of the air travel market is a key factor in assessing the viability of any potential new air services for the airport. Additionally an effective air service development program requires solid market research to quantify full air service demand.

This section of the report provides a summary of the research findings, including total passenger market sizes, airport diversions/leakage and details on top city-pairs. A detailed data file presenting the fifty largest city-pair market sizes in each sector has been provided separately.

5.2 MARKET RESEARCH DATA & METHODOLOGY

As no one source is currently available to provide origin/destination passenger market information for Kingston (Norman Rogers) Airport (YGK), multiple data sources were required to develop the passenger market information. Data and information was compiled from the following sources. See the Market Research Appendix C for a more detailed discuss of each data source and its value in constructing all components of the total travel market for Kingston (Norman Rogers) Airport.

- **IATA Billing & Settlement Plan (BSP) Data:** The primary source of project data was the International Air Transport Association (IATA) Billing and Settlement Plan
(BSP) ticket sales data. This dataset includes all airline tickets issued through the IATA BSP system by the travel agent community in Canada and 150 other countries. This data provided information on tickets with travel originating or destined to the Kingston (Norman Rogers) Airport, as well as ticket sales from the YGK catchment area region which originated from Toronto, Syracuse and other airports outside the area.

- **Airlines Reporting Corporation (ARC) Data:** A second important source of project data was the Airlines Reporting Corporation (ARC) ticket sales data. This dataset is very similar to the IATA BSP data discussed above but includes all airline tickets issued through the ARC system by the travel agent community in the United States. This data provided information on tickets with travel originating in the United States and destined to the Kingston (Norman Rogers) Airport.

- **YGK Airport Site Statistics and Air Carrier Schedules:** YGK site statistics were also used to identify and include any traffic that is excluded from the IATA BSP data.

- **Statistics Canada Domestic (1999) and Transborder (2002) Data:** Although no current origin/destination market data is available from Statistics Canada, 1999 for the domestic sector and 2002 for the transborder sector files were used as a historic cross-check for city pair market sizes.

- **Stakeholder Interview with Fixed Base Operator (FBO):** A telephone interview provided insights into YGK corporate charter operations.

- **Travel Agency Survey:** To assist in quantifying passenger diversion/leakage, travel agencies located within the Kingston catchment area were contacted for a telephone interview. A total of 10 of 16 travel agencies completed the survey.

- **Business Survey:** A survey of the Kingston's largest employers was used as an input to examine the nature of air demand by the local business community.

### 5.3 REGION OVERVIEW

#### 5.3.1 Kingston Catchment Area

In consultation with the Kingston (Norman Rogers) Airport, the geographic catchment area was defined for YGK as illustrated in Figure 5.1. Given ideal air service levels, residents and visitors to this catchment area region are reasonably expected to consider YGK as their primary airport of choice. Communities located within the catchment area include Smith Falls, Napanee, Belleville, Trenton and Brockville.

Expanding the catchment area to include communities such as Carleton Place, Cobourg, Peterborough and Port Hope was also considered. However, examination of ticket sales in these communities indicated minimal usage of the Kingston (Norman Rogers) Airport, thus confirming the original catchment area boundaries.
5.3.2 Population

A key foundation of any air travel market is its population base. Table 5-1 provides the 2001 population estimates for the YGK catchment area. The total population of the catchment area is estimated to 538,964 residents.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingston and the Islands</td>
<td>112,870</td>
</tr>
<tr>
<td>Prince Edward – Hastings</td>
<td>92,934</td>
</tr>
<tr>
<td>Hastings – Frontenac - Lennox and Addington</td>
<td>98,155</td>
</tr>
<tr>
<td>Leeds – Grenville</td>
<td>96,605</td>
</tr>
<tr>
<td>Lanark – Carleton</td>
<td>138,400</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>538,964</strong></td>
</tr>
</tbody>
</table>

Sources: Statistics Canada Federal Electoral District Profiles (2001 Census)
5.3.3 Driving Times

Table 5-2 provides a summary of the driving times between Kingston and destinations in the surrounding region. This includes communities from which YGK may draw some passengers, as well as airports to which YGK loses passengers through diversion/leakage.

<table>
<thead>
<tr>
<th>City</th>
<th>Distance to YGK (km)</th>
<th>Estimated Driving Time to YGK*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Catchment Area:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Napanee</td>
<td>35</td>
<td>0 hr &amp; 30 min</td>
</tr>
<tr>
<td>Belleville</td>
<td>76</td>
<td>0 hr &amp; 55 min</td>
</tr>
<tr>
<td>Brockville</td>
<td>93</td>
<td>1 hr &amp; 5 min</td>
</tr>
<tr>
<td>Trenton</td>
<td>94</td>
<td>1 hrs &amp; 5 min</td>
</tr>
<tr>
<td><strong>Outside Catchment Area:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ottawa</td>
<td>195</td>
<td>2 hrs &amp; 10 min</td>
</tr>
<tr>
<td>Syracuse</td>
<td>211</td>
<td>2 hrs &amp; 15 min</td>
</tr>
<tr>
<td>Toronto</td>
<td>263</td>
<td>2 hrs &amp; 52 min</td>
</tr>
<tr>
<td>Montreal</td>
<td>290</td>
<td>3 hrs &amp; 7 min</td>
</tr>
<tr>
<td>Hamilton</td>
<td>323</td>
<td>3 hrs &amp; 33 min</td>
</tr>
<tr>
<td>Rochester</td>
<td>351</td>
<td>3 hrs &amp; 40 min</td>
</tr>
<tr>
<td>Buffalo</td>
<td>415</td>
<td>4 hrs &amp; 33 min</td>
</tr>
</tbody>
</table>

Source: Microsoft MapPoint.

* Note: Estimated driving time to YGK does not reflect traffic delays due to congestion.
5.3.4 Airports in the Catchment Area and Surrounding Region

Air service levels at neighbouring airports become another factor in the development of an air service strategy. Table 5-3 provides a summary of the annual enplaned/deplaned passenger traffic at airports outside the catchment area, which capture some diversion.

<table>
<thead>
<tr>
<th>Airport</th>
<th>Annual Passengers (2005)*</th>
<th>Scheduled Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toronto (YYZ)</td>
<td>29,900,000</td>
<td>Domestic, Transborder,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>International</td>
</tr>
<tr>
<td>Montreal (YUL)</td>
<td>10,900,000</td>
<td>Domestic, Transborder,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>International</td>
</tr>
<tr>
<td>Buffalo (BUF)</td>
<td>4,800,000</td>
<td>U.S. Domestic, Transborder,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>International</td>
</tr>
<tr>
<td>Ottawa (YOW)</td>
<td>3,700,000</td>
<td>Domestic, Transborder,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>International</td>
</tr>
<tr>
<td>Rochester (ROC)</td>
<td>2,900,000</td>
<td>U.S. Domestic, Transborder,</td>
</tr>
<tr>
<td>Syracuse (SYR)</td>
<td>2,400,000</td>
<td>U.S. Domestic, International</td>
</tr>
<tr>
<td>Hamilton (YHM)</td>
<td>1,500,000</td>
<td>Domestic, Transborder (Limited), International (Limited)</td>
</tr>
</tbody>
</table>

Source: Airport site statistics and OAG flight schedules.

*Note: Enplaned/deplaned airport statistics include applicable charter services.
5.3.5 Existing Kingston Air Services

In 2005, Kingston (Norman Rogers) Airport had non-stop services to one domestic destination via Air Canada. Table 5-4 provides a summary of the total 2005 outbound flight frequency and seat capacity for Kingston (Norman Rogers) Airport by Air Canada.

<table>
<thead>
<tr>
<th>Kingston to:</th>
<th>Carrier</th>
<th>Aircraft Type</th>
<th>Annual 2005 Outbound Frequency</th>
<th>Annual 2005 Outbound Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toronto</td>
<td>Air Canada</td>
<td>De Havilland DH1</td>
<td>1,303</td>
<td>48,211</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Beechcraft 1900D</td>
<td>222</td>
<td>4,218</td>
</tr>
<tr>
<td></td>
<td></td>
<td>De Havilland DH3</td>
<td>23</td>
<td>1,150</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>1,548</td>
<td>53,579</td>
</tr>
</tbody>
</table>

Source: OAG flight schedules (2005).

5.4 KINGSTON CATCHMENT AREA PASSENGER MARKET SIZE

This chapter presents total market size estimates and top market summaries for the YGK catchment area. Additional market size detail is included separately in the accompanying data file.

In the tables presented in this chapter, the current market represents origin/destination passengers presently utilizing Kingston (Norman Rogers) Airport. For the market area, estimates for outbound diversion by residents and inbound diversion by visitors have also been included. Passenger diversion or leakage includes those passengers originating or destined to the YGK catchment area but using airports outside of the region such as Toronto, Ottawa, Hamilton, Montreal, Syracuse and Rochester.

5.4.1 Kingston Catchment Area Market Size Summary

Table 5-5 presents the estimated total origin/destination (O/D) market size for YGK’s catchment area. Details by domestic, transborder and international sector are also included.
### Table 5-5 Kingston Catchment Area Origin/Destination Market Size Summary (2005/06)

<table>
<thead>
<tr>
<th></th>
<th>Current Air Market</th>
<th>Diversion</th>
<th>Total Air Market by Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>46,160</td>
<td>50,030</td>
<td>96,190</td>
</tr>
<tr>
<td>Transborder</td>
<td>13,770</td>
<td>69,850</td>
<td>83,620</td>
</tr>
<tr>
<td>International</td>
<td>6,600</td>
<td>42,230</td>
<td>48,830</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>66,530</strong></td>
<td><strong>162,110</strong></td>
<td><strong>228,640</strong></td>
</tr>
</tbody>
</table>


Notes: (1) Totals may not add due to rounding. (2) For air service development evaluation purposes, non-revenue passengers are excluded.

In total, YGK’s catchment area generated over 228,000 O/D passengers in 2005/06. The vast majority (162,110 passengers or 71%) used an airport located outside the catchment area. The remaining 29% (66,530 passengers)\(^1\) used Kingston (Norman Rogers) Airport. Diversion/leakage percentages are significantly higher for transborder and international travel. Domestic diversion is approximately 50% of the total domestic market, whereas for the transborder and international sectors diversion represents over 80% of the total market.

In addition to the existing air travel market to/from the Kingston catchment area, a considerable surface travel market within the region is acknowledged. VIA Rail provides regular passenger service to Montreal, Ottawa, and Toronto, along the main Ontario-Quebec corridor line which passes through Kingston. Additionally, Highway 401 is the primary artery for vehicle and inter-city bus travel. While Kingston origin/destination information for surface travel modes cannot be readily quantified, the potential to shift some ground travellers to air modes is recognised given ideal air service levels and competitive air ticket pricing.

### 5.4.2 Kingston Catchment Area Domestic Market Size

Table 5-6 presents the total origin/destination market sizes for YGK’s top domestic markets. Cities are presented in descending order of market size.

\(^1\) For the purposes of air service development, origin/destination passenger figures represent revenue passengers only for the specified 2005/06 12-month period. Revenue passenger volumes will be lower than total enplaned/deplaned airport passenger statistics which include fared and non-fared passengers (e.g. employee travel, etc.).
### Table 5-6 Kingston Catchment Area – Top O/D Domestic Markets (2005/06)

<table>
<thead>
<tr>
<th>City Market</th>
<th>Current Market</th>
<th>Diversion</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vancouver</td>
<td>5,310</td>
<td>17,780</td>
<td>23,090</td>
</tr>
<tr>
<td>2. Edmonton</td>
<td>4,980</td>
<td>6,610</td>
<td>11,580</td>
</tr>
<tr>
<td>3. Calgary</td>
<td>3,740</td>
<td>6,700</td>
<td>10,440</td>
</tr>
<tr>
<td>4. Toronto</td>
<td>7,510</td>
<td>820</td>
<td>8,330</td>
</tr>
<tr>
<td>5. Halifax</td>
<td>3,730</td>
<td>4,430</td>
<td>8,150</td>
</tr>
<tr>
<td>6. Winnipeg</td>
<td>3,840</td>
<td>2,300</td>
<td>6,140</td>
</tr>
<tr>
<td>7. Victoria</td>
<td>2,100</td>
<td>1,620</td>
<td>3,710</td>
</tr>
<tr>
<td>8. Fredericton</td>
<td>2,910</td>
<td>230</td>
<td>3,140</td>
</tr>
<tr>
<td>9. Thunder Bay</td>
<td>2,040</td>
<td>310</td>
<td>2,350</td>
</tr>
<tr>
<td>10. St. Johns, NF</td>
<td>960</td>
<td>860</td>
<td>1,810</td>
</tr>
<tr>
<td>Other</td>
<td>9,040</td>
<td>8,370</td>
<td>17,410</td>
</tr>
<tr>
<td><strong>Total Domestic</strong></td>
<td><strong>46,160</strong></td>
<td><strong>50,030</strong></td>
<td><strong>96,180</strong></td>
</tr>
<tr>
<td><strong>Percentage Share</strong></td>
<td><strong>48%</strong></td>
<td><strong>52%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>


Note: (1) Totals may not add due to rounding. (2) Non-revenue passengers are excluded. (3) O/D = origin/destination.

In 2005/06, YGK’s total catchment area domestic market size was just over 96,000 O/D passengers, including diversion. Diversion to airports outside the catchment area was over 50,000 O/D passengers or 52% of the total domestic market size.

Vancouver was by far the largest domestic market with over 23,090 O/D passengers (24% of total domestic market). Other top markets include Edmonton (11,580 passengers; 12%), Calgary (10,440 passengers; 11%) and Toronto (8,330 passengers; 9%).

### 5.4.3 Kingston Catchment Area Transborder Market Size

Total transborder O/D market sizes for the YGK catchment area are presented in Table 5-7.
Table 5-7 Kingston Catchment Area – Top O/D Transborder Markets (2005/06)

<table>
<thead>
<tr>
<th>City Market</th>
<th>Current Market</th>
<th>Diversion</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Orlando</td>
<td>360</td>
<td>9,280</td>
<td>9,640</td>
</tr>
<tr>
<td>2. New York*</td>
<td>1,080</td>
<td>6,840</td>
<td>7,920</td>
</tr>
<tr>
<td>3. Las Vegas</td>
<td>540</td>
<td>4,780</td>
<td>5,320</td>
</tr>
<tr>
<td>4. Chicago**</td>
<td>940</td>
<td>1,980</td>
<td>2,910</td>
</tr>
<tr>
<td>5. Los Angeles</td>
<td>620</td>
<td>2,040</td>
<td>2,660</td>
</tr>
<tr>
<td>6. Tampa</td>
<td>210</td>
<td>2,410</td>
<td>2,630</td>
</tr>
<tr>
<td>7. Cincinnati</td>
<td>0</td>
<td>2,580</td>
<td>2,590</td>
</tr>
<tr>
<td>8. San Francisco</td>
<td>730</td>
<td>1,530</td>
<td>2,250</td>
</tr>
<tr>
<td>9. Ft. Lauderdale</td>
<td>80</td>
<td>2,080</td>
<td>2,170</td>
</tr>
<tr>
<td>10. Atlanta</td>
<td>440</td>
<td>1,730</td>
<td>2,170</td>
</tr>
<tr>
<td>Other</td>
<td>8,770</td>
<td>34,600</td>
<td>43,360</td>
</tr>
<tr>
<td><strong>Total Transborder</strong></td>
<td><strong>13,770</strong></td>
<td><strong>69,850</strong></td>
<td><strong>83,620</strong></td>
</tr>
</tbody>
</table>


Notes: (1) Totals may not add due to rounding. (2) *Includes JFK, La Guardia and Newark combined. (3) **Includes Chicago-O'Hare and Midway combined. (4) Non-revenue passengers are excluded.

YGK’s catchment area generated over 83,000 transborder O/D passengers in 2005/06, including diversion. Diversion to airports outside of the catchment area was over 69,000 passengers or 84% of the total transborder market.

Top transborder markets include Orlando (12% of total transborder market), New York (JFK, EWR & LGA combined – 9%), Las Vegas (6%), Chicago (ORD & MDW - 3%) and Los Angeles (3%).
5.4.4 Kingston Catchment Area International Market Size

YGK’s total international O/D market sizes are presented in Table 5-8.

<table>
<thead>
<tr>
<th>City Market</th>
<th>Current Market</th>
<th>Diversion</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. London (LHR &amp; LGW)</td>
<td>1,340</td>
<td>5,770</td>
<td>7,120</td>
</tr>
<tr>
<td>2. Cancun</td>
<td>50</td>
<td>2,170</td>
<td>2,220</td>
</tr>
<tr>
<td>3. Punta Cana</td>
<td>0</td>
<td>1,710</td>
<td>1,710</td>
</tr>
<tr>
<td>4. Varadero</td>
<td>0</td>
<td>1,650</td>
<td>1,650</td>
</tr>
<tr>
<td>5. Puerto Plata</td>
<td>0</td>
<td>1,600</td>
<td>1,600</td>
</tr>
<tr>
<td>6. Paris</td>
<td>350</td>
<td>950</td>
<td>1,300</td>
</tr>
<tr>
<td>7. Rome</td>
<td>170</td>
<td>1,020</td>
<td>1,180</td>
</tr>
<tr>
<td>8. Amsterdam</td>
<td>100</td>
<td>1,000</td>
<td>1,100</td>
</tr>
<tr>
<td>9. Frankfurt</td>
<td>300</td>
<td>790</td>
<td>1,090</td>
</tr>
<tr>
<td>10. Manchester</td>
<td>110</td>
<td>960</td>
<td>1,060</td>
</tr>
<tr>
<td>Other</td>
<td>4,180</td>
<td>24,580</td>
<td>28,780</td>
</tr>
<tr>
<td><strong>Total International</strong></td>
<td><strong>6,600</strong></td>
<td><strong>42,200</strong></td>
<td><strong>48,800</strong></td>
</tr>
</tbody>
</table>


Notes: (1) Totals may not add due to rounding. (2) Non-revenue passengers are excluded.

YGK catchment area represented over 48,000 international O/D passengers in 2005/06. Of all the sectors, international traffic has the highest diversion rate at 86%. The top international markets include a mix of European and Sunspots destinations. Top markets include London (LHR & LGW - 15% of total international market), Cancun (5%), Punta Cana (4%) and Varadero (3%).

5.4.5 Airport Usage

The airport usage analysis was based on all inbound/outbound origin/destination tickets for the YGK catchment area. Charter and other non-BSP passengers have been incorporated into the analysis to provide a more representative reflection of airport usage in the region.
- **Domestic sector:** This sector experienced the lowest levels of leakage/diversion (52%) to airports outside the catchment area, primarily Toronto Pearson Airport (48%).

- **Transborder sector:** Travel to/from the U.S. experienced the second greatest levels of diversion (84%). Toronto Pearson Airport and Syracuse Airport are among the most commonly used alternate airports with 49% and 28% shares, respectively.

- **International sector:** Diversion for this sector is 86%, the highest of all sectors. Airport usage for international travel itineraries are divided among Kingston (Norman Rogers) Airport (14%), Toronto (62%), Montreal (14%), Ottawa (5%) and Syracuse (5%).

Overall for all sectors, 29% of all origin/destination passengers currently use the Kingston (Norman Rogers) Airport for their journey. The largest diversion occurs to Toronto (51%), followed by Syracuse (11%). The total weighting for overall airport usage is affected by the relative sizes of the domestic, transborder and international sectors.

Figure 5.2 graphically summarizes the outbound catchment diversion by sector.

---

**Figure 5.2 Kingston Outbound Catchment Area Diversion by Sector (2005/06)**

- **Domestic**
  - Kingston 49%
  - Toronto 48%
  - Ottawa 4%
  - Others <1%

- **Transborder**
  - Toronto 49%
  - Kingston 16%
  - Syracuse 28%
  - Ottawa 6%
  - Others 1%

- **International**
  - Toronto 62%
  - Ottawa 9%
  - Montreal 14%
  - Syracuse 9%
  - Others <1%

- **TOTAL**
  - Toronto 51%
  - Kingston 29%
  - Syracuse 11%
  - Ottawa 6%
  - Others 3%

5.5 TRAVEL AGENCY SURVEY

A total of 10 Kingston catchment area travel agencies provided feedback on ticket sales patterns through the Travel Agency Survey conducted in July/August 2006. The survey results were used as input in the overall market and diversion calculations. Highlights from the survey are included in the following sections.

5.5.1 Kingston Travel Agencies Ticket Sales Overview

Travel agencies from the Kingston catchment area were asked to assess airline ticket sales by destination. The top domestic destinations cited were Vancouver, Halifax and Calgary. For the U.S. Los Angeles, Orlando and Miami / Ft. Lauderdale were the top mentions.

<table>
<thead>
<tr>
<th>Top 3 Domestic Destinations</th>
<th>Top 3 US Destinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancouver</td>
<td>Los Angeles</td>
</tr>
<tr>
<td>Halifax</td>
<td>Orlando</td>
</tr>
<tr>
<td>Calgary</td>
<td>Miami / Ft. Lauderdale</td>
</tr>
</tbody>
</table>

Source: Kingston Travel Agency Survey, July/August 2006.

Notes: Results reported are for responding agencies only, non-responding estimates not included.

5.5.2 New Air Services from Kingston

Travel agencies from the Kingston catchment area were asked to suggest three domestic and three transborder destinations which they felt their clients would most desire to see direct air service from Kingston. Based on the responses, Vancouver, Ottawa, Halifax and Calgary were the top four domestic destinations cited, while Ft. Lauderdale/Miami, New York and Orlando were the top three transborder destinations desired. Note that while travel agency route preferences often provide insights into the nature of a local travel market, air service development programs are generally based on detailed analyses of market data and other factors.
5.5.3 Additional Travel Agency Comments

Travel agents were asked to provide additional comments on the airport or air service issues. Most had no additional comments to make. Verbatim comments are provided in Table 5-10.

<table>
<thead>
<tr>
<th>Table 5-10 Kingston Catchment Area Travel Agency Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Additional Comments:</strong></td>
</tr>
<tr>
<td>▪ There is a need for longer runways to accommodate larger planes.</td>
</tr>
<tr>
<td>▪ Flights to Toronto with prices comparable to the Air Canada “Toronto Connector” would be beneficial.</td>
</tr>
<tr>
<td>▪ Price needs to be lower for flights departing from the Kingston (Norman Rogers) Airport.</td>
</tr>
<tr>
<td>▪ More inbound car rental from the airport would be beneficial.</td>
</tr>
<tr>
<td>▪ Connections to Syracuse and Montreal are needed.</td>
</tr>
<tr>
<td>▪ The airport provides good service.</td>
</tr>
</tbody>
</table>

Source: Kingston Travel Agency Survey, July/August 2006.
5.6 BUSINESS SURVEY

A survey of the larger employers in the Kingston area was conducted through calls to the twenty largest employers, with follow-up calls two days later. This yielded responses from eight organisations regarding business travel, with one completed questionnaire.

Most companies contacted, despite not filling out a questionnaire, provided information regarding business travel patterns. Universally, these organizations did not have any internal designate through which travel was organized. Most businesses travel was organized either by the individual travelling or the individual's assistant. In three instances, the organization did use specific travel agencies to book travel. Anecdotally, the organizations contacted expressed that if travel for business purposes was necessary that the train was the most common travel mode used by their businesses. Most expressed that air travel represented only a small portion of any company travel.

The four surveys completed were by individuals within Queen's University. Similar to the information gathered from other Kingston organizations, business travel was organized on an individual basis. For business travel within the region, train travel was cited as the most common travel mode. The majority of air travel was to the United States, followed by other international destinations and Canadian destinations. The quantity of surveys received, and the lack of varied sources limited the degree to which survey information could be utilised as a representative sample.
Section 6.0
Air Service Development Opportunities

6.1 INTRODUCTION

Air Service Development is an integral part of the Kingston (Norman Rogers) Airport Master Plan process. The objective of this section of the report is to assess potential air routes between Kingston and points in Canada/USA/Sun destinations based on the air travel market size research and with no constraint on the type of aircraft that might be operated. This latter assumption means that runway length is not a constraining factor so that there is an indication from airline service potential as to what might be the optimal runway length for Kingston (Norman Rogers) Airport. The ideal aircraft in terms of short take-off capability and appropriate seat configuration for market size may not necessarily be the fleet of the airlines that might most likely offer the service. Therefore, the runway requirements may be longer under these circumstances than if the ideal aircraft was available. The cost of extra runway length for the potential services that might be provided then needs to be assessed.

Market sizes have been ranked in descending order of passenger volume, in conjunction with output from the Market Research section of the Master Plan and opportunities for new and expanded air services (both scheduled and charter) identified. Additional consideration has also been given to historical air service at the airport, as well as alternative modes of transportation available to air passengers within Kingston’s market catchment area. Proximity to alternate airports, when considering highway driving options as well as train/bus intermodal connections, were also taken into account.

This section of the report also provides a summary of the research findings, including identification of top city pair markets (both international and domestic) as well as recommendations for specific routes to target for new non-stop service to/from Kingston, and/or expansion of existing services.
6.2 AIR SERVICE DEVELOPMENT PROCESS

6.2.1 General

The Air Service Development (ASD) process involves several steps:

1) Market Research
   • Required to quantify the true market potential

2) Review of Market Size
   • Determination of what markets and routes are worthy of detailed route analysis

3) Detailed Route Analysis
   • Needed to understand expected viability of new flights, and impact on existing services

4) Packaging the Information
   • The market’s qualitative and quantitative strengths must be clearly communicated to prospective air carriers

5) Risk Sharing Investment
   • An appropriate tool, in certain circumstances, to entice airlines to commit to new air services
   • Air Service Development efforts must take into account both market needs and airline objectives.
   • Cities and regions want easy access and price-competitive options for inbound visitors as well as for outbound residents
   • Airlines require a positive and acceptable financial return from each service provided
   • There are three types of air carriers, each with their own strategies for achieving profitable results
      a. Network (and their affiliated regional) carriers;
      b. Low cost carriers; and
      c. Charter carriers.

As a result, air service development strategies must be tailored for each carrier type.
Air service development is a long-term, strategic effort. The majority of air carriers focus on three timeframes in the planning process:

- **Short term** (frequency and schedule adjustments)
- **Medium term** (new routes); and
- **Long term** (new aircraft)

Airlines operate with planning cycles whereby schedules are generally finalized three to six months in advance of service start-up. Air service development initiatives may take a variable amount of time, before an airline makes the decision to initiate the service, ranging from six months to several years.

**6.2.2 Market Assessment Criteria**

Market assessment involves the process of determining Kingston’s true air travel market size and potential for sustaining new or expanded non-stop services. An integral part of this process is the definition of Kingston’s O&D catchment area, as defined in Section 5.

The air service market assessment evaluation process involves several key steps:

- **Market review** (Section 5)
  - Market size
  - Traffic flow potential
  - Type of traffic (business, leisure, VFR, cruise); drivers of air travel demand
  - Current non-stop, direct and connecting air services
  - Services at similar or competing airports
  - Review traffic right opportunities

- **Focus on unserved or underserved markets**
  - Which cities could support new non-stop air services?
  - Which existing services could support improvements in seat capacity, flight frequency or pricing?

- **Incorporate airline strategies in evaluating new opportunities**
  - Priorities and constraints vary from carrier to carrier

- **Identify route opportunities, appropriate airline options and air service development priorities.**
Establishing an air service development strategy is key to ensuring that community efforts and limited resources are focused on the airlines and routes that are of greatest importance, and that hold the greatest potential for success. Our suggested approach for Kingston includes:

- A prioritized list of potential new air services of the combined domestic, trans-border and international sectors, based on anticipated route viability as determined using the PLANET model (see below);
- Identification of one or more targeted air carriers for each route (among charter airlines, tour operators and scheduled carriers), giving consideration to carrier fleet and expansion strategies;
- A timeline for approaching each airline based on knowledge of individual airline planning cycles and marketing lead-time required for each type of air service.

The PLANET traffic allocation model will be used to assess various traffic flows and connecting opportunities for the top potential non-stop routes identified in this section. PLANET is a high-speed traffic and revenue allocation model used to forecast market share, traffic composition, connectivity, load factor, yield, route profitability and airline network contribution. PLANET is a sophisticated route planning software program used by major U.S. and international carriers such as Delta Air Lines and Alaska Airlines. The model allows nearly instantaneous analysis of hypothetical new routes, schedule changes, interlining and codeshare partnerships, fleet changes and other scenarios.

6.3 SCHEDULED AIR SERVICES AT KINGSTON (NORMAN ROGERS) AIRPORT

6.3.1 Current & Historical Air Services

At present, the Kingston (Norman Rogers) Airport is served by only one carrier, Air Canada Jazz, offering 49 weekly non-stop flights to Toronto Pearson International Airport. These services are operated by Air Canada commuter partner Jazz/Georgian Airways, currently using 19 seat Beech 1900 turboprop aircraft.

The seasonal and year-to-year differences in flight schedules at YGK over the past five years are illustrated in Table 6-1. Also included are projected schedule offerings for February and July 2007, based on schedules already offered for sale by Air Canada. Note that February schedules were included as a surrogate for typical winter schedules, while July was included to denote typical summer schedule offerings.
The above chart shows a general downward trend, both in terms of the number of weekly non-stop seats and the number of weekly non-stop flights. It is worthy of note that Toronto (YYZ) has been served non-stop throughout the entire above period, while Montreal (YUL) was only served non-stop by Air Canada during the winter and summer schedule seasons of 2003. This service was daily during the winter and once weekly in summer. Both services were flown with small turboprop aircraft.

### 6.3.2 Kingston Air Travel Market Size

As noted in the market research section of this report, the true size of the Kingston air travel market is about 228,640 annual passengers. However, only 66,530 currently use the airport. This low retention rate is due to several factors, including Kingston’s location along the national highway system, relative proximity to alternate airports and the existence of other bi-modal forms of transportation to get to/from alternate airports (chiefly rail and bus).

#### Table 6-2: Kingston Catchment Area Overall O&D Passenger Market Sizes (2005/06)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Current Air Market</th>
<th>Diversion</th>
<th>Total Air Market by Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>46,160</td>
<td>50,030</td>
<td>96,190</td>
</tr>
<tr>
<td>Transborder</td>
<td>13,770</td>
<td>69,850</td>
<td>83,620</td>
</tr>
<tr>
<td>International</td>
<td>6,600</td>
<td>42,230</td>
<td>48,830</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>66,530</strong></td>
<td><strong>162,110</strong></td>
<td><strong>228,640</strong></td>
</tr>
</tbody>
</table>


Notes: (1) Totals may not add due to rounding. (2) For air service development evaluation purposes, non-revenue passengers are excluded.
Table 6-3, Table 6-4, and Table 6-5 present the total origin/destination market sizes for YGK’s top domestic, transborder and international markets, respectively. Cities are presented in descending order of market size.

### Table 6-3: Kingston Catchment Area – Top O/D Domestic Markets (2005/06)

<table>
<thead>
<tr>
<th>City Market</th>
<th>Current Market</th>
<th>Diversion</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vancouver</td>
<td>5,310</td>
<td>17,780</td>
<td>23,090</td>
</tr>
<tr>
<td>2. Edmonton</td>
<td>4,980</td>
<td>6,610</td>
<td>11,580</td>
</tr>
<tr>
<td>3. Calgary</td>
<td>3,740</td>
<td>6,700</td>
<td>10,440</td>
</tr>
<tr>
<td>4. Toronto</td>
<td>7,510</td>
<td>820</td>
<td>8,330</td>
</tr>
<tr>
<td>5. Halifax</td>
<td>3,730</td>
<td>4,430</td>
<td>8,150</td>
</tr>
<tr>
<td>6. Winnipeg</td>
<td>3,840</td>
<td>2,300</td>
<td>6,140</td>
</tr>
<tr>
<td>7. Victoria</td>
<td>2,100</td>
<td>1,620</td>
<td>3,710</td>
</tr>
<tr>
<td>8. Fredericton</td>
<td>2,910</td>
<td>230</td>
<td>3,140</td>
</tr>
<tr>
<td>9. Thunder Bay</td>
<td>2,040</td>
<td>310</td>
<td>2,350</td>
</tr>
<tr>
<td>10. St. Johns, NF</td>
<td>960</td>
<td>860</td>
<td>1,810</td>
</tr>
<tr>
<td>Other</td>
<td>9,040</td>
<td>8,370</td>
<td>17,440</td>
</tr>
<tr>
<td><strong>Total Domestic</strong></td>
<td><strong>46,160</strong></td>
<td><strong>50,030</strong></td>
<td><strong>96,180</strong></td>
</tr>
</tbody>
</table>

**Percentage Share**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>


Note: (1) Totals may not add due to rounding. (2) Non-revenue passengers are excluded. (3) O/D = origin/destination.
### Table 6-4: Kingston Catchment Area – Top Transborder O/D Markets (2005/06)

<table>
<thead>
<tr>
<th>City Market</th>
<th>Current Market</th>
<th>Diversion</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Orlando</td>
<td>360</td>
<td>9,280</td>
<td>9,640</td>
</tr>
<tr>
<td>2. New York*</td>
<td>1,080</td>
<td>6,840</td>
<td>7,920</td>
</tr>
<tr>
<td>3. Las Vegas</td>
<td>540</td>
<td>4,780</td>
<td>5,320</td>
</tr>
<tr>
<td>4. Chicago**</td>
<td>940</td>
<td>1,980</td>
<td>2,910</td>
</tr>
<tr>
<td>5. Los Angeles</td>
<td>620</td>
<td>2,040</td>
<td>2,660</td>
</tr>
<tr>
<td>6. Tampa</td>
<td>210</td>
<td>2,410</td>
<td>2,630</td>
</tr>
<tr>
<td>7. Cincinnati</td>
<td>0</td>
<td>2,580</td>
<td>2,590</td>
</tr>
<tr>
<td>8. San Francisco</td>
<td>730</td>
<td>1,530</td>
<td>2,250</td>
</tr>
<tr>
<td>9. Ft. Lauderdale</td>
<td>80</td>
<td>2,080</td>
<td>2,170</td>
</tr>
<tr>
<td>10. Atlanta</td>
<td>440</td>
<td>1,730</td>
<td>2,170</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td><strong>8,770</strong></td>
<td><strong>34,600</strong></td>
<td><strong>43,360</strong></td>
</tr>
<tr>
<td><strong>Total Transborder</strong></td>
<td><strong>13,770</strong></td>
<td><strong>69,850</strong></td>
<td><strong>83,620</strong></td>
</tr>
</tbody>
</table>


Notes: (1) Totals may not add due to rounding. (2) *Includes JFK, La Guardia and Newark combined. (3) **Includes Chicago-O’Hare and Midway combined. (4) Non-revenue passengers are excluded.
Table 6-5: Kingston Catchment Area – Top International O/D Markets (2005/06)

<table>
<thead>
<tr>
<th>City Market</th>
<th>Current Market</th>
<th>Diversion</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. London (LHR &amp; LGW)</td>
<td>1,340</td>
<td>5,770</td>
<td>7,120</td>
</tr>
<tr>
<td>2. Cancun</td>
<td>50</td>
<td>2,170</td>
<td>2,220</td>
</tr>
<tr>
<td>3. Punta Cana</td>
<td>0</td>
<td>1,710</td>
<td>1,710</td>
</tr>
<tr>
<td>4. Varadero</td>
<td>0</td>
<td>1,650</td>
<td>1,650</td>
</tr>
<tr>
<td>5. Puerto Plata</td>
<td>0</td>
<td>1,600</td>
<td>1,600</td>
</tr>
<tr>
<td>6. Paris</td>
<td>350</td>
<td>950</td>
<td>1,300</td>
</tr>
<tr>
<td>7. Rome</td>
<td>170</td>
<td>1,020</td>
<td>1,180</td>
</tr>
<tr>
<td>8. Amsterdam</td>
<td>100</td>
<td>1,000</td>
<td>1,100</td>
</tr>
<tr>
<td>9. Frankfurt</td>
<td>300</td>
<td>790</td>
<td>1,090</td>
</tr>
<tr>
<td>10. Manchester</td>
<td>110</td>
<td>960</td>
<td>1,060</td>
</tr>
<tr>
<td>Other</td>
<td>4,180</td>
<td>24,580</td>
<td>28,780</td>
</tr>
<tr>
<td><strong>Total International</strong></td>
<td><strong>6,600</strong></td>
<td><strong>42,200</strong></td>
<td><strong>48,800</strong></td>
</tr>
</tbody>
</table>


Notes: (1) Totals may not add due to rounding. (2) Non-revenue passengers are excluded.

6.3.3 Alternative Modes of Transportation

The key reason why Kingston’s air passenger catchment area retention rate is relatively low is due to:

a) Its proximity to alternate airports and;

b) The variety of transportation modes available to reach those alternate airports.

An examination of these alternate transportation modes is explained below.

6.3.4 Highway System

Kingston, Ontario is roughly halfway between Toronto and Montreal. These two metropolitan centres are linked by Highway 401. This four-lane motorway allows drivers to reach Toronto in roughly three hours, and Montreal in nearly three hours and ten minutes. Drive time to Ottawa, via Highway 401 and 416 (mostly a two-lane highway), requires two hours and twenty minutes. Drive time to an alternate airport, in favour of
non-stop flights, schedule convenience, lower fares, preferred airlines, etc, often weighs heavily in a passenger’s decision to shift loyalty from their logical, nearby airport to an alternate one. Figure 6.1 shows the Canadian highway system linking Kingston with the nearby metropolitan centres of Montreal, Ottawa and Toronto.

**Figure 6.1: Kingston Region Highway System**

Figure 6.2 reiterates the distance between Kingston and area alternate airports, as well as associated driving times to those airports.
Figure 6.2: Kingston (Norman Rogers) Airport Alternate Airports and Driving Times

Source: MSN MapPoint

Note: Distances and drive times are to the airports specified.

6.3.5 Rail

Kingston is on the Via Rail train network, similar to motorway transportation. Figure 6.3 shows the eastern Ontario Via Rail network.

Figure 6.3: Via Rail Route Map – Eastern Ontario

Table 6-6 shows the average daily frequency and transit time for rail service between Kingston and nearby metropolitan centres.

The high frequency, and perceived convenience of train travel versus motorway or air travel, provides an incentive to Kingston catchment area passengers to consider...
beginning/ending their journey via a bi-modal transportation connection. This rail effect also erodes Kingston’s core air traffic base.

<table>
<thead>
<tr>
<th>Route</th>
<th>Frequency</th>
<th>Average Journey Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingston – Toronto</td>
<td>10 trains/weekday</td>
<td>2hrs 15min</td>
</tr>
<tr>
<td>Kingston – Ottawa</td>
<td>5 trains/weekday</td>
<td>2 hrs</td>
</tr>
<tr>
<td>Kingston – Montreal</td>
<td>5 trains/weekday</td>
<td>2hrs 40min</td>
</tr>
</tbody>
</table>

### 6.4 AIRLINE STRATEGIES

#### 6.4.1 Network Carriers

Network carriers normally carry 50% or more of their passenger load from feed traffic. Feed traffic is comprised of passengers who are not flying locally on a non-stop flight, but rather are connecting to an onward destination. These carriers also typically have higher market share of point-to-point (Origin/Destination) traffic from their hub cities, while having a lower market share in connecting/feed market city pairs.

Network carriers typically serve smaller markets such as Kingston, Ontario by linking them with one or more of their major hubs with smaller-sized feeder-type aircraft, such as the 37-seat DH8 or 50-seat regional jets. For Kingston, with Air Canada Jazz service, the major international hub is Toronto Pearson International Airport. This has proven to be the most efficient and cost-effective manner in which to connect a market like Kingston with as many other markets as possible. As air travel markets grow over time, non-stop links with additional hubs and/or new point-to-point service may be warranted. Below is a diagram which depicts how Kingston traffic flows through YYZ at present:
While network carriers use detailed market share models to determine route opportunities, there are also some basic rules of thumb for planning purposes. For example, a rule-of-thumb test is used to calculate the number of passengers required to viably fill an airplane and compare it to the market size available for a given city pair (see Table 6-7).

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Seats</th>
<th>Airline</th>
<th>Each Way</th>
<th>Minimum Daily O/D Passengers*</th>
</tr>
</thead>
<tbody>
<tr>
<td>B737-700</td>
<td>135</td>
<td>WestJet</td>
<td>88 – 108</td>
<td>44 – 54</td>
</tr>
<tr>
<td>Dash 8</td>
<td>37</td>
<td>Air Canada</td>
<td>24 – 30</td>
<td>12 – 15</td>
</tr>
</tbody>
</table>

* Note: Assumes 70% load factor where 50% of onboard passengers are local origin/destination and 50% are feed.

6.4.2 Low Cost Carriers

Low cost carriers generate additional demand over and above existing traffic which improves load factors and financial results. This strategy includes:

- Achieving profitability by capturing a given percentage of the existing market on a route, as well as by stimulating additional demand with low prices.

- Stimulating the local market by 100-600%, depending on flight frequency, the level of competition and the relative difference in airfares.

Examples of low cost carriers include: Westjet, JetBlue Airways, AirTran Airways and Southwest Airlines.

6.5 EVALUATION OF KINGSTON AIR SERVICE POTENTIAL

6.5.1 The Filters

A number of tools are used in the air service evaluation process. As depicted in Figure 6.4, the air service evaluation process involves several steps to refine the analysis and identify the priority routes.
Figure 6.4: Air Service Evaluation Process

First Filter: Rule-of-thumb and Benchmarking

- The rule-of-thumb quickly reveals a cut-off point below which routes cannot support non-stop service.
- Benchmarking involves comparing Kingston air travel market sizes, population and other metrics with those of similar communities, to gauge the level of air services that might be feasible.

Second Filter: Industry Judgment

- Routes that pass the first filter are further refined on the basis of carrier, network and expansion strategies.
- This identifies whether there are one, several or no carriers suitable for each route.

Third Filter: PLANET Analysis

- Routes with the highest potential are evaluated using the PLANET traffic allocation model.
- This model, used by several U.S. and international airlines, provides estimates of airline market share, load factor and revenue for potential new air services.
6.5.2 Route Filter Results

The route potential filters were applied to Kingston’s top O&D markets, which are listed in Table 6-8.

Table 6-8: Top O/D Markets - Kingston

<table>
<thead>
<tr>
<th>Rank</th>
<th>City</th>
<th>Annual O/D Pax</th>
<th>Pass The Rule of Thumb Test?</th>
<th>Pass The Industry Judgment Test?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vancouver</td>
<td>23,090</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Edmonton</td>
<td>11,580</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Calgary</td>
<td>10,440</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Orlando</td>
<td>9,640</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Toronto (Pearson)</td>
<td>8,330</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>6</td>
<td>Halifax</td>
<td>8,150</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>7</td>
<td>Winnipeg</td>
<td>6,140</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>New York</td>
<td>7,920</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>London (Heathrow)</td>
<td>5,370</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>10</td>
<td>Las Vegas</td>
<td>5,320</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Other Domestic/International</td>
<td>132,650</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note: New York includes the airports LGA, JFK and EWR. Kingston’s top 4 O&D cities pass the Rule of Thumb test, assuming 70% load factor and 50% local traffic, but all four fail the Industry Judgment test.

6.6 POTENTIAL FOR SCHEDULED AIR SERVICES

6.6.1 Opportunities and Challenges

A number of opportunities and challenges will shape Kingston’s air service development strategy:

**Opportunities**

- Market research has demonstrated that the Kingston region generates a large air travel market.

- YGK is well-poised, geographically, to recapture a larger share of its true market size when airfield runway lengths permit take-offs/landings of larger aircraft, capable of flying longer non-stop distances.

**Challenges**

- Kingston’s proximity to alternate airports, including YYZ, YOW, YUL and SYR will continue to siphon off passengers in search of competing air services based on preferences related to schedule (non-stop vs. connect), price and perceived convenience.
• YGK’s short runway length (5,000 feet) is a substantial obstacle to attracting greater air service using larger aircraft over longer distances.

• Some past Kingston air services have been discontinued, which may increase the perceived risk among airlines in serving Kingston.

• Current air service provider (Air Canada) has generally reduced capacity, in terms of non-stop seats and flights, at YGK.

In order to compete with the existing air service (30 flights/week on Air Canada to YYZ), some new routes would require daily service to attract passengers (e.g. YVR, YEG, YYC, etc.) while other routes, such as Orlando, could be operated on a weekend and/or seasonal basis. These opportunities and challenges are carefully considered with regard to the new route opportunities identified below.

6.6.2 Air Service Development Timeline

As mentioned in Section 5.2, Market Assessment Criteria, significant planning is required before an airline commences service on a new route. Table 6-9 highlights the typical planning process. This timeline is simplified, and assumes that the airline has the available aircraft in their fleet to perform the services outlined, and that no other constraints (crew scheduling, airfield/runway conditions, obtaining route authorities) prevent commencement of such services. It is also important to note that there is no guarantee that a targeted service will commence within the 12-month timeframe suggested. The actual timeline from market prioritization to service commencement can vary greatly, depending on the market and airline(s) involved.

<table>
<thead>
<tr>
<th>Task</th>
<th>Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Prioritize market potential</td>
<td></td>
</tr>
<tr>
<td>2) Conduct detailed market analysis</td>
<td></td>
</tr>
<tr>
<td>for selected route(s)</td>
<td></td>
</tr>
<tr>
<td>3) Arrange target airline head office</td>
<td></td>
</tr>
<tr>
<td>meeting</td>
<td></td>
</tr>
<tr>
<td>4) Conduct target airline head office</td>
<td></td>
</tr>
<tr>
<td>meeting</td>
<td></td>
</tr>
<tr>
<td>5) Solicit feedback from airline and</td>
<td></td>
</tr>
<tr>
<td>conduct follow-up</td>
<td></td>
</tr>
<tr>
<td>6) Secure commitment from airline</td>
<td></td>
</tr>
<tr>
<td>7) Airline announcement of new service</td>
<td></td>
</tr>
<tr>
<td>and schedule load</td>
<td></td>
</tr>
<tr>
<td>8) Airline commencement of new service</td>
<td></td>
</tr>
</tbody>
</table>
6.6.3 Hub Linkage Opportunities

As mentioned in the Section 6.4, Airline Strategies, network carriers place a significant emphasis on connecting smaller cities in their system with their major hubs. After reviewing the traffic demand and potential from the Market Research section of this document, with consideration to the primary demand traffic flow cities, we developed a chart (Table 6-10) of potential hubs with which Kingston could conceivably be linked to on a non-stop basis. We included YGK’s existing non-stop service to Toronto (YYZ), and listed several connecting hubs in the northeastern and upper Midwest sections of the United States. The valuation cited in the “Likelihood” column is based on:

a) The amount of connectivity;
b) The degree of circuity to major O&D markets through the given hub and;
c) The appropriate size of aircraft relative to market potential.

Table 6-10: YGK Hub Connection Opportunities

<table>
<thead>
<tr>
<th>Hub</th>
<th>Nonstop Mileage</th>
<th>Carrier</th>
<th>Likely Aircraft</th>
<th>Seats</th>
<th>AC Type</th>
<th># of Nonstop Destinations</th>
<th># of Daily Nonstops</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>YYZ</td>
<td>156</td>
<td>AC</td>
<td>DH1</td>
<td>37</td>
<td>Prop</td>
<td>105</td>
<td>309</td>
<td>Existing</td>
</tr>
<tr>
<td>YUL</td>
<td>165</td>
<td>AC</td>
<td>DH1</td>
<td>37</td>
<td>Prop</td>
<td>47</td>
<td>130</td>
<td>Good</td>
</tr>
<tr>
<td>EWR</td>
<td>274</td>
<td>CO</td>
<td>ER3</td>
<td>37</td>
<td>Jet</td>
<td>148</td>
<td>396</td>
<td>Good</td>
</tr>
<tr>
<td>JFK</td>
<td>286</td>
<td>B6</td>
<td>E90</td>
<td>100</td>
<td>Jet</td>
<td>45</td>
<td>152</td>
<td>Poor</td>
</tr>
<tr>
<td>PHL</td>
<td>308</td>
<td>US</td>
<td>DH8</td>
<td>37</td>
<td>Prop</td>
<td>109</td>
<td>432</td>
<td>Good</td>
</tr>
<tr>
<td>CLE</td>
<td>330</td>
<td>CO</td>
<td>ER3</td>
<td>37</td>
<td>Jet</td>
<td>78</td>
<td>216</td>
<td>Fair</td>
</tr>
<tr>
<td>IAD</td>
<td>367</td>
<td>UA</td>
<td>SF3</td>
<td>30</td>
<td>Prop</td>
<td>96</td>
<td>316</td>
<td>Good</td>
</tr>
<tr>
<td>DTW</td>
<td>368</td>
<td>NW</td>
<td>SF3</td>
<td>33</td>
<td>Prop</td>
<td>137</td>
<td>491</td>
<td>Fair</td>
</tr>
<tr>
<td>CVG</td>
<td>549</td>
<td>DL</td>
<td>ER3</td>
<td>37</td>
<td>Jet</td>
<td>124</td>
<td>375</td>
<td>Poor</td>
</tr>
<tr>
<td>ORD</td>
<td>592</td>
<td>AA</td>
<td>ERD</td>
<td>40</td>
<td>Jet</td>
<td>122</td>
<td>490</td>
<td>Poor</td>
</tr>
<tr>
<td>ORD</td>
<td>592</td>
<td>UA</td>
<td>ER4</td>
<td>50</td>
<td>Jet</td>
<td>137</td>
<td>608</td>
<td>Poor</td>
</tr>
<tr>
<td>YYC</td>
<td>1789</td>
<td>WS</td>
<td>736</td>
<td>110</td>
<td>Jet</td>
<td>21</td>
<td>66</td>
<td>Poor</td>
</tr>
</tbody>
</table>

6.6.4 Aircraft Performance Considerations

Table 6-11 shows the theoretical runway take-off length requirements for several regional jet aircraft as well as two Boeing narrowbody jets. We have included aircraft which would require greater runway length than is presently available at YGK, as certain operations could be permissible based on the stage length, and subject to certain weight restrictions.
Table 6-11: Aircraft Runway Take-off Length Requirements

<table>
<thead>
<tr>
<th>Runway Take-off Length Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>737-700 (WS)</td>
</tr>
<tr>
<td>736 (WS)</td>
</tr>
<tr>
<td>E90 (AC)</td>
</tr>
<tr>
<td>CR7 (AC)</td>
</tr>
<tr>
<td>E75 (AC)</td>
</tr>
<tr>
<td>CRJ (AC)</td>
</tr>
<tr>
<td>ERJ (AA/UA)</td>
</tr>
<tr>
<td>SF3 (NW/UA)</td>
</tr>
<tr>
<td>ER3 (AA/CO)</td>
</tr>
<tr>
<td>DH1 (AC/US)</td>
</tr>
<tr>
<td>YGK Runway Length</td>
</tr>
</tbody>
</table>

Source: Aircraft Manufacturer statistics.

Note: The runway lengths cited for the ER3 and ERJ aircraft are based on MTOW for a 460-mile journey, not based on the aircrafts’ MTOW for maximum range.

Table 6-12 shows the relationship between aircraft range and capacity, and is correlated to the aircraft shown in Table 6-11.

Table 6-12: Aircraft Range vs. Capacity

<table>
<thead>
<tr>
<th>Range (Miles)</th>
<th>Capacity (Psgrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF3 (NW/UA)</td>
<td>0</td>
</tr>
<tr>
<td>CRJ (AC)</td>
<td>500</td>
</tr>
<tr>
<td>DH1 (AC/US)</td>
<td>700</td>
</tr>
<tr>
<td>E75 (AC)</td>
<td>1,000</td>
</tr>
<tr>
<td>CR7 (AC)</td>
<td>1,500</td>
</tr>
<tr>
<td>ERJ (AA/UA)</td>
<td>2,000</td>
</tr>
<tr>
<td>ER3 (AA/CO)</td>
<td>2,500</td>
</tr>
<tr>
<td>ER9 (AC)</td>
<td>3,000</td>
</tr>
<tr>
<td>736 (WS)</td>
<td>3,500</td>
</tr>
<tr>
<td>737-700 (WS)</td>
<td>4,000</td>
</tr>
</tbody>
</table>

Source: Aircraft Manufacturer statistics
6.6.5 New Route Opportunities

1) Kingston – Vancouver (2,204 air miles)

- Target Carrier: Air Canada
- Alternate Carrier(s): n/a
- Suggested Aircraft Type: Embraer 190 (93 seats)
- Aircraft Range: 2,200 air miles
- Suggested Frequency: 1x/day
- Local market size: 23,090 per year (31.6 passengers per day, each way (PPDEW))

Comments:

- Kingston – Vancouver is Kingston’s largest O&D market. A non-stop service could be attractive, and such an operation could be performed by an aircraft such as Air Canada’s Embraer 190, subject to certain westbound weight restrictions. (Note: YGK-YVR is 2,204 nonstop air miles, and Air Canada is currently offering non-stop service on both YYZ-SEA (2,060 air miles) and YYZ-YXX (Abbotsford) (2,049 air miles).

- Air Canada is by far the most logical and likely airline to target for this service, even if it is unlikely in the near-term.

- Connection opportunities beyond YVR are limited due to Vancouver’s location on the west coast, and Kingston generates very little traffic to/from Asia. Connections would exist to major cities along the western coastline of the United States.

- Another alternative could include operating one-stop Kingston – Vancouver via an intermediate point, such as Winnipeg, Calgary or Edmonton, thereby benefiting from the strength of attracting two or more markets.

2) Kingston – Calgary (1,789 air miles)

- Target Carrier: Air Canada Jazz
- Alternate Carrier(s): Westjet
- Suggested Aircraft Type: Canadair CRJ-705 (75 seats) or Embraer 175 (73 seats)
- Aircraft Range: 2,000 air miles
- Suggested Frequency: 1x/day
- Local market size: 10,440 per year (14.3 PPDEW)
Comments:

- Kingston – Calgary is Kingston’s third-largest O&D market. A non-stop service would be attractive, but such an operation would need to be flown by longer-haul regional jet aircraft, such as the CRJ-705 or EMB 175, both if which would incur payload penalties on the westbound flights departing from Kingston. Westjet could be an alternative carrier, but the smallest aircraft in their fleet is the Boeing 737-600, which could not operate non-stop from Kingston to Calgary.

- YYC is a hub for Westjet and a focus city for Air Canada.

- Service to YYC would provide additional connecting opportunities to/from other points in western Canada and the western United States.

3) Kingston – Edmonton (1,778 air miles)

- Target Carrier: Air Canada Jazz
- Alternate Carrier(s): n/a
- Suggested Aircraft Type: Canadair CRJ-705 (75 seats) or Embraer 175 (73 seats)
- Aircraft Range: 2,000 air miles
- Suggested Frequency: 1x/day
- Local market size: 11,580 per year (15.9 PPDEW)

Comments:

- Kingston – Edmonton is Kingston’s second-largest O&D market. A non-stop service would be attractive, but such an operation would need to be flown by longer-haul regional jet aircraft, such as the CRJ-705 or EMB 175, both if which might incur payload penalties on the westbound flights departing from Kingston.

- Air Canada is by far the most logical and likely airline to target for this service, even if it is unlikely in the near-term.

- Kingston – Edmonton could also be served on a one-stop basis, via either Winnipeg or Calgary. Such a routing would increase the flight’s drawing pool of potential passengers.

- Service to YEG would provide additional connecting opportunities to/from other points in western Canada.
4) Kingston – Orlando (1,120 air miles)

- Target Carrier: Air Canada Jazz
- Alternate Carrier(s): Delta Connection E75
- Suggested Aircraft Type: Canadair CRJ-705 (75 seats) or Embraer 175 (73 seats)
- Aircraft Range: 2,000 air miles
- Suggested Frequency: 1-2x/week, possibly seasonal
- Local market size: 9,640 per year (13.2 PPDEW)

Comments:

- Kingston – Orlando is Kingston’s fourth-largest O&D market. A non-stop service would be attractive, but such an operation would need to be flown by longer-haul regional jet aircraft, such as the CRJ-705 or EMB 175, both of which would incur payload penalties on the southbound flights departing from Kingston.
- Air Canada is by far the most logical and likely airline to target for this service, even if it is unlikely in the near-term.
- Kingston – Orlando could also be a viable charter market, again pending runway lengthening.
- Note: JetBlue commenced daily non-stop Airbus A320 (150 seats) service between SYR and MCO in July 2006. The relative proximity of Syracuse to Kingston (127 miles), coupled with JetBlue’s reputation as a quality low-cost carrier, will likely further erode Kingston’s true Orlando O&D as a segment of YGK’s natural market will be drawn to this new SYR-MCO service.

5) Kingston – Halifax (647 air miles)

- Target Carrier: Air Canada Jazz
- Suggested Aircraft Type: Canadair CRJ (50 seats)
- Aircraft Range: 978 air miles
- Suggested Frequency: 1x/day
- Local market size: 8,150 per year (11.2 PPDEW)

Comments:

- Kingston – Halifax is Kingston’s sixth-largest O&D market. A non-stop service would be attractive, and a CRJ regional jet should be able to fly the route from the current runway, subject to verification.
- Air Canada is by far the most logical and likely airline to target for this service, even if it is unlikely in the near-term.
6) Kingston – New York (276 air miles)

- Target Carrier: Air Canada Jazz
- Alternate Carrier(s): Continental Express, USAirways, Delta Connection, American Eagle
- Suggested Aircraft Type: Canadair CRJ (50 seats) or Embraer 135 (37 seats)
- Aircraft Range: 978 air miles
- Suggested Frequency: 2x/day
- Local market size: 7,920 per year (10.8 PPDEW)

Comments:

- Kingston – New York is Kingston’s seventh-largest O&D market. A non-stop service would be attractive, and a CRJ or ERJ regional jet should be able to fly the route from the current runway without payload penalty, subject to verification.

- Air Canada is by far the most logical and likely airline to target for this service, even if it is unlikely in the near-term.

- Given YGK’s lack of U.S. Customs pre-clearance facilities, coupled with LaGuardia’s slot restrictions and severe congestion problems, this service is unlikely to ever materialize, based on known parameters. Most likely service would be Continental Express turboprop service to Newark (EWR). Note that the smallest aircraft currently operating at Continental’s EWR hub is the Embraer ERJ regional jet.

7) Kingston – Winnipeg (1,046 air miles)

- Target Carrier: Air Canada Jazz
- Alternate Carrier(s): n/a
- Suggested Aircraft Type: Canadair CRJ-705 (75 seats) or Embraer 175 (73 seats)
- Aircraft Range: 2,000 air miles
- Suggested Frequency: 1x/day
- Local market size: 6,140 per year (8.4 PPDEW)

Comments:

- Kingston – Winnipeg is Kingston’s eighth-largest O&D market.

- Winnipeg could serve as a logical intermediate stop for direct flights between Kingston and western Canada (Vancouver, Edmonton, Calgary, etc.), thereby enabling the operating carrier to capitalize on multiple market demand synergies.
- Air Canada is by far the most logical and likely airline to target for this service, even if it is unlikely in the near-term.

8) Kingston – Montreal (165 air miles)

- Target Carrier: Air Canada
- Alternate Carrier(s): n/a
- Suggested Aircraft Type: de Havilland Dash 8-100 (37 seats)
- Aircraft Range: 805 air miles
- Suggested Frequency: 1x/day
- Local market size: 400 per year (0.5 PPDEW)

Comments:

- Kingston – Montreal was flown by Air Canada during 2003, but the service was discontinued. Given the increased traffic congestion, as well as high operating costs at Toronto Pearson International Airport, coupled with the connection opportunities available via Montreal Trudeau International Airport to points in eastern Canada and beyond, reinstatement of this non-stop service deserves consideration.

- Air Canada is by far the most logical and likely airline to target for this service.

- Montreal Trudeau is a growing hub for Air Canada. It is likely that Air Canada would find it more cost-effective to funnel certain YGK passengers via YUL rather than via the current YGK-YYZ flights.

9) Other U.S. Hubs

Based on the existing air traffic demand in Section 5 of this report, with consideration to Kingston’s geographic position and an effort to minimize connecting flight circuitry, the most beneficial service to the YGK catchment community would be non-stop service by Continental Connection to/from Continental’s international hub at Newark Liberty International Airport. A twice-daily YGK-EWR non-stop link, using Embraer ERJ aircraft, would provide YGK passengers with a variety of beyond connecting opportunities, both in the United States and beyond. Other hub options in the northeastern United States include Northwest Airliner service to Northwest’s Detroit (DTW) hub, using Saab SF3 turboprop equipment, as well as non-stop service to United’s hub at Washington Dulles.

6.7 AIR CHARTERS

This chapter examines the potential for air charter service to meet a portion of the air service demand at Kingston (Norman Rogers) Airport. Air charter focuses on higher volume, lower-yield routes that are generally seasonal and/or cannot sustain scheduled service. Charter services are usually provided in conjunction with one or more tour
operators and/or wholesalers, who buy blocks of seats on the aircraft for inclusion in various vacation packages that they sell to clients.

The characteristics of charter carriers are significantly different from those of network or low cost carriers. Following are highlights of those differences:

**Service Strategy:**

- Low frequency approach (1-2 flights/week)
- Services are often confined to peak travel season only
- Very mobile and often choose substitute destinations (contestable demand), such as Las Vegas, Orlando or Mexico

**Sales Strategy:**

- Frequently sold through wholesalers as a package
- Look for inexpensive package components (all-inclusive resorts/packages)
- Service/destination decisions are often made by wholesalers
- Good for market development (establishing demand for a market)

**Traveler Type:**

- Carry Kingston outbound traffic only
- Very little business or VFR (visit friends and relatives) traffic
- Normally low yield and high load factor (90% and higher)

### 6.8 MARKET OVERVIEW

The charter market taps into the same pool of potential Kingston catchment area travellers as was identified in the overall Origin/Destination market size. Table 6-12 below reiterates the market potential.
Table 6-12: Kingston Catchment Area Origin/Destination Market Size Summary (2005/06)

<table>
<thead>
<tr>
<th></th>
<th>Current Air Market</th>
<th>Diversion</th>
<th>Total Air Market by Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>46,160</td>
<td>50,030</td>
<td>96,190</td>
</tr>
<tr>
<td>Transborder</td>
<td>13,770</td>
<td>69,850</td>
<td>83,620</td>
</tr>
<tr>
<td>International</td>
<td>6,600</td>
<td>42,230</td>
<td>48,830</td>
</tr>
<tr>
<td>Total</td>
<td>66,530</td>
<td>162,110</td>
<td>228,640</td>
</tr>
</tbody>
</table>


Notes: (1) Totals may not add due to rounding. (2) For air service development evaluation purposes, non-revenue passengers are excluded.

Based on the Top 10 market list identified in Section 6.3.2, the most logical potential transborder charter markets include Orlando (#4) and Las Vegas (#9). However it should be noted that charter airlines typically fly aircraft no smaller than a single-class, 150-seat narrow-body airplane, and generally prefer to fly high seating density, single-class wide-body aircraft. Considering the tight operating margins that charter carriers are working under, this high-volume, low cost approach makes sense for their business model. Given Kingston’s current 1,524 metres (5,000 ft.) runway, a narrow-body aircraft such as a Boeing 737 or Airbus 320 would be unable to take-off or land.

It is unlikely that Kingston will ever stimulate enough traffic to warrant an intercontinental charter flight to London or even a flight to a Caribbean island. Most realistic would be the potential of charter activity to/from Orlando and Las Vegas, pending necessary runway requirements. Furthermore, in the case of Orlando, the non-stop distance is such that a scheduled service using a 50-75 seat regional jet is much more likely to commence before significant charter activity is generated on the route.

6.9 POTENTIAL FOR AIR CHARTER

Based on the above observations related to Kingston’s relatively market sizes – even after including existing air traffic demand which is diverted to alternate airports/transporation modes, the core demand is insufficient to warrant serious consideration of the pursuit of charter flight activity. This is coupled with the fact that the smallest aircraft operated by charter carriers are high seat density narrowbody aircraft, and that these aircraft are unable to operate from YGK’s existing runway. Given these considerations, the potential for air charter traffic is not realistic at this point in time, nor for the foreseeable future.
6.10 AIR SERVICE DEVELOPMENT – SUMMARY AND RECOMMENDATIONS

In this section of the report, we have examined a number of factors linked to Kingston’s existing, as well as potential passenger air travel demand. Kingston suffers from substantial erosion of its core air travel market presently due to the existence of viable alternate airports within close driving/rail distance. These airports offer a wide array of non-stop flight options to the traveling public, from competing airlines at competitive prices. The other detriment to Kingston’s air service development is the airfield’s current lack of runway length. The current 1524 metre (5,000 ft) x 30 metre (100 ft) runway lacks sufficient landing and take-off length for all narrow body and many regional jet aircraft to utilize these facilities. Until the runway length is extended by a minimum additional 300 metres (1,000 ft), the airport will likely be restricted to service by turbo-prop aircraft.

Kingston is fortunate to be linked with Air Canada’s sizeable hub at Toronto Pearson International Airport multiple times each day. This vital air link provides Kingston catchment area passengers with the ability to travel by air between Kingston and worldwide destinations through flight connections at YYZ. Over time, as the local Kingston region economy grows, the price of gasoline causes travellers to reconsider flying instead of driving and Kingston air travel markets increase, there will no doubt be additional air services at Kingston. Non-stop air links between YGK and either Ottawa or Montreal have been attempted in the past, but have been discontinued for one reason or another. This does not mean that new direct air services between Kingston and other Canada/USA cities will not be introduced in the future.

It is highly appropriate and logical that Kingston (YGK) should aspire to attract a non-stop link with an additional airline hub in Canada such as Calgary or Montreal or even a focus city such as Winnipeg or Edmonton as well as one in the United States. Such a U.S. hub would further foster transborder commercial ties, and could provide an attractive competitive alternative to Air Canada’s existing Toronto service for the traveling public. Table 6-13 summarizes the potential flight options that might happen at Kingston.
### Table 6-13: Potential Routes for Kingston (Norman Rogers) Airport

<table>
<thead>
<tr>
<th>Canadian/USA City</th>
<th>Route</th>
<th>Airline</th>
<th>Possibility</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancouver</td>
<td>Non-stop AC</td>
<td>Unlikely</td>
<td>Minimal connectivity to help support local flight load</td>
<td></td>
</tr>
<tr>
<td>Vancouver</td>
<td>Via YYC or YWG AC or WS</td>
<td>Possible</td>
<td>Additional connectivity at YYC or YWG</td>
<td></td>
</tr>
<tr>
<td>Calgary</td>
<td>Non-stop AC</td>
<td>Possible</td>
<td>Considerable connectivity at YYC</td>
<td></td>
</tr>
<tr>
<td>Calgary</td>
<td>Via YWG AC or WS</td>
<td>Possible</td>
<td>Added YWG traffic can supplement YYC, which is critical for WS</td>
<td></td>
</tr>
<tr>
<td>Edmonton</td>
<td>Non-stop AC</td>
<td>Less likely</td>
<td>Less AC connectivity at YEG than at YYC</td>
<td></td>
</tr>
<tr>
<td>Edmonton</td>
<td>Via YWG AC</td>
<td>Less likely</td>
<td>YYWG could contribute to total onboard passengers</td>
<td></td>
</tr>
<tr>
<td>Orlando</td>
<td>Non-stop AC</td>
<td>Possible</td>
<td>Initial weekend-only non-stop service is a possibility, using CRJ-705 or EMB175 aircraft</td>
<td></td>
</tr>
<tr>
<td>Halifax</td>
<td>Non-stop AC</td>
<td>Unlikely</td>
<td>Market too small and not much connectivity</td>
<td></td>
</tr>
<tr>
<td>Halifax</td>
<td>Via YUL AC</td>
<td>Possible</td>
<td>YUL hub could enhance flight load</td>
<td></td>
</tr>
<tr>
<td>New York (LaGuardia)</td>
<td>Non-stop AC</td>
<td>Unlikely</td>
<td>Unlikely due to LaGuardia Airport slot constraints</td>
<td></td>
</tr>
<tr>
<td>New York (Newark)</td>
<td>Non-stop CO</td>
<td>Possible</td>
<td>Feeder hub for CO eastern U.S. and Europe</td>
<td></td>
</tr>
<tr>
<td>Winnipeg</td>
<td>Non-stop AC/WS</td>
<td>Possible</td>
<td>YYG is a focus city for WS</td>
<td></td>
</tr>
<tr>
<td>Winnipeg</td>
<td>Extended to YYC or YVR AC/WS</td>
<td>Possible</td>
<td>YYC traffic could supplement the YWG onboard passengers</td>
<td></td>
</tr>
<tr>
<td>Montreal</td>
<td>Non-stop AC</td>
<td>Possible</td>
<td>AC hub for east/west connectivity that is 1/3 the cost of YYZ</td>
<td></td>
</tr>
<tr>
<td>Montreal</td>
<td>Extended to YHZ AC</td>
<td>Possible</td>
<td>YHZ traffic can supplement YUL load</td>
<td></td>
</tr>
<tr>
<td>Detroit</td>
<td>Non-stop NW</td>
<td>Unlikely</td>
<td>A NW hub but somewhat of a back haul for a key northeastern U.S. markets</td>
<td></td>
</tr>
<tr>
<td>Philadelphia</td>
<td>Non-stop US</td>
<td>Possible</td>
<td>A US hub with strong connectivity along the entire eastern seaboard</td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td>Non-stop UA</td>
<td>Possible</td>
<td>Washington is a UA hub; some circuitry to northeastern business markets, but good connectivity to mid-Atlantic and southeastern regions</td>
<td></td>
</tr>
</tbody>
</table>
Section 7.0
Air Traffic Forecasts

7.1 AVIATION DEMAND FORECASTS

Forecasts were undertaken to gauge aviation traffic growth from 2005-2026. Aviation forecasts deal with different traffic components – including the number of passengers, aircraft movements and amount of cargo transported. Factored into the forecasts are outlooks for the regional socio-economic environment including population and economic growth, tourism developments, as well as potential market and air services expansion.

7.2 PURPOSE AND APPLICATION

Aviation activity forecasts are essential to airport management, operations and planning. Forecasts are expressed in terms of passengers, aircraft movements and the magnitude of air cargo tonnage. They are typically used to assess operational performance, to establish future facility/land use requirements, and to identify relative timings for the implementation of capital projects.

It is important to recognise that aviation forecasts are always in a state of revision and update as the inputs used to develop the forecasts are continually changing. The priorities and actions of carriers/operators in response to the changing demand and the industry environment further amplify this variation. Because of the dynamic nature of the forecasts, future facility needs and corresponding land requirements should be established as a function of traffic activity levels. Trigger points for facility expansion can then be identified. In this way, the facilities and corresponding land requirements for a certain activity level remain relatively constant, but the actual implementation schedules can be moved earlier or later as demand warrants. In addition, a forecast range (i.e. low, medium and high) is provided to address some of the uncertainties regarding the socio-economic environment and other factors that may affect the aviation forecasts.
Passenger demand is generally described in terms of annual enplaned plus deplaned (E+D) passengers at Kingston (Norman Rogers) Airport (YGK).

Annual aircraft operations are made up of itinerant movements and local movements. Itinerant operations are aircraft movements that depart or arrive at YGK to or from other destinations. Local aircraft movements are those operations that remain in the close proximity of Kingston (Norman Rogers) Airport (5 miles). Over the past 20 years at YGK, itinerant activity has generally accounted for approximately 60% of total operations. In 2005, itinerant movements amounted to 67% of total aircraft movements.

Planning peak period forecasts are forecasts of traffic levels (passenger or aircraft) at the busy periods of airport operations. These forecasts reflect the acute nature of traffic demands on airport facilities. Planning peak hour passengers are an essential input for terminal facility planning. Similarly, planning peak hour aircraft movements are critical in the assessment of runway, taxiway and terminal apron facilities.

Air cargo activity is expressed in tonnes of cargo and is generally used to determine the extent of land and facilities required by commercial operators to handle cargo at a particular airport.

### 7.3 Historical Aviation Activity

#### 7.3.1 Historical Passenger Traffic

The historical YGK enplaned and deplaned (E+D) passenger traffic is depicted in Figure 7.1.

**Figure 7.1: Historical YGK E+D Passengers**

Source: City of Kingston.
Over the period of 1990-2005, total enplaned and deplaned passengers handled at YGK increased by approximately 92%, reflecting an average growth of 4.5% per annum.

The significant surge in passenger traffic in 1999, due mainly to the introduction of a second airline serving YGK, also changed the traffic base at the airport.\(^1\) However, since 2001, the airport has experienced consecutive annual decreases in passenger traffic. The airport handled roughly 69,000 passengers in 2005, which represents a 16% decrease from the 2001 level. This decrease in traffic is consistent with the decline in scheduled passenger services. An analysis of the 2001-2005 OAG data revealed a steady decrease in scheduled flights/seat capacity from YGK since 2001 (52% decrease in flights offered by Air Canada).

Partial 2006 data suggests that traffic at the airport is recovering. For the January to July period, 2006 passenger traffic was 7% higher than that handled in 2005 – see Figure 7.2.

**Figure 7.2: YGK E+D Passengers, January-July (2005 versus 2006)**

\(^1\) In 1999, both Inter-Canadien and Air Canada Regional (ACR) operated from YGK to Toronto. Inter-Canadien also served the Ottawa/Montreal market. The increased frequency and seat capacity brought by ACR allowed more travellers to use the YGK facility.
7.3.2 Historical Cargo Activity

Statistics Canada and Transport Canada do not publish any cargo data for YGK. Currently, there are two primary cargo operators at YGK - Air Canada Jazz offers cargo services through its regular scheduled passenger services, and SkyLink Express offers daily cargo services to/from Hamilton (served with a Beechcraft 1900). Other small charter carriers may also handle some air freight. Overall air cargo traffic at YGK is not significant, estimated at approximately 500 tonnes a year.

A key reason that Kingston does not handle more cargo activity is its strategic location; which impedes air cargo operations at YGK from both a cost and logistics point of view. The airport's strategic location provides it with two notable disadvantages for more development:

1. **Proximity to Major Airports**: Kingston is located within close proximity to several larger airports with more developed cargo operations, including: Montreal, Ottawa, Toronto, and Hamilton. This, in combination with the extensive highway system and trucking industry makes cargo operations in/out of YGK relatively non-competitive.

2. **Position along three major east-west transportation routes**: In addition to air cargo operations at other airports, the region is also well served by other transportation modes (water, trucking, rail).

   - **Saint Lawrence Seaway**: The world’s longest deep draft inland waterway which provides access to 15 Canadian and U.S. ports. The Seaway offers a strategic geographical location, directly serving Ontario and Quebec to the north, and Illinois, Michigan, Ohio, Indiana, Wisconsin, Minnesota, New York and Pennsylvania to the south.

   - **Highway 401**: The 401 is one of the most important highway in Canada, as it connects Southern Ontario with Quebec and Michigan, while also connecting to most other major highways in the province. The highway also serves as the principal connection to Montreal and points east, becoming Autoroute 20 at the Quebec border.

   - **Rail access**: Both Via Rail and CN Rail offer regular daily freight services between Kingston and major Canadian markets.

7.3.3 Historical Aircraft Movements

The two basic types of aircraft movement activity at YGK are itinerant aircraft movements and local aircraft movements.

7.3.3.1 Historical Itinerant Movements

Itinerant aircraft movements refer to arriving and departing flights with origins and destinations other than YGK. Itinerant movements include both air carrier and general aviation operations. Carrier movements include passenger-related operations and other
carrier operations such as courier, air ambulance operations and smaller charter activities. General aviation activity includes “other commercial” operations, corporate/private aircraft and government aircraft operations.

Over the past twenty years, there have been considerable upward and downward swings in itinerant aircraft movements at YGK. From 1990 to 2005, itinerant operations have ranged between 20,060 and 32,530 movements a year, as depicted in Figure 7.3.

Annual itinerant movements have declined in consecutive years since traffic peaked in 1999. The consolidation of the domestic airline industry, reduced corporate aircraft operations, and a decline in itinerant flight training have all contributed to the recent decline in itinerant operations.

Figure 7.3: Historical YGK Itinerant Movements

![Figure 7.3: Historical YGK Itinerant Movements](image)

Source: Transport Canada, Aircraft Movement Statistics (AMS), TP 577.

7.3.3.2 Historical Local Movements

Local aircraft movements are movements that remain within the proximity of YGK. This type of activity is primarily linked to flight training operations at the airport. Currently, there are two flight training schools/operations that operate out of YGK - the Kingston Flying Club and Ontario Fun Flyers.

Over the past twenty years, local movements have been very cyclical, averaging about 18,000 operations a year (see Figure 7.4). There has been very little trending, just sporadic year-over-year increases and decreases. The decline in local movements since 2002 has been substantial, to a record low level of less than 10,000 movements in
2005. High costs in flight training (due mainly to increased fuel costs, and high insurance costs, particularly after the September 11 terrorist attacks on the U.S.) coupled with competition from other airports have resulted in the recent decline. High fuel costs may also deter some flying practices. In addition to the decline in fixed-wing airplane training, there was also an observed decline in helicopter training at the airport (helicopter training ceased in 2002). A third training school also ceased operations in 2002.

Partial 2006 data suggests that local movements appear to be recovering. Over the first six months of the year, local movements are roughly 12% higher than those recorded over the same period in 2005.

**Figure 7.4: Historical YGK Local Movements**

![Graph showing historical YGK local movements from 1985 to 2005](image)

Source: Transport Canada, Aircraft Movement Statistics (AMS), TP 577.

### 7.3.4 Aviation Industry Trends

In recent years, the world airline industry has been experiencing significant changes. Even before the terrorist attacks on the U.S., the world economic slowdown had impeded air travel growth and airline profitability. The tragic events of September 11th prompted a sharp downturn in passenger traffic in many markets. However, by 2003 world airline traffic had recovered to 2000 levels, and in 2005, traffic levels were approximately 21% higher than in 2000.

As economies improve, and the fear factor subsides, the airline industry adjusts and ultimately air travel resumes and continues to grow. It is likely that for the longer-term, basic airline dynamics will prevail. The globalisation of world economies and societies will continue. There will be increased air travel for business transactions, visiting friends and relatives, as well as for leisure and educational experience only available abroad.
Over the period of 2005 to 2025, Boeing forecasts that world air passenger traffic will grow faster than the world economy, at about 4.9% per year (compared to 3.1% per annum worldwide economic growth). The additional growth will be stimulated by lower fares, growing world trade, and airline network improvements including increased frequencies and more direct service. Regional traffic flow will vary, depending on economic growth and market maturity. Table 7-1 presents the forecast regional traffic flows that may affect North American airport traffic.

<table>
<thead>
<tr>
<th>Table 7-1: Forecast World Passenger Traffic Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North America (to and from)</strong></td>
</tr>
<tr>
<td><strong>2005-2025 (20 years)</strong></td>
</tr>
<tr>
<td>Europe</td>
</tr>
<tr>
<td>4.9% p.a.</td>
</tr>
<tr>
<td>North America</td>
</tr>
<tr>
<td>4.5% p.a.</td>
</tr>
<tr>
<td>Asia Pacific</td>
</tr>
<tr>
<td>5.9% p.a.</td>
</tr>
</tbody>
</table>

Source: Boeing Current Market Outlook, 2006

For Canada, the recent Transport Canada General Forecast Update (2005-2019) indicates that passenger traffic for Canada will grow at an average annual rate of 3.2%. For Ontario as a whole, passengers are forecast to increase at a slightly higher rate of 3.5% per year between 2005 and 2019.

### 7.3.5 Aviation Demand Forecasts - Kingston (Norman Rogers) Airport

As previously mentioned, the aviation forecasts are based on several key factors, which include: the regional socio-economic environment and outlook, regional tourism developments, and potential market and air services expansion. Low, Medium and High forecasts were prepared for passengers, cargo and aircraft movements.

#### 7.3.5.1 Socio-Economic Environment Outlook

Kingston is located at the eastern end of Lake Ontario, roughly equidistant from Toronto, Montreal and Ottawa. With an approximate driving time of three hours between Montreal and Toronto, its geographic location makes it a hub for business opportunities.

The region’s demographic characteristics (age profile, family characteristics, marital status, and income) are very similar to those of the province of Ontario. One key difference between the Kingston region and the province in terms of demographics is that Kingston has a larger senior base (Kingston is a retirement location for many Ontario residents).

Recently, through planned improvements in infrastructure and the willingness of young professionals to move from large cities (e.g. Toronto) to middle sized cities, the region has been successful in attracting young middle-class individuals and their families.
The key economic sectors within the region include: health care, education, government, tourism, manufacturing, and research and development. The local economy relies heavily on public sector institutions and establishments such as the Royal Military College (RMC) and Queen’s University. The region also houses the largest group of federal penitentiaries in Canada.

Recently, there has been significant growth in several industries, including: biotechnology, alternative energy research, customer call centres, and software development.

The regional socio-economic environment will continue to expand over the forecast horizon. Over the period of 2005 to 2016, population, personal disposable income (PDI) and real GDP in the region are expected to grow on average by 0.9%, 1.2% and 2.4% per annum, respectively.\(^2\)

### 7.3.5.2 Passenger Traffic Forecasts

Passenger traffic growth at YGK will largely be driven by regional economic and population growth, influenced by market and air services development.

Low, Medium and High forecasts were generated. The Medium forecast represents the most likely scenario based on the socio-economic outlook and market development potential.\(^3\) The Low forecast assumes slower economic growth for the region and stagnant market growth, while the High forecast reflects a more optimistic economic outlook plus increased tourism and market development.

For the short-to-medium term, the Medium passenger forecasts indicate passenger traffic growth of 2.8% per annum, reaching 93,500 passengers by 2016. By 2026, YGK is projected to handle 116,000 passengers a year. The medium forecasts incorporate certain assumptions, including:

- **Continued diversion:** Due to the nature of the Kingston catchment area (proximity to larger airports, and modal competition), it is assumed that the diversion of YGK traffic will continue into the forecast horizon.

- **No significant changes in air services:** Based on the market research and air service development analyses, it is expected that no significant changes in air services will occur over the forecast horizon.

\(^2\) There are no available forecasts for regional GDP and PDI. The regional socio-economic projections are based on historical Census data for the Kingston region and Ontario, as well as the Transport Canada economic forecasts for Ontario used in the General Forecast Update.

\(^3\) The traffic forecasts incorporated historical growth trends, regional population and socio-economic forecasts, and relevant demand elasticities derived by Transport Canada. Potential market development was also considered.
• **Socio-economic growth:** The Medium forecasts reflect the socio-economic forecasts as discussed earlier.

Table 7-2 provides a summary table of the passenger forecast growth ranges, while Figure 7.5 displays the corresponding graph. In the short-to-medium term, average annual passenger traffic growth ranges between 2.0% and 3.6% per annum. Over the entire forecast horizon (2005-2026), annual passenger growth ranges between 1.7% and 3.3%.

<table>
<thead>
<tr>
<th>Forecast Period</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005-2016</td>
<td>2.0%</td>
<td>2.8%</td>
<td>3.6%</td>
</tr>
<tr>
<td>2016-2026</td>
<td>1.3%</td>
<td>2.2%</td>
<td>3.1%</td>
</tr>
<tr>
<td>2005-2026</td>
<td>1.7%</td>
<td>2.5%</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

**Figure 7.5: Enplaned and Deplaned Passenger Forecasts**

7.3.5.3 **Air Cargo Forecasts**

Given the nature of economic activity in the Kingston region and available convenient access by ground transportation (both rail and highway) to the region, the potential for air cargo growth at YGK is not expected to be significant.
There have been discussions regarding attracting a dedicated cargo operator to the airport, but several key operational issues must first be resolved. These issues include the current runway length, and the proximity of the taxiway to residential areas.

Based on the existing ground transportation options, proximity to larger and well-established air cargo operations at other airports, traffic is forecast to increase along with the regional economy, reaching approximately 700 and 900 tonnes a year by 2016 and 2026 respectively.

### 7.3.5.4 Aircraft Movement Forecasts

Aircraft movement forecasts are based on a combination of factors, including: historical movement activity, passenger forecasts and average flight loads, air service development as well as the recovery of general aviation activity and local flight training. Figure 7.6 displays the itinerant, local and total aircraft movement forecasts.

In the short-to-medium term, the medium forecast projects total aircraft movements to increase on average by 3.7% per annum, reaching 44,500 operations by 2016. Aircraft movements are expected to reach 53,000 by 2026, growing on average by 2.8% per annum over the entire forecast period (2005-2026).

**Figure 7.6: Total Aircraft Movement Forecasts**

![Total Aircraft Movement Forecasts](image-url)
7.3.5.4.1 Itinerant Movements

Air Carrier Movement Forecasts

Air carrier movements include operations by Level I-VI carriers offering scheduled and charter services to carry passengers and/or cargo, and other carriers. In 2005, YGK handled approximately 2,500 carrier movements related to passengers and 6,200 other carrier operations. The balance of 11,360 itinerant movements was categorized as general aviation operations.

Passenger-carrier operations are forecast to grow in line with passenger demand, albeit at a slightly lower annual rate over the forecast horizon due to increased aircraft productivity. Productivity improvements can result from improved load factors and/or slightly larger average aircraft size. By the end of the forecast horizon (2026), YGK is expected to handle roughly 4,000 passenger-carrier movements annually.

Other carrier movements, including air ambulance, courier and other small commercial charter operations, are expected to increase with the regional economic growth. Corporate cost-saving measures that induces more use of commercial charters, increased air tour activity and expanded hospital infrastructure, etc. may also help the growth of other carrier operations. This traffic component is forecast to increase at 3% per year, reaching 11,500 operations annually by 2026.

Based on the medium forecasts, by the end of the forecast horizon (2026), YGK is projected to handle 15,500 total carrier movements.

General Aviation Movement Forecasts

General aviation movements include “other commercial” activities, private/corporate aircraft and government aircraft (civil/military) activities. Other commercial operations include commercial flight training, sightseeing, aerial surveys and aerial inspection services, etc. by non-government aircraft. Private aircraft movements include both corporate and personal aircraft operations.

Over the last 15 years, general aviation operations at YGK ranged between 9,000 to 13,800 movements a year with a cyclical pattern. In 2005, YGK handled approximately 11,400 general aviation operations. In recent years, the reduction in corporate/private aircraft operations has been somewhat offset by increases in “other commercial” operations. Government aircraft activity has been relatively stable.

Over both the medium and long term, general aviation movements are forecast to increase moderately, on average by about 1.5% per annum, to 15,500 movements by

---

4 The ‘other carriers’ category includes activities such as air ambulance, courier services, and other commercial charter operations.
2026. Growth in “other commercial” operations and recovery in corporate/private aircraft activity will contribute to most of the traffic increases.

**Total itinerant Movement Forecasts**

Total itinerant movements represents the sum of both air carrier and general aviation movements. Over the forecast horizon, itinerant operation will go through a recovery phase and continue to grow. Between 2005 and 2026, itinerant aircraft movements will increase at an average annual rate of 2.1%. YGK is forecast to handle 31,000 itinerant operations by 2026.

### 7.3.5.4.2 Local Movements

Historical annual local operations have been within the range from 10,000 to 22,000 movements, averaging 18,000 movements per year. While 2006 activity indicates some recovery in this traffic component, further growth will depend mostly on future student enrolment.

Currently, the demand for flight training at YGK is not high. However, as the baby-boomer generation pilots continue to retire and more pilot jobs become available, it is likely that the demand for flight training will respond and increase. Assuming competitive flight training costs at YGK, local operations are forecast to recover and continue to increase moderately, resulting in 19,000 and 22,000 movements by 2016 and 2026 respectively.

**7.3.6 Traffic Peaking Analysis**

While Planning Peak Day Movement (PPDM) forecasts are essential input for the noise impact analysis (NEF contours), Planning Peak Hour Movement (PPHM) and Planning Peak Hour Passenger (PPHP) forecasts are used to determine the future capacity requirements of airside and terminal facilities.

### 7.3.6.1 Passenger Peaking

Historically, during the peak period (peak hour), YGK has handled two passenger aircraft at the passenger terminal with over 63 seats. Currently in 2006, there is only one turboprop aircraft with 37 or 50 seats during the peak hour.

In the future, as total traffic demand grows, it is expected that planning peak hour passengers will also increase. However, it is not exactly known how air services will evolve. Aircraft upgauging during the peak period is likely, even if there would not be incremental services during the peak.

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5 During the summer of 1999, both Inter-Canadian and Air Ontario operated flight departures within half an hour, using an ATR42 and a DH8-100 respectively.
For master planning purposes, it is suggested that terminal facilities should be able to accommodate at least 70+ passengers per hour. This peak demand will provide the flexibility to support two smaller turboprop aircraft (a 50-seat plus a 20-seat) or a larger aircraft of the 70-seat range. Terminal expandability should also be incorporated.

### 7.3.6.2 Aircraft Movement Peaking

Planning Peak Hour Movement (PPHM) forecasts take into consideration the historical peaking characteristics of aircraft operations at YGK and the annual aircraft movement forecasts, assuming moderate peak spreading over the forecast period. These peaking analyses are based on 2005 Transport Canada/Statistics Canada Aircraft Movements Statistics (AMS).

Itinerant peak hour activity has the most impact on the capacity of airside facilities, while peak day activity is essential to assessing noise impacts and noise contour development. Itinerant and local peaking characteristics at YGK for 2000, 2004 and 2005, along with forecasts for 2016 and 2026 are presented in Table 7-3. The 2005 itinerant planning peak movement characteristics are displayed graphically in the Appendix D.

Our analyses of future itinerant PPHM and PPDM suggest that the peak traffic does not increase significantly. YGK should have sufficient airside capacity to meet the peak traffic demand.

<table>
<thead>
<tr>
<th>Table 7-3: YGK Planning Peak Hour Movements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Itinerant</strong></td>
</tr>
<tr>
<td><strong>Annual</strong></td>
</tr>
<tr>
<td><strong>Planning Peak Day (PPDM)</strong></td>
</tr>
<tr>
<td><strong>Planning Peak Hour (PPHM)</strong></td>
</tr>
<tr>
<td><strong>Local</strong></td>
</tr>
<tr>
<td><strong>Annual</strong></td>
</tr>
<tr>
<td><strong>Planning Peak Day (PPDM)</strong></td>
</tr>
</tbody>
</table>

Air services development analysis does not suggest a high probability of a larger aircraft serving YGK.

Planning peak hour movement is the demand concept for airside facility planning. PPHM is based on the 95th percentile concept that Transport Canada developed for airside capacity analysis. Facility designed adopting this concept will likely lead to 5% of the annual traffic experiencing delay.
Section 8.0 Facility Requirements

8.1 INTRODUCTION

To properly plan for the future of Kingston Airport, it is necessary to translate forecast aviation demand (as presented in Section 7) into the specific improvement requirements for existing facilities, as well as the types and quantities of new facilities needed to adequately serve this identified demand. This section uses established planning criteria to determine specific airside and landside requirements recommended during the planning horizon.

The objective of this effort is to identify in general terms, the adequacy or inadequacy of existing airport facilities, outline what new facilities may be needed, suggest alternatives for meeting these needs, and establish the timing for implementation based on identifiable “trigger” points.

8.1.1 Planning Criteria

The planning associated with the proposed facility requirements is based on meeting Transport Canada Standards and Recommended Practices for Aerodromes (TC Doc. No. TP312E, 4th Ed., March 1993) and related requirements for certified aerodromes (generally covered under applicable Canadian Aviation Regulations [CAR]).

As confirmed with the Airport Committee, the facility requirements planned shall comply with the following key assumptions:

- The Airport will remain a certified, public use facility;
- Overall layout and facility locations are to protect for a Precision Approach, Code 4 Runway 01-19 with a maximum allowable length that can be accommodated within the current property boundary (> 1800 metre in length); and
• Aircraft manoeuvring surfaces and parking areas are to protect for the physical characteristics of Code C aircraft (< 36 metre wingspan).

• Design aircraft for the short term improvements will be the DHC-8-400, a Code C turboprop aircraft. To protect for the long term improvements the design aircraft used is a Code C jet aircraft such as the A320, B-737, ERJ-195 plus the Code B CRJ-700.

8.1.2 Implementation Timelines

The ultimate development recommendations have been broken down into three timeframes:

**Short Term**: representing activities that are recommended to be undertaken immediately and up to approximately 5 years into the future.

**Mid Term**: activities that should be protected for now and could be required based on demand at any time but more likely in the 10 -15 year time frame.

**Long Term**: activities that are considered as part of the airports overall vision and would be undertaken in the 15-20 year and beyond time horizon.

8.2 AIRSIDE FACILITIES

8.2.1 Runways

8.2.1.1 Runway Surface Remediation

Discussions between the Airport and Transport Canada in the fall of 2006 have resulted in their agreement in principle to fund the rehabilitation of the complete length of Runway 01-19 including the turning buttons and transitions to adjacent pavements. This work would be completed under the Federal Airport Capital Assistance Programme (ACAP).

The rehabilitation plans include major crack repair as well as partial depth milling (50 mm) and a 50 mm overlay. In order to meet the requirements of TP312E, the current width of the graded area for Runway 01-19 will need to be increased to 75 metres by relocating the ditches along the east and west sides of the runway (in order to meet Code 3 requirements). This work will be included in the proposed rehabilitation works and will be funded by Transport Canada resulting in the TC deviation exemption being lifted following relocation.

Based on the February 8, 1999 Pavement Condition Rating and Load Testing report by JEGEL, the easterly extension of Runway 07-25 is in good condition. The remainder of the runway has regular low to medium severity longitudinal and transverse cracking. It was noted that there were several areas of significant slippage cracking. Based on a visual inspection of the runway the current condition of this runway is similar to its condition noted in 1999.
It is therefore recommended that this runway be rehabilitated between the threshold of Runway 07 and Taxiway Bravo within the next 5 years. As the remaining portion of the runway is generally considered to be in good shape due to its more recent construction in 1996, rehabilitation of this section is probably not required within the next 10 years.

It is however suggested that a pavement condition assessment be completed every 5 years to ensure that the pavements do not deteriorate to a point where a more extensive and costly rehabilitation strategy will be needed.

8.2.1.2 Runway Improvements

TC Doc. No. TP312E recommends that the actual length of an airport’s primary runway should be adequate to meet the operational requirements of the aircraft for which the runway is intended. This length should not be less than the longest length determined by applying the corrections for local conditions (e.g. elevation and temperature) to the operations and performance characteristics of the relevant aircraft. Generally, the aircraft for which the primary runway is intended is commonly referred to as the critical design aircraft.

Runway 01-19

The current length of the primary runway, Runway 01-19 is adequate to meet the airport’s short term needs and potentially into the mid term planning horizon. Although there have been some comments provided that suggest Runway 01-19 is too short for some business jets; particularly during poor weather resulting in reduced runway friction, the runway currently meets the needs of the scheduled, charter and public aircraft that normally use the airport.

The following are examples of aircraft than can be accommodated within Runway 01-19’s current 1,524 metre (5,000 ft) length (sea level, ISA + 15 deg C, MTOW, zero wind and dry pavement) based on manufacturers’ performance literature:

- Beech 1900
- DeHavilland -Dash 8 – 100
- DeHaviland - Dash 8 – 300
- SAAB 340 B
- Jetstream 31
- Falcon 50
- BritishAerospace-BAE-146

In all cases the landing distance for these aircraft can also be accommodated at maximum landing weight (MLW). For further information on takeoff and landing length requirements for the above referenced aircraft refer to Table 8-1.
Table 8-1 – Aircraft Runway Requirements

<table>
<thead>
<tr>
<th>Airplane Type</th>
<th>ALR</th>
<th>Seats</th>
<th>MTOW</th>
<th>MLW</th>
<th>Range</th>
<th>Take-Off Runway Length</th>
<th>Landing Runway Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Max Max</td>
<td>MTOW MTOW</td>
<td>Sea Level, ISA MTOW</td>
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<tr>
<td>Beech 1900C</td>
<td>2.9</td>
<td>19</td>
<td>16,600</td>
<td>16,100</td>
<td>629</td>
<td>3,800</td>
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</tr>
<tr>
<td>Dash 8 - 100</td>
<td>4.6</td>
<td>37</td>
<td>34,500</td>
<td>33,900</td>
<td>530</td>
<td>3,875</td>
<td>4400</td>
</tr>
<tr>
<td>Dash 8 - 300 (Model 311, DS-300A)</td>
<td>4.8</td>
<td>50</td>
<td>43,000</td>
<td>42,000</td>
<td>850</td>
<td>4450</td>
<td>4750</td>
</tr>
<tr>
<td>SAAB 340 B</td>
<td>34</td>
<td>29,000</td>
<td>28,500</td>
<td>345</td>
<td>4220</td>
<td>4600</td>
<td>Not provided</td>
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<tr>
<td>Embraer 135 Long Range Model</td>
<td>37</td>
<td>44,092</td>
<td>40,785</td>
<td>1750</td>
<td>5774</td>
<td>5872</td>
<td>4,462</td>
</tr>
<tr>
<td>Embraer 145, Model ER, A1 Engines</td>
<td>6</td>
<td>50</td>
<td>45,415</td>
<td>41,226</td>
<td>&lt;1100</td>
<td>6430</td>
<td>6500*</td>
</tr>
<tr>
<td>Embraer 175, LR Model, CF34-10E5</td>
<td>7.2</td>
<td>82</td>
<td>84,000</td>
<td>77,500</td>
<td>975</td>
<td>4000</td>
<td>5000</td>
</tr>
<tr>
<td>Lear 60</td>
<td>4.6</td>
<td>10</td>
<td>23,500</td>
<td>19,500</td>
<td>2451</td>
<td>5450</td>
<td>Not provided</td>
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<tr>
<td>Falcon 50EX</td>
<td>8</td>
<td>39,700</td>
<td>35,715</td>
<td>3075</td>
<td>4890</td>
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<tr>
<td>Gulfstream G500</td>
<td>19</td>
<td>85,100</td>
<td>75,300</td>
<td>5100</td>
<td>5150</td>
<td>5600</td>
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<td>9</td>
<td>13,870</td>
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<tr>
<td>Challenger 601</td>
<td>6.4</td>
<td>12</td>
<td>48,200</td>
<td>38,000</td>
<td>5840</td>
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<tr>
<td>Citation Encore</td>
<td>6.6</td>
<td>15</td>
<td>16,830</td>
<td>15,200</td>
<td>1778</td>
<td>3550</td>
<td>2,777</td>
</tr>
<tr>
<td>CRJ100 ER</td>
<td>6.5</td>
<td>50</td>
<td>1015 to 574</td>
<td>6000*</td>
<td>6000**</td>
<td>4,900</td>
<td></td>
</tr>
<tr>
<td>CRJ100 ER</td>
<td>6.5</td>
<td>50</td>
<td>1112 to 919</td>
<td>6500</td>
<td>6500*</td>
<td>4,900</td>
<td></td>
</tr>
<tr>
<td>CRJ200ER</td>
<td>6.5</td>
<td>50</td>
<td>1062 to 752</td>
<td>6000</td>
<td>6000*</td>
<td>4,850</td>
<td></td>
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<tr>
<td>CRJ700ER</td>
<td>7.6</td>
<td>75</td>
<td>1416 to 1140</td>
<td>6000*</td>
<td>6000**</td>
<td>5,235</td>
<td></td>
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<tr>
<td>CRJ700ER</td>
<td>7.6</td>
<td>75</td>
<td>1758 to 1573</td>
<td>6500</td>
<td>6500*</td>
<td>5,235</td>
<td></td>
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<tr>
<td>A320 - 200</td>
<td>9.7</td>
<td>164</td>
<td>162,037</td>
<td>142,196</td>
<td>&lt;2800</td>
<td>6500**</td>
<td>6500**</td>
</tr>
<tr>
<td>B737-700</td>
<td>10.2</td>
<td>128</td>
<td>154,500</td>
<td>129,200</td>
<td>not available</td>
<td>6500***</td>
<td>6500***</td>
</tr>
<tr>
<td>B737-700</td>
<td>10.2</td>
<td>128</td>
<td>154,500</td>
<td>129,200</td>
<td>not available</td>
<td>6500***</td>
<td>6500***</td>
</tr>
</tbody>
</table>

Notes/Legend

- Weight penalty assumed, reduced range shown
- Take-off weight must be reduced to 152,000 lbs @ ISA + 15deg C
- B737-700 will need to reduce it take-off weight to 148,000 lbs at ISA + 15 deg C
- Aircraft that can be accommodated with 5000 ft of runway
- Aircraft that can be accommodated with 6000 ft of runway
- Aircraft that can be accommodated with 6500 ft of runway

Over the longer term, and in conjunction with the growth of the City and its air traffic requirements, it is envisioned that there may be justification for an increase in aircraft requiring longer runway surfaces due to:

- Increased demand for business travel using faster aircraft with their attendant additional runway length requirements;
- Potential demand for scheduled air service routes using larger turboprop and / or regional jet aircraft with their corresponding longer runway requirements;
In order to allow for these potential future needs, it is recommended that the City protect Runway 01-19 for a maximum runway length of 1,829 metres (6,000 ft). This runway length will accommodate the following additional aircraft (sea level, ISA + 15 deg C, MTOW, zero wind and dry pavement):

- Beech 1900
- Dash 8 – 100 /300 / 400
- SAAB 340 B
- Embraer 135, LR
- CRJ-100
- CRJ-200, (MTOW of 47,450 lbs)

This runway length would also accommodate other Code C jet aircraft such as the B737-700, however they could not operate under maximum takeoff weight (MTOW) resulting in a shorter range or reduced payload. Since in all cases, the landing distance requirement for these aircraft is less than their takeoff needs, almost all can be accommodated at their maximum landing weight (MLW). For further information refer to Table 8-1.

Establishment of the maximum runway length of 1,829 metres (6,000 ft.) was determined based on the following assumptions and constraints.

**205 metre (672 ft) Extension to the North**

- Runway extension works with the exception of the approach lighting system will be confined to within the existing airport boundary.

- Transport Canada’s recommendation for a Runway End Safety Area (RESA) will become a requirement in the near future. A 90 metre RESA has therefore be accounted for at the end of the runway strip south of Coverdale Drive.

- A grading allowance to slope down to existing ground as well as an allowance for an airport maintenance road around the perimeter of the airport lands.

- No changes in the existing registered aeronautical zoning is planned.

**100 metre (328 ft) Extension to the South**

- Runway extension works with the exception of the approach lighting system will be confined to the north side of Front Road.

- Transport Canada’s recommendation for a Runway End Safety Area (RESA) will become a requirement. A 90 metre RESA would therefore be provided at the end of the runway strip north of Front Road.
A grading allowance to slope down to existing ground as well as an allowance for an airport perimeter maintenance road will be provided.

Approximately 7 metres of clearance between the future OLS and Front Road would be provided. It is recommended that the existing power lines along Front Road at the end of the runway be buried in order to provide similar obstacle clearance.

The Localizer would be removed in conjunction with this extension and would need to take place after replacement with Global Navigation Satellite System (GNSS) stand alone approaches designed to current ILS minimums. It should be noted that substantial grading on existing private property located south of the runway including a likely Front Road realignment would be required for the localizer if it was decided to retain the current ILS system.

A 450 metre long Simple Approach Lighting System (ODALS) would be provided as recommended by TC Doc No. TP312E for a Non-Precision approach. One light would need to be placed in the water approximately 15 to 30 metres off shore. Approval from both Transport Canada (Navigable Waterways Branch) and Fisheries and Oceans Canada would be required for this installation.

If the existing approach to Runway 01 was upgraded to a Precision Approach facility, a 720 metre long medium intensity (MALSR) approach lighting system would need to be installed requiring a total of 5 lights to be placed in Lake Ontario to a distance of approximately 304 metres from the shore.

A further northerly runway extension is physically possible, however it will result in some significant operational impacts on properties to the north of the Airport lands. Since the additional +/-150 metre (500 ft.) length provides only marginally enhanced aircraft accessibility, it is not recommended to pursue this option.

The federally registered Aeronautical Zoning currently in place for Runway 01-19 as described in Section 3 of this report and depicted on Figure 9.1 is based on a 1,524 meter (5,000 ft.) Code 3C Category 1 Precision Approach runway. To accommodate an 1,829 metre (6,000 ft.) runway length, we recommend that the existing approach zoning be retained in its current configuration and the new threshold 19 be displaced by 205 metres to the south. By doing so the airport will be able to offer a 1,829 metre (6,000 ft.) runway Take Off Run Available (TORA) to accommodate the above referenced aircraft without necessitating expensive and time consuming OLS zoning changes north of the airport or creating negative impacts on existing off site businesses such as the Collins Bay Marina.

For the southerly runway extension, it is recommended that since only one row of properties exists between the Airport controlled lands and Lake Ontario, the zoning controls in this area be updated by municipal land use planning by-law or property acquisition be initiated immediately.
Based on this recommendation, the declared distances for the 1,829 metre (6,000 ft.) runway are provided in Table 8-2 below.

<table>
<thead>
<tr>
<th>Table 8-2 – Declared Distances Runway 01-19 (1,829m)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Declared Distances</strong></td>
</tr>
<tr>
<td>TORA</td>
</tr>
<tr>
<td>TODA¹</td>
</tr>
<tr>
<td>ASDA</td>
</tr>
<tr>
<td>LDA</td>
</tr>
</tbody>
</table>

Note 1: It has been assumed that the north end of the existing runway will be extended within the existing clearway such that additional clearing will not be required except for that which is required for the regular maintenance of the existing OLS as well as for the future construction of Taxiway Charlie.

**Runway 07-25**

The possibility of extending Runway 07-25 was reviewed to confirm its feasibility. It was found that there were a number of constraints that would make any significant extension of this runway difficult, if not impossible. A summary of the issues and constraints are provided below:

- Based on a 90 metre RESA, the longest physical extension of Runway 07-25 (assuming for the moment that there are no other constraints) would be 195 metres to the west and 215 metres to the east resulting in an overall runway length of 1,609 metres. Since this is only 85 metres longer than the existing primary runway it offers no long term benefit to the airport.

- While the current federally registered Obstacle Zoning protects for Non-Precision Approaches for Runway 07 and Runway 25, both are currently operating under Non-Instrument Approach procedures with their associated reduced visual aid requirements. Upgrading Runway 07-25 to a Non-Precision approach category would, according to TC Doc. No. TP312E, necessitate inclusion of a Simple Approach Lighting System (ODALS). This approach lighting system would require a total length of 450 metres from each threshold. This space is currently not available at either end of the existing runway before intersecting with the airport boundary. The inclusion of ODALS would therefore necessitate as a minimum, acquisition of permanent easements on private properties.

- Extension of Runway 07-25 toward the east would require revisions to the existing Aeronautical Zoning over built-up areas. Furthermore an increase in noise profiles over these residential areas would be anticipated.

As any significant extension of this runway will not yield a length much longer than current Runway 01-19 and the impacts of such expansion are quite significant, it is recommended that the current length of Runway 07-25 remain unchanged.
Figures 8.2 8.3 and 8.4 illustrate the airfield layout based on the short, mid and long term airfield recommendations.

8.2.2 Runway Approaches

8.2.2.1 Instrument Landing Aids

The current City of Kingston owned Instrument Landing System (ILS) provides Precision Approach aircraft guidance for Runway 01-19. It was installed in 1986. NavCanada currently maintains the system on behalf of the City, on a cost recovery basis.

NavCanada have no plans to upgrade the equipment unless the City is prepared to provide the necessary capital investment. Since the system is reaching its life expectancy, spare parts are becoming difficult to obtain. Accordingly, over the next 5-10 years, replacement of this unit or switching to Global Positioning System (GPS) based approaches will need to be considered in order to retain the Precision Approach operating parameters on Runway 01-19.

Global Positioning System Technology

The global trend for not only airport approaches, but also air navigation in general, is toward the use of GPS equipment. GPS technology, which was initially developed by and for the U.S. military, is based on a constellation of 24 satellites orbiting the earth that send signals to receivers on earth. When receiving the signals from at least four satellites, a GPS receiver can determine the latitude, longitude, altitude and time.

Since January 2003 the use of Wide Area Augmentation System (WAAS) receivers for en-route, terminal, and Non-Precision Approach operations has been permitted in Canada. Vertical guidance provided by WAAS receivers is now authorized for RNAV approaches. The use of WAAS compatible equipment will provide aircraft with the abilities to fly precision type approaches to LNAV/VNAV (lateral / vertical navigation) and LPV (localizer performance with vertical guidance) minimums. It should be noted that these approaches do not currently meet the International Civil Aviation Organization’s (ICAO) requirements for Precision Approaches.

Based on our research and a number of discussions with Nav Canada, Avionics suppliers and flight instructors it is clear that the use of GNSS with WAAS is in its infancy in Canada as well as in Ontario. Approaches currently available for use by pilots in Canada generally consist of GPS overlay approaches which are traditional VOR or NDB based approaches which have been approved for use using the guidance of Instrument Flight Rules (IFR) approach-certified GNSS avionics. These approaches allow aircraft to be flown to non-precision minimums. There are approximately 120 of them in Canada. The use of overlay approaches is intended as a temporary measure until GNSS stand-alone approaches can be developed. One example of an overlay approach is the NDB RWY19 (GNSS) approach at Kingston airport which allows approaches to Runway 19 to a MDA (minimum decision altitude) of 840 ft. ASL (540 ft. AGL).
GNSS based RNAV approaches are currently being developed for runways with no traditional approach, runways that are currently served by circling type approaches or runways with a traditional approach that would gain an operational advantage with a GNSS-based approach. There are approximately 350 of these approaches in the Canada Air Pilot (CAP) at this time.

Further research shows the following:

- **Need published approaches** – A review of the CAP at this time shows that LNAV/VNAV approaches are not authorized at this time in Ontario. There is only one LPV approach and this is at Kitchener/Waterloo.

- **Need equipment** – Equipment necessary to fly LNAV/VNAV or LPV type approaches is not installed in the training aircraft at two of the largest flight training schools in Ontario.

- **Need to upgrade aircraft avionics** – The Garmin GNS 480 would provide the necessary avionics required to fly LNAV/VNAV and LPV approaches. This unit in addition to a compatible Course Deviation Indicator (CDI) would cost approximately $16,000 to $18,000.

- **Need to train pilots** – Instructors are unfamiliar with LNAV/VNAV and LPV approaches and will need to undergo further training/familiarization before pilots can be trained to undertake these type’s of approaches.

- **Holders of air operator certificates (AOC) issued under Part VII of the CAR’s, and private operator certificates issued under Part 604 of the CAR’s are required to be authorized by an operations specification to conduct GNSS instrument approach operations in IMC.**

- **Airlines will need to invest funds in upgrades to avionics before GPS approaches to LPV minimums becomes a reality.**

While the Kingston Airport users, including the Flight Training schools, benefit from the current ILS facilities, the ongoing cost of maintenance, the scarcity of parts and the very expensive system replacement cost, transition to a GPS based approach in next 5 to 10 years should be considered.

Accordingly we recommend:

- **The City request that Nav Canada expedite the preparation of RNAV (GNSS) approaches for Runway 01-19 and Runway 07-25.** It is imperative that the approaches to Runway 19 be designed to LPV minimums in order to provide the same decision altitude as the current ILS approach for that runway. The remaining runway approaches should be designed to LNAV and LNAV/VNAV minimums. Provision of these GPS approaches should be undertaken as soon as possible in order to allow a transition period for both training and for upgrades to aircraft avionics before the eventual failure of the ILS approach system.
• Retain the current ILS system maintenance contract with NavCanada in the short term to provide a transition period. This will allow local based pilots requiring the necessary equipment, the opportunity to move to a GPS based approach over an extended time frame. While the change may have an initial detrimental and financial impact on a portion of the local flight training operations, the use of a GPS approach could also open up new pilot training opportunities at the airport in the mid term.

• The decommissioning of the ILS should be completed in advance of any runway extension planned to the south end of Runway 01-19 unless a new localizer was being contemplated in lieu of the GPS approach solution.

8.2.2.2 Visual Approach Aids

As indicated in Section 4, the existing approach lights at both ends of Runway 01-19 are low intensity centreline type fixtures and are less than 400 metres in length. Transport Canada indicates in TC Doc. No. TP312E that “It is intended that existing approach lighting systems not conforming to the specifications in 5.3.5 be replaced not later than January 1, 2005”.

Assuming that the Precision Approach to Runway 19 and the Non-Precision Approach to Runway to 01 are maintained, the approach lights will need to be upgraded over time at both ends of the runway as described below.

While for Runway 01, a 450 metre long Simple Approach Lighting System (ODALS) is recommended by TC Doc. No. TP312E, no changes are currently proposed for this system in the short term. However, assuming in the mid term that the runway was extended by 100 metres to the south, as suggested in Section 8.2.1.2, the ODALS would need to be upgraded to the current standard resulting in one approach light needing to be installed in Lake Ontario approximately 30 metres from shore.

To accommodate the Runway 19 extension of 205 metres (672 ft.), it is anticipated that Transport Canada would recommend the existing substandard approved lighting be replaced with a new 720 metre long MALSR approach lighting system in conjunction with this work. This would result in additional light towers being required in Collins Bay with their potential impact on the operation of the navigable waterway. However, under the suggested displaced threshold option, Transport Canada may allow the existing approach lighting system to be retained in its current configuration, with the exception of the initial 3 towers, which would need to be modified to in-pavement approach lights.

Since the installation of a 720 metre MALSR approach lighting system to accommodate the additional runway length would be very expensive and disruptive to the adjacent business owner, it is recommended that if and when such an extension is considered, the use of the displaced threshold combined with retention of the existing approach lighting system (with modifications) be discussed further with Transport Canada.
8.2.3 Taxiways

The condition of the taxiways at Kingston Airport is generally considered to be good given that they were rehabilitated between 2001 and 2003. Rehabilitation of these taxiways is not anticipated for another 10 to 15 years (mid to long term horizon).

No further taxiways are considered necessary in the immediate future.

A new taxiway (Charlie) is however proposed for the mid to long term horizon in conjunction with the extension of Runway 01-19. It is suggested that this taxiway be connected from the apron to the threshold of extended Runway 01 and then northerly and parallel to the centreline of Runway 01-19 in accordance with a Code 4D runway classification.

The rationale for this facility includes:

- Potential for improved airside safety since taxiing aircraft on the runway, especially as the length and corresponding taxi times increase) creates an undesirable safety hazard.
- The proposed taxiway location will keep taxiing aircraft as far as possible from existing residential areas.
- Aircraft departing on Runway 19 must currently back track on the runway from its intersection with Taxiway Bravo. Construction of a parallel taxiway along the length of this runway will allow concurrent runway and taxiway movements thus improving runway capacity.
- For aircraft departing on Runway 19, the use of this taxiway will provide a shorter route than via Taxiway Bravo. This shorter route will minimize de-icing hold over times and increase the effectiveness of de-icing applications.
- Taxiway Charlie will provide runway access to the future General Aviation and Related Industrial / Commercial airside lots proposed along the west boundary of the airport property.

Phase 1 of Taxiway Charlie development would occur when Runway 01 threshold was implemented and would extend northerly +/- 1,000 metres to the intersection of Taxiway Bravo (Figure 8.3). It is recommended that the remaining +/- 700 metre extension of Taxiway Charlie to Runway 01 threshold (Figure 8.4) be implemented when the runway traffic volume exceeds 15 movements in the peak hour.

To connect Taxiway Charlie to the runway, an approximate 150 metre connector taxiway opposite existing Taxiway Bravo would also be recommended. This would provide for a more direct route between this point and the easterly portion of the main apron.

Provision for a future Code C taxiway located parallel to Runway 07-25 has also been identified between Taxiways Alpha and Bravo in the long term scenario (Figure 8.4).
The centreline of this taxiway (Taxiway Delta) has been located at 92 metre from the centreline of the runway in accordance with the requirements for a Code 3C Non-Precision approach runway. Protection for a possible direct taxiway link between Taxiway Delta and the main apron (Taxi Echo) has also been accounted for but would only be implemented once Delta was constructed and apron congestion was experienced. Relocation of the central aircraft de-icing bay would need to be undertaken in advance of this improvement.

8.2.4 Aircraft Parking Apron

Improvements to the current aircraft apron surface in the short term are not considered warranted. However as identified in Section 4.0, the apron area between Hangars 4 and 5 is particularly flat and poorly drained. It is recommended that in the short term that the installation of one or more catchbasins in this area be considered or alternatively, a ditch be installed along the east edge of the apron to improve drainage in this area.

Some new / renovated taxilanes perpendicular to the main apron taxilane (designated as F) will be required to accommodate the planned phased redevelopment of the existing hangar areas as outlined on Figures 8.5, 8.6 and 8.7. These new facilities will be sized to accommodate the planned aircraft usage in the area. It may be possible to salvage portions of the existing hangar concrete floor slabs and rehabilitate them in lieu of total replacement. This option should be further evaluated at the time of the implementation of these improvements.

The main apron area east of the passenger terminal building is currently restricted to parking of aircraft with gross take-off weights of less than 12,500 lbs. In order to provide access to the redeveloped Hangar 4 and 5 areas and associated additional aircraft parking stands proposed in Section 8.3.3, this area should be rehabilitated to accommodate PLR-7 (Code C) aircraft loading. It is recommended that upgrades to this apron be undertaken in conjunction with the proposed phasing of the hangar redevelopment.

In the long term, there is potential need to accommodate up to two Code C type aircraft directly in front of the passenger terminal building. To provide adequate clearance between these aircraft and apron Taxilane F, its centreline will need to be shifted north requiring a small filet to be added along the north side of the main apron at the connection to Taxiway Alpha. The relocation of apron Taxilane F will also result in unusable apron space on the north side of the taxilane (currently used for remote aircraft parking). It is recommended that this section of apron be removed in conjunction with the relocation of the taxilane and the existing helicopter positions be repositioned to in front of the FSS as indicted on Figure 8.6.

8.2.5 Fuel Facilities

Aviation fuel facilities are currently provided by Central Airways, Ontario Fun Flyers and Kingston Flying Club. In addition, vehicle fuel facilities are located northwest of Hangar 4 for airport maintenance equipment. At this time we understand that these facilities are adequate to meet the needs of airport users. However, all but the Central Airways
(Esso) fuel facilities will need to be relocated in conjunction with the proposed redevelopment of the airport hangars and associated manoeuvring surfaces.

In the short term it is anticipated that the City’s above ground vehicle fuel facility for airport maintenance equipment will need to be relocated in order to accommodate new Taxilane India. It is recommended that these tanks be relocated either opposite the existing maintenance facilities or alternatively in the vicinity of the future Maintenance Building located between the PTB and the FSS.

With the removal and replacement of Hangar 5 in the short term, Ontario Fun Flyer’s above ground fuel tank and Kingston Flying Club’s underground fuel dispensing cabinets will need to be removed in order to provide adequate horizontal clearances from Code B aircraft using new Taxilane Juliet. Since it is highly likely that these tanks cannot be salvaged, two options have been considered for these facilities. Either a new joint use above ground installation could be provided coincident to the proposed relocated vehicle fuel facilities between the PTB and the FSS or the units not be replaced at all and all refuelling be completed via the existing aviation refuelling station located immediately west of Central Airways.

8.2.6 Aircraft De-icing Fluid Treatment and Disposal

The key deficiencies noted in Section 4 included the leaking of closed shut-off valves resulting in surface water leakage into the glycol recovery tank. As well, significant rain water and melt water drains into the tank during de-icing operations as a result of the large catchment area that drains to the glycol recovery tank.

In the short term, it is recommended that improvements to the existing facility be made by reducing the contributory area being directed to the recovery tank. This could be achieved by separating the flows collected along the airside face of the PTB curb by incorporating an additional catchbasin and providing new gate valves on each line in advance of the existing recovery tank. A slight reorientation of the aircraft parking position may also be required in order that any de-icing fluid that falls to the apron can be collected by one or the other catchbasins only. In this way, when de-icing a single aircraft, runoff from only approximately ½ of the existing area would need to be collected and disposed. The other catchbasin lead would direct uncontaminated water directly to the storm water outfall.

In the mid to long term it is recommended that a new remote De-Icing Facility be constructed in conjunction with the southerly extension of Runway 01-19 and the associated construction of Taxiway Charlie. The new facility would be located on the north side of the main apron south of Runway 07-25 as noted on Figure 8.3 and 8.6. This location would not only reduce hold over times but would avoid spraying of glycol in the vicinity of enplaning/deplaning passengers and ramp workers.

Design of the new de-icing pad has been positioned to accommodate one Code C aircraft while allowing sufficient space for another Code C aircraft to pass on Taxiway Foxtrot.
8.3 LANDSIDE FACILITIES

8.3.1 Passenger Terminal Building

In order to assess the future requirements of the passenger terminal building (PTB) the traffic forecasts were reviewed in combination with the deficiencies identified in the Facility Inventory Assessment (Section 4) as well as the Community Involvement Program (Section 10).

In order to address these requirements the following improvements to the terminal are recommended. These improvements have been categorized into Short Term, Mid Term and Long Term.

**Short Term**

In the short term it was assumed that departing passenger loads would be limited to approximately 37 people per departure (based on a Dash 8-100 type aircraft). As the passenger hold room currently contains 57 seats, building expansion in the short term is not deemed necessary.

However a number of internal PTB enhancements are proposed to improve passenger flows, improve signage, enhance the interior aesthetic and improve overall functionality of the space as outlined on Figure 8.8. The recommended improvements to the passenger terminal building are summarized below.

- The queue space for the two unused counters adjacent to the south of wall of the PTB is limited by the protrusion of the check-in hall vestibule into the main building. In order to increase the available space for queuing it is recommended that the entrance vestibule be relocated to the south such that it is positioned beyond the existing exterior façade of the building. In order to accommodate this relocation, the frontage road sidewalk, road and short term parking would need to be modified as shown on Figure 8.5. The existing canopy would remain as it is currently configured as the new vestibule will be constructed within the limits of the existing overhang.

- In order to provide improved signage for passengers as well as meeter/greeters entering the terminal building it is recommended that new internally illuminated signs denoting the Arrivals and Departures entrances be installed.

- In order to provide more visual impact for arriving and departing passengers and to protect passengers from rain and snow at the airside entrance to the building, it is recommended that a illuminated feature canopy directing apron passengers to the building’s primary airside entrance (the Portal) be installed on the terminal façade.

- The queue from the CATSA screening point (Side of House – convertible combined) currently interferes with the ticket counter queue. This could be improved by reorienting the queue toward the west. In order to accomplish this,
the “Bay” glazing would need to be removed. The “Bay” was originally installed on the basis that the screening area closest to the airline ticket counters would be used to screen both passengers and checked luggage during off-peak hours. However in practice, CATSA only screens baggage at this location negating the need for the walk-through-metal detector and the by-pass lane that was afforded by the “Bay” configuration. As passengers are screened through the walk-through-metal detector in the other screening area at the entrance to the passenger hold room, the “Bay” and associated walk-through-metal detector could be eliminated creating additional queuing space as depicted on Figure 8.8. The pre-security queue would form from the west and within the landside concourse hall and avoid the check-in queue.

- The baggage claim area is a closed in space partially separated from the meeter/greeter / public waiting area by several walls and doors. The meeter/greeter hall is also used by departing passengers and well-wishers as a landside waiting area prior to going to passenger security and in addition a waiting area due to delayed departure flights. This hall serves as the only waiting landside multi-purpose area for all passengers and has insufficient seating space, circulation and comfort. The modified plan will visually open up the bag claim area for passengers and meeter/greeters and provide additional natural light to penetrate the bag claim space. The open plan will also serve as additional occupant space and circulation. This improvement in the layout could also be used to provide more seating as required.

- The existing seating within the passenger hold room should be upgraded to provide improved comfort.

- The existing public address system should be enhanced in order to improve auditory quality of the announcements. This could be undertaken either as a stand alone system or integrated into the existing telephone paging system.

- Flight Information Display monitors should be provided within the public space of the PTB to provide up to date information on inbound and outbound flight status. This information could be tied to the airport’s web site to allow flight status to be reviewed remotely.

- The desire for TV’s both in the passenger public lounge area as well as in the passenger hold room was identified in the Facility Requirements as well as the Community Involvement sections of this Master Plan. These monitors can be used for news, advertising and special announcement dissemination. Third party equipment suppliers may be willing to supply such units at no cost to the airport based on being able to collect all of the advertising revenue derived from the units.

- The number of public telephones in the PTB is minimal and difficult to find. While cellular phone use is slowly making public telephones obsolete, it is recommended that the existing public telephone units be relocated to a more prominent location in the immediate vicinity of the arriving passengers. An area for the location of these
public phones, as well as direct dial taxi/hotel phones is recommended immediately adjacent to the baggage claim area.

- The existing rental car kiosks are currently not well identified. Accordingly, it is recommended that they be repositioned to the renovated baggage claim area to be more visible to the arriving passengers.

- A new PTB Security Centre (open counter) will be located in the former car rental area; relocated from the second level office. The new Security Centre location is centralized on the main floor providing direct observation of the landside areas, improved and direct access to the apron and landside curb. In the same alcove and behind the Security Centre, an additional closed room is proposed for CATSA or airline storage that is being displaced by the bag claim improvements. The former Security Centre office currently located on the Terminal second level would then become available to the airport for additional space needs or for airline rental.

- Concerns have been expressed on the ability of the PTB’s mechanical system to adequately cool the facilities in the summer. It is therefore recommended that an analysis of the mechanical system and associated heat loads be undertaken to determine whether the cooling system needs to be supplemented in order to maintain acceptable internal temperatures.

**Mid Term**

In the mid term (Figure 8.9) it is anticipated that the passenger hold room will need to support a peak hour volume equivalent to a single CRJ aircraft (CRJ 200 -50 seats or CRJ 705- 70 seats). In order to accommodate these increased passenger requirements a number of additional PTB enhancements are recommended including:

- A northerly 4.0 metre expansion of the PTB holdroom (approximately 76 square metres). This expansion will also allow the passenger hold room to accommodate separate male and female washrooms (Barrier Free Compliant), F&B Vending Machines, Entertainment Systems, as well as additional new mechanical and electrical space. The overall holdroom area will be ample and will raise the IATA Level of Service to ‘B’ or better and provide for very comfortable seating arrangements, passenger circulation, and access to the gate boarding process and airside door. The single holdroom should convey a feeling of a club type lounge rather than a hold area. The expanded holdroom and services will promote more potential users to want to fly from the PTB rather than drive.

- Since web based check-in and / or self check-in kiosks is currently used by over 60% of scheduled passengers, the existing 5 check-in counters should be adequate to serve the needs of the airport throughout the 20 year planning horizon of this Master Plan. In order to accommodate the future space requirements of the airline ticket offices and/or associated cargo and baggage storage, an easterly +/- 40 square metre building expansion has been accounted for in the plan.
• A +/- 20 square metre space immediately adjacent to the outside wall of the outbound baggage room area has also been protected for to accommodate increases in outbound hold baggage processing.

• Resurrection of the existing kitchen facilities as well as the inclusion of a small bar and/or restaurant area (based on demand and tenant commitments) located in the south west corner of the PTB is suggested.

**Long Term**

In the long term (Figure 8.10), it has been assumed that growth in scheduled air service could require the parking of up to two 70 seat aircraft (CRJ 705 type aircraft) and the need to accommodate up to 140 passengers during peak hour. In order to meet this additional demand the following PTB improvements are recommended:

• Provide a further +/- 45 square metre expansion of the passenger hold room on the east side of the building.

• Expansion of the inbound baggage claim device toward the west in order to provide additional presentation length to suit peak hour passenger volume requirements and possible further easterly building expansion for ATO space or if required additional check-in / bag drop counters.

• A westerly expansion of the terminal building (approximately 77 square metres in area) is proposed to enlarge the public waiting area and to enhance the restaurant and lounge areas in conjunction with the increase in passengers, meeters and greeters.

**8.3.2 Airport Maintenance Building**

As stated in Section 4, the existing Transport Canada Building located between the passenger terminal building and the FSS facility is in a poor state of repair. It is recommended that this facility be demolished in the short term to improve the land side and air side aesthetics to the general public.

The location of the existing maintenance building requires maintenance staff and equipment to cross Len Birchall Way when accessing airside manoeuvring surfaces and facilities. In order to avoid this practice and to provide improved access to airside, it is recommended that the Airport Maintenance Building be relocated to the building site currently occupied by the Transport Canada Building in the mid to long term time horizon. This will place the maintenance facilities with desirable direct airside access as well as free up the resultant landside area for other development opportunities.
8.3.3 General Aviation and Related Industrial / Commercial Requirements (GARIC)

General Aviation Hangar Requirements (GARIC #1)

The area currently occupied by the former World War II hangars (Hangars 3, 4 and 5) is considered as valuable airport space given its central location relative to landside roads, airport buildings as well as airside facilities such as fuel, taxiways and runways.

It is recommended that this area therefore be reserved for directly related aviation type usages requiring airside access. Such facilities include aircraft hangars, avionics facilities, fuel services, cargo facilities, time-sensitive/perishable distribution centres; aircraft manufacturing and aircraft repair/maintenance/refurbishment facilities amongst others.

As discussed in Section 4, the existing hangar facilities are World War Two vintage and will require significant cost to convert and/or restore over the years. As the hangars age, continual increases in maintenance requirements are also anticipated, particularly given their wooden frame structure. Also their internal configuration and airside access are not conducive to efficient operations.

Key comments provided by the local aviation community support the removal and replacement of these structures with more modern and serviceable facilities. This master plan sets out a plan for this area in order to provide maximum flexibility for its orderly redevelopment. It will ensure that a mix of aviation related uses and services can be accommodated as and when demand dictates.

Other uses requiring airside access but where a central location is not as critical, could be located along the west side of Runway 01-19 adjacent to the Airport’s west property boundary.

T Hangars

The aviation community has generally agreed that the construction of several unheated T hangars would provide modern and functional hangar space for small privately owned aircraft. T hangars have been installed at airports across the country because they allow easy access to a particular aircraft without the need to remove or relocate several other aircraft within a shared hangar space. In addition, the configuration lends itself to low cost construction materials and techniques. The installation of T hangars is proposed in the area currently occupied by Hangar 3.

The plan for the redevelopment of this area is described below:

- Remove Hangar 3 and salvage as much of the existing slab as possible for incorporation into the new T hangars and associated taxi lanes.
- Construct two rows of unheated T hangars to provide quality hangars for small Code A type aircraft (Cessna 172’s, Pipers and light twins such as the Cessna 310
and Piper Aztec). These hangars could be constructed in groups of 10 or as demand dictates. Two rows of 10 (130 metres by 16 metres) are shown on Figure 8.5 for construction in the short term. An additional 4 hangar spaces could be added to each row in the mid to long term scenarios (Figure 8.6-7) or as demand dictates.

- Each hangar would be approximately 13 metres by 16 metres (42 ft. by 52 ft.) in size. The hangar facility would be constructed with a light steel structure, wood rafters and corrugated steel cladding. Hangar access would be provided by sliding doors on rails.

- Individual hangars would be serviced with electricity and communications only. Insulation and heating could be undertaken at an optional additional cost.

- Access to the hangars would be provided by Taxilanes G, H and I. Taxilanes G and H would meet Code A aircraft requirements while Taxilane I would be constructed to allow Code B aircraft access to the hangar space proposed to east.

- In order to provide outdoor tie down parking the pavement on the existing apron in front of the T hangars would need to be remarked.

- In order to allow space for flight training facilities, “clubhouse” shell space has also been accounted for (if required) at the south end of the two rows of T hangars. The shell space would be serviced with basic utilities such as water, sanitary, power and communications. A Flying Club or related Owners Association would be responsible for fit out of the common space.

Since raising sufficient capital to fund hangar developments, particularly on speculation, could be risky for the City, it is recommended that any hangars be developed by potential tenants or by third-party developers based on long term land leases.
Nevertheless, it is recommended that the City consider servicing and pre-grading lots designated for development in order to adequately market the opportunities to the public.

Development of this T hangar area is recommended to be initiated immediately as it will provide for quality hangars in support of the local general aviation community and help to revitalize this important sector of the airport's operation.

In order to ensure a mix of Code A and B aircraft parking spaces is provided at the airport, aircraft parking stands have been recommended on the north side of each of the two T Hangar sites outlined above. These locations are illustrated on Figures 8.5, 8.6 and 8.7.

**Code B and C Hangars**

In order to provide for future uses such as aircraft maintenance, overhaul, painting and aircraft manufacturing for aircraft of varying sizes, it is recommended that Hangar 5, of which only a portion is currently occupied, be demolished and new hangar space be developed in its place. This space could be redeveloped over an extended time to accommodate two 40 metre by 80 metre hangars. Each of these hangars could then be further sub-divided into 4 - 40 metre by 40 metre spaces. The easterly hangar area would need to be deferred until the current AOG lease expires.

Once this area was fully developed the remaining Hangar 4 should be demolished and replaced with another aviation related development of equivalent size and configuration to 5.

Development of these two sites could be completed on a City based initiative to construct, own and rent the facilities or a third party developer / tenant building on the available lands based on long term lease arrangements with the City.

The hangar proposed immediately east of the proposed T-hangars would be provided with a Code B taxilane on the west side and a Code C taxilane on the east side. The hangar facility proposed furthest to the east would be provided with Code C taxilanes on both the west and east sides.

At present, the Airport does not have an on-site Airport Maintenance Facility (AMO). In conjunction with development and rental of the T hangars, it is recommended that the City also market to attract an AMO business to the Airport.

**West Property Boundary Area (GARIC #2)**

The area located along the west side of Runway 01-19, which is surplus for airside operations in the long term, could provide additional prime land for the development of leasable building lots for aviation related industrial/commercial usage. Given its relatively close proximity to the airside manoeuvring areas, this area could provide essentially the same development opportunities as the area south of the main apron.
area. This area would only be considered for general aviation related development after GARIC #1 is fully developed.

Lot sizes would be up to approximately 100 metres in depth and could be provided at virtually any width depending on the developer’s/tenant’s requirements. A 20 metre earth berm buffer would be provided between the planned north / south access road and the west property boundary of the airport adjacent to the Lemoine Point Conservation Area to help shield visual impacts and provide noise attenuation along the common boundary.

In order to develop this area, a landside access road would need to be extended north from the present day terminus of Front Road. This access road could be extended incrementally toward the north in conjunction with the demand for airside/landside lots.

Access to the airside manoeuvring areas would be provided by the extension of Taxiway Charlie along the west side of Runway 01-19. While the extension of this taxiway as well as the development of this area would commence upon sufficient demand, it is currently planned as a mid-term initiative continuing into the long term as required.

Development of this area would require the City to extend the existing utilities including sanitary, electrical and communications from their present day terminus at the end of Len Birchall Way as well as relocating the existing security fence and entail some tree removals. Upgrading of the existing watermain along Len Birchall Way and possibly on Front Road from Bayridge Drive may also be required to supply sufficient fire flow to this new development area. A separate study to determine the utility requirements is recommended in advance of any commitments to develop this area.

8.3.4 Non-Aviation Industrial Commercial Requirements

Three general areas within the existing airport boundary have been identified for Non-aviation Industrial / Commercial development.

- NAICA #1: is an existing land segment of approximately 33 hectares located on the north east corner of the airport boundary abutting Bayridge Drive and the West Park residential subdivision.
- NACIA #2: is a 4.2 hectare parcel of land located between Front Road and Len Birchall Way west of Hampton Gray Gate that was recently re-designated for Business Park Industrial usage.
- NACIA #3: is an approximate 5.0 hectare block of land located at the northwest corner of Bayridge Drive and Front Road, owned by the City and currently zoned as Residential Type 1 (R1-H designation). This area has however recently been considered for development rezoning to allow Business Park type usage.

These areas are discussed further in Section 9.
8.3.5 Other Airport Lands

The remaining lands located within the airport boundary are proposed to remain in their current state within the period of the Master Plan.

8.3.6 Landside Parking and Access

Access to the passenger terminal building is currently provided via Hampton Gray Gate and Len Birchall Way. It is deemed to be a rather circuitous route passing both non airport related uses and the existing World War II hangars.

A new direct access to the PTB is recommended in the short term in order to provide an easy straight forward and recognizable airport entrance. The new Terminal Approach Road proposed as depicted in Figure 8.5 would be constructed as a 2 lane divided urban road with full illumination between Front Road and Len Birchall Way. Initially it would connect directly into the existing roadway accessing the PTB and public parking lot.

In the mid term development phase (Figure 8.6), a traffic roundabout has been proposed to allow for free flowing traffic in and around the terminal area as well as acting as a central "Arrivals" focal point for the airport. The roundabout would include significant vegetation combined with applicable directional signage.

Other changes to the Terminal Approach Road would include its realignment in order to accommodate a small expansion of the existing parking lot as well as a widening to provide for a possible taxi stand immediately prior to the terminal building.

New enlarged signage clearly indicating the Airports entrance should also be provided at the intersection of the Terminal Approach Road at Front Road upon construction of this new entrance. The Hampton Gray Gate intersection would then be redefined as the entrance for the Landings Golf Course and other non aviation related facilities.

In order to accommodate the increased parking requirements commensurate with increased passenger demand, the existing parking lot would be expanded to the south and to the east in the mid term to provide an additional 30 parking spaces over and above the existing parking capacity of 121 vehicles. This work cannot be completed until the existing Transport Canada property is acquired. As well, an overflow parking lot is proposed for construction immediately south of the Nav Canada FSS facility providing public parking for up to an additional 80 vehicles. It is anticipated that this overflow parking facility could be phased in during the mid to long term time horizons based on demand.

Other changes commencing in the mid term would include the reconfiguration of the FSS parking lot as well as the addition of dedicated parking for the Airport Maintenance Building.

Landside parking for the three redeveloped hangar areas identified under Section 8.3.5 would be provided by dedicated parking lots to be located along the south side of each
of the three hangar facilities. Construction of these parking lots would be phased in conjunction with the redevelopment of each of the various hangar areas. Parking for the Landings Golf Course would continue to be provided in the existing gravel parking area located immediately north of the club house.

**PROPERTY ACQUISITION REQUIREMENTS**

The land currently held by Transport Canada for Building No. 6 should be acquired immediately to allow for the demolition of the existing structure as well as erection of a new Airport Maintenance Building in the mid term.

Ensuring the safety of aircraft and the flying public is of paramount importance at any airport. The ability of the City to maintain airport obstacle limitation surfaces free from obstructions, particularly near the runway ends, is therefore extremely important. While the airport’s existing Federal Aeronautical Zoning limits the use of some of the adjacent lands, opportunities to acquire any of the properties (or easements) at the south end of Runway 01-19 should be evaluated and taken advantage of when presented to the City given the need for approach lighting upgrades as well as the potential desire for runway extension in the future. At the very least an easement should be obtained along the runway centreline through the properties between Front Road and Lake Ontario.

It should be noted that since the designated lands located south of Front Road are located within the extended Runway 01 approach zone, they will not be available for redevelopment. Accordingly if acquired by the City, it is recommended that these lands be offered to the Lemoine Point Conservation Area as a continuation of the current park property for their ongoing development, use and maintenance as compatible Open Space lands. Acquisition and use of these lands as interconnected open space is consistent with the City’s Official Plan policies. Applicable controls will need to be retained by the City to ensure the Obstacle Limitation Surfaces associated with the extended runway are however maintained.

In order to allow the approach lights for Runway 19 to be upgraded to Transport Canada standards in the future, an easement through the Collins Bay Marina will be required regardless of whether the runway is extended or not. It is recommended that any opportunities to acquire an easement in the short term should be evaluated seriously. The need for this easement may become a requirement in the mid term should Transport Canada decree that the extension of Runway 01-19 to the north must include MALSR replacement.
Section 9.0
Recommended Airport Land Use

The recommended Airport Land Use Plan recognizes the current areas designated by the Official Plan and zoned by the Restricted Area By-Law No. 76-26 for existing and proposed aviation and non-aviation uses. In addition, future development areas for both aviation related and non-aviation uses are suggested. The proposed Land Use Plan divides the airport’s various compatible activities into a series of sub-areas in an effort to foster development synergies for the long term growth of the site. It is intended that the Airport Land Use Plan, as approved by City Council, be reflected in the City’s consolidated planning documents (new Official Plan and Zoning By-Law), the preparation of which are currently underway.

The proposed Land Use Plan was prepared based on meeting the following objectives:

- maximizing the economic development potential of the airport and surrounding area,
- minimizing future land use conflicts, and
- establishing a local land use framework for the area that maintains or enhances the quality of life of the surrounding community.

In order to ensure input is obtained prior to any of the recommended airport master plan developments proceed, the City of Kingston has committed where appropriate, to undertake public consultations in conjunction with the site plan control process.

9.1 PLAN APPROACH

In preparing the Airport’s land use plan, the following objectives were considered:

- the safe operation of the Airport and aircraft using it must be priority #1;
• the protection of lands, facilities and infrastructure required for essential Airport operations now and into the future (generally following TC Doc. No. TP1247E);

• the utilization of lands and facilities surplus to essential aircraft operations in order to enhance the overall commercial viability of the Airport; and

• optimization of development having regard for the physical and natural features of the area.

An assessment of the total available land base of the Airport was carried out. The recommended land use plan and future development sequencing presented in this document reflect: the physical, environmental, and aviation related constraints to development that exist; safety regulations; and the need to ensure compatibility with existing adjacent land uses. A subtractive method was used to identify those areas with the least constraints for development and that lay outside the areas identified as essential to core Airport operations.

The proposed extent of each of the land use types proposed for the Kingston (Norman Rogers) Airport is illustrated in Figure 9.1. The various areas and their recommended land use, as noted herein, comply with the overall Land Use designations included in the Kingston Official Plan.

9.2 AIRPORT OPERATIONS AREA

The Airport Operations Area (AOA) includes all of the airside operational facilities essential for the safe and efficient operation of aircraft, including runways, taxiways, aprons, visual and navigation aids. This area must remain generally flat and clear of all obstructions, including buildings, trees and vehicles (unless involved in the operation of airport maintenance or temporary construction of airside facilities).

The AOA has been planned to protect for a number of future airside developments including runway extensions, taxiways and apron expansions. In addition, non-AOA areas have been setback sufficiently to ensure proper horizontal clearances (in accordance with TP312E) for the ultimate airside configuration.

9.3 TERMINAL COMMERCIAL AREA

The Terminal Commercial Area (TCA) is located primarily in the south western quadrant of the Airport and has direct access to both airside and landside facilities. Typical uses in this area would include commercial operations serving scheduled aviation users or associated tenants and those facilities providing services essential to passenger uses.

Facilities located here would include the passenger air terminal building, flight services facilities and environmental/weather reporting equipment, facilities relating to scheduled aircraft operations, airport management and administration offices, airport maintenance and operations facilities, car rental facilities, food services, and parking for passengers.
9.4 GENERAL AVIATION AND RELATED INDUSTRIAL / COMMERCIAL AREA

Two Aviation Related Industrial/Commercial (GARIC) Areas are identified on the recommended Airport Land Use Plan. Current and future usage of these areas includes aircraft hangars for private aircraft, aircraft maintenance and avionics facilities, fuel pumps, cargo facilities, time-sensitive/perishable distribution centres; aircraft manufacturing, aircraft repair/maintenance/refurbishment and flight-training. Other industrial uses requiring access to both airside facilities (apron, taxiway and runway) and landside access could also be located in these areas.

GARIC #1

The primary GARIC location is positioned immediately east and west of the Terminal Commercial Area. It occupies the majority of the area along the southern boundary of the Airport Operations Area. It is prime aviation related real estate which should be developed to its full potential initially as outlined in Section 8.

GARIC #2

The second segment is located along the western airport boundary located between Lemoine Point Conservation Area and Runway 01-19. This area offers the opportunity for individual, smaller leaseable lots with future airside access via Taxiway Charlie. Development of this area is capable of expanding incrementally based on demand for space. This area should only be considered for development after the majority of GARIC #1 has been leased.

Since the lots in GARIC #2 will be located adjacent to Lemoine Point Conservation Area, a minimum 20.0 metre earth berm buffer is proposed to shield any future airport activities in this area from the recreational use / activities associated with the Conservation Area.

9.5 NON-AVIATION INDUSTRIAL / COMMERCIAL AREA

In considering Non-Aviation Industrial/Commercial Area (NAICA) activities, care should be taken to ensure that they do not interfere with aircraft operations, communications equipment and aids to navigation on the ground. Smoke and dust created from industrial applications can obscure visibility. Compatibility with adjacent land uses would also need careful consideration.

Three general areas are identified for Non-Aviation Industrial/Commercial development.

NACIA #1

Although individual development lots in NAICA #1 could have airside access, the area would primarily be associated with uses which gain a distinct advantage to being located at /or near the Airport or adjacent to specific Airport users or tenants. The area would
include an internal transportation corridor connected to Bayridge Drive at the intersection with Roosevelt Drive.

Development of this area is anticipated in the long term horizon of the airport although it could be advanced at virtually any time should there be a specific demand for its use. Servicing of this area would be provided by connection to the existing sewers and utilities located on Bayridge Drive.

**NACIA #2**

This area is already designated and zoned for Business Park Development. Development of the first phase of NAICA # 2 is anticipated in the short term of the Master Plan and would comprise the land bounded by Len Birchall Way, Front Road and the new Terminal Approach Road in the east. Depending on the size of lots in demand at the time of development, a road parallel to Len Birchall Way could be constructed parallel to and north of Front Road as depicted on Figure 8.6.

Development of the second phase of NAICA # 2 is anticipated in the mid term. It would comprise the area bounded by Front Road, Len Birchall Way and Hampton Gray Gate. Similar to Phase 1 of NAICA # 2, a road parallel to Len Birchall Way could be constructed depending on the lot sizes in demand at that time as depicted on Figure 8.7.

Servicing of NAICA # 2 with sewer, water and other utilities will be provided by the connection and/or extension of services and utilities on Len Birchall Way. Prior to development occurring within this area, detailed design guidelines must be approved by City Council in accordance with the requirements of the existing zoning.

**NACIA #3**

Development of NAICA # 3 at the northwest corner of Front Road and Bayridge Drive is anticipated for the long term planning horizon. This area would be serviced through the connection of proposed services and utilities to those located on Bayridge Drive and Front Road. Development within this area would act as a stand alone unit without any connection to the remaining airport lands.

While noise exposure from airport operations is not anticipated to be significant within this area, it would be our recommendation that this development parcel be retained for non residential uses compatible with the surrounding area.

**9.6 SPORTS / RECREATIONAL AREAS**

The south-eastern segment of the existing airport lands are currently being used as a golf course and associated driving range. Within the timelines of the Master Plan it is proposed that the golf course lands remain under this land use designation since significant other currently vacant lands remain on the airport site that are better situated for development purposes.
The current Landings Driving Range is located within the NAICA #2 area. Accordingly, it is suggested that the lease arrangements associated with this portion of land remain flexible to address potential development of this parcel of land for future prestige business park industrial uses.

### 9.7 OPEN SPACE AREAS

As noted previously, open space zones have been proposed around the airport site to act as a natural buffer between airport and related activities and the adjacent land uses.

Accordingly the plan accounts for the following open space zones within the airport boundary.

- A minimum 20 metre zone along the western property boundary adjacent to Lemoine Point Conservation Area.

- A 15 metre area along the southern and eastern boundary of the airport adjacent to both Front Road and Bayridge Drive. This zone would be protected for future development of a bikepath / walking trail connecting to the Lemoine Point Conservation Area.

- A minimum 15 metre vegetative buffer / earth berm combination is proposed along the northern and east boundary of this NACIA #1 to protect the planned operations from the existing adjacent residential development.

- The remaining section of the north and western boundary of the existing airport is also identified as open space. It is surplus to the needs of the airport but needs to be protected to ensure long term obstruction zoning clearances are maintained. This area could be used as part of an extension of the existing conservation area as suggested in the 1999 Lemoine Point Conservation Area Master Plan.

In order to implement these buffer zones, some airport security fencing and internal perimeter road segments will need to be relocated.
10.0 Community Involvement Program

10.1 INTRODUCTION

As part of the overall consultation process, the team solicited input from the community both informally and at scheduled events throughout the study duration in support of the Master Plan development. This section outlines the process followed and summarizes the outcome from feedback received.

10.2 AIRPORT STAKEHOLDER CONSULTATION

As part of the site inventory assessment completed in the summer of 2006, the Project Team interviewed virtually all on site building owners / tenants in order to solicit their comments on the existing facilities as well as future aspirations for the airport.

The list of tenants interviewed included:

- Central Airways
- Ontario Fun Flyers
- Kingston Flying Club
- Nav Canada
- AOG Helicopters
- Air Canada Jazz
- McGugan Real Estate Appraisers
• Landings Golf Club

The key issues identified by these tenants are summarized as follows:

• Concern over glycol recovery system configuration size and associated disposal cost;

• Disparity between monthly aircraft storage rental rates;

• Quality, maintenance and overall functionality of the existing hangars;

• Lack of visibility /exposure that the airport has within the community;

• ILS is old and expensive to maintain by Nav Canada;

• Hard surfaces surrounding hangars are in poor condition;

• Available hangarage space is of poor quality resulting in some private pilots moving their aircraft elsewhere;

• Elimination of ILS in the future could impact flight training operations;

10.3 BUSINESS CONTACT

Section 5.6 of this report provides the results of a survey conducted to obtain input from the local business community. Of the twenty representative businesses contacted, nine responses were obtained. The information derived from these contacts were used to help explain the current high passenger diversion percentages as well as ascertain possible charter aircraft viability and the need for related services at the airport.

10.4 ADJACENT LANDOWNER CONTACT

Discussions with the two major adjacent landowners including the operator of Collins Bay Marina and the Cataraqui Region Conservation Authority (regarding Lemoine Point Conservation Authority) were also held in order to ascertain input on the recommendations for future development of the airport.

Concerns expressed included:

• Removal of a portion of the current vegetative buffer between the western airport boundary and the Lemoine Point Conservation Area in support of general aviation and related industrial / commercial development;

• Need for inclusion of a 15 metres conservation corridor on the north side of Front Road / Bayridge Drive in support of the City of Kingston Cycling and Pathways Study (2003) and the Conceptual Plan for Lemoine Point Conservation Area (1999);
• Vegetative buffer size adjacent to the West Park residential subdivision (NACIA #1) should be increased to at least 15 metres and as much of the natural vegetation / forest in this open area be retained;

• The long term runway extension plan will attract jet aircraft with its associated increase in noise levels which will further disrupt the current marina operation and put an end to recreational boating in this location.

10.5 PUBLIC INFORMATION SESSION #1

Public Information Session #1 was held on November 08, 2006. The event was advertised via the Kingston This Week newspaper, placed on the City and Airports web site. Public information announcements were also provided on two local radio stations prior to and on the day of the event.

The Information Session was held in Hangar 4 from 18:00 to 21:00 hours. Presentation board displays of various key components of the marketing research, and traffic forecasts were available for review.

A total of approximately 100 people attended including City of Kingston senior staff and local politicians.

The Project Team was available for the initial hour to discuss and receive input on the community’s vision for the airport with members of the public in an informal atmosphere.

This was followed by a formal presentation made by the Project Team with the use of overhead slides. A copy of the slides were posted on the City of Kingston web site for access by the public the following day.

A short question and answer period occurred subsequent to the end of the formal part of the agenda. All attendees were urged to fill out available comment forms and forward them to the project team for further evaluation.

Of those attending 18 submitted detailed comments.

Key comments received include:

• The airport should be further subsidized by the taxpayers to make the operation “break-even”;  

• Do other municipalities in the catchment basin help with the operating costs of the airport?;  

• Older buildings should be torn down since they cost an exorbitant amount of money to properly maintain and almost never meet the needs of the users;  

• The City should be actively involved with KEDCO in order to promote the airport’s potential and possibly attract investment;
Recommend that the airport leases land and create a building standard that should be met by building owners or create facilities for long term lease by tenants;

Approach the private charter companies located in Toronto / Montreal / Ottawa / Syracuse / Rochester to see if a consolidation into a centrally located airport makes financial / economic sense;

Invest in modern efficient reasonably priced infrastructure that can evolve to service the projected growth that the traffic forecasts seem to suggest;

Provide the airport management with more latitude to make near term and mid term rental decisions;

More marketing and business opportunities should be sought;

Additional aviation support services should pursued;

Don’t forget about the private pilots. They pay rent for services and offer charitable events to the community;

A combination of T open door hangars with fully enclosed private hangars would add a great deal to the appeal of the airport;

Fix up or replace the aging World War II hangars;

Attract a reputable aircraft maintenance facility;

Restaurants are a single great attractor of transient aircraft;

Terminal building enhancements including wireless internet, televisions, Flight Information Display monitors, additional seating outside the security check point etc. would help;

Better and more seating in the departures lounge would be good;

Direct taxi cab phones;

Provide bus service to the airport;

Provide more parking spaces in front of the terminal;

Build a new terminal off Bayridge Drive and Roosevelt Drive area. New building should provide increased domestic and transborder facilities to make it reasonable for other airlines to start services from Kingston;

Lengthen runway so as to add to the type of aircraft capable of landing at the airport;
• The infrastructure supporting general aviation is based on World War II constructed hangars whose doors are no longer serviceable and roofs leak tar. Design a modular hangar complex that allows easy and rapid expansion based on demand. Healthy airports show an abundance of privately owned / rental T hangars;

• Attraction of more general aviation aircraft generates new demand for new FBO facilities, expanded flight training and such secondary benefits;

• Don’t consider helicopter training that will hover over the airport;

• Provide more flights to Toronto with more morning and evening choices;

• Have the quietest aircraft possible use the airport;

• Business Park construction should be planned with great care so that it focuses on businesses who heavily use airport facilities and / or carriers;

10.6 PUBLIC INFORMATION SESSION #2

Public Information Session #2 was held on January 25, 2007. The event was advertised via the Kingston This Week newspaper, the City’s web page, the Airports web page and the ECity News. Press releases were sent to the media, all tenants were invited by email, all stakeholders who provided an email on their comment sheets from Public Information Session #1 were invited by email and the Airport Manager participated in two radio interviews to promote the event.

The Information Session was held in Centre 70, 2nd Floor Meeting Room (corner of Days Road and Front Road) from 18:00 to 21:00 hours. Presentation board displays of various key components of the staged implementation plans were available for review.

A total of approximately 40 people attended the meeting including Kingston City senior staff and local politicians.

The Project Team was available for the initial hour to discuss and receive one on one input on the physical plans for the airports long term development. This was followed by a formal presentation made by the Project Team with the use of overhead slides. The slides were posted on the City of Kingston web site for access by the public.

A question and answer period occurred after the formal presentation. The following general comments were provided verbally:

• Development of T hangars would be a very beneficial to the airport. Pilots will not want to pay property tax;

• How would the Hangar 3 area be redeveloped? Who would lead this?;
• The proposed general aviation development lots on the west side of the airport boundary should be relocated to the vacant lands on the east side of the airport abutting Bayridge Drive and the West Park residential subdivision;

• Locating aircraft in the lot adjacent to Bayridge Drive could have noise impacts on the adjacent residential subdivision so locating it on the west side of the field is a better choice;

• The buffer zone along the west side of the site between the mid term planned general aviation development is too small to be effective;

• The extended runway should be built now to attract possible economic development opportunities. Federal funds are available to complete such an expansion at no cost to the City;

• What happens to the airport if the current scheduled passenger traffic service is curtailed? Does the airport remain as a viable operation?;

• The planned aircraft de-icing bay will result in glycol spray being blown into the adjacent Central Airways hangar lease area. Is an alternate location on the north side of the existing apron available for this operation?;

• A 6000 ft runway would be a good length for a Falcon 50;

All attendees were urged to fill out available comment forms and forward them to the project team for further evaluation.

A total of thirteen responses were received of which seven were provided by the general public. Of the remainder, one was issued by a current airport tenant, one was received from a Pilot Association and letters were issued by Cataraqui Region Conservation Authority, Friends of Lemoine Point, Kingston Field Naturalists and Collins Bay Marina.

Key comments received include:

• Don’t undervalue the historical and commercial value of the Kingston Flying Club;

• There will always be a need for general aviation facilities such as hangars in addition to the planned T hangars, including tie down area and refuelling facility etc. The burgeoning very light jet market is just one example of the developing demand for municipal airports;

• It is good to see that your plan includes developing the west side of Runway 01-19 but I would like to emphasize the need for affordable alternatives for much of this market, who are very cost sensitive. Tie-down areas and low cost simple hangars will be a key to attracting this market and other airside GA businesses such as maintenance services;
• New Charlie Taxiway is excellent to keep noise away from the residential areas. Extending the runway will also help in bringing larger aircraft to Kingston;

• Look forward to the City raising the profile of the airport with an Ad campaign;

• Our primary concern is with the Plan’s proposal to remove the current buffer between the Airport and Lemoine on the Airport side of the shared boundary and to develop that as a commercial / industrial area. The suggestion of the 10 meter buffer is meaningless and the planned destruction of the existing buffer zone that ranges up to 100 meters of forest including mature hickory and maple tress is of grave concern;

• We are not in favour of the increase in traffic and noise that would result from the extension of the runway however recognize the inherent incompatibility of having a conservation area and the airport beside each other and that some impacts are inevitable;

• I was pleased to hear that the plan covered all aspects of the airport in a multi faceted approach. I believe that the airport is an underutilized strategic asset that the City owns;

• I strongly endorse the proposed Kingston Airport Master Plan;

• I am distressed by the plan to perhaps put commercial / industrial buildings within a few metres of the dividing fence between the Airport and the Lemoine Point Conservation Area. A vegetative buffer of unknown makeup would provide scarce cover to birds and animals…may we have 100 metres as a constant from the north to south along the Airports Western boundary?;

• Extending Runway 01-19 north to allow for larger aircraft currently using the airport will negatively impact the residential neighbourhood under the flight path.

• Additional lighting to support the northern extension of Runway 01-19 will have a negative impact on nocturnal birds and animals in Collins Bay. It will also detrimentally affect the wetland north of the railway and Bath Road.

• If Kingston is to develop socially, industrially and commercially the airport is probably in the wrong place. It would be better located north of Hwy 401.
11.1 INTRODUCTION

Virtually all new airport developments invoke some form of impact on the adjacent lands and / or social environment. The key is to try to balance the specific negative impacts associated with such development with the positive long term benefits of the plan on the overall community.

The three predominant environmental impacts that have been identified within the recommended Master Plan relate to:

- vegetation removal including habitat loss and visual intrusion;
- increased aircraft noise and;
- property devaluation.

The following sections quantify these predominant impacts and offers suggested mitigation measures in an attempt to ameliorate there effects.

11.2 IMPACTS TO NATURAL FEATURES AND MITIGATION MEASURES

Short Term

In the short term, the planned redevelopment will not necessitate removal of any natural vegetation. All work planned will be completed in already urbanized areas. Standard construction mitigation measures such as silt fencing around the work area should be
sufficient to prevent any loss of dangerous substances such as fuel or lubricants during repaving.

**Mid Term**

Mid term development plans will necessitate some vegetation removal in order to allow for construction activities in one specific area.

In order to build the westerly General Aviation area (GARIC #2), removal of approximately 1.4 hectares of natural vegetation along the airport’s south-western boundary will be necessary. Vegetation within this impacted area was identified as a Significant Woodland in the Central Cataraqui Region Natural Heritage Study (CRCA, 2006) based on its area and age. The Provincial Policy Statement (PPS) (2005) requires planning authorities to protect Significant Woodlands by demonstrating that proposed development will not have a negative impact on the natural feature or the ecological functions provided by the natural feature.

An Environmental Impact Study (EIS) to determine ecological functions, assess impacts and propose mitigation measures would be recommended in advance of initiating development of this area.

Preliminary mitigation measures that are suggested include retention of an earth berm buffer of approximately 20 metres between the planned access road servicing GARIC #2 and the existing airport boundary. This will help screen the development from the adjacent Conservation area.

In order to extend the runway by approximately 205 metres (672 ft) to the north additional tree clearing is not anticipated except for regular tree clearing activities which are required by Transport Canada in order to keep the existing OLS clear of obstacles.

The runway extension to 1,829 metres (6,000 ft.) also requires locating some approach lights within Collins Bay. Constructing the approach lights will require permits from the Department of Fisheries and Oceans and Transport Canada under the Navigable Waters Protection Act. As part of the permit process an Environmental Impact Study (EIS) would be warranted to ensure both navigation and natural environmental impacts within the waterway are not negatively affected.

**Long Term**

Extension of Taxiway Charlie to the Runway 19 threshold will require some additional tree removal. Prior to embarking on this long term initiative, an Environmental Impact Study (EIS) to determine ecological functions, assess impacts and propose mitigation measures is recommended.

Mitigation recommendations from an EIS are likely to be similar to those generated for vegetation found along the western boundary of the airport. Recommendations may include revegetation, vegetation buffers and retention of as much of the natural vegetation as possible within reducing aviation safety.
The Master Plan recommends that all remaining open space within the airport lands, be managed as part of an expanded Lemoine Point Conservation Area. While the Airport must retain ownership and control over these areas for the purposes of maintaining compliance with applicable airport zoning and related TC regulations, the area could be incorporated as part of an expanded natural area for use by the community.

11.3 SOCIAL IMPACTS

11.3.1 Aircraft Noise

The number one social impact associated with airports is most often aircraft noise.

In order to assist municipalities in planning development surrounding airports, Transport Canada developed document TP 1247E entitled “Aviation Land Use in the Vicinity of Airports”. Within this document a number of recommended practices and policies are provided including establishing noise impacts of aircraft activity and mitigation requirements specifically related to new development.

NEFCAL (Version 1.8) is a software program created by Transport Canada to predict noise annoyance on possible adjacent development. The Federal Aviation Administration (FAA) in the US has a similar program. THE NEFCAL program uses a combination of the sound levels, duration, pitch and time of day of each occurrence based on the predicted mix and volume of aircraft, to develop a Noise Exposure Forecast. The output from this computer model is a series of NEF contours. Each contour line represents a different level of annoyance. These contour lines are then compared against a table of acceptable values for various types of land use activities thereby providing the municipality guidance in order to better plan for future developments surrounding airports.

Noise Exposure Forecast (NEF) Contour Plans have been developed for the Kingston (Norman Rogers) Airport – 2007 Master Plan Study. These NEF Contour Plans have been prepared for:

- the existing conditions (2005 peak planning day);
- 2026 conditions (using projected annual growth of the existing base of traffic) with no changes to existing runway length and;
- 2026 worse case scenario assuming primary Runway 01-19 was extended to 1,829 metres (6,000 ft.) and some increased jet activity was included.

The existing 2005 and forecast 2026 peak planning day aircraft movements for Kingston Airport volumes at the Airport for both itinerant and local movements were obtained from Table 7-3 of Section 7 of this report. As noted in this table, the existing 2005 peak planning day movements were 113 itinerant aircraft and 85 local aircraft. For the 2026 peak planning day, traffic movements are forecast to be 170 itinerant aircraft and 180 local aircraft.
The peak planning day movements were then split between daytime (0700 to 2200 hrs) and night time (2200 to 0700 hrs) operations. Local movements were assumed to only occur during the daytime period. Based on actual 2005 aircraft movement records obtained from the Kingston FSS, the overall daytime / night time distribution of aircraft movements at the airport is 95 percent / 5 percent under existing 2005 conditions and is forecast to be 96 percent / 4 percent under 2026 conditions.

The breakdown of aircraft movements by type of aircraft was determined on the basis of the type of aircraft recorded in the Kingston Airport tower logs during the peak day of the peak month (i.e. July 3rd, 2005). These aircraft types were then aggregated into aircraft classification types included in the NEFCAL aircraft database. Table 11-1 summarizes the 2005 and 2026 peak planning day aircraft movements aggregated by aircraft type.

It should be noted that helicopters are not included in the NEFCAL database. Consequently, twin turbine helicopters were modelled by using Dash8 aircraft, which have a larger engine power rating than these helicopters, in order to compensate for the additional rotor noise of the helicopter. Similarly single turbine helicopters were modelled by using Jetstream31 aircraft.

<table>
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<tr>
<th>Aircraft Type and NEFCAL Equivalent Type</th>
<th>2005 PPD Movements (Existing Runways)</th>
<th>2026 PPD Movements (Existing Runways)</th>
<th>2026 PPD Movements (Extended 01/19)</th>
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<tr>
<td>DHC8 (represents Dash8’s plus twin turbine helicopters)</td>
<td>10</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Jetstream31 (represents 19-seat aircraft plus single turbine helicopters)</td>
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<td>6</td>
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<td>Cessna CNA441 (represents twin turbine 6 to 8 seat aircraft)</td>
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<td>Beech BEC58P Baron (represents twin piston General Aviation aircraft)</td>
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<td>3</td>
<td>3</td>
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<tr>
<td>Cessna C-172 (represents single piston General Aviation aircraft)</td>
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<td>318.75</td>
<td>314.75</td>
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<td>Lockheed C-130 Hercules (represents military aircraft)</td>
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</tr>
<tr>
<td>CL601 (represents CRJ705 Regional Jet)</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>198</strong></td>
<td><strong>350</strong></td>
<td><strong>350</strong></td>
</tr>
</tbody>
</table>

1) Dash 8s kept constant at 4-arrivals and 4-departures per day. Six (3-arrivals and 3-departures) twin turbine helicopters included.
2) Dash 8s increased to 10 flights per day (5-arrivals and 5-departures). Helicopters increased to 9 flights per day.

3) Regional Jets can only use the Airport after Runway 01/19 is extended to 1,829 metres (6,000 ft).

Aircraft movements were distributed to the Airport runways based on observed runway arrival and departure usage as noted in the Tower Logs. Three distributions of aircraft movements by runway were obtained. These are for Cessna C-172 type aircraft (ie. single piston General Aviation), DHC8 (used for all other aircraft except CRJ705), and CRJ705 Regional Jet which will be limited to Runways 01/19. Table 11-2 summarizes the runway usage distribution by aircraft type.

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Runway 01</th>
<th>Runway 19</th>
<th>Runway 07</th>
<th>Runway 26</th>
</tr>
</thead>
<tbody>
<tr>
<td>C172 – Arrivals</td>
<td>15 %</td>
<td>41 %</td>
<td>17 %</td>
<td>27 %</td>
</tr>
<tr>
<td>C172 – Departures</td>
<td>24 %</td>
<td>27 %</td>
<td>15 %</td>
<td>34 %</td>
</tr>
<tr>
<td>Other Aircraft – Arrivals</td>
<td>13 %</td>
<td>65 %</td>
<td>12 %</td>
<td>10 %</td>
</tr>
<tr>
<td>Other Aircraft - Departures</td>
<td>44 %</td>
<td>18 %</td>
<td>6 %</td>
<td>32 %</td>
</tr>
<tr>
<td>CRJ - Arrivals</td>
<td>17 %</td>
<td>83 %</td>
<td>0 %</td>
<td>0 %</td>
</tr>
<tr>
<td>CRJ - Departures</td>
<td>71 %</td>
<td>29 %</td>
<td>0 %</td>
<td>0 %</td>
</tr>
</tbody>
</table>

All of the future flight data was aggregated and summarized for input into the NEF model based on aircraft type, runway distribution and peak planning day volumes. The data were input into the NEFCAL model, along with the runway Cartesian co-ordinates and the flight path arrival and departure profiles. These flight path profiles were obtained from the current departure and arrival flight paths for Kingston Airport.

The resultant NEF contours were produced by the NEFCAL model for Kingston Airport for the following scenarios:

- 2005 existing;
- 2026 projected traffic without any runway extension; and
- 2026 projected with runway extension to 1,829 metres (6,000 ft.).
Transport Canada publication TP1247E “Aviation Land Use in the Vicinity of Airports” dated May 2005 recommends that new residential development is not compatible at existing airports within the NEF 30 contour line. Figure 11.1 depicts the critical NEF 30 contour for all three scenarios described above.

As can be seen from Figure 11.1, the NEF 30 contour lines, under all three conditions, remains within the boundary of the Kingston Airport. Accordingly, while an increase in noise levels from those experienced currently could be anticipated as the airport traffic continues to grow over the next 20 years, even with the introduction of some jet aircraft activity on an extended runway of 1,829 metres (6,000 ft.), noise level impacts on the adjacent properties will continue to be within the Transport Canada guidelines.
Section 12.0 Implementation

12.1 INTRODUCTION

Preparation of a long-term development concept for Kingston (Norman Rogers) Airport is an important planning exercise that enables the City of Kingston and the study team to visualize the Airport in a likely future role in the community and the region. The concept presents a vision for an ultimate, fully built-out Airport (which could undoubtedly occur beyond the planning period of this study). Such a concept plan will enable the City to make decisions today regarding development and expansion which will ensure that future needs and opportunities are not limited or constrained.

The planning associated with the development strategy has taken into account TC's Aerodrome Standards and Recommended Practices (TP312E, 4th Ed., March 1993) so that future development will respect aviation and public safety and the physical and social environment. It should be noted however, that Transport Canada are in the process of updating this document and some changes in dimensional requirements for certain aspects may occur upon its issuance. While it is not know exactly what impact such a revision could have on the overall plan outlined herein or when this new edition will be published, it is unlikely that any modifications to the current TC Doc. No. TP312E document will adversely impact the planned development noted and more likely it may be beneficial in reducing certain standards resulting in the availability of additional area for development.

The first priority in developing our recommended “Go Forward” strategy was to ensure that any future airport development could take place without unduly limiting future expansion of purely aviation related activities and facilities such as extension of the primary runway, addition of new taxiways, and improvements to visual and navigational aids. Once the long term needs of these key facilities had been properly accounted for, other secondary compatible land uses were considered. These would enhance the
airports operation by providing new and valuable community assets to help stimulate overall long term growth.

Some of the development areas identified, could, and should, be developed by third party developers / tenants to minimize costs and risks to the City. Although the City will most likely be responsible for the planning and construction of airside infrastructure (such as taxiways, and runway extensions) and common infrastructure including access roads and site services, third party developers could finance the cost of implementing leasehold development or improvements such as new hangars and/or comparable development.

The ultimate development concept as further outlined in Section 8.0 of this report has been broken down into three timeframes:

**Short Term**: representing activities that are recommended to be undertaken immediately and up to approximately 5 years into the future.

**Mid Term**: activities that should be protected for now and could be required based on demand at any time but more likely in the 10-15 year time frame.

**Long Term**: activities that are considered as part of the airports overall vision and would be undertaken in the 15-20 year and beyond time horizon.

### 12.2 SHORT TERM IMPROVEMENTS

The short term improvements outlined throughout the report have been broken down into a number of categories for ease of presentation and simplification of future budgeting. They include:

**AIRPORT OPERATIONS AREA**

- complete the Transport Canada ACAP funded Runway 01-19 rehabilitation recommendations including relocation of ditches to meet TC Doc. No. TP312E;

- undertake rehabilitation of Runway 07-25 between the threshold of Runway 07 and Taxiway Bravo;

- provide RNAV (GNSS) GPS Approaches for Runway 01 - 19 (precision like) and Runway 07 – 25 (non precision);

- modify the existing aircraft gate de-icing collection system to reduce the volume of unnecessary water being collected for treatment;

- undertake regular tree clearing necessary to maintain existing OLS free from obstructions as required by Transport Canada;
TERMINAL COMMERCIAL AREA

- relocate the PTB departures entrance vestibule;
- add exterior signage on both landside and airside PTB facades;
- revise PTB security portal functionality and entrance queue;
- open up PTB baggage claim hall / enhance public waiting area;
- relocate car rental counter;
- relocate PTB Security Centre to former car rental space;
- upgrade PTB holdroom seating;
- provide canopy over airside PTB entrance;
- enhance / upgrade PTB public address system;
- provide Flight Information Display monitors within the public space of PTB and tie the information to Airport web site to allow flight status to be viewed remotely;
- add A/V monitors in PTB holdroom and public area for news, advertising and special announcement dissemination;
- upgrade public lounge area with mix of lounge and beam seating;
- reconfigure PTB frontage road to accommodate expanded area required for new vestibule and eliminate short term parking area;
- construct new 2 lane divided urban Terminal Approach Road between Front Road and Len Birchall Way including full illumination;
- provide new airport entrance signage at Front Road;
- undertake an analysis of mechanical system and heat loads to ensure system is adequate;

GENERAL AVIATION RELATED INDUSTRIAL / COMMERCIAL DEVELOPMENT

- demolish old Transport Canada building (6) beside FSS;
- demolish existing Hangar 3 (salvage of floor slab to be considered);
- undertake environmental clean-up around fuel tanks if necessary;
- provide consolidated fuel dispensing facility;
replace Hangar 3 with series of unheated T-hangars (banks of 10 – 130 metre x 16 metre) based on demand and commitment from possible private aircraft tenants;

develop “clubhouse” shell space (located at south end of T-hangars including utilities (water, sanitary, power, communications) based on demand for space, for tenant fit up;

create new Code A and B taxilane access to T-hangars;

remark pavement in front of T-hangars for outside tie down parking;

upgrade landside hard surfaced parking in front of new T-hangar development and provide separate entrance via Len Birchall Way;

modify security fencing and access gates as required to suit new development;

improve drainage of apron area between Hangars 4 and 5;

relocate above ground fuel facility for Maintenance Building;

demolish existing Hangar 5;

remove above ground fuel facility on west side of Hangar 5 as well as underground fuel tanks and dispensing cabinets and replace with consolidated fuel dispensing facility on north side of existing Transport Canada building (optional);

provide new +/- 40 metre x 80 metre hangarage / aviation support facilities (shell space) in general location of old Hangar 5 including site utilities to building face;

rehabilitate the apron pavement directly north of existing Hangar 5 as needed to support the anticipated aircraft loadings;

provide new landside parking area for Hangar 5 redevelopment;

**NON-AVIATION INDUSTRIAL/COMMERCIAL DEVELOPMENT**

develop Phase 1 of Business Park (NAICA#2) south of Len Birchall Way and west of new Terminal Approach Road.

**PROPERTY ACQUISITION / EASEMENTS**

acquire the Weatherall, Deruiter and Southerland properties located immediately south of Front Road for flight line protection (optional);

acquire the Transport Canada owned lands that existing building 6 occupies;
12.3 MID TERM IMPROVEMENTS

The Mid Term improvements outlined throughout the report have been broken down into a number of categories for ease of presentation and simplification of future budgeting. They include:

AIRPORT OPERATIONS AREA

- decommission Instrument Landing System (ILS) for Runway 19;
- extend Runway 01 threshold southerly 100 metres;
- extend Runway 19 threshold northerly 205 metres;
- replace final 3 approach lights of existing Runway 19 low intensity approach lighting system with inset pavement lights as required for proposed displaced threshold;
- relocate and extend existing Runway 01 omnidirectional capacitor discharge approach lights (ODALS) to meet TC Doc. No. TP312E section 5.3.5.2. This will require the last light standard to be positioned in Lake Ontario and warranting approval from both Transport Canada Navigable Waterways section and Fisheries and Oceans Canada. Upgrade to MALSAR to provide Category 1 Precision Approach for Runway 01 could be provided as an option;
- develop first phase (approximately 1,300 metres) of Taxiway ‘C’ from existing apron westerly across threshold of Runway 01 and northerly parallel to Runway 01-19;
- develop new single Code ‘C’ central aircraft de-icing bay between existing apron and Runway 07-25;
- provide approximately 120 metres Taxiway ‘B’ connection between Taxiway ‘C’ and Runway 01-19;
- undertake selective vegetation removal;
- relocate / install approximately 3,200 metres of primary security fence along west and north sides of airport property;
- undertake regular tree clearing necessary to maintain existing OLS free from obstructions as required by Transport Canada;

TERMINAL COMMERCIAL AREA

- expand PTB holdroom northerly to create approximately 76 square metre increased passenger seating area;
• include new washroom facilities and additional mechanical spaces within the expanded PTB holdroom;

• expand the existing ATO space by an approximate 40 square metre expansion to the east;

• expand existing outbound baggage makeup area by an approximate 20 square metres to the east;

• resurrect existing kitchen facilities and provide limited restaurant / bar facilities (based on demand and tenant commitments);

• extend Terminal Approach Road including new roundabout to expanded PTB including extension of taxi stand area;

• expand public parking spaces to suit demand including phase 1 of overflow lot located east of the Terminal Approach Road;

• realign roads and parking for FSS and airside access;

**GENERAL AVIATION RELATED INDUSTRIAL / COMMERCIAL DEVELOPMENT**

• relocate existing Airport Maintenance building to new site located along primary security line east of PTB.

• demolish existing vacated AOG buildings (lease expires in 2011) and develop addition hangarage / aviation support facilities (40 metre x 80 metre) east of short term hangar development;

• provide new Code ‘C’ taxilane for access to expanded hangarage / aviation support facilities;

• rehabilitate existing apron area in front of hangars 3 and 4;

• expand unheated T-hangars northerly (banks of 4) based on demand and commitment from possible private aircraft tenants;

• develop leasable building lots (GARIC#2) along the western boundary of the airport site including provision of two lane rural access road originating at Front Road including applicable trunk site utilities;

• extend sanitary, water, hydro and telecommunications from Len Birchall Way to west property boundary of airport;

• upgrade existing watermain from Front Road and Bayridge Drive to west end of Len Birchall Way;
NON AVIATION INDUSTRIAL / COMMERCIAL DEVELOPMENT

- develop Phase 2 of Business Industrial Park (NAICA #2) south of Len Birchall Way and east of new Terminal Approach Road;

PROPERTY ACQUISITION / EASEMENTS

- acquire easement for MALSAR across Collins Bay Marina property.

12.4 LONG TERM IMPROVEMENTS

The Long Term improvements outlined throughout the report have been broken down into a number of categories for ease of presentation and simplification of future budgeting. They include:

AIRPORT OPERATIONS AREA

- extend Taxiway Charlie from intersection with Taxiway Bravo to threshold of Runway 19;
- undertake selective vegetation removal;
- provide new Taxiway ’D’ parallel to and south of Runway 07-25 including a central connection to the main apron;
- rehabilitate original 1,524 meters (5000 ft.) portion of Runway 01-19;
- undertake regular tree clearing necessary to maintain existing OLS free from obstructions as required by Transport Canada;

TERMINAL COMMERCIAL AREA

- expand PTB holdroom easterly +/- 45 square metres to provide additional passenger seating area as required;
- expand PTB inbound baggage claim device to provide additional presentation length to suit peak hour passenger volume requirements;
- extend ATB westerly +/- 77 square metres to create additional public space for use as restaurant and expanded lounge for meeters and greeters;
- expand public overflow parking lot based on traffic demand;

GENERAL AVIATION RELATED INDUSTRIAL / COMMERCIAL DEVELOPMENT

- demolish existing Hangar 4;
- replace with multiple hangarage / aviation support facilities based on demand;
• upgrade landside hard surfaced parking in front of new hangarage;

**NON AVIATION INDUSTRIAL COMMERCIAL DEVELOPMENT NON AIRPORT**

• develop the +/- 33 hectare Business Industrial Park (NAICA #1) area located on the east side of the airport abutting Bayridge Drive and the West Park residential subdivision;

• develop Business Industrial Park (NAICA #3) within previously re-designated lands located at the corner of Bayridge Drive and Front Road;

**PROPERTY ACQUISITION / EASEMENTS**

• N/A

**12.5 CAPITAL COST ESTIMATES**

Estimated capital costs associated with each timeframe are presented in Tables 12-1 to 12-4. The costs quoted are based on 2007 dollars.

**Table 12-1 – Short Term Improvement Plan, Capital Costs**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong></td>
<td><strong>Airport Operations Area</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ACAP funded Runway 01-19 rehabilitation</td>
<td>$1,526,415</td>
</tr>
<tr>
<td>2</td>
<td>Rehabilitation of Runway 07-25 between threshold of Runway 07 and Taxiway Bravo</td>
<td>$660,000</td>
</tr>
<tr>
<td>3</td>
<td>Prepare RNAV (GNSS) GPS Approaches for Runways 01, 07, 19 and 25 (Costs incurred by Nav Canada)</td>
<td>$0</td>
</tr>
<tr>
<td>4</td>
<td>Modify existing de-icing collection system</td>
<td>$20,000</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total - Airport Operations Area</strong></td>
<td><strong>$2,206,415</strong></td>
</tr>
</tbody>
</table>

<p>| <strong>B.</strong>   | <strong>Terminal Commercial Area</strong>                                                |                |
| 1        | New entrance vestibule                                                      | $58,000        |
| 2        | Arrivals and Departures signage revisions including enlarged PTB sign on airside | $11,000        |
| 3        | Modify ATB security portal functionality and entrance queue                 | $12,000        |
| 4        | Arrivals Lounge                                                            | $66,000        |
|          | 2 wall mounted flat screen TV’s                                            |                |
|          | 50 new seats                                                               |                |
|          | new phones                                                                  |                |
|          | aquarium feature                                                            |                |
|          | demolish bag claim area and make good finishes                             |                |
|          | add rental car counters and finish work                                     |                |</p>
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Upgrade ATB holdroom seating</td>
<td>$22,400</td>
</tr>
<tr>
<td>6</td>
<td>Provide canopy over airside ATB entrance</td>
<td>$8,000</td>
</tr>
<tr>
<td>7</td>
<td>Upgrade ATB public address system</td>
<td>$20,000</td>
</tr>
<tr>
<td>8</td>
<td>Provide Flight Information Display monitors within the public space of ATB and tie the information to Airport web site</td>
<td>$5,000</td>
</tr>
<tr>
<td>9</td>
<td>Provide TV's in ATB holdroom and public lounge</td>
<td>$3,000</td>
</tr>
<tr>
<td>10</td>
<td>Rearrange ATB frontage road to accommodate expanded area required for new vestibule and eliminate short term parking area</td>
<td>$60,000</td>
</tr>
<tr>
<td>11</td>
<td>Terminal Approach Road between Front Road and Len Birchall Way including illumination</td>
<td>$297,500</td>
</tr>
<tr>
<td>12</td>
<td>Provide new airport entrance signage at Front Road</td>
<td>$15,000</td>
</tr>
<tr>
<td>13</td>
<td>Undertake an analysis of mechanical system and heat loads to ensure system is adequate</td>
<td>$5,000</td>
</tr>
</tbody>
</table>

**Sub Total - Terminal Commercial Area**  
$582,900
d

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Demolish Transport Canada building (#6)</td>
<td>$50,000</td>
</tr>
<tr>
<td>2</td>
<td>Demolish Hangar #3</td>
<td>$200,000</td>
</tr>
<tr>
<td>3</td>
<td>Construct 2 rows of 10 T hangars including services</td>
<td>$600,000</td>
</tr>
<tr>
<td>4</td>
<td>Provide &quot;clubhouse&quot; shell space (located at south end of T-hangars) including utilities and services</td>
<td>$285,000</td>
</tr>
<tr>
<td>5</td>
<td>Provide Code A and B Taxilane access to T-hangars</td>
<td>$421,200</td>
</tr>
<tr>
<td>6</td>
<td>Remark pavement in front of T-hangars for outside tie down parking</td>
<td>$2,000</td>
</tr>
<tr>
<td>7</td>
<td>New landside hard surfaced parking in front of T-hangar development</td>
<td>$88,200</td>
</tr>
<tr>
<td>8</td>
<td>Modify security fencing and access gates as required to suit new development</td>
<td>$40,000</td>
</tr>
<tr>
<td>9</td>
<td>Demolish Hangar #5</td>
<td>$200,000</td>
</tr>
<tr>
<td>10</td>
<td>Improve drainage of apron area between Hangars 4 and 5</td>
<td>$5,000</td>
</tr>
<tr>
<td>11</td>
<td>Relocate Maintenance Building's above ground fuel facility</td>
<td>$20,000</td>
</tr>
<tr>
<td>12</td>
<td>Remove above ground fuel facility as well as underground fuel tanks and dispensing cabinets along west side of Hangar 5.</td>
<td>$20,000</td>
</tr>
<tr>
<td>13</td>
<td>Allowance for environmental clean-up around fuel tanks</td>
<td>$40,000</td>
</tr>
<tr>
<td>14</td>
<td>Provide consolidated fuel dispensing facility</td>
<td>$75,000</td>
</tr>
<tr>
<td>15</td>
<td>Provide new 40m x 80m hangarage (shell space) near old Hangar 5 including site utilities to building face</td>
<td>$4,800,000</td>
</tr>
<tr>
<td>16</td>
<td>Rehabilitate pavement areas infront of existing Hangar 5 in order to accommodate anticipated aircraft parking.</td>
<td>$297,000</td>
</tr>
<tr>
<td>17</td>
<td>New landside parking area for Hangar 5 redevelopment</td>
<td>$100,920</td>
</tr>
<tr>
<td>Sub Total - General Aviation Related Industrial/Commercial Development</td>
<td>$7,244,320</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

D. **Non Aviation Industrial Commercial Development**

| 1 | Develop Phase 1 of Business Industrial Park (NAICA#2) south of Len Birchall Way (developer incurred costs) | $ - |
| Sub Total - Non-Aviation Industrial/Commercial Development- | $ - |

| Total Construction Cost | $ 10,033,635 |
| 25% Engineering and Contingencies | $ 2,508,409 |
| **Total Estimated Short Term Cost** | $ 12,542,044 |
### Table 12-2 – Mid Term Improvement Plan, Capital Costs

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Airport Operations Area</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Decommission Instrument Landing System (ILS) for Runway 19</td>
<td>$20,000</td>
</tr>
<tr>
<td>2</td>
<td>Extend Runway 01 100 metres to the south</td>
<td>$247,500</td>
</tr>
<tr>
<td>3</td>
<td>Extend Runway 19 threshold 205 metres to the north</td>
<td>$461,250</td>
</tr>
<tr>
<td>4</td>
<td>Fill required for Rwy 01-19 extension to the north</td>
<td>$1,278,000</td>
</tr>
<tr>
<td>5</td>
<td>Relocate existing ditching outside of graded area.</td>
<td>$250,000</td>
</tr>
<tr>
<td>6</td>
<td>Modify existing approach lighting system for displaced threshold of Runway 19</td>
<td>$50,000</td>
</tr>
<tr>
<td>7</td>
<td>Install new approach lights (ODALS) for Runway 01</td>
<td>$320,000</td>
</tr>
<tr>
<td>8</td>
<td>Construct first phase of Taxiway ‘C’</td>
<td>$1,768,500</td>
</tr>
<tr>
<td>9</td>
<td>New single Code ‘C’ aircraft de-icing bay as part of Taxiway C construction</td>
<td>$573,750</td>
</tr>
<tr>
<td>10</td>
<td>Approx 120 m Taxiway ‘B’ connection between Taxiway ‘C’ and Runway 01-19</td>
<td>$195,750</td>
</tr>
<tr>
<td>11</td>
<td>Install primary security fence along west and north sides of airport property</td>
<td>$192,685</td>
</tr>
<tr>
<td>12</td>
<td>Undertake selective removal of vegetation</td>
<td>$30,000</td>
</tr>
<tr>
<td>13</td>
<td>Rehabilitate Runway 07-25 between Taxiway Bravo and Threshold of Runway 25.</td>
<td>$200,000</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total - Airport Operations Area</strong></td>
<td><strong>$5,587,435</strong></td>
</tr>
<tr>
<td><strong>B. Terminal Commercial Area</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Northerly expansion of ATB holdroom (approx. 76 m²)</td>
<td>$220,000</td>
</tr>
<tr>
<td>2</td>
<td>Expand ATO space to the east (approx. 40 m²)</td>
<td>$70,000</td>
</tr>
<tr>
<td>3</td>
<td>Resurrect existing kitchen facilities and provide limited restaurant facilities (associated costs incurred by tenant)</td>
<td>$57,000</td>
</tr>
<tr>
<td>4</td>
<td>Expand Outbound Bag Room</td>
<td>$40,000</td>
</tr>
<tr>
<td>5</td>
<td>Extend Terminal Approach Road to Terminal including new roundabout</td>
<td>$97,500</td>
</tr>
<tr>
<td>6</td>
<td>Expand main parking lot including first phase of overflow lot located east of the Terminal Approach Road</td>
<td>$84,000</td>
</tr>
<tr>
<td>7</td>
<td>Realign roads and parking for FSS and airside access</td>
<td>$199,200</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total - Terminal Commercial Area</strong></td>
<td><strong>$767,700</strong></td>
</tr>
</tbody>
</table>
### C. General Aviation Related Industrial/Commercial Development

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Relocate existing Airport Maintenance building</td>
<td>$1,040,000</td>
</tr>
<tr>
<td>2</td>
<td>Demolish vacated AOG buildings</td>
<td>$40,000</td>
</tr>
<tr>
<td>3</td>
<td>Expand 40 m x 80 m hangar facility commenced in Short Term</td>
<td>$4,800,000</td>
</tr>
<tr>
<td>4</td>
<td>Provide new Code ‘C’ taxilane for access to expanded hangar</td>
<td>$549,750</td>
</tr>
<tr>
<td>5</td>
<td>Rehabilitate existing apron area infront of FSS and Hangars 3 and 4</td>
<td>$1,075,200</td>
</tr>
<tr>
<td>6</td>
<td>Expand T-hangars northerly (2 banks of 4)</td>
<td>$240,000</td>
</tr>
<tr>
<td>7</td>
<td>Extend sanitary, water, hydro and telecommunications from Len Birchall Way to west property boundary</td>
<td>$357,500</td>
</tr>
<tr>
<td>8</td>
<td>Upgrade existing watermain from Front Road and Bayridge Drive</td>
<td>$240,000</td>
</tr>
<tr>
<td>9</td>
<td>Construct fully serviced access road from Front Road to north end of leasable building lots along the western boundary of the airport site</td>
<td>$1,880,000</td>
</tr>
<tr>
<td>10</td>
<td>Provide new general aviation development in GARIC #2 (assume ½ designated area)</td>
<td>$6,300,000</td>
</tr>
</tbody>
</table>

**Sub-Total - General Aviation Related Industrial/Commercial Development $16,522,450**

### D. Non Aviation Industrial Commercial Development

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Develop Phase 1 of business industrial park (NAICA #2) south of Len Birchall Way (developer incurred costs)</td>
<td>$ -</td>
</tr>
<tr>
<td>2</td>
<td>Develop NAICA #3 at the corner of Bayridge Drive and Front Road (developer incurred costs)</td>
<td>$ -</td>
</tr>
</tbody>
</table>

**Sub Total - Non-Aviation Industrial/Commercial Development $ -**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Construction Cost</td>
<td>$22,877,585</td>
</tr>
<tr>
<td>25% Engineering and Contingencies</td>
<td>$5,719,396</td>
</tr>
<tr>
<td>Total Estimated Mid Term Cost</td>
<td>$28,596,981</td>
</tr>
</tbody>
</table>
### Table 12-3 – Long Term Improvement Plan, Capital Costs

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Airport Operations Area</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Extend Taxiway ‘C’ to the new threshold of Runway 19</td>
<td>$ 903,000</td>
</tr>
<tr>
<td>2</td>
<td>Complete selective removal of vegetation</td>
<td>$30,000</td>
</tr>
<tr>
<td>3</td>
<td>Provide new Taxiway ‘D’ including a taxiway connection to the main apron</td>
<td>$ 1,012,500</td>
</tr>
<tr>
<td>4</td>
<td>Rehabilitate original 5000 ft portion of Runway 01-19</td>
<td>$ 1,526,415</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total - Airport Operations Area</strong></td>
<td><strong>$ 3,471,915</strong></td>
</tr>
<tr>
<td>B.</td>
<td>Terminal Commercial Area</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Expand ATB holdroom easterly to provide additional passenger seating area as</td>
<td>$87,000</td>
</tr>
<tr>
<td></td>
<td>required</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Expand ATB inbound baggage claim device</td>
<td>$86,000</td>
</tr>
<tr>
<td>3</td>
<td>Expand ATB westerly</td>
<td>$140,000</td>
</tr>
<tr>
<td>4</td>
<td>Phase 2 expansion of overflow parking lot</td>
<td>$87,000</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total - Terminal Commercial Area</strong></td>
<td><strong>$400,000</strong></td>
</tr>
<tr>
<td>C.</td>
<td>General Aviation Related Industrial/Commercial Development</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Demolish existing Hangar #4</td>
<td>$200,000</td>
</tr>
<tr>
<td>2</td>
<td>Replace with multiple hangarage / aviation support facilities based on</td>
<td>$9,600,000</td>
</tr>
<tr>
<td></td>
<td>demand (80 m by 80 m assumed)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Upgrade landside hard surfaced parking in front of new hangarage</td>
<td>$120,600</td>
</tr>
<tr>
<td>4</td>
<td>Provide new general aviation development in GARIC #2 (assume ½ designated</td>
<td>$ 6,300,000</td>
</tr>
<tr>
<td></td>
<td>area)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>**Sub Total - General Aviation Related Industrial/Commercial Development</td>
<td><strong>$16,220,600</strong></td>
</tr>
<tr>
<td>D.</td>
<td>Non Aviation Industrial Commercial Development</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Develop approx. 33 ha NAICA #1 (developer incurred costs)</td>
<td>$ -</td>
</tr>
<tr>
<td>2</td>
<td>Develop NAICA #3 at the corner of Bayridge Drive and Front Road</td>
<td>$ -</td>
</tr>
<tr>
<td></td>
<td>(developer incurred costs)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>**Sub Total - Non-Aviation Industrial/Commercial Development</td>
<td><strong>$ -</strong></td>
</tr>
<tr>
<td></td>
<td>Total Construction Cost</td>
<td><strong>$ 20,092,515</strong></td>
</tr>
<tr>
<td></td>
<td>25% Engineering and Contingencies</td>
<td><strong>$ 5,023,128</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Estimated Long Term Cost</strong></td>
<td><strong>$ 25,115,643</strong></td>
</tr>
</tbody>
</table>
Table 12-4 – Summary of Capital Costs

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td><strong>Airport Operations Area</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short Term</td>
<td>$2,758,019</td>
</tr>
<tr>
<td></td>
<td>Mid Term</td>
<td>$6,984,293</td>
</tr>
<tr>
<td></td>
<td>Long Term</td>
<td>$4,339,893</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total - Airport Operations Area</strong></td>
<td><strong>$14,082,205</strong></td>
</tr>
<tr>
<td>B.</td>
<td><strong>Terminal Commercial Area</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short Term</td>
<td>$728,625</td>
</tr>
<tr>
<td></td>
<td>Mid Term</td>
<td>$959,625</td>
</tr>
<tr>
<td></td>
<td>Long Term</td>
<td>$500,000</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total - Terminal Commercial Area</strong></td>
<td><strong>$2,188,250</strong></td>
</tr>
<tr>
<td>C.</td>
<td><strong>General Aviation Related Industrial/Commercial Development</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short Term</td>
<td>$9,055,400</td>
</tr>
<tr>
<td></td>
<td>Mid Term</td>
<td>$20,653,062</td>
</tr>
<tr>
<td></td>
<td>Long Term</td>
<td>$20,275,075</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total - General Aviation Related Industrial/Commercial Development</strong></td>
<td><strong>$49,984,212</strong></td>
</tr>
<tr>
<td>D.</td>
<td><strong>Non Aviation Industrial Commercial Development</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short Term</td>
<td>$ -</td>
</tr>
<tr>
<td></td>
<td>Mid Term</td>
<td>$ -</td>
</tr>
<tr>
<td></td>
<td>Long Term</td>
<td>$ -</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total - Non-Aviation Industrial/Commercial Development</strong></td>
<td><strong>$ -</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Estimated Cost</strong></td>
<td><strong>$66,254,667</strong></td>
</tr>
</tbody>
</table>
APPENDIX A
GLOSSARY
AND
EXPLANATION
OF TERMS

LIST OF ABBREVIATIONS

AGL    Above Ground Level
ASL    Above Mean Sea Level
ARCAL  Aircraft Radio Control of Airport Lighting
AVGAS  Aviation Gasoline (typically 100 low lead)
AWOS   Automated Weather Observation Station
CAR    Canadian Air Regulations
CEAA   Canadian Environmental Assessment Act
CFS    Canadian Flight Supplement
CIP    Capital Improvement Program
DME    Distance Measuring Equipment
FAA    Federal Aviation Administration (United States)
FBO    Fixed Base Operator
GPS    Global Positioning System
GNSS   Global Navigation Satellite System
ICAO   International Civil Aviation Organization
IFR  Instrument Flight Rules
ILS  Instrument Landing System
MALSR  Medium Intensity Approach lighting System
MDA  Minimum Decision Altitude
MTOW  Maximum Gross Take-off Weight
NDB  Non-Directional Beacon
NM  Nautical Miles
NOTAM  Notice To All Airmen
ODALS  Omni-directional Approach Lighting System
OLS  Obstacle Limitation Surfaces
PAPI  Precision Approach Path Indicator
PTB  Passenger Terminal Building
RIL  Runway Identification Lighting
RVR  Runway Visibility Range
TC  Transport Canada
UNICOM  Universal Communications
VFR  Visual Flight Rules
VMC  Visual Meteorological Conditions
VOR  Very High Frequency Omni-directional Range
WAAS  Wide Area Augmentation System
## EXPLANATION OF TERMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aerodrome</strong></td>
<td>Any area of land, water or other supporting surface used or designed, prepared, equipped or set apart for use either in whole or in part for arrival and departure, movement or servicing of aircraft and includes any buildings, installations and equipment in connection thereof.</td>
</tr>
<tr>
<td><strong>Aerodrome Beacon</strong></td>
<td>Aeronautical beacon / light used to indicate the location of an aerodrome from the air.</td>
</tr>
<tr>
<td><strong>Aerodrome Elevation</strong></td>
<td>The elevation of the highest point of the landing area (runway).</td>
</tr>
<tr>
<td><strong>Aerodrome Reference Code</strong></td>
<td>A simple coding system used to interrelate and identify standards for various sizes of aerodrome facility that are suitable for the airplanes intending to operate at them. The code is composed of two elements – a code number (from 1 to 4) related to the airplane reference field length, and a code letter (from A to E) related to the aircraft wing span &amp; outer main gear wheel span.</td>
</tr>
<tr>
<td><strong>Aerodrome Reference Point</strong></td>
<td>The designated point or points on an aerodrome normally located at or near the geometric centre of the runway complex that establishes the locus of the radius or radii of the outer surface (as defined in a Zoning Regulation).</td>
</tr>
<tr>
<td><strong>Aerodrome Reference Temperature</strong></td>
<td>The monthly mean of the maximum daily temperature for the hottest month of the year (the hottest month being that which has the highest monthly mean temperature).</td>
</tr>
<tr>
<td><strong>Air Carrier</strong></td>
<td>An aircraft operator, licensed under the National Transportation Act to transport persons, mail and/or goods by air, who has an official ICAO or Transport Canada designator.</td>
</tr>
<tr>
<td><strong>Air Taxi</strong></td>
<td>An air carrier providing on demand, public transportation of persons and property by aircraft. Generally operating small aircraft “for hire” for specific trips.</td>
</tr>
<tr>
<td><strong>Air Traffic Control Tower (ATCT)</strong></td>
<td>A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signalling, and other devices to provide safe and expeditious movement of terminal air traffic.</td>
</tr>
<tr>
<td><strong>Aircraft Movement</strong></td>
<td>A take-off, landing, or simulated approach by an aircraft.</td>
</tr>
<tr>
<td><strong>Airplane Reference Field Length</strong></td>
<td>The minimum field length required for take-off at maximum certified take-off mass, sea level, standard atmospheric</td>
</tr>
</tbody>
</table>
conditions, still air and zero runway slope, as listed in relevant airplane flight manuals prescribed by the certifying authority or equivalent data from the airplane manufacturer. Field length means balanced field length for airplanes or take-off distance in other cases.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport</td>
<td>An aerodrome for which an airport certificate is in force.</td>
</tr>
<tr>
<td>Airport Zoning Regulations</td>
<td>A regulation respecting a given airport pursuant to the Canadian Aeronautics Act. A zoning or legal instrument that will prohibit the erection of structures which would violate any of the defined obstacles limitation surfaces.</td>
</tr>
<tr>
<td>Airside</td>
<td>The movement area of an aerodrome, including adjacent terrain and buildings or portions thereof, where access is controlled.</td>
</tr>
<tr>
<td>Approach Minimums</td>
<td>The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.</td>
</tr>
<tr>
<td>Approach/ Take-off Path</td>
<td>The flight track aircraft follow when landing at or taking off from an aerodrome which translates to a quadrilateral area on the surface of the earth lying directly below the approach/take-off surface.</td>
</tr>
<tr>
<td>Apron (Ramp)</td>
<td>An area on the airside portion of an aerodrome, other than the manoeuvring area, intended to accommodate the manoeuvring and parking of aircraft, the loading and unloading of aircraft, and the general handling of flights and the associated aircraft, vehicles and passengers.</td>
</tr>
<tr>
<td>AWOS</td>
<td>A group of equipment used to automatically record weather conditions including cloud height, visibility, wind speed and direction, temperature, dewpoint, etc.</td>
</tr>
<tr>
<td>Circling Approach</td>
<td>A pilot initiated manoeuvre to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.</td>
</tr>
<tr>
<td>Clearway</td>
<td>A defined rectangular area on the ground or water under the control of the appropriate authority selected or prepared as a suitable area over which an airplane may make a portion of its initial climb to a specified height.</td>
</tr>
<tr>
<td>Controlled Airspace</td>
<td>Airspace of defined dimensions within which air traffic control services are provided to IFR and VFR flights in accordance with the air space classification.</td>
</tr>
<tr>
<td>Control Zone</td>
<td>Controlled airspace of defined dimensions extending upwards from ground level to and including 3,000 feet above aerodrome elevation.</td>
</tr>
</tbody>
</table>
Design Aircraft
Most operationally demanding or critical aircraft, identified from among the aircraft an aerodrome is intended to service, used to determine the dimensions, bearing strength and other physical characteristics in the design of an aerodrome.

Displaced Threshold
A threshold not located at the extremity of a runway. Displaced thresholds are used when an obstacle in the final approach area intrudes into the specific obstruction clearance surfaces. Displacing the threshold provides the required obstacle free slope. The declared landing distance (LDA) which assumes a specified obstacle clearance plane is therefore measured from the displaced threshold; however there is no restriction to an aircraft actually landing on the useable runway prior to the displaced threshold. This portion of the runway is also available take-off or roll out.

Flight Service Station
An aeronautical facility providing mobile or fixed communications, flight information, search and rescue alerting, and weather advising services to pilots/other users.

Helipad
A designated area for the takeoff, landing, and parking of helicopters.

Instrument Approach
A series of predetermined manoeuvres for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

Instrument Flight Rules (IFR)
Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.

Itinerant Movement
Movements proceeding to or arriving from another location, or leaves the aerodrome traffic circuit but returns without landing at another aerodrome. Excludes flights which are strictly passing through the control zone of the aerodrome.

Local Movement
A movement in which the aircraft remains in the circuit or in close proximity to the aerodrome, and will return to land at the aerodrome. Typically, this includes aircraft executing practice instrument approach procedures or touch-and-go training operations.

Low Level Airspace
All airspace within the Canadian Domestic Airspace below 18,000 feet ASL.

Low Level Airway
Within low level airspace, a route extending upwards from 2,200 feet ASL up to, but not including 18,000 feet ASL, and for which air traffic control is provided.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navaid</td>
<td>A term used to describe electronic equipment used by pilots for air navigation purposes (i.e. NDB, VOR, DME, ILS).</td>
</tr>
<tr>
<td>Non-instrument Runway</td>
<td>A runway intended for the operation of aircraft using visual procedures or instrument procedures to circling minima only.</td>
</tr>
<tr>
<td>Non-Precision Approach</td>
<td>An instrument approach in which electronic azimuth information is only provided. No electronic glide path information is provided and obstacle assessment in the final segment is based on minimum descent altitude.</td>
</tr>
<tr>
<td>Non-Precision Approach</td>
<td>A standard instrument approach procedure in which no electronic glide slope is provided.</td>
</tr>
<tr>
<td>Procedure NOTAM</td>
<td>A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.</td>
</tr>
<tr>
<td>Obstacle</td>
<td>Any fixed (whether temporary or permanent) and mobile object that could have an adverse effect on safe operation of aircraft in flight or on the ground, or otherwise a hazard to air navigation.</td>
</tr>
<tr>
<td>Obstacle Limitation Surface (OLS)</td>
<td>A surface that establishes the limit to which objects, including a parked or moving vehicle, may project into the airspace so that aircraft operations for which the airport is intended may be conducted safely and, includes a transitional surface, a take-off surface, an approach surface, and an outer surface. Any object, which penetrates an obstacle limitation surface, and is deemed to be a hazard to air navigation, must either be removed, lowered and/or marked and lighted.</td>
</tr>
<tr>
<td>Passenger Terminal Building (PTB)</td>
<td>An installation provided with facilities and services necessary for the loading and unloading of aircraft and in-transit handling of traffic (passengers, cargo and mail) which is moved by aircraft.</td>
</tr>
<tr>
<td>Precision Approach Path Indicator (PAPI)</td>
<td>A lighting system providing visual approach slope guidance to aircraft during a landing approach. It is similar to a VASI but provides a sharper transition between the coloured indicator lights.</td>
</tr>
<tr>
<td>Private Use Airport</td>
<td>Except in an emergency, a private use airport is not normally open to itinerant aircraft and therefore the operator's permission should be obtained prior to use.</td>
</tr>
<tr>
<td>Public Use Airport</td>
<td>An aerodrome available for use by the general public without requirement for prior approval of the owner or operator. Aerodromes listed in the CFS, which are not certified as airports.</td>
</tr>
<tr>
<td>Registered Aerodrome</td>
<td></td>
</tr>
<tr>
<td>Reliever Airport</td>
<td>An airport to serve general aviation aircraft, which might otherwise</td>
</tr>
</tbody>
</table>
use a congested air-carrier served airport.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway Identification Lights (RIL)</td>
<td>Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.</td>
</tr>
<tr>
<td>Runway End Safety Area</td>
<td>An area symmetrical about the extended runway centreline and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway.</td>
</tr>
<tr>
<td>Runway End Safety Area</td>
<td>A defined surface symmetrical about the extended runway centreline and adjacent to the end of the strip intended to reduce the risk of damage to airplanes in the event of an overshoot, undershoot, or excursion from the runway.</td>
</tr>
<tr>
<td>Runway Gradient</td>
<td>The average slope, measured in percent, between the two ends of a runway.</td>
</tr>
<tr>
<td>Runway Incursion</td>
<td>Any occurrence at an airport involving the unauthorized or unplanned presence of an aircraft, vehicle, or person on the protected areas of a runway.</td>
</tr>
<tr>
<td>Runway Strip</td>
<td>A defined area including the runway and stopway, if provided, intended to reduce the risk of damage to aircraft running off a runway or to protect aircraft flying over it during take-off or landing operations.</td>
</tr>
<tr>
<td>Runway Visual Range (RVR)</td>
<td>An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.</td>
</tr>
<tr>
<td>Secondary Runway</td>
<td>A runway designed to serve less critical airplanes and not necessarily sufficient for all airplanes which the primary runway is intended to serve and is provided to take account of the effect of particular winds of high velocity.</td>
</tr>
<tr>
<td>Stop-and-Go</td>
<td>A procedure in which an aircraft lands, makes a complete stop on the runway, and then commences a take-off from that point. A stop-and-go is record as two operations (landing and take-off).</td>
</tr>
<tr>
<td>Stopway</td>
<td>A defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take-off.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Taxiway</td>
<td>A defined path established for the taxiing of aircraft from one part of an airport to another.</td>
</tr>
<tr>
<td>Threshold</td>
<td>The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.</td>
</tr>
<tr>
<td>Touch-and-Go</td>
<td>An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is recorded as two operations: one operation for the landing and one operation for the take-off.</td>
</tr>
<tr>
<td>Unicom</td>
<td>A non-government communication facility, which may provide airport information at certain airports. Locations and frequencies of UNICOM’s are shown on aeronautical charts and publications.</td>
</tr>
<tr>
<td>Visual Approach</td>
<td>An approach wherein an aircraft on an IFR flight path operating in VMC under the control of ATC and ATC authorization, may proceed to the airport of destination.</td>
</tr>
<tr>
<td>Visual Flight Rules (VFR)</td>
<td>Rules that govern the procedures governing flight using visual means (without instruments or using instruments for aiding in visual flight procedures).</td>
</tr>
<tr>
<td>Visual Meteorological Conditions</td>
<td>Conditions equal to or greater than the minima prescribed in Subpart 2 of CAR’s, Part IV, expressed in terms of visibility and distance from cloud.</td>
</tr>
</tbody>
</table>
APPENDIX B
MARKETING RESEARCH SURVEYS

Market Research Data & Methodology

As no one source is currently available to provide origin/destination passenger market information for Kingston (Norman Rogers) Airport (YGK), multiple data sources were required to develop the passenger market sizes. The following sections provide a brief description of each source and its value in constructing all components of the total travel market for Kingston (Norman Rogers) Airport.

- **IATA Billing & Settlement Plan (BSP) Data**

The primary source of project data was the International Air Transport Association (IATA) Billing and Settlement Plan (BSP) ticket sales data. This dataset includes all airline tickets issued through the IATA BSP system by the travel agent community in Canada and 150 other countries. Tickets issued by travel agents represent the majority of all airline tickets issued for scheduled flights worldwide. In Canada, transborder and international sectors are well represented in the IATA BSP data; however, domestic ticket sales within the system have experienced declining volumes in recent years. This is due to an increase in ticket sales made directly through Air Canada (i.e., via their website and telephone reservation centres) rather than through travel agents. Additionally, the growth in domestic passenger traffic on WestJet and other carriers with non-IATA BSP distribution channels have also impacted the ticket volumes in the dataset. Although the IATA BSP data is not without its limitations, it provides a very detailed base on which to build the origin/destination market sizes.

The data used in this project includes all IATA BSP tickets sold in anywhere where in the world (except US) with travel originating or destined to the Kingston (Norman Rogers) Airport.
Rogers) Airport. Additionally, all IATA BSP ticket sales from the YGK catchment area region which originated from Toronto, Syracuse and other airports outside the area were also captured for the analysis (i.e., airport leakage/diversion data). The most current 12-month travel period was selected from July 2005 to June 2006.

- **Airlines Reporting Corporation (ARC) Data**

A second important source of project data was the Airlines Reporting Corporation (ARC) ticket sales data. This dataset is very similar to the IATA BSP data discussed above but includes all airline tickets issued through the ARC system by the travel agent community in the United States. (ARC handles ticket sales settlement in the United States and the IATA BSP system operates in most other countries).

The ARC data used in this project includes all ARC tickets sold in the United States with travel destined to the Kingston (Norman Rogers) Airport. The most current 12-month travel period was selected from July 2005 to June 2006.

- **YGK Airport Site Statistics and Air Carrier Schedules**

YGK site statistics were also used to identify and include any traffic that is excluded from the IATA BSP data. The site statistics were also used as a cross-check for total passenger volumes by sector. Although no origin/destination level details are available from the site statistics, they were used as a starting point for estimating individual market sizes for the non-BSP carriers. In order to estimate city-pair level data, the site statistics were used in conjunction with flight capacity, schedule data and other market modelling tools.


Although no current origin/destination market data is available from Statistics Canada, 1999 for the domestic sector and 2002 for the transborder sector files were used as a historic cross-check for city pair market sizes. Note that the Statistics Canada data does not include all carriers operating in Canada, e.g., the data excludes WestJet. Additionally, international origin/destination data is not available from Statistics Canada.

- **Stakeholder Interview**

InterVISTAS Consulting conducted a telephone interview with Central Airways Corp., YGK’s only fixed base operator (FBO). The purpose of the interview was to research charter activity at YGK. Central Airways Corp. reported limited involvement with charter flights at YGK as booking corporate charters is not among their service offering. However Central Airways Corp. representative did indicate that corporate charters at YGK typically operate on an irregular schedule and utilize 4 to 12-seat aircraft, and as such annual passenger volumes are anticipated to be low.
- **Travel Agency Survey**

Although the IATA BSP data provided information on some of the *outbound* passenger diversion or leakage to other airports, WestJet, other low cost carriers and charter carriers are generally excluded from this data set. To assist in quantifying the remaining outbound diversion/leakage, travel agencies located within the Kingston catchment area were contacted in July/August 2006 for estimated passenger volumes on the non-IATA BSP carriers. There were a total of 16 travel agencies within the catchment area for which contact information was available. Travel agencies were contacted to complete a short telephone interview. Follow-up calls were made to achieve as high a response rate as possible within the project timeline. In total 10 agencies completed the survey.

A list of travel agencies surveyed and a copy of the telephone interview guideline follows in this Market Research Appendix.

- **Business Survey**

A survey of the Kingston’s largest employers was used as an input to examine the nature of demand by the local business community for transportation services and the degree to which local business utilizes air travel.

A list of the businesses contacted and a copy of the telephone interview guideline is included in this Appendix.
### Kingston Travel Agency Contact List

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Company</th>
<th>Completed Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jim Perry</td>
<td>Carlson Wagonlit Cleland Travel</td>
<td>☑</td>
</tr>
<tr>
<td>Jim Vance</td>
<td>CruiseShipCenters Kingston</td>
<td>☑</td>
</tr>
<tr>
<td>Phyliss Kathy</td>
<td>Kingston Carlson Wagonlit</td>
<td>☑</td>
</tr>
<tr>
<td>Robert Jones</td>
<td>Merit Travel Kingston</td>
<td>☑</td>
</tr>
<tr>
<td>Linda Tobin-Nelson</td>
<td>Sears Travel</td>
<td>☑</td>
</tr>
<tr>
<td>Lorraine</td>
<td>Service Guaranteed Travel Plus</td>
<td>☑</td>
</tr>
<tr>
<td>Sarmistha Dey</td>
<td>Algonguin Travel</td>
<td>☑</td>
</tr>
<tr>
<td>Anna Kovachis</td>
<td>Odyssey Travel</td>
<td>☑</td>
</tr>
<tr>
<td>Lorne Knutson</td>
<td>Bayridge Travel Choice/AMEX</td>
<td></td>
</tr>
<tr>
<td>Lynn McCreedy</td>
<td>Cleland Travel and Cruise</td>
<td></td>
</tr>
<tr>
<td>Kathy Halliday</td>
<td>CAA Travel</td>
<td>☑</td>
</tr>
<tr>
<td>Sandra Rix</td>
<td>The Travel Broker</td>
<td></td>
</tr>
<tr>
<td>Robert Belanger</td>
<td>Cruise Holidays of Brockville</td>
<td>☑</td>
</tr>
<tr>
<td>Julie Hoffer</td>
<td>ANZ Australia New Zealand and South Pacific Travel Resource Centre</td>
<td>☑</td>
</tr>
<tr>
<td>Brenda Ewing</td>
<td>Algonguin Travel</td>
<td></td>
</tr>
<tr>
<td>Penny Lawson</td>
<td>Penny's Travel</td>
<td></td>
</tr>
</tbody>
</table>
Travel Agency Telephone Interview Guideline

Kingston (Norman Rogers) Airport
Air Travel Demand Survey

Thank you for completing this questionnaire for Kingston (Norman Rogers) Airport. Your responses will assist us in understanding the air travel market and will help identify future opportunities for air services at Kingston (Norman Rogers) Airport that will better serve your agency and your clients. Please be assured that all individual responses will be treated as confidential. In all tabulated results, only aggregate data will be reported.

1. Are you an IATA agency?
   □ Yes    □ No

2. On average, how many total air tickets (combined BSP & non-BSP) did your agency sell in 2005?
   ___________ tickets

3. Approximately what percentage of your total air tickets are:
   _____ Domestic Canada travel
   _____ United States travel
   _____ International travel
   100% Total

4. What percentage of all your air tickets sold (BSP & Non-BSP) are for…
   _____ Business   _____ Leisure

5a. What are your top 5 domestic destinations and what percentage of your total domestic ticket sales do they represent?
   1. ___________________________   _________%
   2. ___________________________   _________%
   3. ___________________________   _________%
   4. ___________________________   _________%
   5. ___________________________   _________%
All other domestic destinations  _______%

100% Total

6. Overall, approximately what percentage of your agency’s air tickets to destinations in Canada are…
   _____ BSP tickets
   _____ Air Canada tickets (Mainline, Jazz & Zip) booked through the airline’s travel agency website
   _____ Charters (Air Transat, Skyservice, etc.)
   _____ Other non-BSP tickets (WestJet, CanJet, Jetsgo, HMY Airways, etc.)

100% Total

7a. What are your top 5 U.S. destinations and what percentage of your total U.S. ticket sales do they represent?
1. ____________________  _______%
2. ____________________  _______%
3. ____________________  _______%
4. ____________________  _______%
5. ____________________  _______%

All other U.S. destinations  _______%

100% Total

7b. Overall, approximately what percentage of your agency’s air tickets to U.S. destinations are…
   _____ BSP tickets
   _____ Air Canada tickets (Mainline, Jazz & Zip) booked through the airline’s travel agency website
   _____ Other scheduled carrier tickets booked through the airlines’ travel agency websites
   _____ Other non-BSP tickets (WestJet, CanJet, Jetsgo, HMY Airways, etc.)
   _____ Charters (Air Transat, Skyservice, etc.)
   _____ Consolidator tickets
   _____ Air Portion of Tour/Cruise Packages (FIT/IT)

100% Total
9a. On an annual basis, what approximate percentage of your DOMESTIC air tickets are for trips originating at...

_______% Kingston (Norman Rogers) Airport
_______% Toronto Lester B Pearson International Airport
_______% Ottawa International Airport
_______% John C. Munro Hamilton International Airport
_______% Montreal Trudeau International Airport
_______% Greater Rochester International Airport
_______% Syracuse Hancock International Airport
_______% Buffalo Niagara International Airport
_______% Other Airports  (Please Specify:__________________________________)
100%  Total

9b. On an annual basis, what approximate percentage of your TRANSBORDER air tickets are for trips originating at...

_______% Kingston (Norman Rogers) Airport
_______% Toronto Lester B Pearson International Airport
_______% Ottawa International Airport
_______% John C. Munro Hamilton International Airport
_______% Montreal Trudeau International Airport
_______% Greater Rochester International Airport
_______% Syracuse Hancock International Airport
_______% Buffalo Niagara International Airport
_______% Other Airports  (Please Specify:__________________________________)
100%  Total

9c. On an annual basis, what approximate percentage of your INTERNATIONAL air tickets are for trips originating at...

_______% Kingston (Norman Rogers) Airport
_______% Toronto Lester B Pearson International Airport
_______% Ottawa International Airport
_______% John C. Munro Hamilton International Airport
_______% Montreal Trudeau International Airport
_______% Greater Rochester International Airport
_______% Syracuse Hancock International Airport
_______% Buffalo Niagara International Airport
% Other Airports (Please Specify: ________________________________)
100% Total

10. What scheduled non stop domestic and transborder air services do you believe would have the greatest demand at Kingston (Norman Rogers) Airport?

<table>
<thead>
<tr>
<th>City 1:</th>
<th>City 1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>City 2:</td>
<td>City 2:</td>
</tr>
<tr>
<td>City 3:</td>
<td>City 3:</td>
</tr>
</tbody>
</table>

Additional Comments for Kingston (Norman Rogers) Airport:

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

We would appreciate the following information:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Name:</td>
<td></td>
</tr>
<tr>
<td>Company Representative Name and Title:</td>
<td></td>
</tr>
<tr>
<td>Telephone Number:</td>
<td>( )</td>
</tr>
<tr>
<td>Location of Firm (City):</td>
<td></td>
</tr>
</tbody>
</table>

Thank You for Your Participation!
## Kingston Businesses Contact List

<table>
<thead>
<tr>
<th>Organization</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Private Sector</strong></td>
<td></td>
</tr>
<tr>
<td>StarTek</td>
<td></td>
</tr>
<tr>
<td>Invista Canada</td>
<td>✓</td>
</tr>
<tr>
<td>Assurant Group</td>
<td>✓</td>
</tr>
<tr>
<td>Novelis (Research and Development Division)</td>
<td></td>
</tr>
<tr>
<td>Novelis (Manufacturing Division)</td>
<td></td>
</tr>
<tr>
<td>Empire Financial Group</td>
<td></td>
</tr>
<tr>
<td>Dupont Canada Inc. - Research and Development Centre</td>
<td></td>
</tr>
<tr>
<td>Bombardier</td>
<td></td>
</tr>
<tr>
<td>Bosal Canada</td>
<td>✓</td>
</tr>
<tr>
<td>Wal-Mart</td>
<td></td>
</tr>
<tr>
<td><strong>Public Sector</strong></td>
<td></td>
</tr>
<tr>
<td>Canadian Forces Base, Kingston</td>
<td></td>
</tr>
<tr>
<td>Queen’s University</td>
<td>✓</td>
</tr>
<tr>
<td>Kingston General Hospital</td>
<td>✓</td>
</tr>
<tr>
<td>Limestone District School Board</td>
<td>✓</td>
</tr>
<tr>
<td>Correctional Services of Canada</td>
<td></td>
</tr>
<tr>
<td>City of Kingston</td>
<td>✓</td>
</tr>
<tr>
<td>Hotel Dieu Hospital</td>
<td>✓</td>
</tr>
<tr>
<td>Providence Continuing Care Centre</td>
<td></td>
</tr>
<tr>
<td>Royal Military College</td>
<td>✓</td>
</tr>
<tr>
<td>Ontario Ministry of Transportation</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Only Queen’s University completed surveys. Other businesses did not provide survey information but did supply information relevant to business travel.*
Kingston Business Telephone Interview Guideline

Kingston (Norman Rogers) Airport
Business Travel Demand Survey

Thank you for completing this questionnaire for Kingston (Norman Rogers) Airport. Your responses will assist us in understanding the air travel market and will help identify future opportunities for air services at Kingston (Norman Rogers) Airport that will better serve your organization and your clients. Please be assured that all individual responses will be treated as confidential. In all tabulated results, only aggregate data will be displayed.

1a. How many business trips by air did employees at this location of your company take in 2005?

__________ trips

b. What percentage of these trips are destined to Canada and the U.S. or other international countries?

______% Canada
______% U.S.
______% All other countries

100% Total

c. Do you utilize train service for business trips?

______ Yes    ______ No

If yes how often and to what destinations?

_____________________________________________________________________

2. What % of your company’s air tickets are purchased through the following channels….

_____% Through a travel agent
   → if used a travel agency, where is the agency located?
      ☐ travel agency located in Kingston region
      ☐ travel agency located elsewhere, please specify
         City:__________________

_____% Directly with the airline by phone/ Internet

_____% On an Internet travel site (e.g., Orbitz, Travelocity, etc.)

_____% Other (Specify: ________________________________ )
3. What % of business trips by air originated from:

<table>
<thead>
<tr>
<th>Airport</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingston (Norman Rogers) Airport</td>
<td>_______</td>
</tr>
<tr>
<td>Toronto Lester B Pearson International Airport</td>
<td>_______</td>
</tr>
<tr>
<td>Ottawa International Airport</td>
<td>_______</td>
</tr>
<tr>
<td>John C. Munro Hamilton International Airport</td>
<td>_______</td>
</tr>
<tr>
<td>Montreal Trudeau International Airport</td>
<td>_______</td>
</tr>
<tr>
<td>Greater Rochester International Airport</td>
<td>_______</td>
</tr>
<tr>
<td>Syracuse Hancock International Airport</td>
<td>_______</td>
</tr>
<tr>
<td>Buffalo Niagara International Airport</td>
<td>_______</td>
</tr>
<tr>
<td>Other Airports (Please Specify:)</td>
<td></td>
</tr>
</tbody>
</table>

100% Total

4. What were your company’s 5 top/most frequent Canadian city air destinations and what percentage of your total Canadian air trips do they represent?

<table>
<thead>
<tr>
<th>Destination</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>All other domestic destinations</td>
<td></td>
</tr>
</tbody>
</table>

100% Total

5. What were your company’s 5 top/most frequent U.S. city air destinations and what percentage of your total U.S. air trips do they represent?

<table>
<thead>
<tr>
<th>Destination</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>All other U.S. destinations</td>
<td></td>
</tr>
</tbody>
</table>

100% Total
6. What is the approximate amount that your company spent on outbound air travel in 2003?

CAD $__________

7a. How many total inbound business trips by air did employees of your company (based outside of Kingston Region) and clients from outside of the Kingston Region take to Kingston Region in 2005?

______________ trips [IF NONE, SKIP TO QUESTION 10]

b. What percentage of these air trips originated from Canada, the U.S. or other international countries?

_______% Canada

_______% U.S.

_______% All other countries

100% Total

8. What % of the total inbound air business trips arrived at:

_______% Kingston (Norman Rogers) Airport

_______% Toronto Lester B Pearson International Airport

_______% Ottawa International Airport

_______% John C. Munro Hamilton International Airport

_______% Montreal Trudeau International Airport

_______% Greater Rochester International Airport

_______% Syracuse Hancock International Airport

_______% Buffalo Niagara International Airport

_______% Other Airports (Please Specify:___________________________)

100% Total

9. What were the 5 top/most frequent city origins for these inbound air trips…

From Canada

1. ___________________________ ___________________________ %

2. ___________________________ ___________________________ %

3. ___________________________ ___________________________ %

4. ___________________________ ___________________________ %

5. ___________________________ ___________________________ %
All other domestic origins %

From the U.S.

1. _________________ %
2. _________________ %
3. _________________ %
4. _________________ %
5. _________________ %

All other U.S. origins %

100% Total

10. Do you use a corporate aircraft?

_____ Yes _____ No

If so, how often and where does it fly to?

_____ Frequency (monthly?, weekly?)

Destinations:

________________________________________________________________________

________________________________________________________________________

Would you consider using commercial flights if there was an improvement in commercial services?

_____ Yes _____ No

11. Does your company have a specific policy for purchasing air tickets for business travel (e.g., specific carrier, lowest price, closest airport etc.)? If yes, please describe below.

________________________________________________________________________

________________________________________________________________________
12. What scheduled non-stop domestic and transborder air services would employees of your company be most likely to use from Kingston (Norman Rogers) Airport?

<table>
<thead>
<tr>
<th>Domestic</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>City 1:</td>
<td>City 1:</td>
</tr>
<tr>
<td>City 2:</td>
<td>City 2:</td>
</tr>
<tr>
<td>City 3:</td>
<td>City 3:</td>
</tr>
</tbody>
</table>

13. If scheduled non-stop flights were available from Kingston (Norman Rogers) Airport to your preferred destination(s):

   a) Would your company/employees use it?
      - Yes  - No  - Maybe

   b) Would it increase your company’s overall travel?
      - Yes  - No  - Maybe

14. What factors would persuade your company/employees to use Kingston (Norman Rogers) Airport’s service? (check all that apply):

   - Lower airfares
   - Flights at preferred time of day
   - Flights on preferred day of week
   - Service by preferred airline, specify __________________________
   - Frequent flyer points
   - Air/hotel package deal
   - Other (specify) ____________________

15. Over the next year, do you expect future air business travel at your company to:

   - Increase versus 2005 ➔ By what %: _____%
   - Decrease versus 2005 ➔ By what %: _____%
   - Stay the same
   - Unknown

16. Do you have any suggestions for air service development at Kingston (Norman Rogers) Airport? (Additional Comments)
We would appreciate the following information:

<table>
<thead>
<tr>
<th>Company Name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Representative Name:</td>
<td></td>
</tr>
<tr>
<td>Title/Responsibilities:</td>
<td></td>
</tr>
<tr>
<td>Telephone Number:</td>
<td>(  )</td>
</tr>
<tr>
<td>Location of Firm (City)</td>
<td></td>
</tr>
<tr>
<td>Type of Company:</td>
<td></td>
</tr>
<tr>
<td>Location of Company Headquarters</td>
<td></td>
</tr>
<tr>
<td>Number of Employees in Kingston Region</td>
<td></td>
</tr>
</tbody>
</table>

Thank You for Your Participation!
APPENDIX C
ITINERANT PEAK HOUR MOVEMENTS

The itinerant planning peak movements (both daily and hourly) from 2005 are provided below in Figure C.1 and Figure C.2.

Figure C.1: YGK 2005 Planning Peak Day Itinerant Movements
Figure C.2: YGK 2005 Planning Peak Hour Itinerant Movements

![Diagram showing YGK 2005 Planning Peak Hour Itinerant Movements]

- PPHM = 15

Cul. Percentage of Annual Movements

August 2007
Notes:

1. Existing aeronautical zoning is based on a 1,524 metre (5,000 ft) primary runway 01-19.
2. No change in existing aeronautical zoning is planned to support a 1,830 metre (6,000 ft) primary runway 01-19.