Oshawa®
Prepare To Be Amazed

Airport Business Plan 2015-2019

Prepared by Development Services and Total Aviation & Airport Solutions in cooperation with the Airport Business Plan Working Team

Table of Contents

Figures

Tables

Executive Summary

The City of Oshawa is the largest municipality in the Region of Durham. As one of Canada's fastest growing areas, the population of the Region is expected to grow from its current population of 658,000 to 960,000 by 2031. Oshawa's population is expected to grow from approximately 160,000 to 197,000 in the same time frame.

Since opening in the early 1940's as a British Commonwealth Air Training Field, the Oshawa Municipal Airport has undergone numerous changes.

Today, the Airport is an executive level regional airport and is centrally located within the City of Oshawa and the Region of Durham. The Airport has been owned and operated by the City since 1997 and has seen an ever increasing role as a community airport.

In 1997 the City of Oshawa signed a 50-year Operating and Options Agreement with the Federal government for the operation of the Airport. As a result, the City is required to operate the Airport until 2047 unless it becomes redundant. The opening of an airport in Pickering could cause the Oshawa Airport to become redundant. However, in 2008, Oshawa Council passed a resolution to continue operating the Airport until at least 2033 regardless of the status of an airport in Pickering.

The Airport functions as a key component of the Region's transportation infrastructure and has a significant positive impact on the City and Regional economy.

The Airport plays an important role in supporting emergency services, general aviation and attracting and retaining aviation businesses and provides significant economic benefits to Oshawa and the broader community. By supporting and facilitating the economy within the Region, the Airport has become a proactive tool for economic development.

Annual aircraft movements are forecast to gradually increase from the 10 year historical average of 61,500 to approximately 102,000 over the next five years as a result of the pending closure of the Buttonville Airport in 2016. **Municipalities have no ability to control or limit flight movements.**

The Oshawa Airport operates under a complex model and seeks to find balance among the various stakeholders. The Business Plan establishes a framework and go forward strategy for the operation of the Airport based on the current runway length as directed by Council. The operational and marketing components of the Business Plan cover a 5 year term while capital considerations cover a 20 year term.

The preparation of the Business Plan was undertaken with extensive consultation of the Council appointed Airport Business Plan Working Team representing airport stakeholders and the community.

The Business Plan includes a thorough SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis and a financial plan including life cycle infrastructure costing.

The Business Plan includes the following key directions:

1. Identifies the role of the Oshawa Municipal Airport as follows: The role of the Oshawa Municipal Airport is to provide high quality aviation facilities:
   - Encourage economic growth;
   - Meet local and corporate aviation needs; and
   - Respect the surrounding neighbourhoods.
2. Includes a strategy to improve the Noise and Traffic Management Plan including:
   - The construction of the Jane Avenue earthen berm;
   - The reclassification of the existing paved 250 foot stopway at the threshold of Runway 30; and
   - That the City not permit any additional flight training facilities.
3. That the East Field and Oshawa Airport Golf Club property continue to be held in reserve for future airport needs.
4. That certain key marketing initiatives be undertaken.
5. That the airport name be changed to the “Oshawa Executive Airport”.
6. That a plan be developed to undertake the airport’s capital needs as outlined in the 20 year capital plan.
7. That the hours of operation of the Canadian Border Service Agency (CBSA) be extended to better serve the business needs in the City and Region.
8. That the existing Airport Business Plan Working Team continue on a go forward basis to monitor and provide input to the Airport Manager and City staff on the implementation of the Business Plan.
9. That an Airport Community Liaison Committee be established to undertake initiatives and provide input, ideas, feedback and discussion focused on community awareness.
10. That the current Airport Advisory Committee be disbanded and that an Airport Community Liaison Committee and appropriate terms of reference be established.
11. Identifies the airport’s key environmental stewardship initiatives.
12. That the Financial Plan be used as a framework for developing the airport’s annual operating and capital budgets.
13. That staff prepare a separate report to outline changes to the City’s Fees and Charges By-law.
14. That staff negotiate the acquisition of certain lands required for Transport Canada’s mandatory Runway End Safety Area (RESA) off the threshold of Runway 12 and report back to Council.
15. That a study of the South Field lands and appropriate uses be undertaken.
16. That the contract for the management of the Oshawa Airport be reviewed and a recommendation for ongoing management be brought back to Council in the fall of 2015.

The Airport has operated in the past with a deficit and will continue to do so. However the cost of service is forecast to show a surplus by 2019 which will be used to offset the capital contribution. The City's portion of total property tax revenue generated from airport and former airport lands exceeds the annual cost of service.

The Financial Plan which forms part of the Business Plan illustrates that the annual overall cost of service will decrease from $472,000 in 2015 to $168,000 in 2019 inclusive of the airport's capital needs.

The key is to minimize the cost of service to the greatest degree possible while maximizing the ability of the Airport to maintain and grow the bigger City and Regional economies.

The "cost" of the Airport is offset many times over by the infrastructure role it plays in maintaining and growing business and commerce on a City/Regional/East GTA basis, accommodating medical flights, police services, supporting emergency preparedness and the general aviation community. The Airport also operates as a "good neighbour" and, accordingly, does not maximize its revenue to the detriment of the surrounding area.

The City and Region need a good, safe and efficient airport to be competitive.

Although the Airport is a City/Regional/East GTA facility, its costs are fully borne by the City of Oshawa and its taxpayers. This is not appropriate and opportunities for funding from other sources are to be pursued.

The Business Plan takes direction from and aligns with the goals and objectives of the City's Community Strategic Plan.

Overall, the Business Plan provides a solid go forward strategy for maintaining the airport infrastructure in a safe and responsible manner, minimizing airport costs, maximizing the airport's relevance to a large business and general aviation community while maintaining a balance which allows it to be a "good neighbour" to the surrounding community.

1.0 Introduction

The Oshawa Municipal Airport was one of many airports that were transferred to local interests in the mid-1990's as a result of the 1994 National Airports Policy. The City of Oshawa assumed responsibility for the Airport in 1997 in recognition of its importance to the local economy and that it formed an essential link in Oshawa's and Durham's transportation infrastructure.

As a condition of the transfer, Transport Canada required that the City of Oshawa operate the Airport until 2047. If the Airport becomes redundant, the City may close the Airport after 2033. The opening of an airport in Pickering could be a consideration for making the Oshawa Airport redundant, however there are no operational conflicts between the two airports that would force the closure of the Oshawa Airport.

In assuming responsibility for the airport, it was recognized that most airports are not profit centres, but play an important role in attracting and retaining the aviation sector and other businesses and industries that rely on airports to move people and products. This holds true today.

Oshawa's Airport is an executive level regional airport centrally located within the City of Oshawa and the Region of Durham.

The Oshawa Municipal Airport is the only business and general aviation airport within the Region of Durham and features:

- A modern terminal building supporting charter service and corporate business travel;
- Dual runways able to service a broad range of aircraft;
- Modern navigational aids including GPS based instrument approaches;
- Canada Customs and Border Services on site;
- Automated weather observation system (AWOS);
- A NAV Canada Control Tower; and
- A variety of aviation services such as aviation fuel, maintenance and logistical support.

The Airport is a key component of the transportation infrastructure of the City and Region and has a significant overall economic impact. In 2005, the economic impact was estimated at 430 jobs, $12.3 million in annual taxes and $57.8 million in annual value added GDP. The airport has grown significantly since 2005 and the annual GDP is estimated to be significantly higher. The airport also generates approximately $1.5 million in total property tax revenue annually.

The Airport infrastructure is critical in supporting the maintenance and growth of the City, Regional and East GTA economies. Most major metropolitan areas, regions and cities have airports including areas that Oshawa and the Region compete against for jobs and commerce.

Flight training, air ambulance, passenger charter services, freight services, aerial police operations, aircraft maintenance and aircraft restoration services are all provided at the airport.

The City operates the airport under an operating and options agreement with the Federal Government that expires in 2047. In 2008, City Council committed to operate the airport to not less than 2033.

The airport currently averages 61,500 aircraft movements annually based on a ten year average from 2005-2014. The annual movements in 2014 were 51,758. The Business Plan recommends a collaborative and measured approach to growth which would result in the movements growing to approximately 102,300 annually. In particular, the growth is focused on itinerant movements associated with general and corporate aviation and includes the additional growth associated with the pending closure of Buttonville Airport.

This Business Plan builds upon the 2008-2012 plan and provides for the ongoing operations of the Oshawa Municipal Airport. The operational and marketing components of the Business Plan cover a 5 year term while capital considerations extend to 2033.

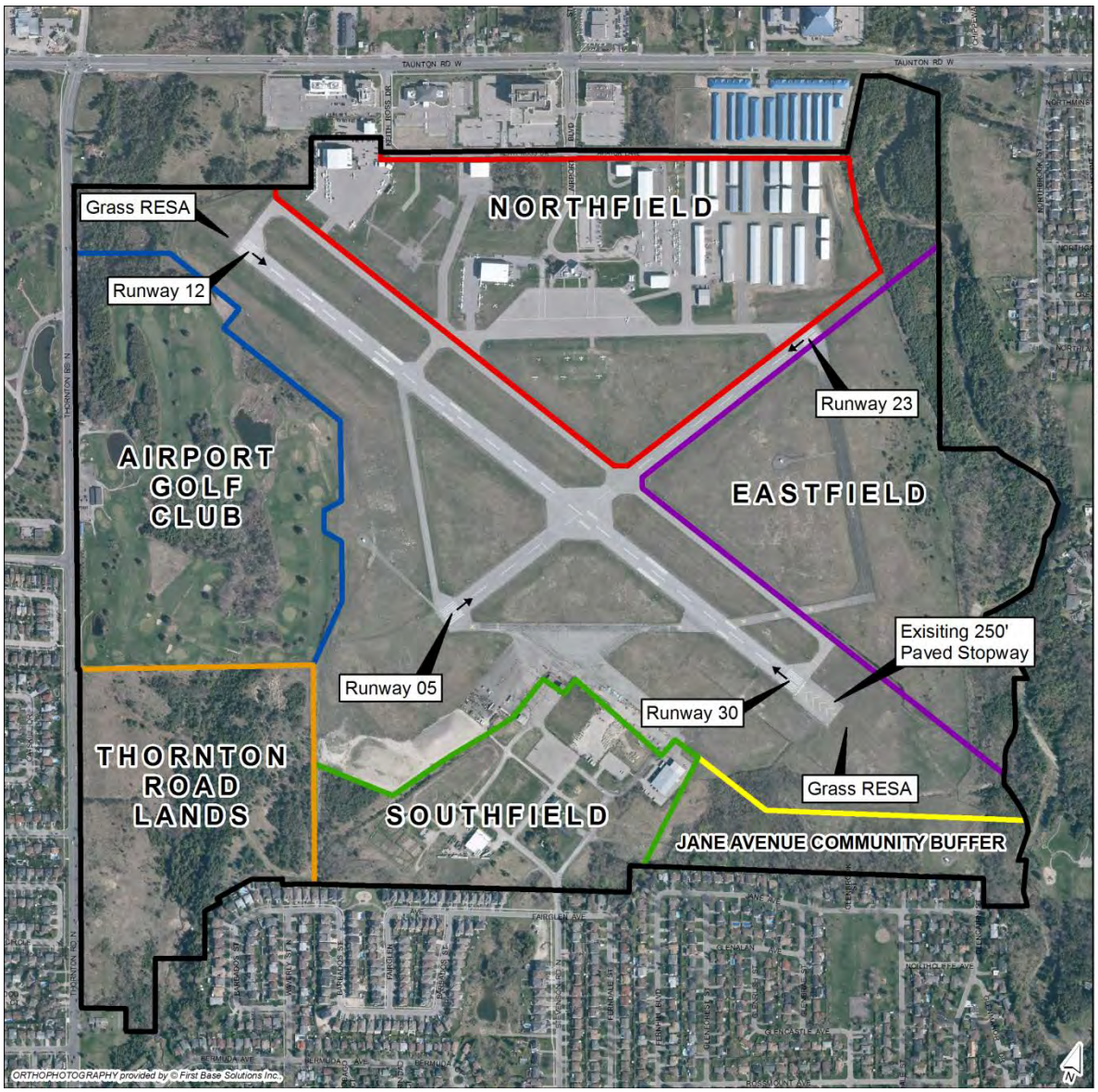
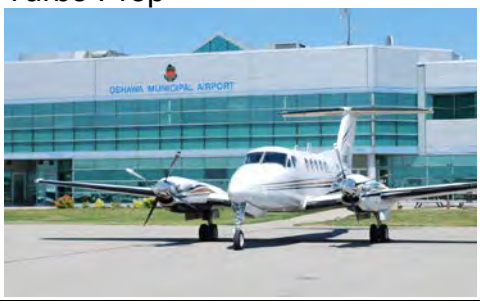


Figure 1: Airport Holdings Area

Table 1: Current and Forecast Movements and Breakdown by Aircraft Type

Aircraft Type	Current Movements	Forecast Movements
Local 	31,116 movements (50.6% of total)	40,000 movements (39.1% of total)
Piston Under 2,000kg 	28,079 movements (45.7% of total)	53,536 movements (52.3% of total)
Piston Over 2,000kg 	1,280 movements (2.1% of total)	4,025 movements (3.9% of total)
Turbo Prop 	829 movements (1.3% of total)	4,261 movements (4.2% of total)
Jets 	165 movements (0.3% of movements)	523 movements (0.5% of movements)
Total Movements	**61,469**	**102,345**

2.0 Methodology

In 2008, Council approved the 2008-2012 Airport Business Plan. Throughout the preparation of that plan, a consultative approach was used to gain input from all stakeholders.

In 2012, Council directed that a new Business Plan for the Airport be developed and that a committee be established to provide input, ideas, feedback and discussion.

Council further directed that the committee consist of the following:

- Councillor John Aker, Chair, Development Services Committee
- Councillor Nancy Diamond, Chair, Finance Committee
- Tom Hodgins, Commissioner, Development Services
- Cindy Symons-Milroy, Director, Economic Development Services
- Stephen Wilcox, Airport Manager
- Warren Hurren, Chair, Airport Advisory Committee
- Manny Rosario, Aviation Business Member, Airport Advisory Committee
- Glenn Jackson, Community Member with CORE (Citizens Opposed to the Runway Expansion)
- Doug Thomson, Community Member with CORE (Citizens Opposed to the Runway Expansion)

The Committee represented a broad spectrum of stakeholders and through a series of meetings the committee contributed greatly in the development of the draft Business Plan. On June 29, 2015 City Council approved the 2015-2019 Airport Business Plan.

3.0 Purpose

The Oshawa Airport is a key component of the overall transportation infrastructure within the Region. As such, it is a strong driver of the local and regional economy and supports a number of business operations, not just those physically located at the Airport, but those who depend on the airport for services.

The purpose of the Business Plan is:

- To continue to strengthen the role of the Airport to provide high quality aviation facilities that encourage economic growth and meet local and corporate aviation needs while respecting the surrounding neighbourhoods;
- To ensure that safety is recognized as a paramount consideration in all aspects of the Airport operations;
- To ensure that the Airport operates within the context of being a “Good Community Neighbour”;
- To determine both the operational and capital cost requirements of the Airport within the term of the Business Plan. The term of the Business Plan covers a 5 year period for operational and marketing strategies. Capital considerations extend to 2033; and
- To develop a strategy to manage the anticipated growth due to the pending closure of the Buttonville Airport.

Given the rapid pace of change within the aviation sector, the Business Plan will be reviewed by the Airport Business Plan Working Team twice per year.

4.0 Background

The Airport opened as a British Commonwealth Air Training Field in 1941 and played a significant role in training pilots for World War II. Once the war was over, the City of Oshawa took over operation of the Airport under a lease from the Federal Government.

Throughout most of its early history, the Airport operated as originally constructed with three runways in a triangular configuration. During this period of time all aviation related services were operated from the airport's South Field with access from Stevenson Road North.

Over time, the aviation services grew to include flight training, general aviation, air freight operations, night air freight operations, scheduled passenger service, air charter services, air ambulance operations and the police helicopter.

In 1979, 71% of the total aircraft movements were attributed to local traffic. Local traffic is defined as an aircraft flight that departs and then returns to the airport without having landed at another airport. Local traffic includes flight training aircraft in the airport circuit pattern, flight training aircraft operating away from the airport and any other flight which meets the above definition. The majority of local traffic in 1979 however, was flight training aircraft.

In the mid-1980s the Airport became the subject of aircraft noise concerns from the surrounding community. A 1987 Airport Master Plan ("1987 Master Plan"), prepared by DeLCan, identified night freight operations and flight training airport circuit traffic as the primary noise concerns.

The 1987 Master Plan proposed the following significant physical and operational changes to the airport:

- Shift the role of the Airport towards catering primarily to air carrier and corporate/business aviation in conjunction with flight training and private aircraft operations.
- Establish new facilities on the North Field and transition all aviation operations from the South Field to the North Field over time.
- Retain Runway 12/30 as the primary runway and extend it to 4000 feet in total length.
- Retain Runway 04/22 (now Runway 05/23) as a secondary runway.
- Convert Runway 08/26 to a taxiway in support of the new North Field development.
- Construct a new airport terminal building on the North Field consistent with the shift towards more air carrier and corporate/business activity.

The 1987 Master Plan is significant because it advocated and laid out a strategy for the modernization of the Airport in a way which allowed growth but mitigated noise impacts.

In 1987 the City of Oshawa enacted an airport curfew which limited aircraft operations between 10:30 p.m. and 6:30 a.m. to police, medical and industrial emergencies and Oshawa based returning aircraft.

Federal Airport Zoning for the Airport was also enacted in 1987 consistent with the 1987 Master Plan.

By 1987 local traffic had decreased to 60% of the total aircraft movements.

The 1987 Master Plan proposed a gradual modernization of the airport and a transition from local traffic (mostly flight schools) and major activity on the South Field to a modern facility based on the North Field supporting the travel/transportation needs of industries, businesses and residents of the Region and stimulating area-wide economic growth. In this manner, the airport would maximize its role as an important piece of transportation infrastructure for the City, the Region and the eastern GTA.

In 1990 an Environmental Assessment of the North Field development was completed.

In 1991 a study of Market Opportunities and an Airport Development Strategy were prepared.

In 1993 an Environmental Assessment for the Runway 12/30 extension was completed.

In 1994 construction of the Runway 12/30 extension, the airport North Field development and the airport terminal began. The total cost of the project was $8 million and included contributions from all levels of government – local, Regional, Provincial and Federal.

In 1997 the new North Field and the new airport terminal building were officially opened.

In 1997 the Federal government transferred ownership of the Airport to the City of Oshawa. As part of the transfer, an Operating and Options Agreement was executed between the Federal Government and the City of Oshawa. This agreement specifies the terms under which the City operates the airport.

In 1997 the Airport Advisory Committee held its inaugural meeting. The Airport Advisory Committee, made up of members appointed by Council from the surrounding community and the airport users, provides input into the operation of the airport.

In 1999 the Airport's first Business Plan was prepared.

In 2000 an airport noise management review was undertaken and continues to serve as a foundation for the airport's current noise management strategies.

In 2007 an Economic Impact Study was prepared for the Airport. A summary of the findings including an update on airport development since 2005 are set out in Section 5.0 of the Business Plan.

The 2007 Economic Impact Study confirmed that the Oshawa Municipal Airport has transitioned from a "local" to a "regional" airport.

In 2008, Council approved the 2008-2012 Airport Business Plan. The 2008-2012 Airport Business Plan included the following key components:

- Identified that the role of the Airport is to serve the City of Oshawa and the Region of Durham as a vital component of the transportation infrastructure supporting business and building community.

- Identified the importance of meeting the role within the context of being a good community neighbour.
- Established a 25 year capital plan which included a life cycle accounting strategy with annual contribution from the airport operating budget to the airport capital account to meet the 25 year capital needs.
- Established a 5 year financial model which maximized income and controlled expenses to the greatest extent.
- Established a strategy to sell airport land for aviation related development and several properties were sold including a large 7 acre property for development as a multi-unit hanger complex under plan of condominium.
- Identified the revenue impact for the City of property tax generated by airport lands.
- Identified a strategy to seek alternate funding models for airport capital and operational needs.
- Identified a strategy to enhance the airport infrastructure to improve the level of service to users.
- Established an operational model focussed on safety.
- Included a commitment by the City to operate the airport to not less than 2033.

Overall the 2008-2012 Airport Business Plan established a strategy for the airport to grow consistent with the growth of the City and the Region and consistent with growth of the aviation industry at a rate of 1-2% annually. The 2008-2012 plan also allowed for measured minimal growth as the surrounding airports of Toronto's Pearson, City Centre and Buttonville began to reach capacity beyond 2012.

In October 2010 the operators of Buttonville Airport announced that they had entered into a joint real estate venture with Cadillac Fairview to redevelop that airport and that the redevelopment was likely to occur within the next five to seven years.

In February 2011 the City retained the service of Genivar, an aviation consulting firm, to undertake a comprehensive study to examine the implications of a main runway extension (Runway 12/30) from 4,000 feet to 5,000 feet and the implications associated with the pending closure of Buttonville Airport.

A series of public meetings and an open house were undertaken to seek input from stakeholders and the findings of the report were presented to Council in June 2012.

In June 2012 Council decided that it would not proceed with the runway extension and that the development of a new Business Plan based on the current runway length be undertaken.

On November 7, 2011 Council directed that should the Seneca College Aviation program wish to relocate from Buttonville to Oshawa airport that they do so without increasing aircraft movement numbers at the Airport.

In January 2013 Seneca College moved its flight training program to the Peterborough airport.

On January 30, 2012 Council directed that “the attraction of a scheduled airline service not be pursued or promoted and further that in the event a scheduled airline service expresses an interest in the future that it be required to specify the proposed nature of its activities and that public meetings be held prior to Council making any decisions”.

On December 17, 2012 Council formed a new Airport Business Plan Working Group.

The Airport Business Plan Working Group retained consultants, as required to undertake certain studies necessary for the completion of the Business Plan.

On May 7, 2015, staff met with the Airport Advisory Committee to review the draft Business Plan.

On May 25, 2015 and June 18, 2015, joint Development Services and Finance Services public meetings were held.

5.0 Economic Impact

The Airport is an important catalyst for economic growth in the region and plays a vital role in partnering with various agencies in order to encourage new investment.

In 2007, RP Erickson & Associates Aviation Consultants, of Calgary undertook an Economic Impact Study (EIS) of the Oshawa Municipal Airport based on 2005 data. The EIS involved an inventory of businesses, aviation users and visitors to the airport and assessed the economic impact of the Airport on the City and the Region.

The EIS concluded that in 2005, the Oshawa Municipal Airport:

- Had a direct economic impact of 215 jobs and $28.3 million in value-added GDP;
- Had, with multipliers, a total economic impact of 438 jobs and $57.8 million in value-added GDP;
- Generated $12.3 million in overall taxes; and
- Had 180 full-time jobs on the airport property.

The EIS also concluded that the Oshawa Municipal Airport had a significant "social impact" on the local economy through emergency medical flights, visitors and volunteer hours at the Oshawa Industrial & Military Museum and RCAF 420 Auxiliary Association as well as home of Canadian Owners and Pilots Association Flight 70, Ontario Young Eagles program and Oshawa Air Armoury.

The Airport is also:

- The base for the Durham Regional Police Services helicopter; and
- A unique resource and opportunity in the emergency preparedness strategies of the City and the Region.

Since the EIS was released, 195,000 square feet of new hangar space has been constructed and the following growth has taken place:

- Cox Aviation moved from a small facility on the South Field to a new modern facility on the North Field with an expanded staff complement.
- Corporate Aircraft Restoration built a new larger hangar facility, expanded their staff complement and became a certified TBM Aircraft maintenance facility.
- Enterprise Air expanded their aircraft fleet and pilot and maintenance staff complement to include two large Basslier BT-67 global survey aircraft and one Falcon 10 corporate charter and medivac jet aircraft.
- Total Aviation and Airport Solutions, the airport's contract management company, expanded their staff complement to meet the growth demands of the airport and the added responsibilities of the new Safety Management System.
- Smooth Air (Air Nunavat) established a base of operation and corresponding staff at the airport for three Falcon 10 corporate charter and medivac jet aircraft.
- OPTECH, a leading manufacturer of lidar and imaging sensor systems built a new facility and corresponding staff for its fleet of airborne lidar testing aircraft.

- Airborne Sensing, a leading provider of airborne commercial survey, photography and lidar imaging established a base of operations and corresponding staff for a fleet of four aircraft.
- The Canadian Border and Service Agency doubled their staff complement and vehicle fleet based at the airport to accommodate growth in the Region.
- Air Partners Inc., an aircraft maintenance provider and certified Cirrus Aircraft service centre moved its maintenance operation and corresponding staff to the airport from Buttonville.
- Aviation Unlimited, the Canadian distributer for Piper, Diamond and GIPPS Aero Aircraft opened a new 20,000 square foot aircraft sales, maintenance and hangar facility with associated staff.

The current annual economic impact is estimated to be significantly higher and continues to grow as a result of new investments. The Airport now generates approximately $1.5 million in property tax revenue each year.

6.0 SWOT Analysis

As a component of updating the Airport Business Plan a detailed SWOT analysis was completed. The SWOT analysis identifies strengths, weaknesses, opportunities and threats as represented by the Airport Business Plan Working Team and by airport stakeholders.

The four standard components of the SWOT analysis are:

Figure 2: SWOT Analysis

6.1 Strengths

- Proximity to Highway 407
- Proximity to UOIT/Durham College
- An industry leading Safety Management System
- Progressive noise and traffic management
- Location of Airport
- Size of Airport
- Infrastructure in City – highways, arterial roads, port, rail
- Good track record at Airport – building on the past successes
- Management Structure: City owned/private operator
- Ability of Airport tenants to buy land
- Availability of vacant Airport lands
- Existing Airport businesses and synergies; good cross section of aviation businesses
- City and community recognition of Airport's importance
- Municipal financial security/backstop
- Municipal ownership and control
- Control over fees
- Airport oversight is under the City's Economic Development Services Branch
- Airport infrastructure (i.e. AWOS, runway layouts, condition, servicing, etc.)
- Growing local economy
- Airport drives economic development/magnet
- Nav Canada control tower
- Customs; designated Port of Entry (passenger and freight)
- Supports emergency services
- Adjacent employment lands
- City commitment to operate to not less than 2033
- Airport Advisory Committee

6.2 Weaknesses

- Airport costs/cost of service vs. revenue
- Public perception of cost of Airport
- Lack of federal/provincial grants (ACAP, etc.)
- Lack of municipal capital reserves
- Bureaucracy and delays in decision making
- Current customs service (limited hours, etc.)
- Balancing Airport and community/neighbourhood
- Environmental management: real vs. perceived
- Lack of community engagement
- Lack of direction re: south field and south field heritage
- Current name does not portray operational model of the Airport
- Airport Advisory Committee

6.3 Opportunities

- General growth in the area
- Expanding complementary infrastructure (407, rail, port, 401)
- Pending closure of Buttonville Airport
- Potential corporate aviation growth
- Proximity to east GTA
- Expanded customs hours of operation
- Municipal control/ownership and ability to exert control through leases and sales
- Cleaner/more environmentally responsible aircraft
- Quieter aircraft
- Proximity to employment lands
- General business growth at Airport
- Increased support from the Region of Durham
- Opportunities with post secondary institutions

6.4 Threats

- Proposed Pickering Airport
- Pickering “chill”/uncertainty for investors
- Continuing impacts on adjacent neighbourhoods
- Additional residential growth in area
- Unmanaged growth/flights
- Lack of funding including federal and provincial
- Political decisions
- Inability to control flight mix and volume
- Supremacy of the Federal government
- Competition e.g. Peterborough and other airports, especially other airports getting senior government funding
- Potential closure in future/potential pressure for alternative uses
- Conflict between federal authority and local wishes

7.0 Role Statement

The Oshawa Municipal Airport is a component of the transportation infrastructure of the City and Region and its social and economic benefits significantly outweigh its costs.

The role of the Oshawa Municipal Airport is to provide high quality aviation facilities that:

- **Encourage economic growth;**
- **Meet local and corporate aviation needs; and**
- **Respect the surrounding neighbourhoods.**

The goals for the Airport are as follows:

- Operate the airport in a safe and secure manner.
- Be a leader in environmental stewardship including noise mitigation, wildlife management and energy conservation.
- Provide excellent customer service that is fair, responsive and courteous.
- Interact with the business, aviation and academic communities to be an effective catalyst for economic development.
- Cooperate with other levels of government to advance the role of the airport.
- Optimize the economic benefit of the airport for the broader community while ensuring that the adjacent neighbourhoods are duly and fairly considered when making future decisions.
- Operate within the context of being a good community neighbour.
- Operate the airport in an efficient and fiscally responsible manner.
- Recognize the proud history of the airport.
- Provide attractive, well maintained aviation-related facilities and services.
- Ensure that the City continue to recognize the importance of this key piece of infrastructure.
- Maintain high quality, experienced administrative and management staff working closely with City departments for the efficient operation of the airport.

In practical terms, the Airport works to fulfill its role in the following five key areas:

1. Supporting Emergency Services

The Airport supports emergency trauma flights on an ever increasing basis consistent with the growth in population. There are five hospitals in Durham Region, three of which have helicopter pads. These pads are not usable during periods of extreme weather and as a result, all of them use the Oshawa Airport. In addition to the trauma flights, the Airport supports emergency medical transfer and organ recovery flights and the Durham Regional Police air unit. The Airport also supports the rapid intervention capabilities of the Canadian Forces in the event of a natural or man-made disaster in the Region.

2. Supporting Oshawa, Durham Region and East GTA Businesses

Businesses need the ability to move people and goods in an efficient manner and aviation offers a level of efficiency not available in any other means of transportation and a wide range of Oshawa, Durham Region and GTA manufacturing and knowledge-based businesses use the Airport to enhance their competitiveness. It is important to note that Oshawa competes for new jobs and investment with a variety of communities in Southern Ontario and elsewhere, such as Hamilton, Kitchener-Waterloo and London all of which have airports. As such, the Airport helps insure that Oshawa and Durham Region remain competitive when seeking new business.

3. Supporting General and Recreational Aviation

For many Oshawa and Durham Region residents, recreational aviation is an important part of their lifestyle and they contribute to the jobs, revenue and activity of the Airport. Often an aircraft is owned by more than one individual and owning and operating an aircraft can be an alternate recreational choice to owning a cottage or spending holidays on the beach.

In addition to their own use of the aircraft, owners often give back to the community by hosting the annual Women of Aviation events that introduces girls and women to aviation and the Young Eagles Day that offers Oshawa youth between the ages of 8 and 17 an opportunity to experience flight at no cost. Many of the local general aviation pilots are also volunteers for organizations such as Hope Air that arranges free flights for financially-disadvantaged Canadians to get them to the healthcare they need.

In addition to these flying opportunities, the local pilots are often tasked as volunteers for a variety of community events at the Airport including the Oshawa Airport Lions Club annual Easter Egg Hunt, the Hearth Place Runway Run and the Airport Open House.

4. Supporting Careers in Aviation

The aviation and aerospace industry is one of the fastest growing industries on a global scale and opportunities to seek education in these fields through flight training and associated businesses at the Airport are available. Although there is sensitivity to flight training, and the Airport Business Plan is seeking to impose limitations on its growth, the important role that flight training plays should be recognized as an important contributor to the global economy. The flight training schools in Oshawa support the three local Air Cadet groups by providing introductory flights. An Air Cadet flight school is held each summer and funded by the Air Cadet League of Canada.

5. Supporting Sports, Airport and Aviation Related Clubs and Associations

The Airport is home to a variety of groups that contribute greatly to the social fabric of Oshawa. These include the Oshawa Airport Lions Club, the RCAF Association 420 Wing, the Oshawa Military and Industrial Museum, Gemini Gymnastics, COPA Flight 70, the Recreational Aircraft Association (RAA) Oshawa Chapter, Ontario

Regiment and the VandenBos Air Cadet Squadron. Collectively, these groups contribute thousands of volunteer hours across Oshawa each year.

8.0 City Commitment to Operate Airport

The premise under which Oshawa assumed the Airport remains valid today – the Airport contributes significantly to the local and regional economy and provides valuable transportation infrastructure.

The Airport is the location for aviation related businesses and is also used by businesses located elsewhere in the Region and GTA. In additional to it being an important asset for business attraction and retention, the Airport serves as a critical base for emergency services such as Medivac, organ transfer and the police helicopter.

The City has committed to operate the Airport to not less than 2033, regardless of whether Pickering opens, in order to attract new investment and allow the Airport to fulfill its supporting role as an economic driver of the City, Regional and East GTA economies.

Under the Operating and Options Agreement with the Federal government, the City has an obligation to operate the airport until 2047, however; the City may close the airport if it becomes redundant in the future.

The Pickering Airport Needs Assessment Study projects that the Pickering Airport will be needed sometime between 2027 and 2037.

There is no operational requirement to close the Airport in the event Pickering Airport opens.

The Operating and Options Agreement also specifies who retains the proceeds of any land sales in the event that the airport closes.

The City's portion of any land sale proceeds post-closing are as follows:

Table 2: City's Portion of Any Land Sale Proceeds

Years	**Percentage of Proceeds**
2033-2037	28
2038-2043	42
2044-2047	65
April 1, 2047 and beyond	100

Currently, 100% of all land sale proceeds are retained by the City while the airport is operational and are deposited into the airports capital reserve account and contribute to the capital needs of the airport.

9.0 Noise and Traffic Management

The Oshawa Municipal Airport is committed to operating within the context of being a good community neighbour.

As noted earlier, the Airport will get busier over the next five years primarily due to the closure of the Buttonville Airport. It is important to note that municipalities have no authority or ability to limit aircraft use or traffic volumes at the Airport. The goal within the context of being a good community neighbor is to limit the impact as much as possible; however, it is anticipated that there will be increased noise and traffic associated with the additional flight movements.

The 2008-2012 Business Plan identified the impacts associated with flight training movements to be a major community concern and advised that a noise and traffic management policy would be put in place for flight training.

As part of any effort to address the impacts of flight training in the community it is critical to understand the legal framework. In this regard:

- The City cannot unilaterally regulate or control the volume of flight training that can occur from each site.
- The City cannot unilaterally control or regulate the type of aircraft used for flight training.
- The City cannot try to control or regulate the volume of flight training or the type of aircraft used for flight training by indirect means, such as the use of unreasonable fees or other unreasonable restrictions such as hours of operation, limiting access to taxiways and runways, etc.
- The Federal Government has an onerous, expensive and time consuming process that can be used to try to establish a noise abatement policy. The process does not guarantee success and the Federal Government will not implement any restrictions unless all parties agree. If possible, a local “homegrown” solution such as our noise and traffic management policy is considered to be much quicker and better.

The current policy was developed in consultation with the industry and is as follows:

(a) General

- Night Operational Limitations – Between the hours of 10:30 p.m. and 6:30 a.m., only police, medical and industrial emergency flights are permitted to land and take off from the Oshawa Municipal Airport. Other airport tenants with aircraft based at the Oshawa Municipal Airport are permitted to land during the hours above, but are not permitted to take off.
- Preferential Runway Use – Runway 30 is the preferential runway at the Oshawa Municipal Airport (aircraft depart from the southeast to the northwest over Thornton Road and Taunton Road). Aircraft will use this runway when the winds are blowing from a heading of 210 degrees (incrementally) to 30 degrees at up to 5 knots.

- Departure Procedures – Aircraft leaving the Oshawa Municipal Airport will continue to fly on the runway heading until they reach 1,000 feet above sea level (540 feet above ground level) before they turn off the runway heading.
- Arrivals Procedures – Aircraft flying into the Oshawa Municipal Airport will remain at least 1,000 feet above sea level (540 feet above ground level) before making the turn for their final approach for landing.

(b) Flight Training Restrictions (includes private aircraft)

- Prior permission by the Airport Manager is required for all flight training including private and commercial pilot recurrent training.
- A maximum of 12 aircraft are permitted in the circuit for training purposes on Runway 05/23 at any given time.
- Flight training aircraft will not utilize a touch-and-go departure pattern on any runway after 4:00 p.m. on any Saturday or Sunday.
- During the holiday long weekends, circuit training is not permitted on the Sunday or Monday on any runway.

Taxiway Charlie was established to facilitate the efficient use of Runway 05/23 particularly during periods when touch-and-go departures are not permitted.

An earthen noise berm was constructed at the northeast corner of the airport to mitigate ground based noise associated with the new hangarminium development.

An earthen noise berm was constructed at the south limit of the airport to mitigate ground based noise affecting the new housing development on the west side of Stevenson Road North.

Since 2008, the flight training facilities at the Airport have voluntarily complied with the above-noted policy and overall this noise and traffic management policy has been very effective in reducing the impact on the community.

From a historical perspective, the period around 1979 was the most significant for community complaints and concerns regarding flight training movements. In 1979 flight training movements were ±118,000 of which ±98,600 were local flights in the circuit.

An Oshawa Historical Aircraft Movement Chart 1974-2014 is included as Appendix 1.

In anticipation of the closure of Buttonville, it is expected that aircraft movements in Oshawa will gradually increase to approximately 102,345 annual movements and that flight training will remain at the 10 year average.

Oshawa 10 Year Average (2005-2014)	61,469
Oshawa Flight Training Growth	12,326
General Aviation and Corporate Growth	28,550
Total Forecast Movements	**102,345**

The City is sensitive to the noise impacts associated with flight training.

In order to limit the establishment of any additional flight schools the following measures are recommended:

1. That the City not sell or lease airport lots for the purpose of establishing a flight training facility.

2. That the Airport Manager be directed to decline all new requests relating to the approval of a Transport Canada flight training operating certificate.

3. That the City's Zoning By-law 60-94 be amended such that flight training facility is no longer a permitted use within AP (Airport) Zone, save and except for lots 1 and 2.

As the traffic at the Airport grows the airport and City staff will monitor the growth closely and will work with the airport users, the flight training facilities and the community to improve the noise and management strategy as necessary.

In addition to the existing procedures relating noise and traffic management the following initiatives are recommended:

1. **Jane Avenue Community Buffer**

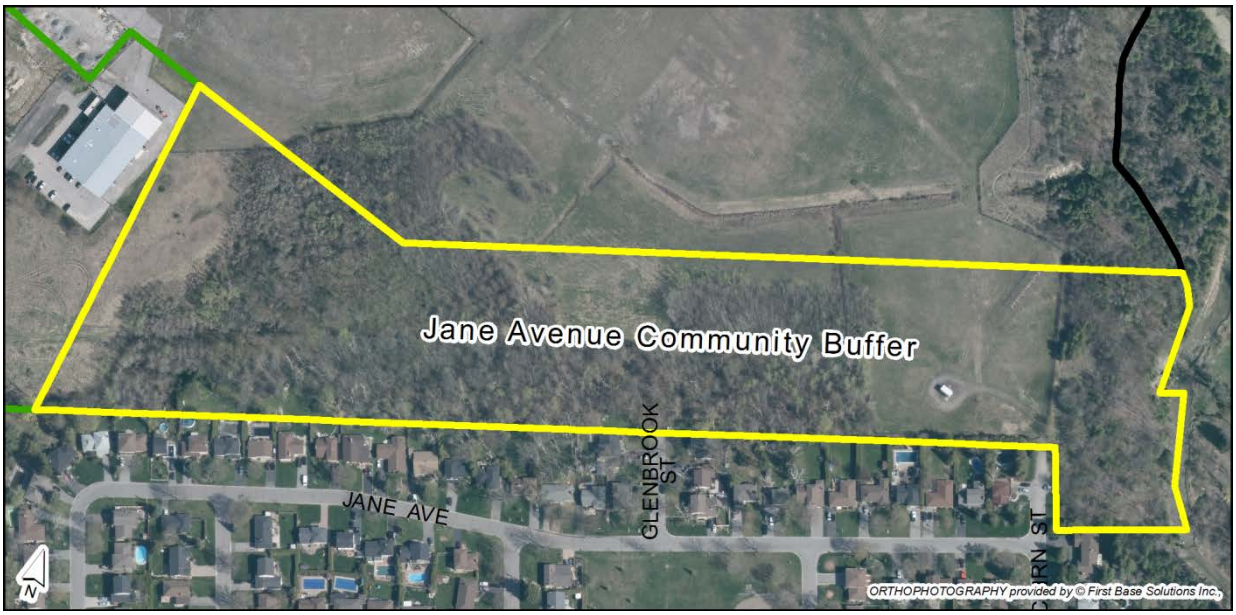


Figure 3: Jane Avenue Community Buffer

Within the South field, the airport property north of the houses located on Jane Avenue provides an ideal buffer between the airport and the community.

In 2014 the City undertook a study to determine the impacts of a potential earthen berm as it relates to aircraft noise management. A copy of the study dated March 11, 2014 by Jade Acoustics is shown in Appendix 2.

The study showed that a berm would lower the perceived noise level from taxiing aircraft 7-9 (db) and up to 3 (db) for departing aircraft.

Early in 2015 a large number of trees located north of the airport fence were removed in order to meet newly established Transport Canada height restrictions. The

remainder of the trees were trimmed to meet the new height standards. All trimming and/or removal is undertaken by qualified personnel under the direction of a certified arborist.

In June 2015 Nav Canada permanently decommissioned the LOC antenna array located at the southeast corner of the airport. Nav Canada anticipates removing the antenna array in late 2015 or early 2016.

The airport has established earthen noise berms in the northeast and southwest areas of the airport and these noise berms have proven to mitigate the ground based noise and visual impacts of aircraft.

It is appropriate to install an earthen noise berm in the Jane Avenue Community Buffer Area. The Jane Avenue community will be consulted during the design stage of the berm and the berm will comply with all applicable Transport Canada standards.

The construction of the berm will start as soon as practical and will utilize only clean fill material. There is no cost associated with the construction.

2. **Stopway Reclassification**

Figure 4: Runway 30 Stopway

A paved 250 foot stopway is located at the southeast corner of airport just prior to the threshold of Runway 30. The stopway is used by aircraft departing to the southeast on Runway 12 and provides a balanced field length for take-off of 4,250 feet (4,000 feet runway and 250 feet stopway).

The increased balance field length of 4,250 feet on Runway 12 over the 4,000 feet on Runway 30 is particularly important for corporate aircraft and provides increased optimization of the aircraft. As such Runway 12 is the preferred runway for corporate aircraft departures when winds are less than 5 knots.

However, as part of the airport's noise and traffic management policy Runway 30 is the preferential runway when winds are less than 5 knots so that the noise associated with aircraft taking off is moving northwest away from the concentrated residential area.

As such, we currently have a disparity between the balanced field length benefits of Runway 12 at 4,250 feet and the noise and traffic management policy for preferential use of Runway 30 at 4,000 feet.

In order to reconcile this disparity and enable the corporate aircraft to utilize Runway 30 when winds are less than 5 knots consistent with the noise and traffic management policy the City undertook a study in 2014 to examine the noise impacts associated with allowing corporate aircraft to utilize the existing paved stopway when departing on Runway 30. A copy of the study dated March 5, 2014 by Jade Acoustics is attached as Appendix 3.

The study included sound measurements of a Falcon 10 jet departing from the current threshold of Runway 30 and from the stopway. The Falcon 10 is a mid-sized light jet and four Falcon 10 aircraft are currently based in Oshawa. The Falcon 10 has a typical noise profile common to other light jets using the airport. The study compared the sound measurements and determined that the use of the stopway would increase the sound level ranging from 1 to 4.2 (db) and that the sound increase is noticeable but not significant.

The study relating to the installation of the earthen berm in the Jane Avenue Community Buffer Area identified that the berm would reduce the sound level of taxiing aircraft by 7 to 9 (db) and departing aircraft by up to 3 (db). As a result, the increased noise of 1 to 4.2 (db) is fully mitigated by the earthen berm noise reduction.

In order to enable corporate aircraft to comply with the noise and traffic management policy of departing from Runway 30 when the winds are below 5 knots it is recommended that the stopway be reclassified to allow it to be used for corporate aircraft departures and arrivals on Runway 30 when necessary.

This change will require the addition of two lights and a minor change in runway markings. The costs associated with this change can be accommodated within the airport operating budget.

In doing so we will improve the airport's noise and traffic management strategy while also enhancing the delivery of service to the corporate aircraft airport users.

It is anticipated that he stopway will be reclassified and operational in 2016.

Overall both improvements will enhance the airport's noise and traffic management strategy and supports our commitment to be a good community neighbour.

10.0 Airport Property Development

10.1 Six Key Areas

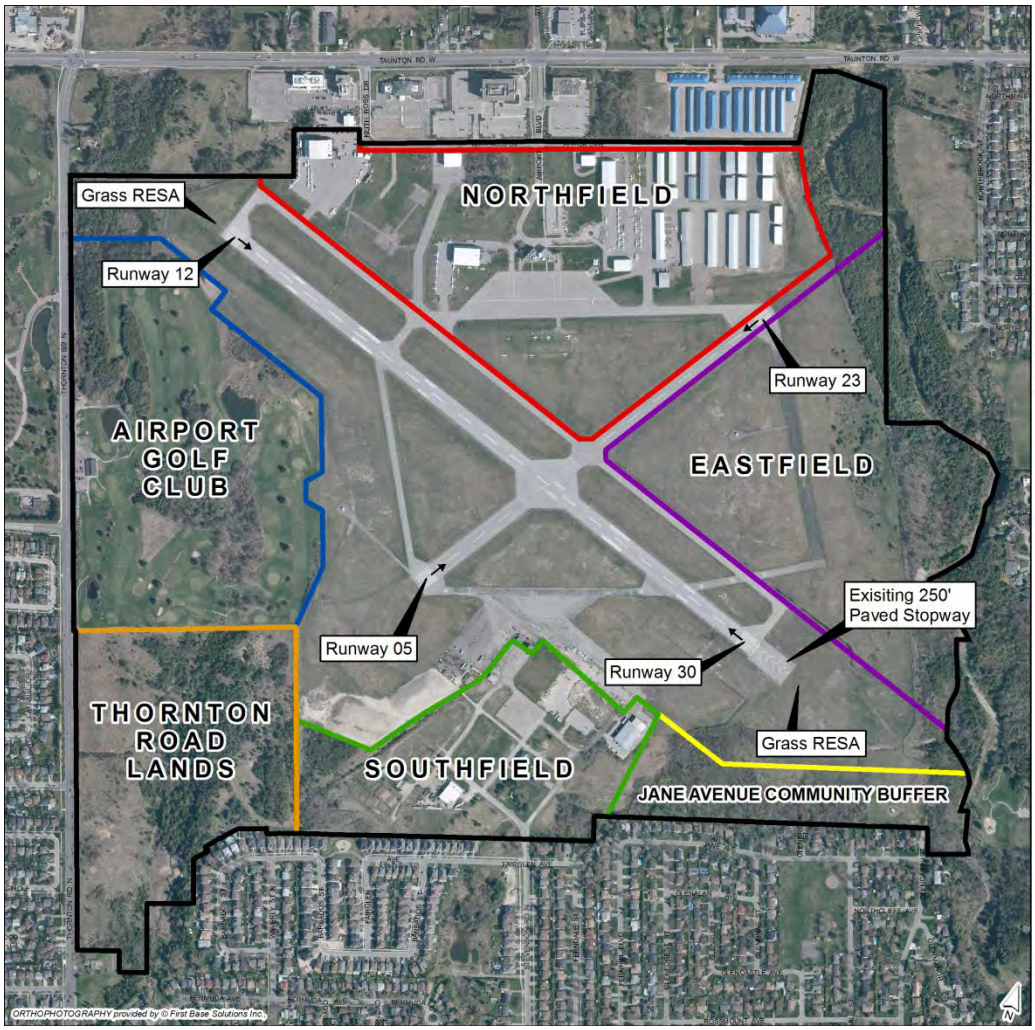


Figure 5: Airport Holdings Area

The Airport is broken down into six key areas:

- The North Field [33 hectares (82 ac.)]
- The East Field [28 hectares (69 ac.)]
- The Airport Golf Course [27 hectares (67 ac.)]
- The South Field [15 hectares (37 ac.)]
- The Thornton Road lands [19 hectares (47 ac.)]
- Runways

In total the airport consists of 196 hectares (484 ac.) including 85 hectares (211 ac.) of managed grass and 18 hectares (45 ac.) of runways, taxiways, aprons and roads.

The remaining property consists of the runways, taxiways and corresponding open areas.

A full size Airport Holdings Map is included in Appendix 4.

10.2 North Field

10.2.1 Lotting Plan

The lotting plan for the development and sale of lots on the North Field as approved in the 2008-2012 Business Plan is illustrated below. A larger map of the lotting pattern is shown in Appendix 5.

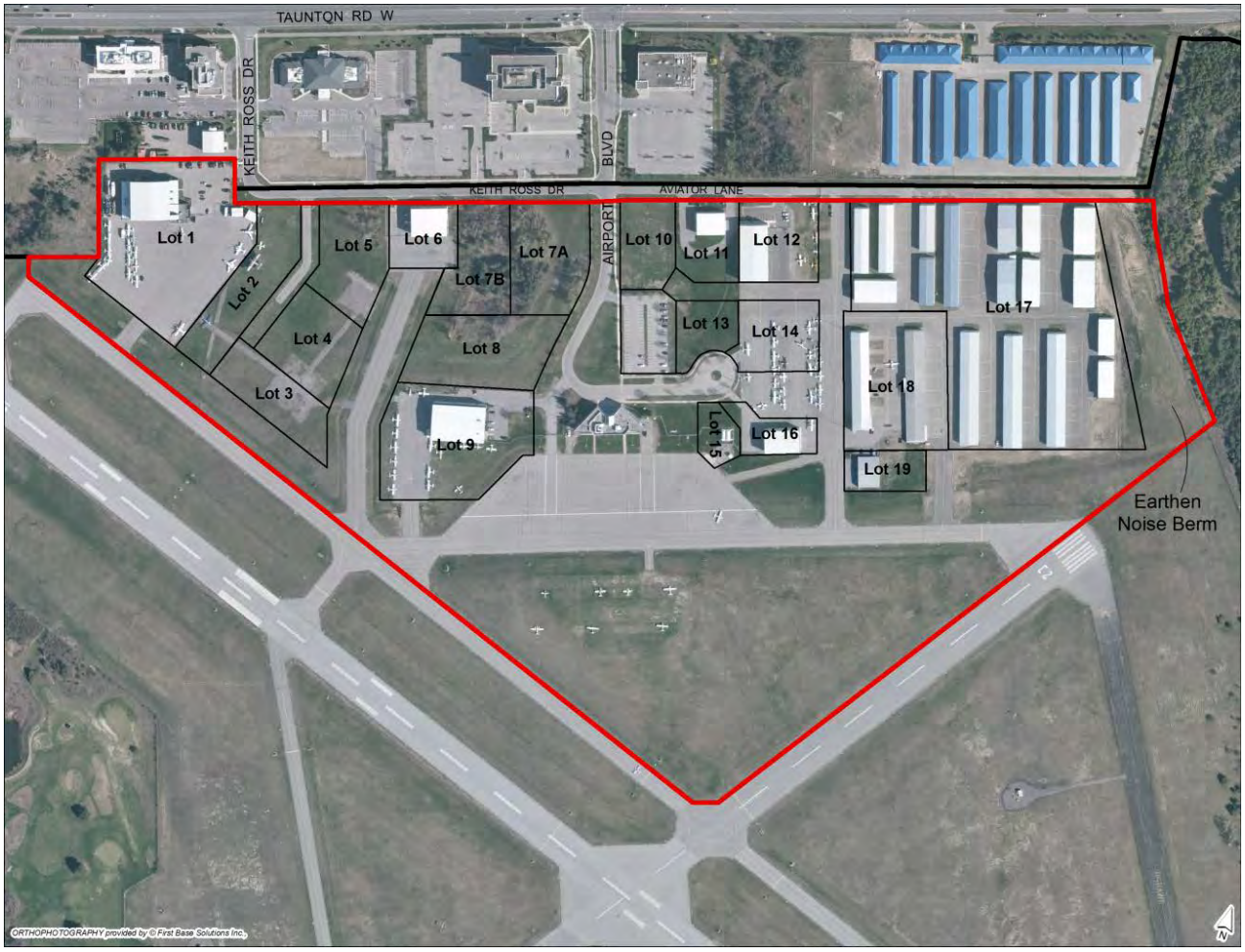


Figure 6: Airport Northfield Property

The North Field is comprised of 33 hectares (82 ac.) of land with Airport Boulevard, the airport terminal and the main airport aviation ramp utilizing approximately 10 hectares (25 ac.). The airport centre field consists of 6.38 hectares (15.8 ac.).

Land sales require specific approval from Council and Transport Canada.

At present, the status of the lots are as follows:

Lot 1:	Sold	Lot 12:	Sold
Lot 2:	Sold	Lot 13:	On hold for future consideration
Lot 3:	Available		
Lot 4:	Available	Lot 14:	On hold for future consideration
Lot 5:	Available		
Lot 6:	Sold	Lot 15:	Aviation Bulk Plant, not for sale
Lot 7A & 7B:	Available		
Lot 8:	Sold	Lot 16:	Sold
Lot 9:	Leased	Lot 17:	Sold
Lot 10:	On hold for future consideration	Lot 18:	"T" hangars, owned by the City
		Lot 19:	Sold
Lot 11:	Sold		

Further details on each North Field lot are provided in the subsequent sections.

As recommended in Section 9.0 no further lots will be sold or leased for the purpose of operating a flight training facility.

10.2.2 Lots 1 and 2 (North Field)

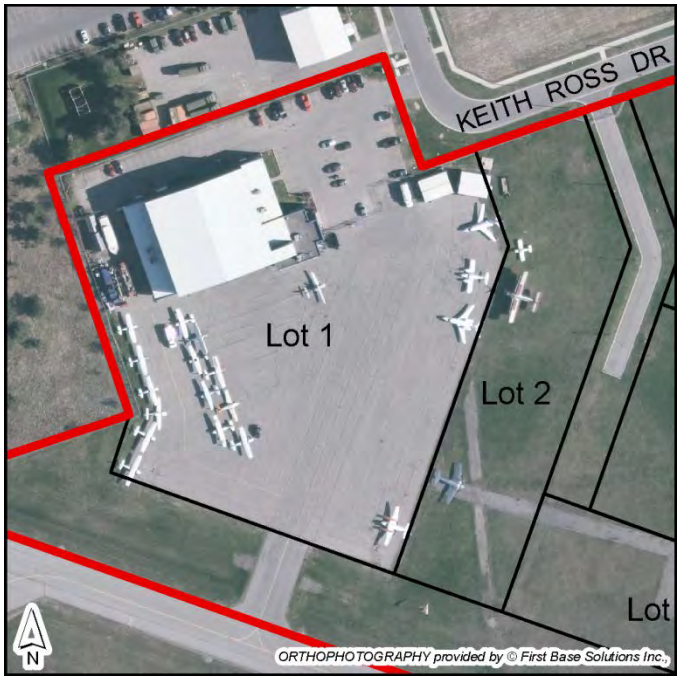


Figure 7: Lots 1 and 2 (North Field)

Lot 1 represents the land originally leased by Durham Aviation Services Limited. Lot 2 was established to increase the operational area of Lot 1 and to provide a sufficient area for an additional hanger. These lots were sold to Baseline Hangars, a sister company to Durham Aviation Services in 2008. These lots support a broad range of commercial aviation activities including flight training, but with a primary focus on the corporate business segment of the aviation industry.

10.2.3 Lots 3, 4, 5 and 6 (North Field)

Figure 8: Lots 3, 4, 5 and 6 (North Field)

Lots 3, 4, 5 and 6 were configured to accommodate the corporate business service segments of aviation and each lot can support a hangar ranging from 10,000 to 20,000 square feet. These lots are zoned AP-A. Lot 6 was sold to OPTECH in 2010 and they moved into a new 10,000 square feet hangar in 2012.

Lots 3, 4, 5 and 6 are accessed by taxiway “Charlie” which was constructed in 2010.

10.2.4 Lots 7A, 7B and 8 (North Field)

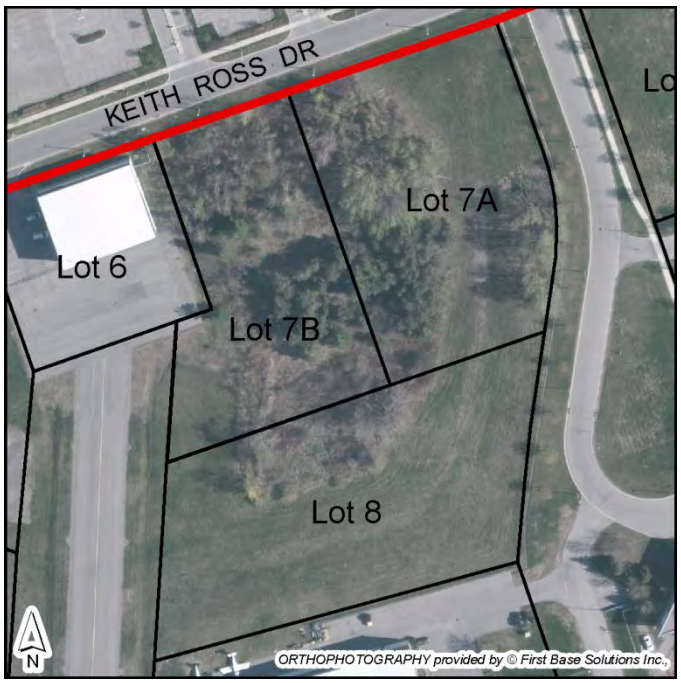


Figure 9: Lots 7A, 7B and 8 (North Field)

Lots 7A, 7B and 8 were configured to accommodate the corporate business and commercial fixed base operator (FBO) segments of aviation. Lots 7A and 7B can support hangars ranging from 10,000 to 30,000 square feet. Lot 8 was sold to Aviation Unlimited in 2010 and they recently opened a new 20,000 square feet hangar facility. These lots have AP-B zoning.

Lots 7A and 8 are accessed by taxiway “Charlie” which was constructed in 2010.

10.2.5 Lot 9 (North Field)

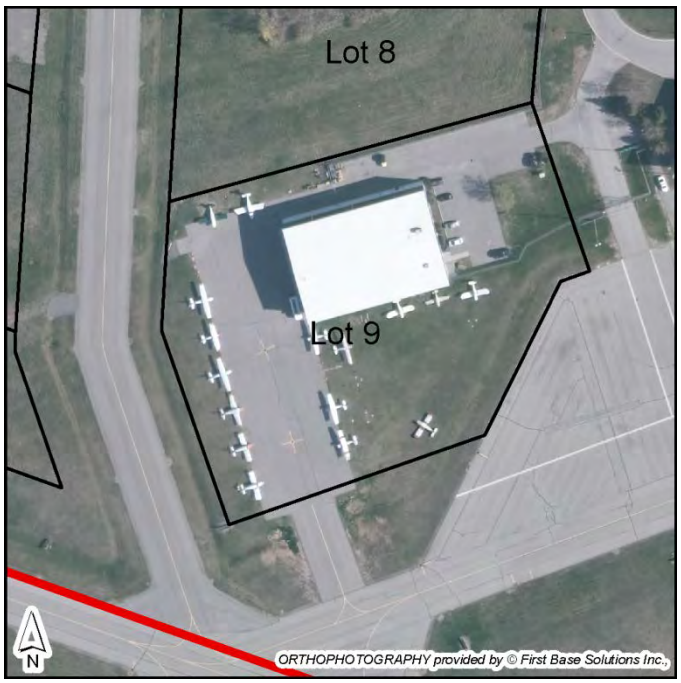


Figure 10: Lot 9 (North Field)

Lot 9 represents the land currently leased by Canadian Flight Academy. The land is zoned AP-A. Aircraft access to Lot 9 is from taxiway “Charlie” and the airport north apron.

10.2.6 Lots 10, 11 and 13 (North Field)

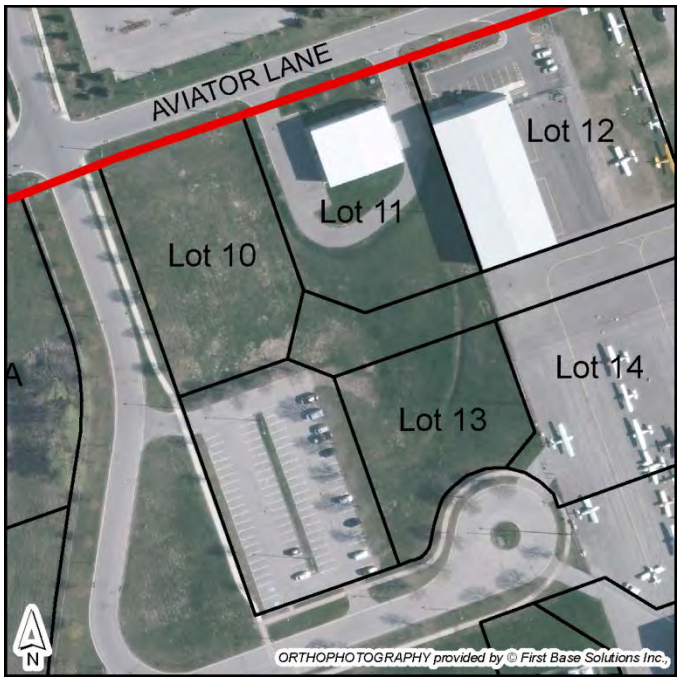


Figure 11: Lots 10, 11 and 13 (North Field)

Lots 10 and 13 have been configured to accommodate additional vehicle parking should the need arise due to the addition of other activities at the airport.

Lots 10 and 13 could however, be converted to accommodate business and general aviation uses.

Lot 11 was sold to Cox Aviation in 2008 and their aircraft parts facility opened in 2009.

10.2.7 Lot 12 (North Field)

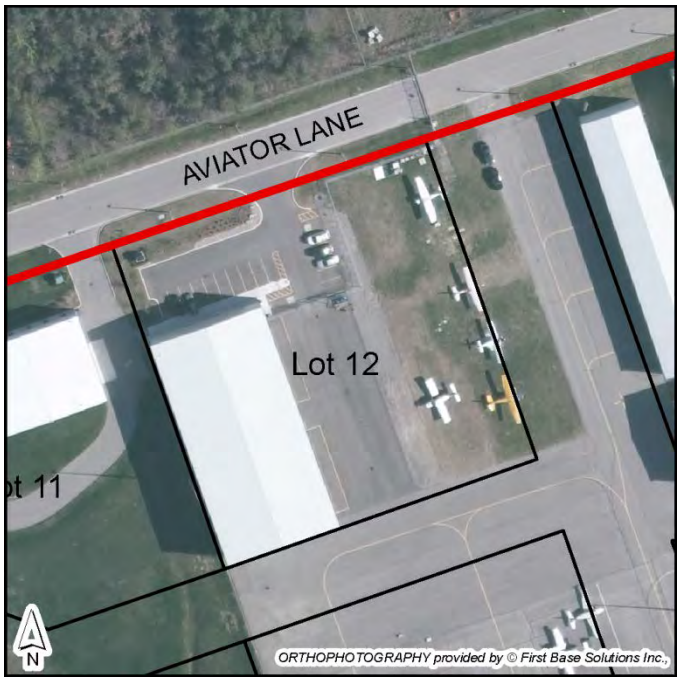


Figure 12: Lot 12 (North Field)

Lot 12 was sold to Corporate Aircraft Restoration in 2011 and their 12,000 square feet aircraft maintenance facility was opened in March 2013.

10.2.8 Lot 14 (North Field)

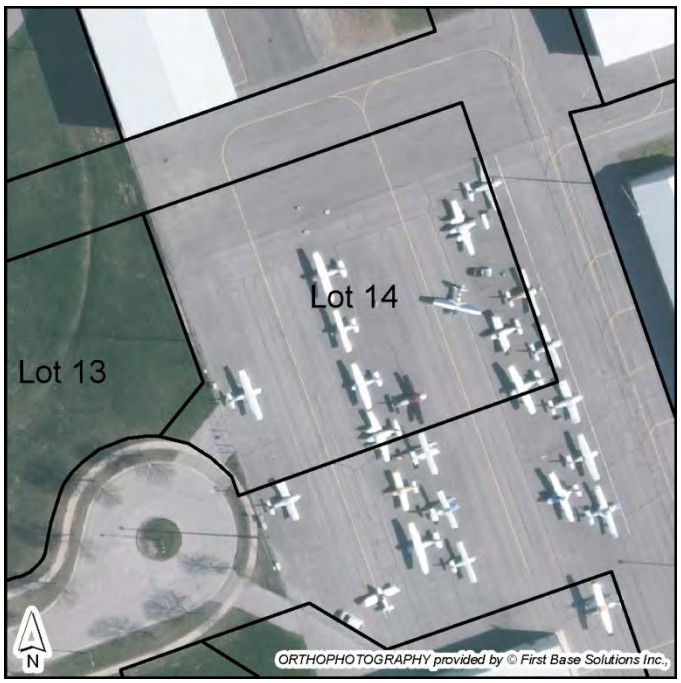


Figure 13: Lot 14 (North Field)

Lot 14 and adjacent lands accommodate 26 paved aircraft tie-down locations. This area represents a significant component of the airport revenue model and is to be maintained. Water, sanitary sewer and storm sewer servicing are available to Lot 14, although none of these services are necessary for aircraft tie-downs. Consideration to convert this area and make it available for sale as a commercial aviation lot was given, however it is not reasonable given the cost and disruption associated with replacing the paved tie-downs in another location. This area is to remain an aircraft paved tie-down area until market factors make the reconstruction of the paved area in a new location appropriate.

10.2.9 Lots 15 and 16 (North Field)

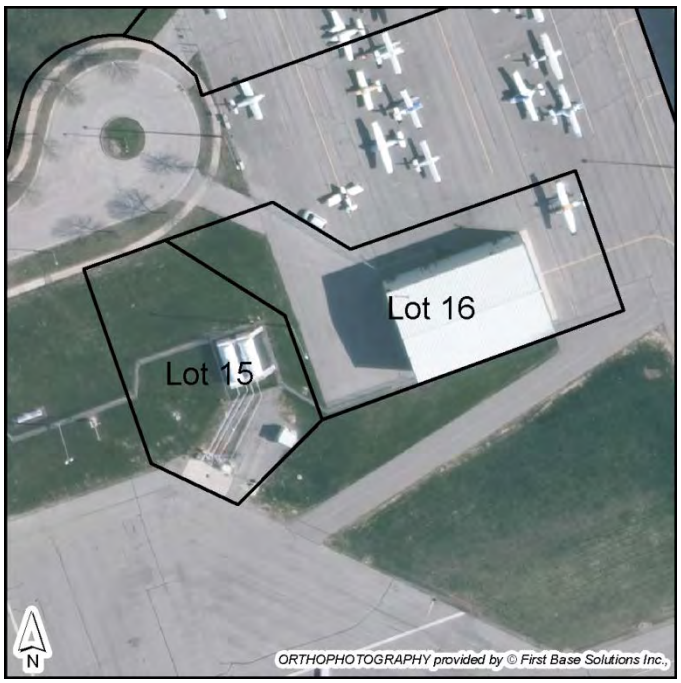


Figure 14: Lots 15 and 16 (North Field)

Lot 15 represents the land currently occupied by the City owned aviation fuel facility.

Lot 16 is privately owned and is currently occupied by Air Partners Inc. and used as an aircraft maintenance facility.

10.2.10 Lot 17 (North Field)

Figure 15: Lot 17 (North Field)

Lot 17 was sold in 2008 and has been developed as the Oshawa Airport Hangarminiums. A total of 17 buildings comprising 80 hangars totalling 124,000 square feet of hangar space have been constructed.

The Hangarminiums are sold and managed under a plan of condominium and will accommodate approximately 100 aircraft ranging in size from small 2 seat aircraft up to the very light jets (VLJs).

Approximately 60% of the units have been sold and many of the new owners had previously based their aircraft at Buttonville airport.

The remainder of the units are expected to be sold over the next 12 to 18 months as aircraft displaced by the pending closure of the Buttonville airport migrate to Oshawa.

The hangars are strictly used for the storage of aircraft.

A noise berm has been constructed east of Lot 17 along the limit of the airport property using material excavated from material from various airport construction projects. The cost of maintaining the noise berm is absorbed within the current airport operating budget.

10.2.11 Lots 18 and 19 (North Field)

Figure 16: Lots 18 and 19 (North Field)

Lot 18 is the land currently utilized for T-hangars. The City acquired the T-hangars in late February 2008. The T-hangars are rented on a monthly basis and provide an alternate to the grass and paved tie-down locations. The existing T-hangars are fully occupied and represent a significant revenue stream for the airport.

Lot 19 was configured to accommodate the land previously leased by Frederick Robinson for a private aircraft hangar and is zoned AP-A. The lot was purchased by Mr. Robinson in 2008.

An area south of Lot 18 was set aside for a taxiway to serve Lots 17, 18 and 19. The construction of the taxiway was completed in June 2013 and was fully funded by the Oshawa Airport Hangarminiums.

10.2.12 Construction of Taxiway Charlie, Services and Access on North Field

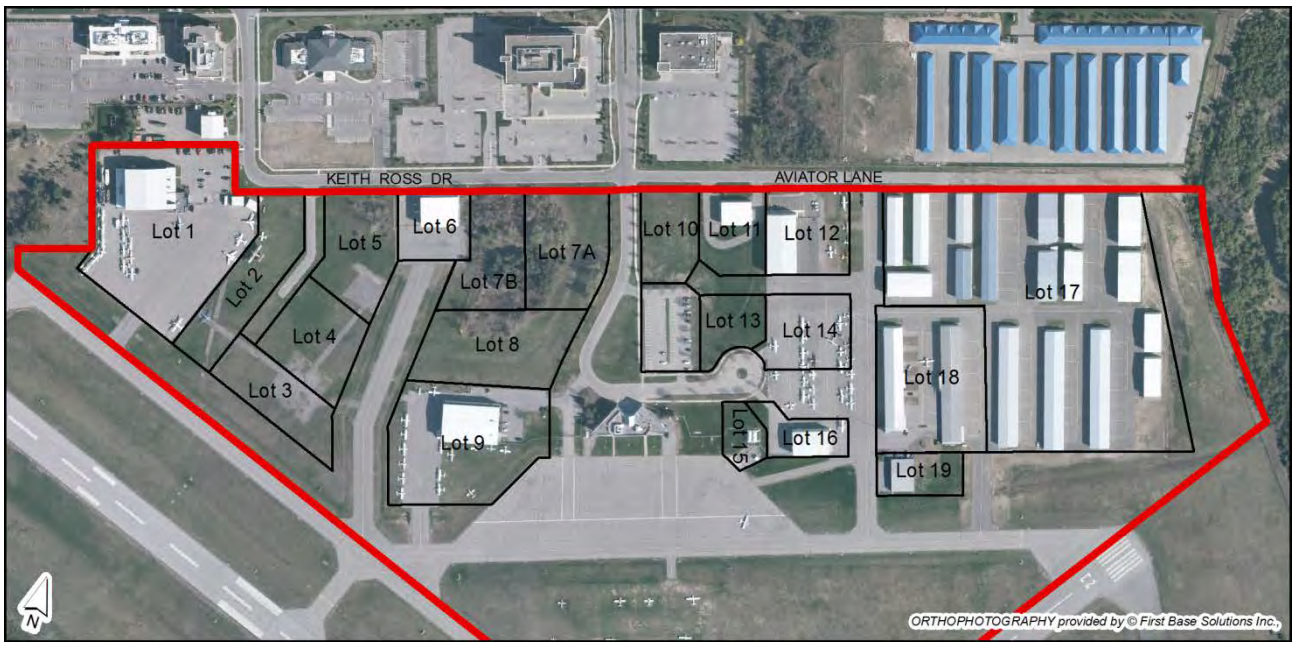


Figure 17: Construction of Taxiway Charlie, Services and Access on North Field

Taxiway Charlie was constructed to serve Lots 2 through 9.

The west access road was constructed to serve Lots 2 through 5.

Storm, sanitary and water services have been installed on each lot.

A new taxiway stub was constructed in the spring of 2013 to serve Lots 17 and 18.

Fire hydrant services were installed servicing Lots 2 through 7 and 10 through 17. All other lots were previously serviced.

Apron improvements were undertaken to serve Lots 12 and 19.

10.2.13 Airport Infield (North Field)

Figure 18: Airport Infield (North Field)

The Airport Infield was converted to a grass tie-down location in 2008. Aircraft access to the area is available from the main airport apron and Taxiway Bravo. User access to this area is available through the airport terminal with vehicle parking in the airport parking lot.

The infield could also be used to increase the size of the main apron as demand warrants.

The Airport Infield has storm sewers along its perimeter and this may be extended to the entire area as necessary.

10.2.14 North Field Zoning (North Field)

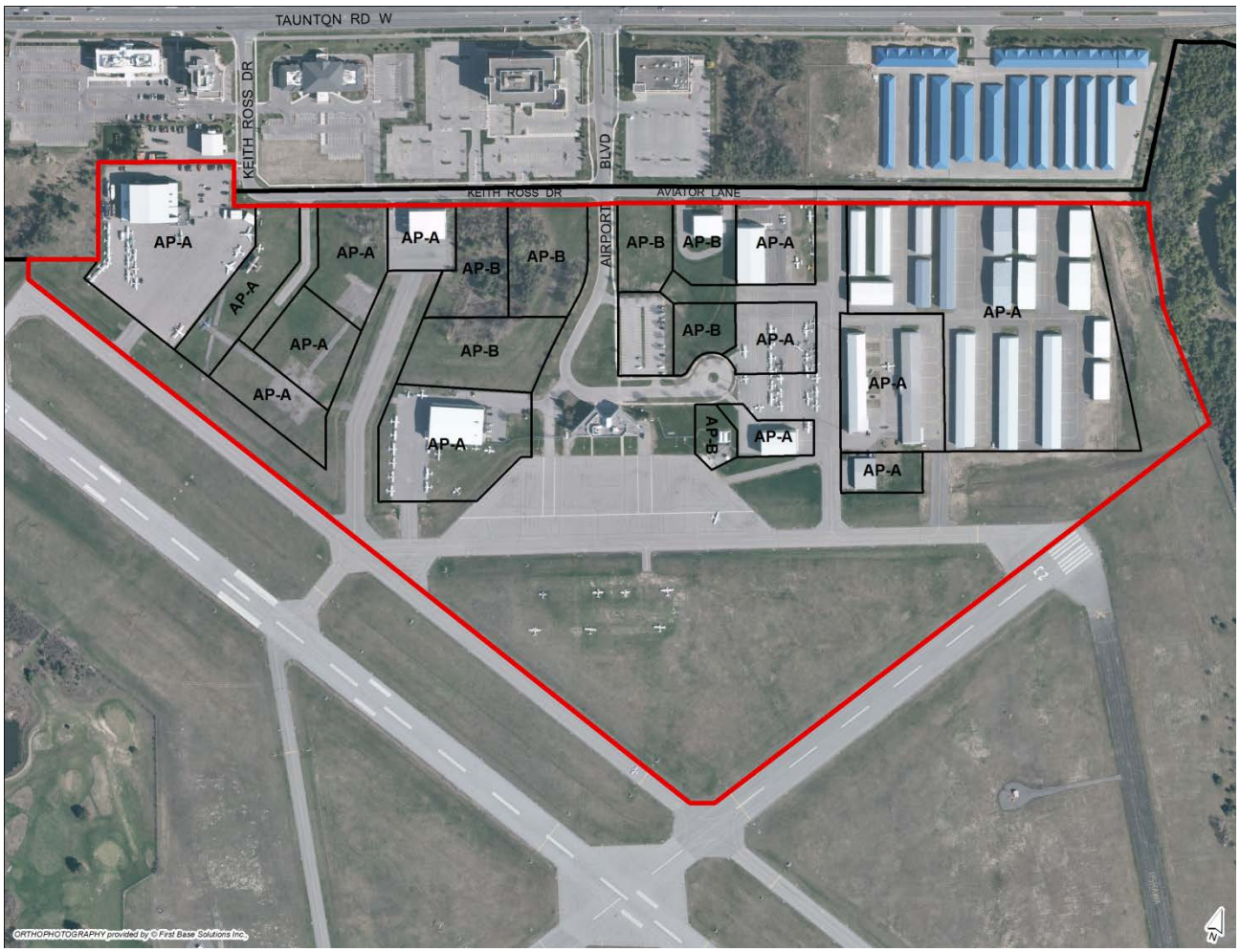


Figure 19: North Field Zoning (North Field)

The current airport zoning was established in 2009 and is based on a lotting plan approved in the 2008-2012 Airport Business Plan. A full size Airport North Field Property – Zoning Area map is shown on Appendix 6.

The permitted uses in Zoning By-law 60-94 for the zones on the North Field are shown on Appendix 7.

It is recommended in Section 9.0 that the Airport zoning be amended to remove flight training with the exception of Lots 1 and 2.

10.3 East Field

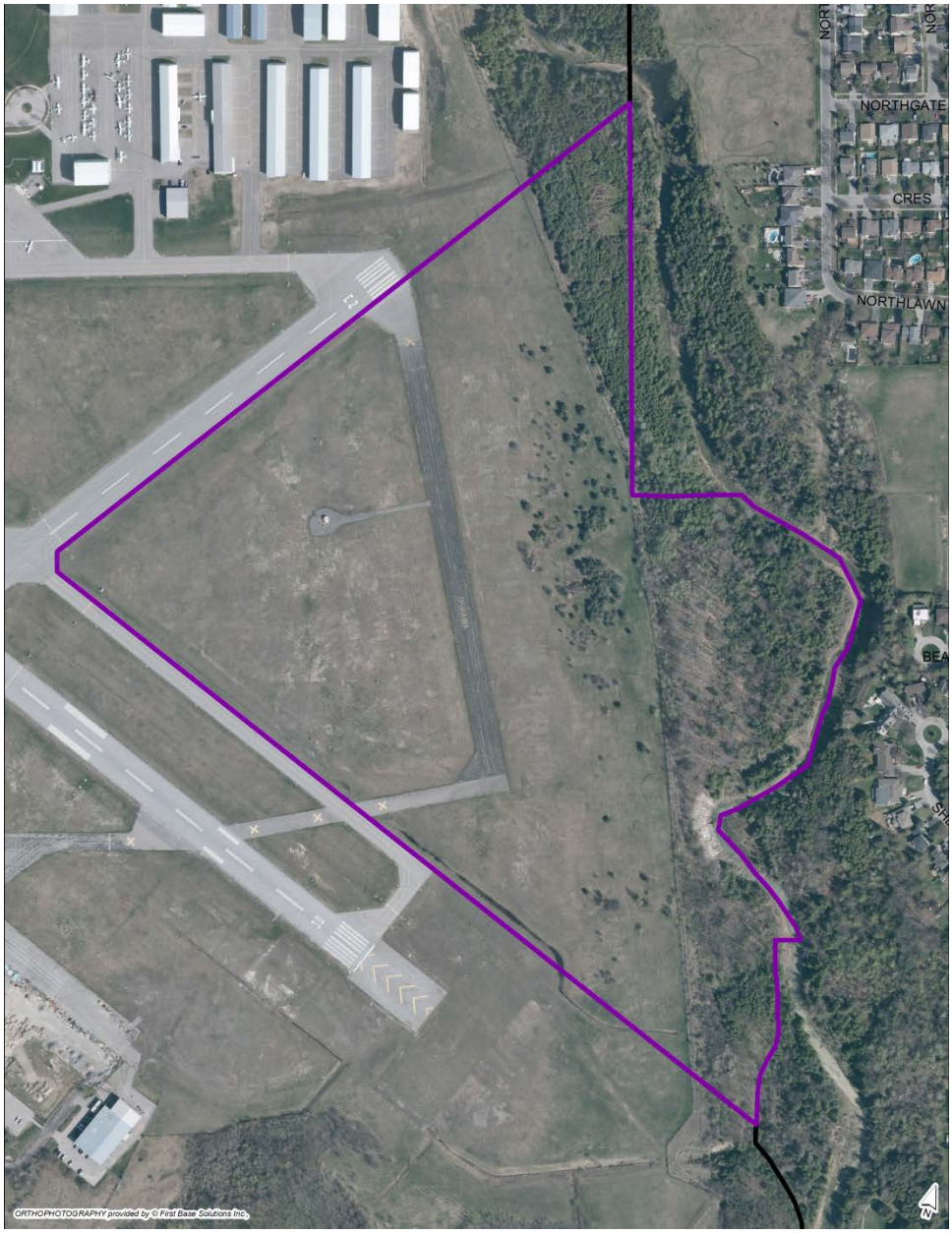


Figure 20: East Field

The 1987 Master Plan and the 2008-2012 Airport Business Plan identified the East Field as an area to be held in reserve for future airport needs.

This 27.3 hectare (67.5 ac.) area provides an opportunity for future development once the airport's North Field is fully subscribed. However, the area currently lacks vehicle access and water, sanitary sewer and storm sewer services. In addition, its proximity to the residential area to the east is a compatibility concern.

The East Field is to continue to be held in reserve for future airport needs. Its' suitability for future development is to be determined at a later date once the Airport North Field Development approaches full capacity.

10.4 The Oshawa Airport Golf Club

Figure 21: The Oshawa Airport Golf Club

The Oshawa Airport Golf Club is located on 26 hectares (65 ac.) of airport property fronting on Thornton Road North. The land is leased to the Oshawa Airport Golf Club.

The golf course is a compatible land use for the airport property and provides a significant revenue source for the airport.

The land was identified in the 1987 Master Plan and the 2008-2012 Airport Business Plan as an area to be held in reserve for the future airport needs.

The Oshawa Airport Golf Club property is to be held in reserve for future airport needs. Its suitability for future development is to be determined once the North Field Development approaches full subscription.

10.5 South Field and Thornton Road North Lands

Figure 22: South Field and Thornton Road North Lands

The airport South Field and Thornton Road North lands are 15 hectares (37 ac.) in size located along the southern limit of the airport as illustrated above.

The 1987 Master Plan recommended that the South Field be considered for recreational uses including such uses as aviation museums and sports fields.

The Thornton Road North lands were acquired by the airport in 1999 in a trade for surplus airport lands located immediately south of the South Field and west of Stevenson Road North.

The Airport South Field and Thornton Road North lands were declared surplus to airport needs in the 2008-2012 Airport Business Plan.

Heritage Oshawa has requested that the City investigate a Heritage District designation in this area. Development Services staff will provide a separate report on the Heritage Oshawa request.

The Thornton Road North lands were acquired by the airport in 1999 in a trade for surplus airport lands located immediately south of the South Field.

The South Field and Thornton Road North lands are no longer required for aviation services and do not need to be retained for future Airport development. However, at all times, the uses on these lands must remain compatible with the Airport and Community.

These lands continue to be maintained by the airport with the exception of the soccer field and Airman's Park which are maintained by the Community Services Department. All costs associated with the South Field maintenance, grass cutting and snow removal on the south field roads are covered within the airport's operating budget.

The airport capital plan does not include any provision for the capital cost maintenance for the South Field roads, water, sanitary, storm water system or the old terminal building. As capital needs arise, reports are brought forward to Council as needed.

Transport Canada is to be approached regarding the possible removal of these lands from the Operating and Options agreement. Subject to Transport Canada's input, the South Field and Thornton Road North lands are to be considered surplus to airport needs and considered for removal from the Operating and Options Agreement. This could allow a transfer of these lands to the City as parkland, other appropriate uses, etc.

A study of appropriate uses for the South Field should be undertaken and the capital requirements be integrated into the City's new City-wide capital management matrix once this new program is implemented.

10.6 The Remaining Airport Property

The remaining airport property is utilized for the runways, taxiways and corresponding open space. These components represent the primary infrastructure of the airport and are integral to the generation of taxation and employment in Oshawa.

11.0 Airport Marketing Strategy

11.1 Airport Marketing Strategy

The Oshawa Municipal Airport functions as an executive level regional airport supporting business and building community.

The 2015-2019 Airport Business Plan builds on the previous Business Plan's role of supporting general aviation, corporate aviation and emergency response utilization. In order to ensure that there is sufficient capacity within the airport infrastructure and within the context of being a good community neighbour the 2015-2019 Airport Business Plan includes a strategy to limit the growth of flight training movements and maximizes opportunities for corporate and general aviation growth.

With this in mind the airport marketing strategy has identified the following two key initiatives:

- Branding and name change
- Community awareness and aviation development

11.2 Branding and Name Change

The current name, Oshawa Municipal Airport, does not accurately reflect the airports' current use. Historically, municipal airports served only their local area and many included a primary focus on flight training.

By contrast, the Oshawa Municipal Airport primarily serves the eastern side of the GTA and Durham Region. Additionally, with the pending closure of Buttonville airport, Oshawa will be the only airport in immediate proximity to Toronto focused on both the general aviation and corporate aviation segments.

Toronto Billy Bishop airport on Toronto Island is focused on short-haul scheduled passenger service, prohibits the use of jets and has limited capacity for general aviation and corporate turbo-prop aircraft.

Burlington and Brampton airports, located in their respective communities serve primarily, if not exclusively, the general aviation and flight training segments of their local economy.

Toronto Pearson International has positioned itself as one of North America's gateway airports focusing on scheduled passenger service and large carrier freight. While Toronto currently has capacity for corporate jet traffic, this segment of the aviation market is expected to be displaced to surrounding airports as Toronto Pearson's passenger and freight segment grows.

In the absence of a significant change in market factors the Pickering Airport will not be required until sometime between 2027 and 2037.

In order to more accurately reflect the airport's current and forecast role it is appropriate to change the name of the airport.

After reviewing a wide range of name selections, it is recommended that the name of airport be changed from Oshawa Municipal Airport to Oshawa Executive Airport.

The cost of the name change is anticipated to be between $7,500 to $10,000 to change the signage on the building and at the street.

The current name is prefixed with the word “Toronto” in all aviation publications. This identifies the location of the airport within the Toronto corridor airspace and places Oshawa within the Toronto section of the Nav Canada aviation publication of the Canadian Flight Supplement and the CAP4. These mandatory publications are used by pilots and provide detailed airport information and instrument flight procedures. Any name change would continue to be prefixed by “Toronto” in the aviation publications for the purposes as noted above.

11.3 Community Awareness and Aviation Development

Building community awareness and developing appropriate aviation uses is the primary goal of the airport’s marketing strategy and in order to accomplish this, the marketing strategy focuses on the following three areas:

1. Increase the corporate utilization of the airport by:

- Active participation as an affiliate member of the Canadian Business Aviation Association (CBAA) and the US based National Business Aviation Association (NBAA);
- Active participation as an affiliate member of the Canadian Airports Council (CAC);
- Advertisements in trade publications;
- Establishment of strategic marketing alliances with the airport aviation businesses where it is mutually advantageous to do so;
- Distribution of timely media releases within this market segment;
- Preparation and distribution of marketing material featuring the availability of the development lots;
- Liaise with the University of Ontario Institute of Technology (UOIT), Durham College and Trent University in support of their clients and related businesses;
- Liaise with Ontario Power Generation (OPG) in support of current and long term operating and construction needs;
- Liaise with General Motors Canada (GM) and other industries in support of their just in time and corporate flight needs; and
- Active participation as an affiliate member of the Airport Management Council of Ontario (AMCO).

Note: Particular attention will be given to the emerging Very Light Jet (VLJ) and advanced turbo-prop marketplace.

2. Increase awareness of the airport, the services it provides and the businesses which operate at it by:

- Hosting an annual community information meeting;

- Hosting an open house targeted at corporate/business interests; not less than every two years;
- Utilization of other public facilities and services for information signage and material distribution;
- Active participation in the Greater Oshawa Chamber of Commerce;
- Utilizing and supporting the Regional Economic Development offices;
- Strategic alliances with the Young Eagles Program, the South Field Museums, other special interest groups and the other businesses where it is mutually advantageous to do so;
- Utilization of the airport by other City departments, such as Fire Services for community initiatives;
- Distribution of timely media releases; and
- Review appropriate signage at all airport entrances

3. Recognize the important role of general and recreational aviation by:

- Active participation as an affiliate member of the Canadian Owners and Pilots Association (COPA), American Owners and Pilots Association (AOPA), Recreational Aircraft Association (RAA) and other aviation special interest groups as may be deemed appropriate to do so;
- Continued participation in the aviation trade shows and events targeting this market;
- Advertisements in trade publications;
- Distribution of timely press releases within this market segment; and
- Opportunities for promotion of airport.

12.0 Airport Asset Inventory and Regulatory Overview

12.1 Existing Facilities

Figure 23: Overview of Oshawa Municipal Airport

The Oshawa Municipal Airport is a modern state of the art facility with corresponding infrastructure and services either newly installed or upgraded as a component of the North Field development in 1997. As such, the infrastructure and services are in fair condition as outlined in the 20 Year Capital Plan dated March 10, 2014 by WSP (see Appendix 8). In particular, the airport infrastructure and services include the following:

- Runway 12/30, 4000 feet x 100 feet plus a 250 foot stopway located in the pre-threshold area of Runway 30
- Runway 05/23, 2670 feet x 100 feet
- Taxiways Alpha, Bravo, Charlie, Delta
- Airport main apron
- Grass and paved tie-down areas
- T-Hangar storage units
- Visual approach aids
- Runway identification lights
- Runway guard lights
- High intensity runway lighting (RWY 12/30)
- Taxiway lighting and signage
- Solar taxiway lights on Taxiway Charlie
- Field Electrical centre complete with back-up generator

- Underground water, storm and sewer services
- Airport perimeter fencing
- Terminal vehicle parking area
- Stormwater management pond
- Automated Weather Observation System (AWOS)
- 60m Runway End Safety Areas (RESA) on all four runways
- GPS GNSS approaches on Runways 12 and 30
- GPS approaches on Runways 05 and 23
- NBD approach on Runway 05
- Bulk aviation fuel facility complete with self-serve system for 100 LL

Figure 24: Airport Signage

Figure 25: Aircraft Tie-downs

Figure 26: Fuel Facility


Figure 27: Visual Approach Aids

Figure 28: Oshawa Municipal Airport

The airport also includes a number of City owned buildings as follows:

- A modern 14,500 square feet two storey terminal building
- South Field old terminal building
- Ontario Military and Industrial Museum buildings (3 in total)
- Two 14 unit T-Hangar Buildings


Figure 29: General Aviation Hangar Complex


Figure 30: Ontario Military and Industrial Museum Building


Figure 31: NAV CANADA Control Tower

12.2 Airport Safety Management System

As a certified airport, the Oshawa Municipal Airport has a statutory obligation to comply with approximately 1,000 prescriptive rules, regulations and standards that govern the design and operation of the airport and include everything from the height of lights along the runways or trees near the airport to the nature of complex guidance documents such as the Airport Operations Manual, the Emergency Response Plan and the Wildlife Management Plan.

Most importantly, these rules, regulations and standards have a primary purpose of ensuring safety and can be found in the Aeronautics Act of Canada, the Canadian Aviation Regulations (CAR's) and various technical publications (TP documents) relating to the airport.

In 2009, in order to ensure compliance with this complex matrix of rules, regulations and standards Transport Canada mandated that every certified airport establish and utilize a Safety Management System (SMS).

The Oshawa Municipal Airport Safety Management System is a planned, documented, organized and proactive approach to safety.

The SMS includes a series of processes undertaken on a daily, weekly, monthly and annual basis at all levels of the organization from the airport Duty Managers who inspect the airport runways not less than three times a day to the City Manager who is the Accountable Executive (AE) and undertakes a detailed annual review. Along with this process, the airport also has an SMS Committee which meets at the beginning of each year to establish safety goals and objectives for the year and quarterly throughout the year to monitor progress.

In order to ensure that the processes are followed, the SMS has the following internal audit features imbedded in the process:

1. The Airport Operations Manager audits the responsibilities of the airport staff (Duty Managers) on an ongoing basis.
2. The Airport Manager audits the responsibilities of the Operations Manager on a quarterly basis.
3. The Airport Manager audits the entire SMS process on an annual basis and, in conjunction with the SMS Committee, prepares a report which is submitted to the AE.
4. The AE then reviews the report and conducts an audit of the above noted audit process.

In addition to the internal audit process, the airport also retains an external third party SMS auditor on an annual basis to audit not less than 1/3 of the SMS process each year so that 100% of the audit process is reviewed within each 3 year cycle.

In addition to the internal and third party external SMS audits, Transport Canada also audits the airport on a regular basis through a Program Validation Inspection (PVI). The

PVI includes a detailed review of the SMS process, an inspection of the airport and interviews with key staff including the SMS Committee members and the AE.

Oshawa Airport has established itself as an industry leader in the field of SMS and during a 2014 PVI inspection Transport Canada found no deficiencies in the airport's SMS processes, a distinction reserved for very few airports in Canada.

The airport's success with SMS is a direct reflection of the airport management team and City staff's commitment to the safety of the flying public and the community surrounding the airport.

12.3 Changing Transport Canada Standards

Within the various rules, regulations and standards that the airport complies with, TP 312 is one of the primary documents. TP 312 provides a comprehensive set of standards relating to the airport design, instrument approach protection and overall operation of the airport. On a regular basis, TP 312 is amended to reflect regulatory changes which occur at the international aviation level and changes which will enhance safety.

Transport Canada is in the process of releasing TP 312 5th Edition as an update to TP 312 4th Edition which has been in use since 1993.

TP 312 5th Edition includes a number of terminology improvements over the previous version and a series of safety enhancements relating to runways which have instrument approach procedures associated with them.

An instrument approach procedure is the procedure that the pilots use to safely land during periods of cloudy or inclement weather and all four Oshawa runways have instrument approach procedures. These procedures are particularly essential for corporate, just in time, medical and emergency flights and are typically used by corporate aircraft regardless of weather conditions.

As a result of TP 312 5th Edition, the following changes to the airport are required:

1. Protection of a new take-off surface

Additional tree trimming and removal is required at the end and along the sides near the ends of Runways 05, 12 and 30 due to the introduction of this new take-off surface standard. This work was completed during January, February and March of 2015 and was undertaken by qualified personnel under the direction of a certified arborist.

2. Changes to aircraft holding areas

Hold signs which denote the location where aircraft stop prior to entering the runway were moved from 45 to 75 metres from the runway for Runway 12/30. This work is underway and will be completed prior to the end of 2015.

3. Runway 12/30 RESA length increase

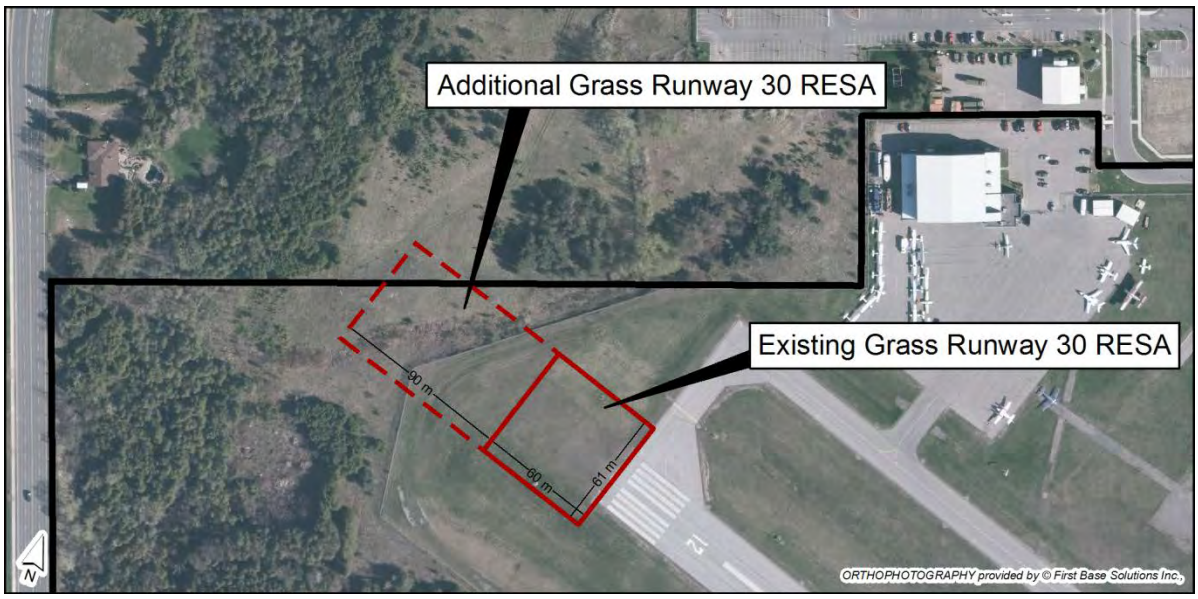


Figure 32: Runway 30 RESA

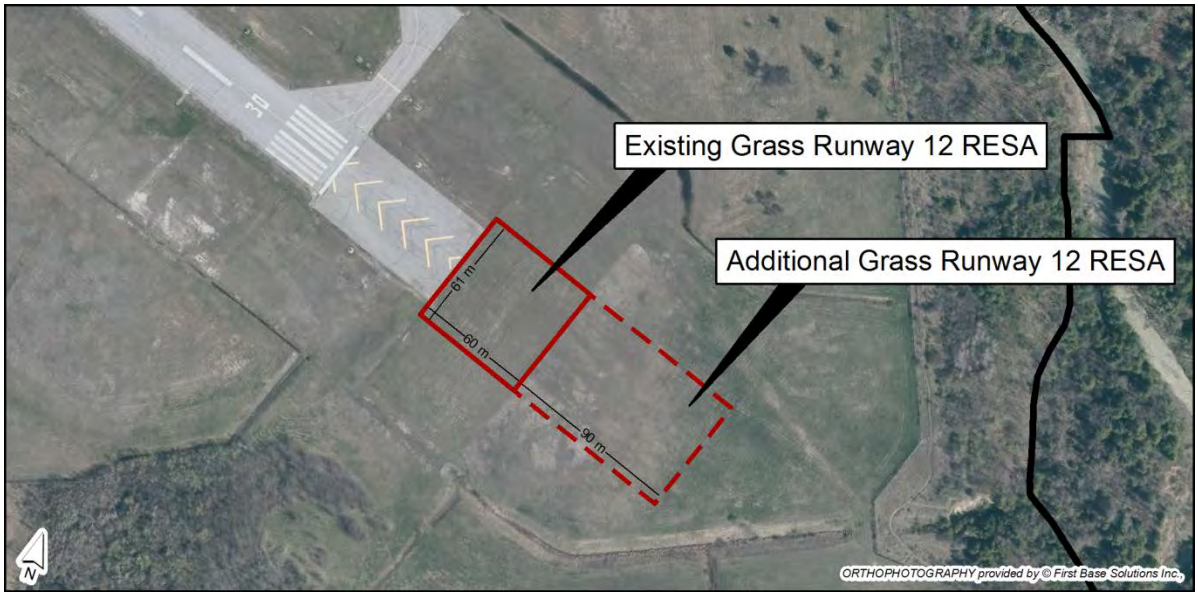


Figure 33: Runway 12 RESA

The mandatory Transport Canada runway end safety area (RESA) for Runway 12/30 has increased from the existing 60 metres to 150 metres in length on both ends of the runway required by Transport Canada. **RESA's are flat, compacted grass-covered areas that are required by Transport Canada for safety and are not used for landings or take-offs.**

Runway 12 has a 200 metre clear flat area extending beyond the stopway located at the threshold of Runway 30. The additional RESA length can be accommodated within this area.

Runway 30 has a 60 metre RESA extending beyond the end of the runway past the threshold of Runway 12. Transport Canada regulations require that this RESA be extended by 90 metres. The Airport has sufficient land to accommodate the

majority of this change. A small parcel of the adjacent land will be required to accommodate the RESA and the City will make suitable arrangements with the adjacent property owner. Preliminary engineering work is currently underway and this work will be undertaken as soon as practical in order to comply with the new standard. It is anticipated that the Runway 30 RESA can be constructed with minimal cost and these costs can be absorbed within the current airport operating budget.

12.4 20 Year Capital Plan

As part of the 2008-2012 Airport Business Plan a 25 year capital plan covering the years 2008-2032 was prepared. In 2014 the capital plan was updated to a 20 year plan covering the years 2014-2033. A copy is attached as Appendix 8.

The results and recommendations of the 20 Year Capital Plan are embedded in the go forward financial plan which forms part of this Business Plan.

Infrastructure renewal and maintenance is critical at the airport for safety and liability reasons and to meet the formal obligation to operate the airport as a certified airport within Transport Canada standards.

The airport terminal building, the two T-hangar buildings and the south field former terminal building are not included in the capital plan. All roads, sanitary, storm and water services associated with the south field are not included in the capital plan.

The majority of the airport runway surface and electrical infrastructure is nearing the end of its life cycle. The capital plan recommends the work be completed as each item and area reaches the end of its life cycle with the majority of work being required between 2015 and 2020. The standard life cycle for airport infrastructure is 25-30 years with minor remedial work required in the 10-15 year cycle.

The airport's financial plan and annual budget includes a contribution to the airport capital reserve account in order to meet the capital needs and the reserve account is in balance by 2033. The reserve account currently has a negative balance which is expected to remain in place until 2033.

In developing a comprehensive plan to undertake the requirements as outlined in the 20 year airport capital plan the following key factors must be considered:

1. The recommended timelines established in the 20 year capital plan.
2. The regulatory requirement within the airport's SMS to undertake a detailed risk assessment and corresponding engineering review for any work extended beyond the recommended time frame.
3. Economies of scale and corresponding savings which may occur if the various phases of the capital works were consolidated into a single project.
4. The impact on various airport users and businesses that rely on the airport for utilization and livelihood.
5. The impact on emergency services and just in time freight.

6. The availability of funds and the implications relating to the City's overall capital management strategies and other existing City capital needs.
7. The availability of funds from other sources including the provincial and federal government.
8. The potential ability of the construction timing to reduce the capital needs between 2033 and 2047.
9. The cost benefits and operational implications of replacing the current lighting and signage with LED or solar lights where possible as part of the airfield lighting capital projects.
10. The current condition of APRON II in the vicinity of the east side of the City owned T-hangar #2.

In the preparation of the airport capital plan update a detailed sub-surface structural analysis was not undertaken and the airport staff are currently working with the City Engineering staff to collect the required sub-surface data and other airport surfaces as needed. The data collected will then be used to update the capital plan to include the condition of the pavement surface substructure. As part of this process the airport staff and City Engineering staff will also determine the need for any localized repairs which may be required to deal with significant frost heaves which have appeared in Runway 12/30 and Apron I in each of the past two winters.

Once the subsurface structure study is complete a comprehensive capital implementation plan will be brought to Council for consideration.

13.0 Additional Initiatives

Over the past 18 years, the City of Oshawa and its Airport operators have focussed on providing excellent customer service and first class facilities in a safe and well maintained environment.

Just as the Business Plan is not a static document, we need to continually monitor and assess new initiatives that will improve the overall operation, provision of services and opportunities for feedback.

13.1 Canadian Border and Service Agency (CBSA)

The Canadian Border and Service Agency (CBSA) currently has an office at the airport and handles all importation including rail, marine, ground and air freight for the Region of Durham and the east GTA. The Airport also has a privately operated sufferance warehouse for air freight.

The CBSA office is open from 8:30 a.m. to 4: 30 p.m. Monday to Friday. Outside of these hours of operation passenger flights, where the pilot and all passengers have a pre-approved Can-Pass designation, may arrive at Oshawa. All passenger flights with non Can-Pass passengers and all freight flights must land at an alternative Canadian airport with a CBSA after hours presence prior to continuing to Oshawa.

This additional stop results in delays and additional costs which particularly impair the just-in-time freight flights.

CBSA now offers a program to extend the hours of operation on an on-call basis. This program would extend the hours of operation from 4:30 p.m. to midnight, Monday to Friday and include Saturday and Sunday from 8:30 a.m. to midnight.

This would eliminate the need for aircraft to stop at an airport with extended hours prior to coming to Oshawa and has no impact on the current traffic as the aircraft ultimately land in Oshawa after stopping elsewhere for CBSA clearance.

The additional on-call hours are provided on a fee for service basis only when CBSA officers attend the aircraft. The estimated annual cost are projected to be approximately $4,000 per year and will be covered by the airport improvement fee as outlined in the financial plan found in Section 14.0.

Overall the extended hours of CBSA service would enhance the level of service provided to the businesses across the Region that rely on just-in-time freight at no cost or impact to the community.

As such, it is recommended that the City enter into negotiations with CBSA to extend the hours of operation as noted above to commence concurrent with the CBSA fiscal year starting April 1, 2016.

13.2 Airport Committees

Accountability and transparency are an integral part of the operation of the airport and a key component of this process is liaising with the community and the airport users on an ongoing basis.

In 1997 the City established the Airport Advisory Committee (AAC) with a role of providing input to the airport. The AAC is made up of 3 community members and 3 airport users and is supported by the Airport Manager and City staff. From 1997 until 2010 the AAC met regularly and provided valuable input into the operation of the airport and the development of the 2008-2012 Airport Business Plan. Essentially, they functioned as an informal peer review committee for the airport.

In 2010, as part of a City wide committee restructuring process, a more formal reporting structure to Council was implemented. As a result the AAC lost the important ability to support the airport by providing an informal peer review to staff.

In 2012, as part of the process to update the 2008-2012 Airport Business Plan, Council directed that a working team be established to provide input, ideas, feedback and discussion.

On a go forward basis it will be important for the airport to continue to have input, ideas, feedback and discussion from the airport users, community, City staff and Council and there are two key areas where this is essential.

1. The Airport Business Plan Working Team

The Airport Business Plan lays out operational and financial goals within a 5 year term and capital needs within a 20 year term. Throughout this term it will be important to monitor the progress and provide feedback and input as conditions change. With this in mind it is recommended that the Airport Business Plan Working Team continue in its role throughout the term of the plan and that its makeup remain essentially as it is today and would consist of:

- Chair, Development Services Committee
- Chair, Finance Committee
- Commissioner, Development Services
- Director, Economic Development Services
- Airport Manager
- Two airport business users
- Two members from the community that reside either adjacent to the airport or along any of its flight paths and have no present or past affiliation with the airport as a user, employee or business relation or affiliation that may be deemed as impeding impartial judgement when representing the community.

This committee would meet not less than twice a year. The role of this Working Team would be to monitor the implementation of the Airport Business Plan. The Working Team would meet twice per year and report to Council annually.

2. Airport Community Liaison

The Airport Business Plan SWOT analysis identified a lack of community engagement, a lack of direction for the south field and the public perception of the cost of the airport as weaknesses. In order to address these weaknesses the Business Plan lays out a number of initiatives including hosting community information meetings, hosting an open house and promoting the airport in other City facilities. In order to be effective with community outreach and input it will be important to establish a committee to provide input, ideas, feedback and discussion focused on community awareness. With this in mind it is recommended that a second airport committee, the "Airport Community Liaison Committee" be established. This Committee would consist of:

- Director, Economic Development Services
- Airport Manager
- Three airport users
- Three members from the community that reside either adjacent to the airport or along any of its flight paths and have no present or past affiliation with the airport as a user, employee or business relation or affiliation that may be deemed as impeding impartial judgement when representing the community
- Representative from the Region of Durham Economic Development Division

The mandate of this committee will be to undertake initiatives and provide input, ideas, feedback and discussion in all areas of community awareness and outreach relating to the airport. Council would appoint the citizen members to this committee.

Neither committee would be a formal advisory committee of Council and with these two airport committees in place, the "Airport Business Plan Working Group" and the "Airport Community Liaison Committee" the current Airport Advisory Committee would be redundant.

As such it is recommended that once the Terms of Reference have been established, that the Airport Advisory Committee be disbanded and that the Airport Business Plan Working Group and the Airport Community Liaison Committee be established as committees of the airport.

13.3 Environmental Stewardship

Environmental Stewardship is an important component of the operation of the airport and can be broken down into 4 key areas.

1. Wildlife Management
2. Surrounding Habitat Management
3. Water Quality Protection
4. Air Quality
5. Noise (see Section 9.0)

13.3.1 Wildlife Management

The airport has a comprehensive Wildlife Management Plan (WMP) which strives to find a balance between the regulatory requirement to prevent wildlife and aircraft collisions while

respecting the natural environment that we live in. This is particularly important as the airport is flanked on its west and east boundaries by creeks.

One of the key strategies of the WMP is to carefully manage wildlife habitat within the airport fence perimeter. Deer pose a particular concern and are present in the wooded areas around the airport. In order to reduce the likelihood of deer residing on the airport the grass areas are cut short, trees and shrubs are removed from the ditch areas and wooded areas are limited.

Coyote's pose a unique wildlife interaction. On the runway the coyotes pose a risk to aircraft however on the grass areas they control the small bird and mice population which in turn reduces the presence of birds of prey. Coyotes are highly adaptive and the airport's coyote wildlife strategy has been to chase the coyotes when they are seen on or near the runways and to leave them alone when they are on the grass areas. As a result the coyote population at the airport has learned to remain clear of the runways and can often be seen hunting for mice in the grass areas.

The term "wildlife" extends well beyond deer, coyotes and birds and the WMP takes into account the complex nature of wildlife, the impact of weather and seasonal changes and the implicit need for safety and in doing so it protects the aircraft, the flying public, the community and nature.

13.3.2 Surrounding Habitat Management

The airport consists of 196 hectares (484 ac.), the majority of which is located inside the airport fence perimeter. Beyond the airport property all properties within a 4,000 metre radius of the airport are governed by the Transport Canada (TC) Airport Zoning regulations. The TC airport zoning regulation establish the maximum height of structures and control the manner in which food waste that can attract birds is handled.

In proximity to the runways the Airport works very closely to manage the height of trees as mandated by Transport Canada, and where necessary trees are trimmed or removed at no cost to the property owner. In determining whether to remove or trim trees the airport strives to balance the aviation safety concerns, the airport budget implications and the impact on the environment with an ultimate goal of limiting the trimming and removal of tress as much as possible. The Airport also strives to retain naturalized areas throughout the property.

In the case of new development, whether it's a small building or a large residential subdivision the airport is included in the approval process and provides input relating to the height of buildings, the placement and design of storm water management ponds, the impact on wildlife management plans and the collection and handling of food waste. In addition, warning clauses are put in subdivision agreements advising of the proximity to the Airport.

In doing so the airport provides important input into the habitat surrounding the airport.

13.3.3 Water Quality Protection

Water quality protection is an important component of the airports commitment to environmental stewardship and can be broken down into 5 areas:

1. Stormwater Management
2. Fuel Handling Practices
3. Runway Chemical Application
4. Vehicle Monitoring
5. Aircraft De-Icing and Anti-Icing

1. Stormwater Management

The airport has a comprehensive stormwater collection system which collects storm water from all paved surfaces and redistributes into the environment. The system functions in the same manner as a roadway storm water collection system and is part of the City's overall storm water management strategy.

Consistent with industry best practices and regulatory requirement all hangars where aircraft servicing is undertaken are equipped with an oil water separator system identical to those found in industrial facilities that service vehicles.

2. Fuel Handling Practices

The airport currently operates a bulk fuel facility similar in nature to the one the City installed at the new Consolidated Operations Depot. In the case of the airport, the tanks include secondary containment and the entire site is protected by a 9,000 litre oil water separator designed to collect the release of any fuel. Fuel inventories are monitored closely and the fuel facility is inspected twice a day for any signs of damage or leaks.

In addition to the fuel facility, privately operated aircraft refueling trucks carry emergency response spill kits and each truck is equipped with a specially designed mat which can be used to cover a storm drain in the event of a spill.

The airport also has two large emergency response spill kits and all airport staff have been trained in the deployment of the spill kits.

3. Runway Chemical Application

The use of rock salt or liquid salt as is commonly used on roads today is strictly prohibited on airports due to the corrosive nature of chloride based products on aluminium aircraft.

As an alternate and consistent with industry practices and regulations the airport uses liquid potassium acetate when necessary. The potassium acetate is a potash based product and is sprayed on the centre section of Runway 12/30 only when absolutely necessary. The potassium acetate creates a thin boundary layer between the pavement and the ice and allows the ice to be removed by a combination of simultaneously plowing and brooming the runway.

As an alternate to the use of potassium acetate the airport primarily relies on the process of sublimation to control ice. Simply described, sublimation of ice is the process whereby the ice evaporates during the freezing process.

In order for sublimation to be effective there has to be a minimal amount of moisture present on the runway. In order to accomplish this, the airport will simultaneously plow and broom the runway continuously though the freezing cycle from wet precipitation to below zero temperatures. The airport uses a 46" diameter, 20 foot wide high speed broom which lifts the water from the small crack, pours and runway surface. With only a limited amount of moisture remaining sublimation can occur returning the runway to a bare and dry condition without the use of chemical.

Although the use of potassium acetate is an approved process and meets environmental standards the practise of drying the runway through sublimation significantly reduces the use of potassium acetate.

4. Vehicle Monitoring

The airport operates a large fleet of equipment in order to accomplish both summer and winter maintenance. Prior to the use of any piece of equipment a detailed inspection of the equipment is undertaken and any equipment with evidence of a leak will not be used until the leak is repaired. If a leak occurs during the operations of a piece of equipment the equipment is immediately returned to the maintenance facility and the spill is cleaned up in an appropriate manner.

5. Aircraft De-Icing and Anti-Icing

The Airport does not have de-icing or anti-icing facilities. Aircraft that require de-icing are placed in a heated hangar. Chemicals are not used.

In the event that aircraft de-icing or anti-icing services are to be provided at the airport in the future, the airport would ensure that all applicable environmental standards were followed.

13.3.4 Air Quality

Air quality is an important issue and often there can be confusion about the impacts associated with aircraft operations.

In order to understand the air quality impacts of the airport particularly relating to the forecast growth in aircraft traffic associated with the potential closure of Buttonville Airport, the City retained XCG to undertake an air quality assessment. A copy of the Air Quality Assessment dated April 10, 2015 by XCG is shown as Appendix 9.

The air quality assessment included background air quality data, aircraft emissions and all ground based airport emission sources and examined the levels of carbon monoxide (CO), nitrogen oxides (NO_x), fine particular matter ($PM_{2.5}$) and lead.

In preparing the air quality assessment, the study utilized extensive data obtained during a US EPA monitoring study of lead concentrates at airports and found that the three month average lead concentrates when the airport reaches the forecast movement levels is expected to correspond to the lower end of the range of concentrates reported by the US EPA and are below the Ambient Air Quality Criteria (AAOC) developed by the Ministry of Environment (MOE).

The study further found that the total levels of CO, NO_X and $PM_{2.5}$ are substantially below the acceptable MOE AAOC levels.

The US Federal Aviation Authority (FAA) is currently undertaking the approval of unleaded aviation fuel and expects the certification process to be completed by 2018. Once certified, the unleaded aviation fuel would be available in Canada and the US and the current 100LL (low lead aviation fuel) would be phased out.

The airport will continue to monitor the development of the unleaded aviation fuel and will phase out the use of 100LL as soon as possible once a replacement is available.

13.4 Aviation Fuel Facility Upgrade

The airport currently operates the bulk aviation fuel facility which consists on one 45,000 litre bulk storage tank for 100LL aviation fuel and one 45,000 litre bulk storage tank for jet fuel. Due to the size of the tanks fuel deliveries to the airport must always consist of a partial load of 100LL in combination with a partial load of jet fuel. A full load of either product would consist of up to 50,000 litres. As the fuel sales volume grows it may become advantageous to increase the tank capacity to enable the delivery of aviation and jet fuel on a full load basis whereby the savings from receiving full load deliveries offsets any additional capital costs associated with increasing the fuel tank capacity. The airport staff will monitor the fuel sales growth on a go forward basis and will report back to Council should an opportunity as noted above develop.

14.0 Financial Plan

14.1 General

The Financial Plan is intended to provide a realistic picture and framework for operating the airport in an effective and efficient manner consistent with sound financial practices and asset management planning.

The Financial Plan examines all user fees by comparison to the fees at airports of a similar size and level of service. The Financial Plan examines all costs and manages these in a manner that controls cost to the greatest extent possible while maintaining an appropriate level of service.

The Financial Plan also includes a 20 Year Capital Plan, 2014-2033, for all airside infrastructure. The operating budget includes an annual contribution to the airport capital reserve account which balances the account within the 20 year term.

The Airport is a critical and essential element of the City and Regional infrastructure. The cost to operate and maintain the Airport is offset many times over by the role the Airport plays in:

- Creating jobs (onsite and offsite)
- Creating GDP
- Supporting and growing business and industry
- Supporting medical transport
- Supporting policing
- Helping the City and Region meet Provincial employment targets
- Emergency preparedness
- The Airport is a key piece of infrastructure
- The Airport also operates as a good neighbour (with a curfew, etc.) and does not maximize its revenues at the expense of compatibility

The total annual cost of service for operating the Airport is less than $5.00 per household based on the 2015 budget.

With new technology, airports will become more and more important.

Most major cities and regions have airports including those areas that the City and Region compete with for jobs.

Although the 5 year operating budget forecast is to be in balance within the 5 year planning window, it is not necessarily reasonable for the City to assume all of the capital costs for this major City/Regional/East GTA facility. Accordingly, some opportunities for potential contributions from other sources are discussed subsequently.

It is also important to note that the airport and former airport properties generated $1.5 million in property taxes in 2014.

14.2 Operating Budget

In keeping with sound financial practices the following goals have been established relating to the operating budget.

- To balance the airport operating budget within the 5 year financial forecast;
- To ensure that all airport user fees are competitively priced within the aviation industry when compared to airports with a similar level of service and operating conditions;
- To ensure that all airport user fees are consistent with any City policies relating to the recovery of user fees at City facilities;
- To ensure that all airport users contribute towards the airport operating budget through fees that are relative to their use taking into account the social and economic impact that they may have in the City; and
- To update the City fees by-law to reflect the fees as identified in this section of the Business Plan.

14.3 Competitive Fee Analysis

A competitive fee analysis has been undertaken for the aircraft landing fee and the aircraft parking fees.

Airport landing fees apply to all aircraft using the airport and includes both landings and approach training aircraft where an actual landing does not occur. Landing fees consist of the following:

- Direct Landing Fees – charged per landing or approach to landing
- Indirect Landing Fees – per litre fee charged on all aviation fuel sales
- Direct Airport Improvement Fee – charged on all direct landing fees
- Indirect Airport Improvement Fee – per litre fee charged on all aviation fuel sales

Table 3: Landing Fee Matrix

Type of Fee	**Price**
Direct Landing Fee, Oshawa Based Aircraft ▪ Applies to private aircraft over 4,000kg and all commercial aircraft	$4.37/1,000kg
Direct Landing Fee, Itinerant Aircraft ▪ Applies to private aircraft over 2,000kg and all commercial aircraft	$5.74/1,000kg
Indirect Landing Fee	$0.10/litre all aviation fuel
Direct Airport Improvement Fee ▪ Based on the aircraft weight	Up to $30.00 per landing
Indirect Airport Improvement Fee	$0.01/litre avgas $0.03/litre jet fuel

The following two tables provide a comparison between landing, tie-down and hangar fees at Oshawa when compared to several other southern Ontario airports.

Table 4: Landing Fee Comparison

Aircraft Type	Weight (kg)	Fuel Purchased (litres)	Oshawa	Peterborough	Buttonville	Lake Simcoe	Toronto Island	Hamilton
Single Engine	1400	150	$16.50	$6.00	$6.00	$6.00	$12.87	$25.71
Light Twin Engine	2100	350	$52.74	$34.00	$23.45	$25.55	$24.31	$43.57
Heavy Twin Engine	3000	700	$100.20	$48.00	$41.50	$44.50	$42.73	$70.24
Light Turbo Prop	3350	800	$117.74	$52.00	$47.08	$50.43	$57.59	$79.17
Heavy Turbo Prop	5700	900	$144.08	$71.00	$61.65	$70.20	$79.55	$116.26
Light Jet	3900	1200	$174.16	$68.00	$65.55	$69.45	$77.80	$102.91
Medium Jet	8500	1500	$232.40	$95.00	$98.25	$111.00	$124.94	$179.68

Note: Fuel purchased is based on the average aircraft fuel purchase per flight for each category of aircraft.

Table 5: Aircraft Monthly Parking Fee Matrix and Comparison

Parking Type	Oshawa	Peterborough	Buttonville	Lake Simcoe	Brampton	Hamilton
Grass Tie-down	$66	$35	N/A	N/A	$65	N/A
Paved Tie-down	$124	$45	$260	$80	$132	$288
Hangar	$654	$450	$600	$465	$387	N/A

As a comparison between the cost to tie down an aircraft or the cost to moor a boat, it is interesting to note that an un-serviced dock at Port Whitby Marina is approximately $157.00/month and a serviced dock which includes hydro and water connection would be approximately $181.00/month.

14.4 5 Year Operating Forecast

The 5 Year Operating Forecast is outlined in Table 6, Table 7, Table 8 and Table 9 is based on the following:

1. All revenues, expenses and costs are shown in 2015 dollars.

2. The Consumer Price Index (CPI) is assumed to be at 2% for each year.

3. All income and expenses are increased by the CPI annually except as noted below.

4. Aircraft grass and paved parking fees are increased by 10% in each of the five years.

5. Increased revenues are primarily related to growth associated with the pending closure of Buttonville Airport.

6. Increased revenues reflect the forecast total aircraft movements of approximately 102,345.

7. Avgas fuel sales grow from 425,000 litres in 2015 to 1.2m in 2019 as a direct result of the increase in forecast aircraft movements.

8. Jet fuel sales grow from 580,000 litres in 2014 to 2.5m in 2019 as a direct result of the increase in forecast aircraft movements.

9. Landing fees grow consistent with projected growth in aircraft movements.

10. Non-aviation land lease fees are consistent with the terms of the leases.

11. Terminal rent and maintenance fees are consistent with the terms of the leases and include the additional lease of vacant space in the terminal starting in 2017.

12. The purchase of Lot 9.

13. All capital recommendations proposed for 2015 have been included in the proposed 2016 budget.

14. That the Canada Border and Service Agency (CBSA) hours of operation are extended to include an on-call service Monday to Friday from 4:30pm to midnight and Saturday and Sunday from 8am to midnight.

15. All on-call costs associated with the CBSA fees for extended hours of service are covered with increased airport improvement fees.

Table 6: Five Year Income Forecast

Projected Income	**2015 ($)**	**2016 ($)**	**2017 ($)**	**2018 ($)**	**2019 ($)**
Aircraft Parking Fees	52,600	57,860	63,646	70,011	77,012
Non-Aviation land Lease	118,000	118,000	118,000	118,000	118,000
Hangar Parking Fees	179,200	182,784	186,440	190,168	193,972
Airport Improvement Fees	31,000	39,330	87,500	105,000	122,000
Airport Revenue - Avgas	600,000	700,000	1,050,000	1,400,000	1,680,000
Airport Revenue - Jet Fuel	640,000	825,000	1,650,000	2,200,000	2,750,000
Aviation Land Lease	23,900	23,900	23,900	23,900	0
Landing Fees	23,000	25,300	27,830	57,942	91,008
Sundry Revenue	15,000	15,000	15,000	15,000	15,000
Rec – Utilities	34,000	36,380	38,927	41,651	44,567
Rental – Terminal Building Rent	90,500	90,500	122,983	125,443	127,952
Total Projected Income from Airport Fees	**1,807,200**	**2,114,054**	**3,384,225**	**4,347,115**	**5,219,510**

Table 7: Amount of Litres Sold

Type	**2015 (litres)**	**2016 (litres)**	**2017 (litres)**	**2018 (litres)**	**2019 (litres)**
litres sold avgas	428,571	500,000	750,000	1,000,000	1,200,000
litres sold jet	581,818	750,000	1,500,000	2,000,000	2,500,000

Table 8: Five Year Expense Forecast

Projected Expenses	**2015 ($)**	**2016 ($)**	**2017 ($)**	**2018 ($)**	**2019 ($)**
Airport Expense - Avgas	550,000	650,000	975,000	1,300,000	1,560,000
Airport Expense - Jet Fuel	588,000	750,000	1,500,000	2,000,000	2,500,000
Management contract	698,500	712,470	726,719	741,254	756,079
Airport Operating Expenses	170,900	174,318	177,804	181,360	184,988
CBSA After Hours Service	0	4,000	4,000	4,000	4,000
Terminal Operating Expense	122,000	124,440	126,929	129,467	132,057
Total Projected Expenses	**2,129,400**	**2,415,228**	**3,510,453**	**4,356,082**	**5,137,123**

Table 9: Summary of Net Airport Operating Budget

Summary	**2015 ($)**	**2016 ($)**	**2017 ($)**	**2018 ($)**	**2019 ($)**
Total Projected Income from Airport Fees	1,807,200	2,114,054	3,360,325	4,323,215	5,219,510
Total Projected Expenses	2,129,400	2,415,228	3,510,453	4,356,082	5,137,123
Net Airport Operating Budget	**(322,200)**	**(301,174)**	**(126,227)**	**(8,966)**	**82,387**
Contribution to Airport Capital Reserve	150,000	150,000	250,000	250,000	250,000
Total Airport Budget	**(472,200)**	**(451,174)**	**(376,227)**	**(258,966)**	**(167,613)**

Note: In 2014, $1.5 million in property tax was paid on airport land with the City of Oshawa retaining just over $500,000.

14.5 20 Year Capital Plan 2014-2033

In keeping with sound financial practices, the following goals have been established relating to the capital budget:

- That a strategy to implement the capital works identified within the capital plan be developed to minimize the impact of the required work on the airport operations, its users and the corresponding loss of airport revenue associated with airport closures necessary to complete the work.
- That the major rehabilitation work identified for Runway 12/30 be completed before the closure of the Buttonville Airport occurs.
- That the management of the airport's buildings and its south field infrastructure be integrated into the City's Asset Management Plan (AMP);

As part of the process to develop the 20 year capital plan, a 5-year airport Property Sales Forecast was generated and is based on the following:

- All revenues are shown in 2015 dollars;
- Lot 9 will be sold;
- That the remaining land sales will be generated due to demand related to the pending closure of Buttonville Airport;
- All lots are to be sold at fair market value.

Table 10: 5 Year Airport Land Sales Forecast - Potential Land Sale Revenue

Lot #	Lot Size (acres)	2015 ($)	2016 ($)	2017 ($)	2018 ($)	2019 ($)
Lot 3	1.16	N/A	N/A	N/A	N/A	166,000
Lot 4	1.36	N/A	N/A	N/A	N/A	372,000
Lot 5	1.44	N/A	N/A	388,000	N/A	N/A
Lot 7	3.02	N/A	N/A	N/A	704,000	N/A
Lot 9	2.85	N/A	N/A	N/A	N/A	570,000
Total	**9.83**	N/A	N/A	**388,000**	**704,000**	**1,108,000**

As part of the 2008-2012 Airport Business Plan, Council approved a life cycle accounting process relating to the airport capital plan which includes contributions from the operating budget annually to the airport capital reserve account.

Annual contributions to the airport capital reserve account are as follows:

Table 11: Airport Capital Reserve Life Cycle Contribution from the Airport Operating Budget

Year	Yearly Contribution ($)	Number of Years	Period Contribution ($)
2015 - 2016	150,000	2	300,000
2017 - 2020	250,000	4	1,000,000
2021 - 2030	300,000	10	3,000,000
2031 - 2033	330,000	3	990,000
Total	**N/A**	**19**	**5,290,000**

The 20 Year Airport Capital Reserve Account Projection is outlined in Table 12 and is based on the following:

- All revenues, expenses and costs are shown in 2015 dollars;
- The 20 Year Capital recommendations are drawn directly from the Airport's 20 Year Capital plan prepared by WSP Canada Inc. in March 2014;
- The plan includes an annual contribution from the airport operating budget to the airport capital reserve account as part of the airports life cycle capital planning process.

Table 12: Forecast 20 Year Airport Capital Reserve Account Projection

Capital Reserve Contributions and Withdrawals	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2030**	**2033**
Opening Balance	(730,000)	(580,000)	(4,924,500)	(4,343,500)	(3,454,500)	(3,415,000)	(3,597,000)	(715,000)
Land Sales	0	0	388,000	704,000	1,108,000	0	0	0
20 Year Capital Recommendations	0	(4,494,500)	(57,000)	(65,000)	(1,318,500)	(432,000)	(118,000)	0
Infrastructure Contribution from Operating Budget	150,000	150,000	250,000	250,000	250,000	250,000	3,000,000	990,000
Year End Balance	**(580,000)**	**(4,924,500)**	**(4,343,500)**	**(3,454,500)**	**(3,415,000)**	**(3,597,000)**	**(715,000)**	**275,000**

14.6 Potential Financial Opportunities

When the Buttonville airport closes, the aircraft movements in Oshawa are forecast to grow to 102,345 annually.

Along with the growth in movements, its growth in supporting businesses will extend well beyond Oshawa and Durham Region into the east and central GTA.

As with any financial plan, needs and wants have to be balanced with affordability and completion with other City priorities.

Given the significant role that the airport will play it is appropriate to look to other sources of financial support particularly relating to the 20 year capital plan.

In keeping with this the airport will look to the Region, the Province and the Federal governments and examine potential programs and avenues of support.

15.0 Appendices

Appendix 1: Oshawa Historical Aircraft Movement Chart 1974-2014

Table 13: Oshawa Municipal Airport – Historical Movements – 1975 to 2014

Year	Local Movements	Itinerant Movements	Total Movements
1974	68,500	37,400	105,900
1975	67,100	39,600	106,700
1976	69,700	37,500	107,200
1977	72,700	42,300	115,000
1978	81,700	44,400	126,100
1979	98,600	44,600	143,200
1980	93,200	43,100	136,300
1981	74,800	39,400	114,200
1982	65,700	32,600	98,300
1983	64,100	34,400	98,500
1984	64,500	35,800	100,300
1985	47,000	35,500	82,500
1986	49,359	37,991	87,350
1987	53,112	40,220	93,332
1988	55,713	40,378	96,091
1989	37,352	60,504	97,856
1990	58,362	38,117	96,479
1991	44,386	36,764	81,150
1992	45,174	37,306	82,480
1993	43,223	32,348	75,571
1994	36,390	27,370	63,760
1995	43,416	32,752	76,168
1996	43,211	34,521	77,732
1997	37,066	34,113	71,179
1998	42,140	41,539	83,679
1999	40,288	39,970	80,258
2000	38,167	35,266	73,433
2001	42,817	33,579	76,396
2002	40,186	33,275	73,461
2003	35,564	31,228	66,792
2004	33,912	28,577	62,489
2005	30,983	28,435	59,418
2006	36,909	28,536	65,445
2007	39,294	29,257	68,551
2008	40,678	29,988	70,666

Year	Local Movements	Itinerant Movements	Total Movements
2009	36,762	29,967	66,729
2010	31,058	31,228	62,286
2011	26,397	31,043	57,440
2012	26,102	34,049	60,151
2013	21,092	31,155	52,247
2014	21,884	29,874	51,758
Total	**1,998,597**	**1,465,950**	**3,464,547**

The 2005-2014 yearly average for:

- Local movements is 31,116
- Itinerant Movements is 30,353
- Total movements is 61,469

Jade Acoustics Inc. | Consulting Engineers | 411 Confederation Parkway, Unit 19, Concord, Ontario L4K 0A8 | Tel: (905) 660-2444 | Fax: (905) 660-4110

March 11, 2014

Appendix 2: Berm Analysis

Corporation of the City of Oshawa
Oshawa Municipal Airport
c/o Total Aviation and Airport Solution
1200 Airport Boulevard, Suite 200
Oshawa, Ontario
L1J 8P5

Attention: Mr. Stephen Wilcox

VIA E-MAIL
swilcox@oshawa.ca

Gentlemen:

Re: Berm Analysis
Oshawa Municipal Airport
1200 Airport Boulevard
City of Oshawa
Our File: 12-044-01

Jade Acoustics Inc. was retained to investigate the change in sound level associated with the construction of a berm up to 10 m tall along the south property line to mitigate noise caused by planes on Runway 30. The existing 9 m tall hill south of Gemini Gymnastics has been included in the analysis. See Figures 1 and 2 for details.

Two scenarios were analyzed, the first includes only planes taxiing, and the second includes taxiing and acceleration along the runway until takeoff. The analyzed receptors are along Jane Avenue between Glen Forest Street and Westdale Street. See Table 1 for the predicted attenuation and Figures 3 and 4 for the location of the berm.

TABLE 1

	Proposed Mitigation (dB)
Scenario 1	
First Storey	Up to 9
Second Storey	Up to 7
Scenario 2	
First Storey	Up to 3
Second Storey	Up to 3

* 1.5 m and 4.5 m high receptors were assumed for first and second storey receptors respectively.

The predicted change of up to 9 dB in sound levels in Scenario 1 is considered substantial. The predicted change in sound levels in Scenario 2 of 3 dB is considered noticeable, but not significant change.

Therefore construction of the proposed berm is predicted to noticeably reduce the sound levels particularly due to the taxiing aircraft, in the community south of the Runway 30 threshold.

When the acoustical mitigation provided by the proposed berm is combined with the increased sound level (approximately 3 dB at receptors located to the south) due to the reclassification of the Runway 12/30 stopway, sound levels due to aircraft movement on the ground in the community to the south are predicted to be unchanged at worst. In many scenarios, accounting for the proposed berm, the sound levels are predicted to be lower than the current sound levels.

If there are any questions, please call.

Yours truly,

JADE ACOUSTICS INC.

Per: _____
Jamie Paterson, P.Eng.

Per: _____
Dalila C. Giusti, P.Eng.

Att.

JP/CK/DCG/sh
L:\Letters\2012\12-044-01 Mar 11-14 Airport Berm.doc

Jade Acoustics Inc.
Consulting Engineers
411 Confederation Parkway
Concord, Ontario L4K 0A8
Tel: 905-660-2444
Fax: 905-660-4110

FIGURE 1
Plan Showing Existing Hill
Oshawa Municipal Airport
City of Oshawa

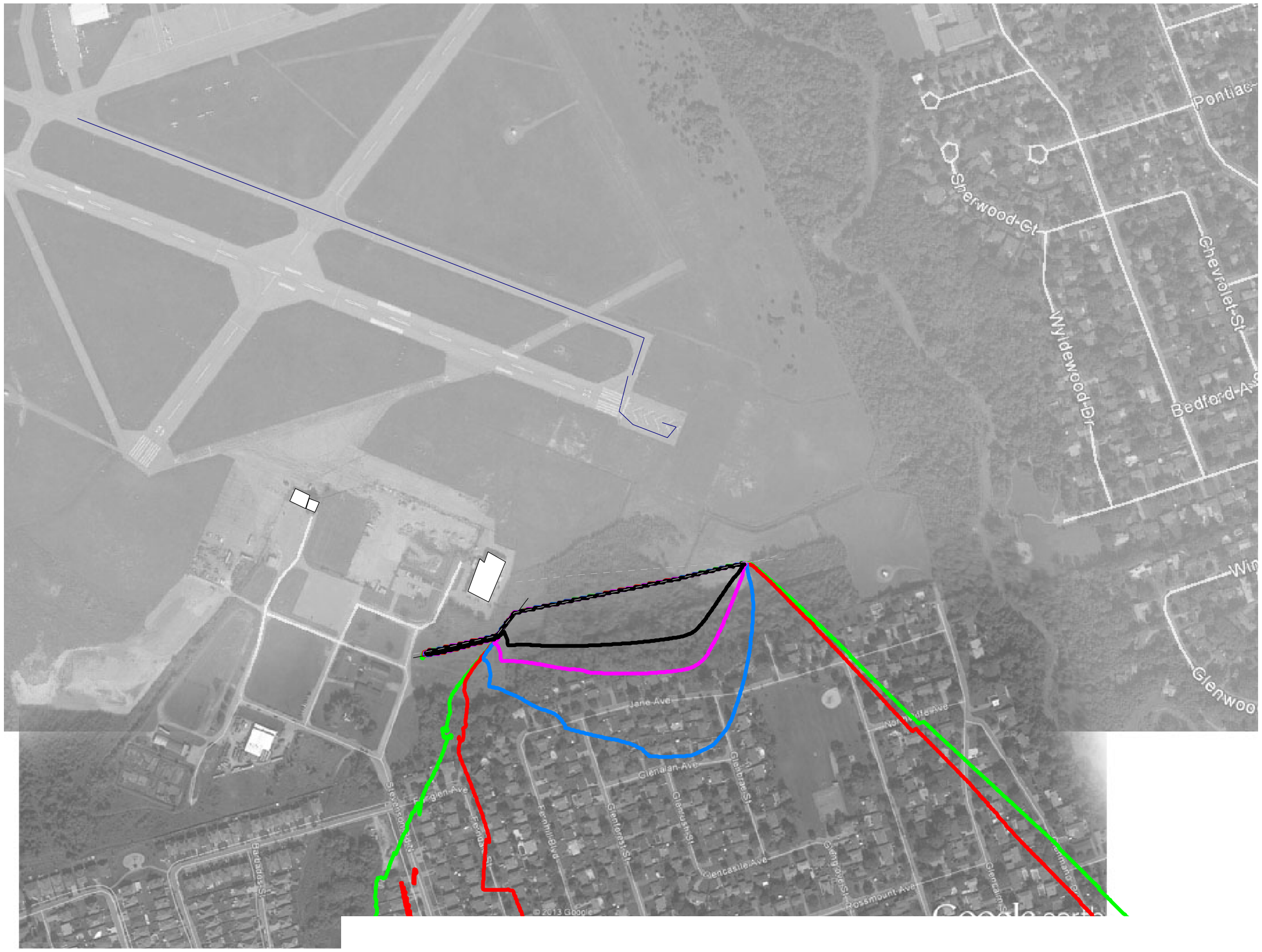
Date: March 2014 **Our File: 12-044-01**

Jade Acoustics Inc.
Consulting Engineers
411 Confederation Parkway
Concord, Ontario L4K 0A8
Tel: 905-660-2444
Fax: 905-660-4110

JADE ACOUSTICS

FIGURE 2
Plan Showing Proposed Berm
Oshawa Municipal Airport
City of Oshawa

Date: March 2014 **Our File: 12-044-01**



Predicted Change (dB)
Grid height: 4.5 m above ground

- 2 dB
- 3 dB
- 5 dB
- 7 dB
- 9 dB
- 10 dB

N

Not to Scale

Jade Acoustics Inc.
Consulting Engineers
411 Confederation Parkway
Unit 19
Concord, Ontario L4K 0A8
Tel: 905-660-2444
Fax: 905-660-4110

Date: March 2014

Jade File Number: 12-044-01

Predicted Change in Sound Level Due to
Construction of Berm
Scenario 1 - Taxiing

FIGURE 3

Predicted Change (dB)
Grid height: 4.5 m above ground

green	2 dB
red	3 dB
blue	5 dB
magenta	7 dB
black	9 dB
orange	10 dB

N

Not to Scale

JADE ACOUSTICS

Jade Acoustics Inc.
Consulting Engineers
411 Confederation Parkway
Unit 19
Concord, Ontario L4K 0A8
Tel: 905-660-2444
Fax: 905-660-4110

Date: March 2014

Jade File Number: 12-044-01

Predicted Change in Sound Level Due to
Construction of Berm
Scenario 2 - Taxiing and Acceleration to Takeoff

FIGURE 4

Jade Acoustics Inc. Consulting Engineers 411 Confederation Parkway Unit 19 Concord, Ontario L4K 0A8 Tel: (905) 660-2444 Fax: (905) 660-4110

Appendix 3: Sound Measurements

March 5, 2014

Total Aviation and Airport Solution
1200 Airport Boulevard, Suite 200
Oshawa, Ontario
L1J 8P5

Attention: Mr. Stephen Wilcox

VIA E-MAIL
swilcox@oshawa.ca

Gentlemen:

Re: Sound Measurements
Oshawa Municipal Airport
1200 Airport Boulevard
City of Oshawa
Our File: 12-044-01

Runway 12/30 at the Oshawa Municipal Airport (OMA) is 4000 feet long and includes an additional 250 foot long stopway at the threshold of Runway 30 located at the southeast end of the runway. The stopway is currently used by aircraft departing to the southeast from the threshold of Runway 12 located at the northwest end of the runway. Jade Acoustics Inc. was retained to investigate the change in sound level associated with the reclassification of the stopway such that it may also be used by aircraft departing from and arriving to the threshold of Runway 30 when the extra length is required due to load, weather and runway conditions.

Due to the landings using limited engine power and variability in the touch down location, minimal change in acoustical impact is predicted at the nearby receptors due to landing aircraft using the stopway.

Based on information provided by the OMA, it is anticipated that only jet and turbo prop aircraft needing the additional length when departing from the threshold of Runway 30 are expected to use the stopway. As such, the majority of takeoffs would start from the current location where Taxiway B intersects with the threshold of Runway 30. Based on the projected total movements, less than 2% of all movements would use the stopway.

Measurements were conducted on January 14, 2014 at four locations on and around the OMA. See Figure 1 and Table A for details of measurement locations. Three takeoffs were measured using the current starting location (Scenario 1) as well as four takeoffs starting from the east end of the stopway (Scenario 2).

Larson Davis sound level meters (Types 820, LxT and 831) which were calibrated before and after the measurements using a Larson Davis CAL200 calibrator were used. The temperature was 2°C and the wind was from the northwest at approximately 15 km/h, these conditions are considered acceptable for the measurements.

JADE ACOUSTICS

TABLE A

Measurement Locations

	Locations	Distance to Intersection of Runway 30 and Taxiway B
1	Airport land near antenna array	340 m
2	North end of Glenbrook Street	330 m
3	Park at west end of Switzer Drive	600 m
4	West end of Northlawn Avenue	710 m

To minimize potential errors, the same pilot and plane were used for all trials. The plane was a Dassault Falcon 10 and the pilot has extensive experience. The OMA indicated that this type of plane is typical of those that would use the stopway when a longer range flight is required.

The first takeoff measured for Scenario 2 was noticeably different than the others with no apparent explanation and was therefore excluded from the data. Data from Location 4 was substantially impacted by frequent car passbys and was also excluded.

The two parameters evaluated were the maximum sound level (L_{max}) and the equivalent continuous sound level (L_{eq}). As it is an average, Leq is commonly used for assessment of noise sources and their impact on sensitive receptors. Lmax is commonly used to address disturbance caused by individual events. Measurements were conducted from the time the airplane entered the runway from Taxiway B until it was inaudible. The average length of time measured was 79 seconds for Scenario 1 and 94 seconds for Scenario 2. See Table B for a summary of measurement results as well as the difference between the two scenarios. Appendix A includes the measured sound levels for each trial.

TABLE B

Summary of Sound Measurements

	Location 1		Location 2		Location 3	
	L_{max} (dBA)	L_{eq} (dBA)	L_{max} (dBA)	L_{eq} (dBA)	L_{max} (dBA)	L_{eq} (dBA)
Scenario 1	64.4	55.4	68.4	60.9	61.7	54.5
Scenario 2	65.4	57.2	71.9	62.5	65.9	55.6
Difference (Scenario 2-Scenario 1)	1.0	1.8	3.5	1.6	4.2	1.1

JADE ACOUSTICS

The measured change in sound levels using the 250 foot stopway is 1.0 to 4.2 dB. This is a noticeable but not significant change.

If there are any questions, please call.

Yours truly,

JADE ACOUSTICS INC.

Per: _____
Jamie Paterson, P.Eng.

LICENSED PROFESSIONAL ENGINEER
Mar 5/14
J. M. PATERSON
100099333
PROVINCE OF ONTARIO

Per: _____
Dalila C. Giusti, P.Eng.

LICENSED PROFESSIONAL ENGINEER
Mar 5/14
D.C. GIUSTI
16267304
PROVINCE OF ONTARIO

Att.

JP/CK/DCG/sh
J:\Letters\2012\12-044-01 Mar 5-14 1200 Airport Blvd SW Edits.doc

JADE

Jade Acoustics Inc.
Consulting Engineers
411 Confederation Parkway
Concord, Ontario L4K 0A8
Tel: 905-660-2444
Fax: 905-660-4110

FIGURE 1
Plan Showing Measurement Locations
Oshawa Municipal Airport
City of Oshawa

Date: March 2014 **Our File: 12-044-01**

APPENDIX A

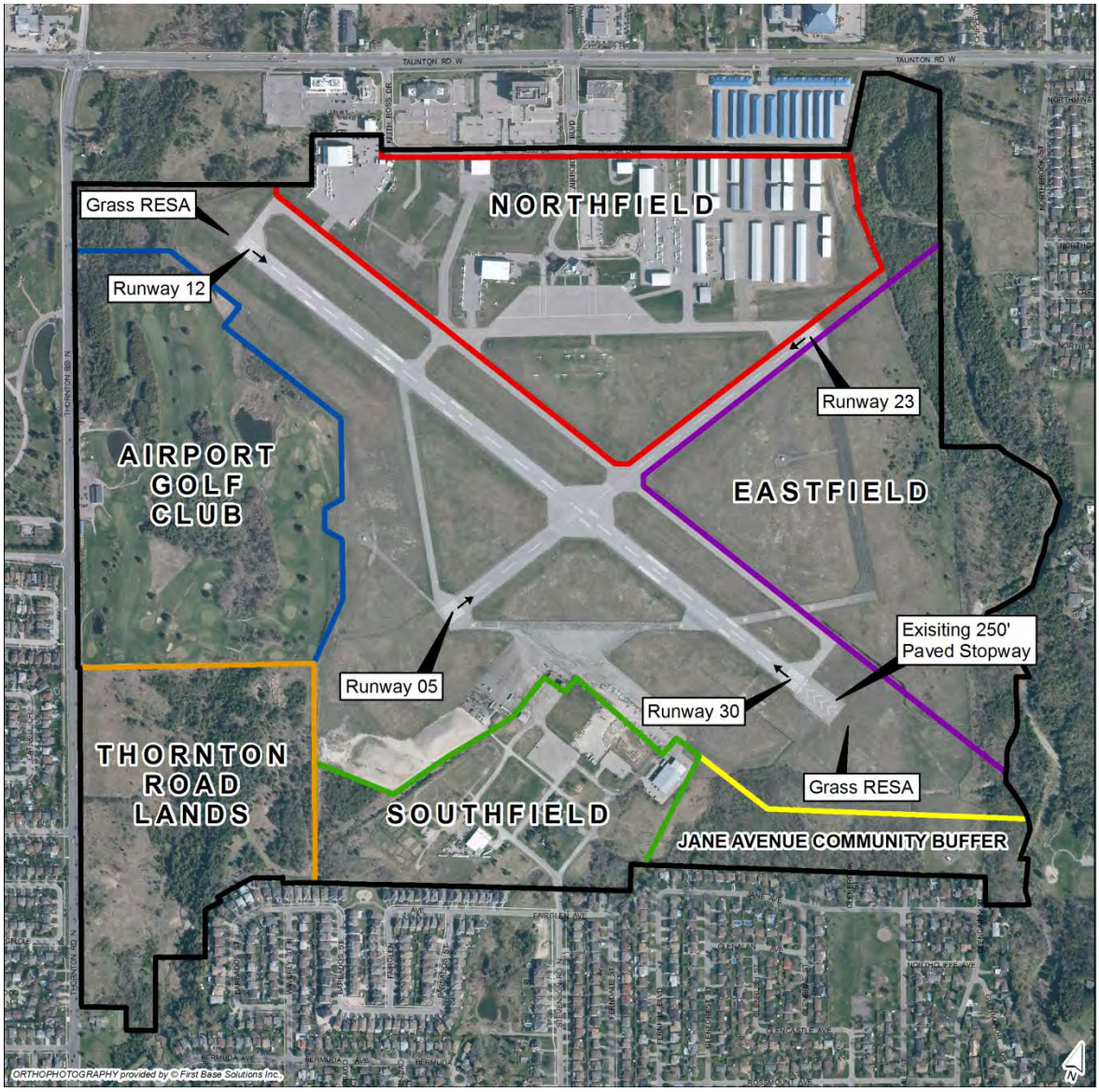
MEASUREMENT RESULTS

TABLE A-1

Summary of Sound Measurement Results

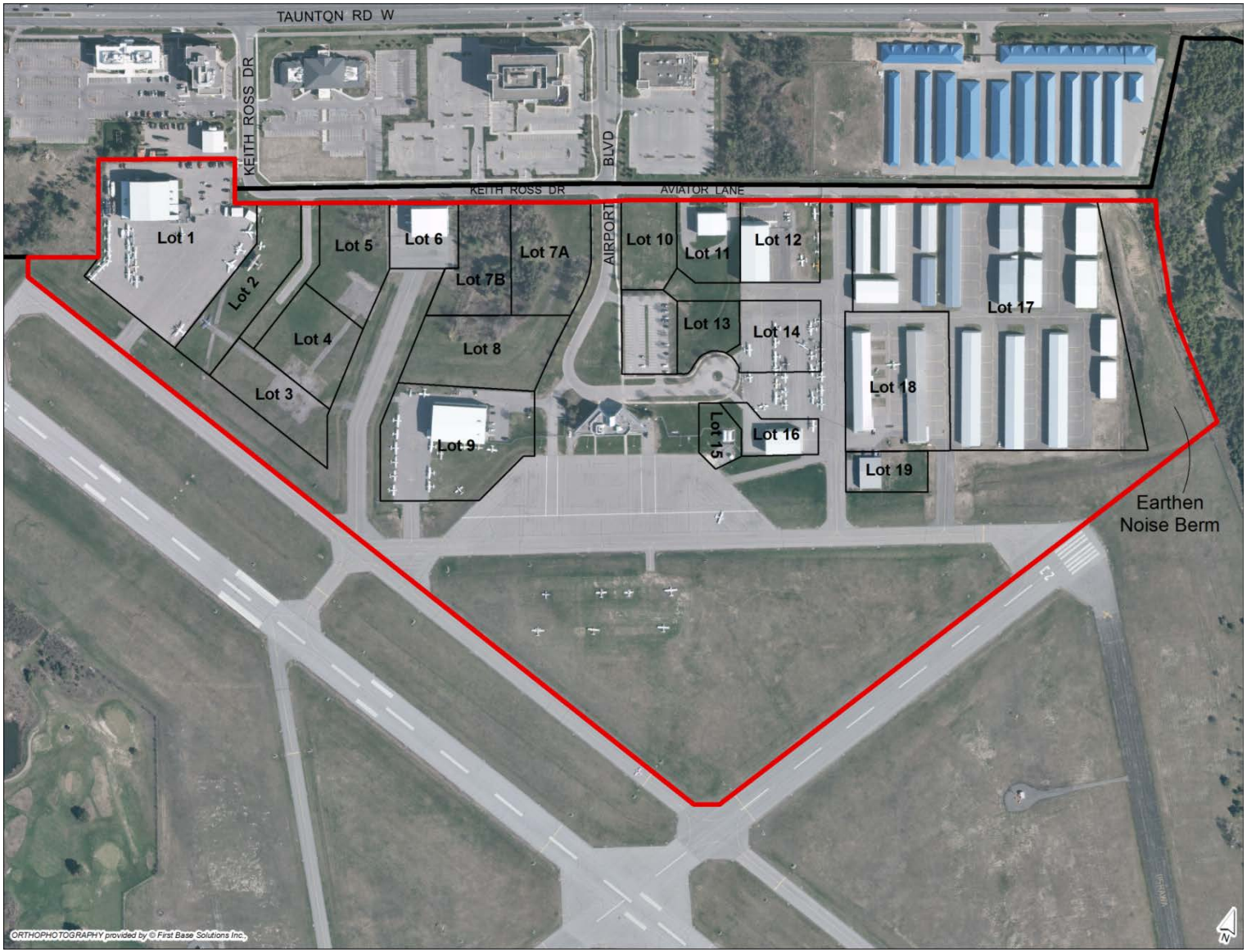
	Duration (s)	Sound Levels (dBA)					
		Location 1		Location 2		Location 3	
		L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}
Scenario 1							
Takeoff 1	79	67.0	57.3	71.1	62.6	61.1	57.5
Takeoff 2	75	62.5	55.7	67.8	60.0	63.6	54.6
Takeoff 3	82	63.7	53.2	66.4	60.1	60.4	51.4
Average	***79***	***64.4***	***55.4***	***68.4***	***60.9***	***61.7***	***54.5***
Scenario 2							
Takeoff 2	99	65.8	56.1	71.9	63.4	66.8	55.2
Takeoff 3	90	63.0	57.1	72.4	62.9	64.0	55.1
Takeoff 4	94	67.5	58.5	71.4	61.1	66.8	56.7
Average	***94***	***65.4***	***57.2***	***71.9***	***62.5***	***65.9***	***55.6***

Appendix 4: Large Overall Map of Airport Holdings

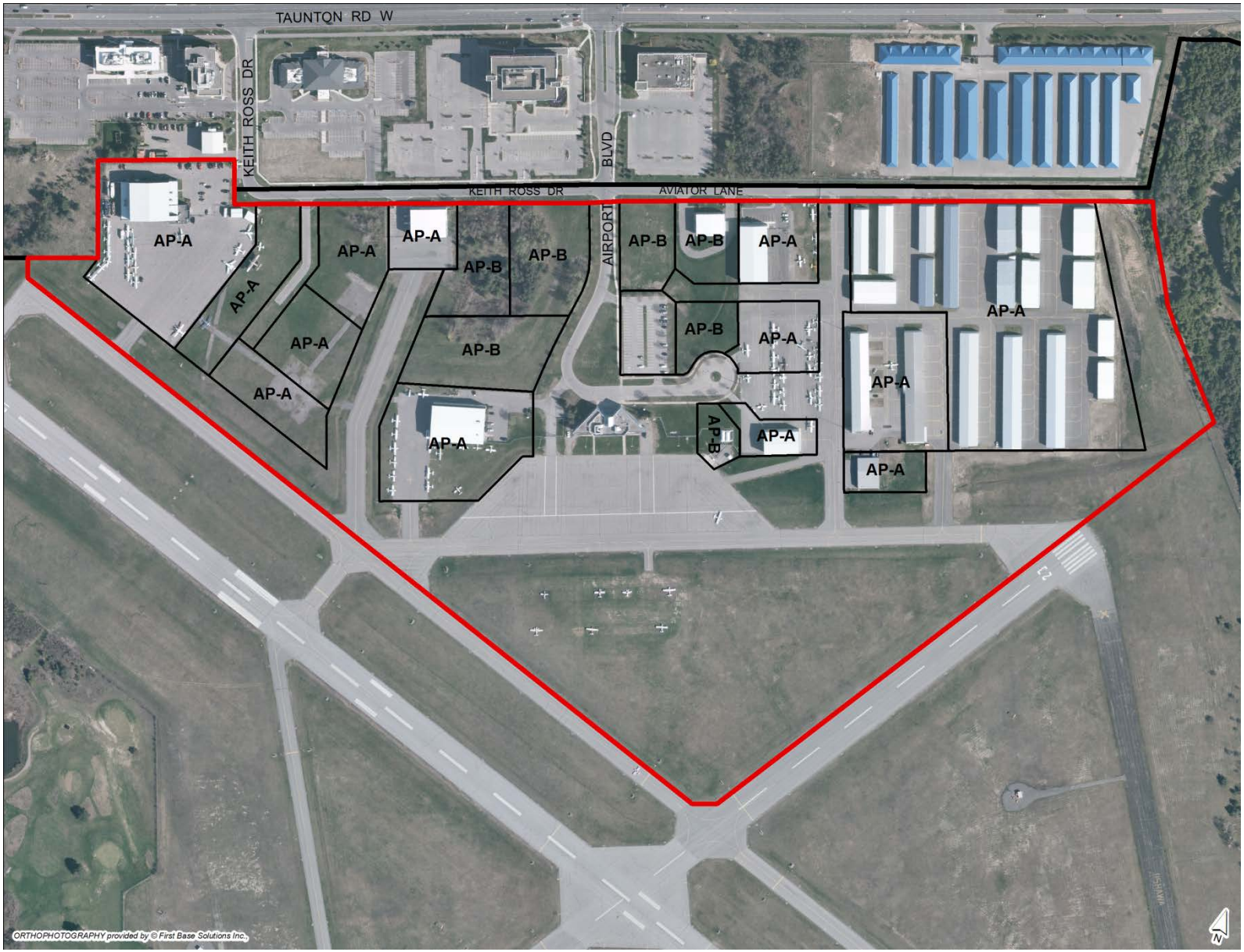


Location	Area
Total	196 ha (484 ac)
Northfield	33 ha (82 ac)
Eastfield	28 ha (69 ac)
Southfield	15 ha (37 ac)
Thornton Road Lands	19 ha (47 ac)
Airport Golf Club	27 ha (67 ac)
Managed Grass Areas	85 ha (211 ac)
Runways, Taxiways, Arrows	18 ha (45 ac)

Appendix 5: Large Map of Preferred North Field Lotting Pattern



Appendix 6: North Field – Zoning Areas



Appendix 7: Permitted Uses for the zones on the North Field

The following uses are permitted in any AP-A Zone:

(a) Airport
(b) Aviation related commercial uses
(c) Aviation related institutional uses
(d) Aviation related manufacturing, processing, or assembly industry
(e) Aviation related transport terminal
(f) Aviation related warehouse
(g) Club, excluding a nightclub
(h) Outdoor storage accessory to any use permitted in the AP-A Zone
(i) Recreational use

The following uses are permitted in any AP-B Zone:

(a) Agricultural uses, but not including new buildings
(b) Airport terminal
(c) Aviation related commercial uses
(d) Aviation related institutional uses including a museum
(e) Aviation related light industrial uses including light manufacturing, processing of semi-manufactured goods or assembly of manufactured goods
(f) Aviation related transport terminal
(g) Aviation related warehouse
(h) Banquet hall
(i) Club, excluding a nightclub
(j) Convention centre
(k) Hotel
(l) Office
(m) Outdoor storage accessory to any use permitted in the AP-B Zone
(n) Recreational use
(o) Restaurant
(p) Sales outlet

The following uses are permitted in any AP-C Zone:

(a) Airport runways and taxiways

The following uses are permitted in any AP-D Zone:

(a) Agricultural uses, but not including new buildings
(b) Museum
(c) Recreational use

March 10, 2014

BY EMAIL & COURIER

Mr. Stephen Wiclox
Total Aviation & Airport Solutions
1200 Airport Blvd.
Suite 200
Oshawa, ON L1J 8P5

Tel: 905-576-8146
Fax: 905-723-6937
Email: swilcox@oshawa.ca

Subject: **Oshawa Municipal Airport**
20 Year Capital Plan
O/Ref.: 131-16880-00

Dear Mr. Wilcox,

We are pleased to submit our 20 Year Capital Plan for the Oshawa Municipal Airport.

If you have any questions or require any additional information, please do not hesitate to contact the undersigned.

Yours truly,

Chris Timmerman, CET
Project Design Manager, Aviation

Encl.
C:\Users\christopher.timmerma\Desktop\Projects\CYOO\131-16880-00 CYOO 20 YR Cap Plan 031014.doc

WSP Canada Inc.
311 Goderich Street
P.O. Box 1600
Port Elgin, Ontario, Canada
N0H 2C0
Tel: 519-389-4343 x 233
Fax: 519-389-4728
www.wspgroup.com

REPORT N^{O} 131-16880-00

OSHAWA MUNICIPAL AIRPORT

20 YEAR CAPITAL PLAN

MARCH 2014

WSP

TABLE OF CONTENTS

LIST OF TABLES

1. INTRODUCTION

1.1 GENERAL

As part of the operating and capital budgeting on an annual basis for the Oshawa Municipal Airport, WSP Canada Inc. (Formerly GENIVAR Inc.) was retained by the City of Oshawa to update the Capital Plan for the Oshawa Municipal Airport. The previous Capital Plan for the Oshawa Municipal Airport was completed by GENIVAR Inc. in 2007.

It is the purpose of this 20 Year Capital Plan to produce a document with sufficient information, analysis, conclusion and recommendations to confirm the required annual upgrades and/or deficiency rectifications for the twenty (20) year period from 2014 to 2033. Included as part of the Capital Plan are condition assessments of airfield facilities, preliminary cost estimates anticipated rehabilitation dates for the required improvements.

Particular emphasis has been placed on the capital improvements that would be required over the next ten (10) years. Long-range planning estimates have also been provided for the latter part of the planning period to provide information to the Airport on the long-term capital requirements at the airport.

2. AIRPORT INFRASTRUCTURE ASSESSMENT

2.1 SCOPE

The scope of the 20 Year Capital Plan includes the airside pavements and electrical systems at the Oshawa Municipal Airport. Not included in the scope are:

- Airport buildings,
- Security Fencing,
- Airfield Infield Drainage, or
- Groundside Infrastructure.

The buildings at the Airport are either relatively new and in good condition or are privately owned. Maintenance of buildings owned by the Airport will be funded through the annual maintenance budget. Maintenance of privately owned buildings will be funded by the owners.

Security fencing and airfield infield drainage are reported to be in good condition, and maintenance of these items will be funded through the annual maintenance budget.

The groundside infrastructure located on the Airport's North Field is relatively new and is reported to be in good condition. The groundside infrastructure is owned, operated and maintained by the City of Oshawa, and is therefore not included in the 20 Year Capital Plan.

While the groundside infrastructure located on the Airport's South Field is much older than the North Field groundside infrastructure, it has not been included in the scope of this assessment.

2.2 GENERAL

In completing the assessment of the infrastructure, WSP. reviewed background information that was available from the Oshawa Municipal Airport. Key resource data (maps, studies, engineering drawings, etc.) are listed in the references at the end of this report.

In addition to reviewing background information, a site inspection was undertaken to visually inspect the airport facilities. The site inspection undertaken to update the 20 Year Capital Plan was undertaken on 12 April 2013.

There was no testing or in-depth analysis completed of the infrastructure to further substantiate the condition rating of the infrastructure over and above what is available in existing reports and that observed during site inspections.

The infrastructure assessment will include the following:

- background/history
- description
- condition
- listing of existing deficiencies
- estimation of life expectancy prior to rehabilitation/reconstruction
- suitability for planning period (i.e., to 2008-2032)
- discussion regarding rectification of any deficiencies
- cost estimates to correct deficiencies

The following is a brief description of each component of the airport infrastructure, its existing condition, suggested date for rehabilitation/reconstruction and the estimated rehabilitation/reconstruction costs.

Refer to Figure 1 for a Site Plan of the Oshawa Municipal Airport.

2.3 RUNWAYS

2.3.1 General

Refer to Table 2-1 for a summary of the runways at the Oshawa Municipal Airport.

2.3.2 Runway 12-30

Runway 12-30 is the primary runway at the Oshawa Municipal Airport, and was originally constructed as a 3000ft runway in the early 1940's. Runway 12-30 was extended to 4000ft in 1994.

At the present time the runway is 4000ft (1219 m) long by 100ft (30 m) wide, and is classified as a Code 2 Instrument, Non-Precision Approach Runway, as defined by TP312.

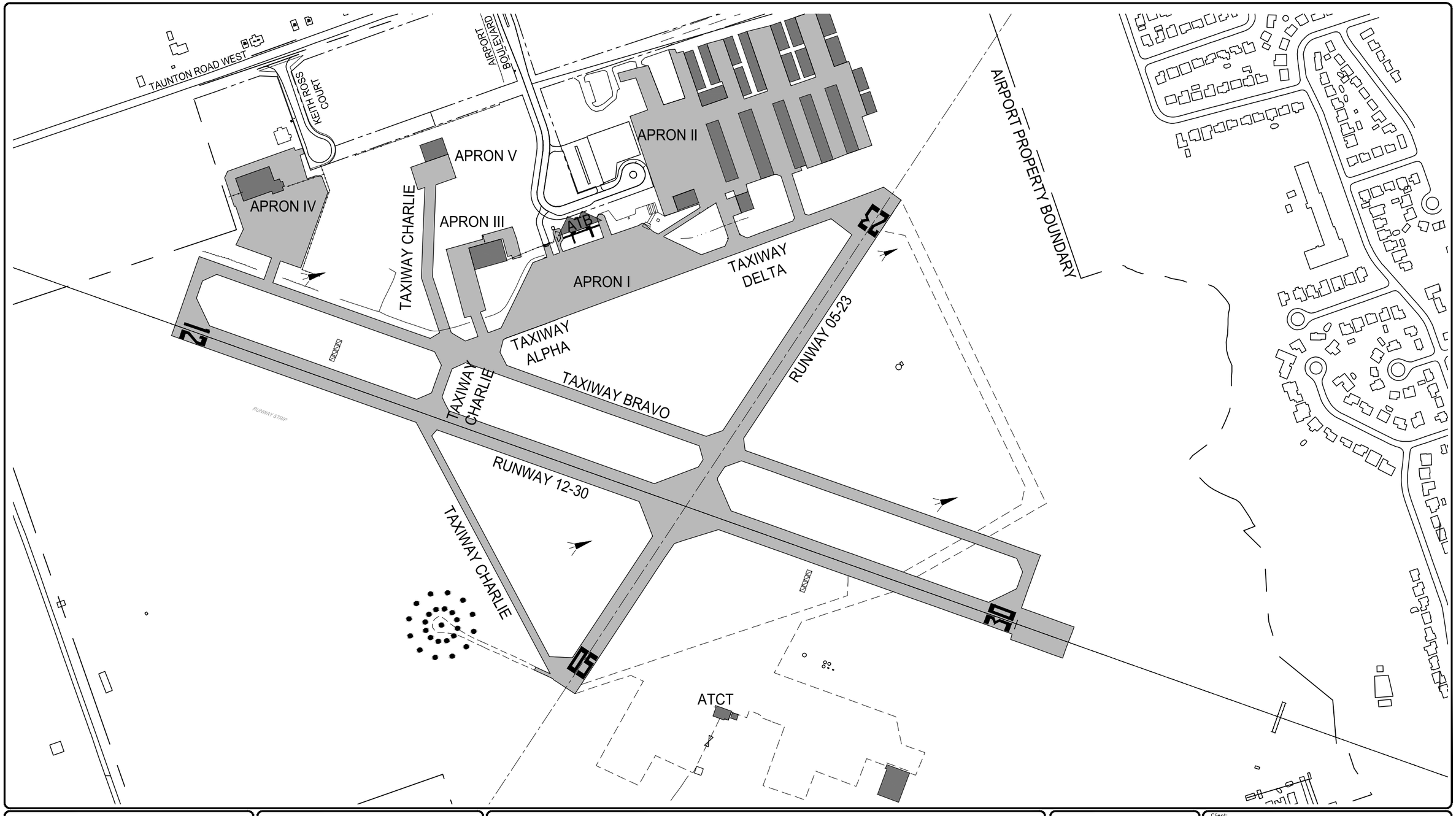
The original runway section from Taxiway Charlie to the 30 Threshold is currently in fair condition as it was rehabilitated in 2006 by localized crack and frost heave repair as well as partial depth milling and asphalt overlay. The main deficiencies noted were transverse and longitudinal cracking of low extent and medium severity. Based on the pavement age and deficiencies observed, the Runway 12-30 pavements from Taxi C to Threshold 30 have been assigned a Condition Rating of 6.

The runway extension from the 12 Threshold to Taxiway Charlie is currently in poor to fair condition. There have been no rehabilitations of this section of the runway since original construction in 1994. The main deficiencies noted were longitudinal cracking of major extent, medium severity, and block cracking of minor extent, medium severity. Based on the pavement age and deficiencies observed, the Runway 12-30 pavements from Threshold 12 to Taxi C have been assigned a Condition Rating of 5.

Due to the current condition of Runway 12-30, it is anticipated that an overall rehabilitation will be necessary by 2016 which represents a reasonable 10 year life cycle for the rehabilitation method used in 2006 and a 22 year lifecycle for the original pavements constructed in 1994.

The anticipated rehabilitation method will include full depth pulverization of the existing asphalt and underlying granular, new granular base leveling course and new asphalt pavement. This rehabilitation is also proposed to include the Runway 12 Stopway. The estimated lifespan of this rehabilitation is 20 years.

The estimated cost of this project is **$2,130,000**.



WSP

Scale 1 5000

25 0 12.5 25 50 75 125 200 METRES

100 50 0 125 250 500 FEET

1. THIS DRAWING IS FOR PLANNING PURPOSES ONLY

LEGEND

- AIRFIELD PAVEMENTS
- BUILDING
- WINDCONE
- NDB

No.	DATE	DESCRIPTION	BY	APPD
0	FEB 28/14	CAPITAL PLAN UPDATE	CT	BGS

REVISION / ISSUE

Client: OSHAWA MUNICIPAL AIRPORT

Project: CAPITAL PLAN UPDATE

Title: SITE PLAN

Project No. 131-16880-00 | Contract No. TBD

DRAWING No. SP1

ANSI (expand) B (11.00 x 17.00 Inches)
P:\CYOO\131-16880-00\Drawings\Capital Plan Update\CAD\CYOO-SP1 11x17.dwg
2014 January 03, 9:05 AM

2.3.3 Runway 05-23

The secondary runway at the Oshawa Municipal Airport was also originally constructed in the 1940's and is 2670 ft (814 m) in length and 100 ft (30 m) in width and is classified as a Code 2 Instrument, Non-Precision Approach Runway, as defined by TP312.

The most recent rehabilitation of Runway 05-23 was in 2009, and consisted of full depth pulverization, 100mm new Granular 'A' and 80mm new HMAC.

Runway 05-23 is currently in excellent condition. No pavement deficiencies were noted at the time of the condition survey. Based on the pavement age and deficiencies observed, the Runway 05-23 pavements have been assigned a Condition Rating of 9.

Based on the current condition of Runway 05-23, it is anticipated that rehabilitation will be required in 2034. The anticipated rehabilitation method will include milling the existing pavements to a depth of 50mm, major crack repairs and 50mm new HMAC. The estimated lifespan of this rehabilitation is 10 years. Further pavement rehabilitations are beyond the planning period for this report.

The estimated cost of the 2034 rehabilitation project is **$811,000**.

Table 2-1 Runway Description

RWY	Length (ft)	Width (ft)	Condition Rating	Most Recent Construction	Recommended Rehabilitation		Estimated Cost
					Year	Method	
12-30	4000	100			2016	Full Depth Pulverization	$2,130,000
TH12-TC	1000		5	1994		New Granular Base	
TC-TH30	3000		6	2006		100mm New HMAC	
05-23	2670	100	9	2009	2034	Mill 50mm & 50mm New HMAC	$811,000

Notes:

1. Condition Rating as observed April 2013
2. Estimated costs are preliminary. Preliminary Design should be completed prior to any request for funding to ensure accuracy of estimated costs.
3. All estimated costs are based on 2014 dollars.
4. All estimated costs are total costs including engineering and contingencies but excluding applicable taxes.
5. Estimated costs are for civil works only, and do not include airfield lighting works

2.4 TAXIWAYS

2.4.1 General

Refer to Table 2-2 for a summary of the taxiways at the Oshawa Municipal Airport.

2.4.2 Taxiway Alpha

Taxiway Alpha extends from the west side of the Main Apron to Taxiway Bravo.

The taxiway was originally constructed in 1994, and has had no rehabilitation since original construction.

Taxiway Alpha is currently in poor to fair condition. The main defects noted include transverse and longitudinal cracking of major extent, medium severity, and raveling to major extent, medium severity. Based on the pavement age and deficiencies observed, the Taxiway Alpha pavements have been assigned a Condition Rating of 5.

Due to the current condition of Taxiway Alpha, it is recommended that rehabilitation take place in 2015, consisting of full depth pulverization of the existing asphalt and underlying granulars, new granular base leveling course and new asphalt pavement. The estimated lifespan of this rehabilitation is 20 years.

The estimated cost of the 2015 rehabilitation project is **$61,000**.

2.4.3 Taxiway Bravo

Taxiway Bravo runs parallel to Runway 12-30, for the entire length of the runway.

The taxiway was originally constructed in 1994, and has had no rehabilitation since original construction.

Taxiway Bravo is currently in fair condition. The main defects noted include transverse and longitudinal cracking of moderate extent, medium severity, raveling to major extent, medium severity, as well as moderate severity rutting at the hold lines at Threshold 12 and Threshold 30. Based on the pavement age and deficiencies observed, the Taxiway Bravo pavements have been assigned a Condition Rating of 5.

Due to the current condition of Taxiway Bravo, it is recommended that rehabilitation take place in 2016, consisting of full depth pulverization of the existing asphalt and underlying granulars, new granular base leveling course and new asphalt pavement. The estimated lifespan of this rehabilitation is 20 years.

The estimated cost of the 2016 rehabilitation project is **$1,052,000**.

2.4.1 Taxiway Charlie

Taxiway Charlie was originally constructed in 1994 as the shortest taxiway at the Oshawa Municipal Airport, providing access from the Main Apron and Taxiway Alpha to Runway 12-30, mid-way between the 12 Threshold and the intersection of Runway 12-30 and Runway 05-23. The taxiway was extended from Runway 12-30 to Threshold 05 in 2008.

Taxiway Charlie (MID) from Taxiway Bravo to Runway 12-30 is currently in fair condition. The main defects noted include longitudinal cracking of moderate extent, low severity, and raveling to major extent, low severity. Based on the pavement age and deficiencies observed, the pavements have been assigned a Condition Rating of 5.

Based on the current condition of Taxiway Charlie (MID), it is recommended that rehabilitation take place in 2017, consisting of full depth pulverization of the existing asphalt and underlying granulars, new granular base leveling course and new asphalt pavement. The estimated lifespan of this rehabilitation is 20 years. Further pavement rehabilitations are beyond the planning period for this report.

Taxiway Charlie (SOUTH) from Runway 12-30 to Threshold 05 is currently in excellent condition. No pavement deficiencies were noted at the time of the condition survey. Based on the pavement age and deficiencies observed, the pavements have been assigned a Condition Rating of 9.

Based on the current condition of Taxiway Charlie (SOUTH), it is anticipated that rehabilitation will be required in 2033. The anticipated rehabilitation method will include milling the existing pavements to a depth of 50mm, major crack repairs and 50mm new HMAC. The estimated lifespan of this rehabilitation is 10 years. Further pavement rehabilitations are beyond the planning period for this report.

Taxiway Charlie (NORTH), north of Taxiway Bravo was constructed in 2010 and is currently in excellent condition. No pavement deficiencies were noted at the time of the condition survey. Based on the pavement age and deficiencies observed, the pavements have been assigned a Condition Rating of 9.

Based on the current condition of Taxiway Charlie (NORTH), it is anticipated that rehabilitation will be required in 2035, which is beyond the planning period for this report.

The estimated cost of the 2017 rehabilitation project is **$57,000**.

The estimated cost of the 2033 rehabilitation project is **$165,000**.

2.4.1 Taxiway Delta

Taxiway Delta extends from the east side of the Main Apron to Threshold 23.

The taxiway was originally constructed in 1994, and has had no rehabilitation since original construction.

Taxiway Delta is currently in poor to fair condition. The main defects noted include transverse and longitudinal cracking of major extent, medium severity, and raveling to major extent, medium severity. Based on the pavement age and deficiencies observed, the Taxiway Delta pavements have been assigned a Condition Rating of 5

Due to the current condition of Taxiway Delta, it is recommended that rehabilitation take place in 2015, consisting of full depth pulverization of the existing asphalt and underlying granulars, new granular base leveling course and new asphalt pavement. The estimated lifespan of this rehabilitation is 20 years.

The estimated cost of the 2015 rehabilitation project is **$223,500**.

Table 2-2 Taxiway Description

TWY	Length (m)	Width (m)	Condition Rating	Most Recent Construction	Recommended Rehabilitation		Estimated Cost
					Year	Method	
Alpha	75	15	5	1994	2015	Full Depth Pulverization New Granular Base 100mm New HMAC	$61,000
Bravo	1295	15	5	1994	2016	Full Depth Pulverization New Granular Base 100mm New HMAC	$1,052,000
Charlie (MID)	70	15	6	1994	2017	Full Depth Pulverization New Granular Base 100mm New HMAC	$57,000
Charlie (SOUTH)	425	10.5	9	2008	2033	Mill 50mm & 50mm New HMAC	$165,000
Charlie (NORTH)	240	15	9	2010	2035	Mill 50mm & 50mm New HMAC	N/A
Delta	275	15	5	1994	2015	Full Depth Pulverization New Granular Base 100mm New HMAC	$223,500

Notes:

1. Condition Rating as observed April 2013
2. Estimated costs are preliminary. Preliminary Design should be completed prior to any request for funding to ensure accuracy of estimated costs.
3. All estimated costs are based on 2014 dollars.
4. All estimated costs are total costs including engineering and contingencies but excluding applicable taxes.
5. Estimated costs are for civil works only, and do not include airfield lighting works

2.5 APRONS

2.5.1 General

Refer to Table 2-3 for a summary of the aprons at the Oshawa Municipal Airport.

2.5.2 Apron I (Main ATB Apron)

The Main Apron is the primary apron used by the flight schools and itinerant air traffic at the Oshawa Municipal Airport. This apron measures approximately 19,650 m2 and was constructed in 1994.

The Main Apron is currently in poor to fair condition, with the main defects noted as longitudinal cracking of moderate extent, major severity, and raveling of major extent, low severity. Based on the pavement age and deficiencies observed, the Apron I pavements have been assigned a Condition Rating of 5.

Due the current condition of the Main Apron, it is recommended that rehabilitation take place in 2016, consisting of full depth pulverization of the existing asphalt and underlying granulars, new granular base leveling course and new asphalt pavement. The estimated lifespan of this rehabilitation is 20 years.

The estimated cost of the 2016 rehabilitation project is **$1,064,500**.

2.5.3 Apron II (Tie Down Area)

The General Aviation (G.A.) Tie-Down Area is located north of Taxiway Alpha, east of the Main Apron. The Tie-Down Area was originally constructed in 1994 and is currently in good condition.

Based on the current condition observed, it is recommended that rehabilitation take place in 2020, consisting of partial depth milling and new asphalt inlay. Due to the relatively light use of the Tie-Down Area, this rehabilitation method is expected to have a lifespan of 15 years.

The estimated cost of the 2020 rehabilitation project is **$432,000**.

2.5.4 Apron II (Hangar Area)

The Hangar Area is located to the east of the Tie-Down Area and has been under construction since 2010.

Based on the current condition observed and the type of traffic using these pavements, it is not estimated that rehabilitation of these pavements will be required within the planning period.

Table 2-3 Apron Description

Apron	Area (m^2)	Condition Rating	Most Recent Construction	Recommended Rehabilitation		Estimated Cost
				Year	Method	
Apron I	19,650	5	1994	2016	Full Depth Pulverization New Granular Base 100mm New HMAC	$953,000
Apron II T-D	11,700	7	1994	2020	Mill 50mm & 50mm New HMAC	$432,000

Notes:

1. Condition Rating as observed April 2013
2. Estimated costs are preliminary. Preliminary Design should be completed prior to any request for funding to ensure accuracy of estimated costs.
3. All estimated costs are based on 2014 dollars.
4. All estimated costs are total costs including engineering and contingencies but excluding applicable taxes.
5. Estimated costs are for civil works only, and do not include airfield lighting works

2.6 VISUAL AIDS / LIGHTING

2.6.1 General

Refer to Table 2-4 for a summary of the visual aids and lighting at the Oshawa Municipal Airport.

2.6.2 Edgelighting

2.6.2.1 Runway 12-30

Runway 12-30 is currently served with high intensity edgelighting, installed in 1994. The edgelighting is reported to be in fair condition.

The expected service life for an edgelighting system is 25 years. Based on this, it is anticipated that the Runway 12-30 edgelighting system will require replacement in 2019.

The estimated cost of the 2019 Runway 12-30 edgelighting replacement is **$470,000**.

2.6.2.2 Runway 05-23

Runway 05-23 is currently served with medium intensity edgelighting, installed in 1994. The edgelighting is reported to be in fair condition.

The expected service life for an edgelighting system is 25 years. Based on this, it is anticipated that the Runway 05-23 edgelighting system will require replacement in 2019.

The estimated cost of the 2019 Runway 05-23 edgelighting replacement is **$330,500**.

2.6.2.3 Taxiways

Taxiways Alpha, Bravo and Charlie (Taxi B to Runway 12-30) are currently served with medium intensity edgelighting, also installed in 1994. The taxiway edgelighting is reported to be in fair condition.

As with the runway edgelighting systems, the estimated life for a taxiway edgelighting system is 25 years. Based on this, it is anticipated that the taxiway edgelighting systems will require replacement in 2019.

Taxiway Charlie from Runway 12-30 to Threshold 05 and north of Taxiway Bravo was fitted with solar powered LED Edgelights in 2010, and this system has been reported to performing well to date. It is estimated that these lights will have a life expectance of 20 years, and will require replacement in 2030. Due to the performance of these solar powered LED lights, it has been assumed that future taxiway edgelighting replacements will be with solar powered LED Edgelights similar to those installed on Taxiway Charlie.

The estimated cost of the 2019 Taxiway Alpha edgelighting replacement is **$12,500**.

The estimated cost of the 2019 Taxiway Bravo edgelighting replacement is **$216,000**.

The estimated cost of the 2019 Taxiway Charlie (Taxi B to Runway 12-30) edgelighting replacement is **$11,500**.

The estimated cost of the 2030 Taxiway Charlie (Runway 12-30 to Threshold 05) edgelighting replacement is **$118,000**.

The estimated cost of the 2019 Taxiway Delta edgelighting replacement is **$46,000**.

2.6.2.4 Aprons

The Main Apron is also served with medium intensity edgelighting, installed in 1994, and is also reported to be in fair condition.

As with the runway and taxiway edgelighting systems, the estimated life for an apron edgelighting system is 25 years. Based on this, it is anticipated that the apron edgelighting system will require replacement in 2019.

The estimated cost of the 2019 Main Apron edgelighting replacement is **$15,500**.

There is currently no edgelighting on the Tie-Down Area. Installation of new edgelighting for the Tie-Down Area has not been considered within the current planning period.

2.6.3 Approach Lights

2.6.3.1 Approach Slope Indicators

Runway 12-30 is currently served with PAPIs for both approaches, which were installed in 1994 (Runway 12) and 2010 (Runway 30). Although the Runway 12 PAPI units are reported to be in good condition, it is anticipated that replacement will be required at the same time as the edgelighting replacement project in 2019. It is estimated that the Runway 30 PAPI units will require replacement in 2035.

The estimated cost of the Runway 12 PAPI and Runway 30 PAPI replacement projects are **$30,500** respectively.

Runway 05 is currently served with PAPI, which were also installed in 2010. The units are reported to be in good condition. It is recommended that the PAPI be replaced at the end of their expected lifespan in 2035.

The estimated cost of the Runway 05 PAPI replacement project is **$30,500**.

There are no Approach Slope Indicators on Runway 23. It is proposed to install PAPI for Runway 23 in 2019 at an estimated cost of **$30,500**.

2.6.3.2 Runway Identification Lights (RILS)

Runway 12-30 and Runway 05 are currently equipped with RILS, which were installed in 2010, and are reported to be in good condition.

It is recommended that the RILS be replaced at the end of their expected lifespan in 2035 at an estimated cost of **$17,500** per system. It is recommended that RILS be installed for Runway 23 in 2019 at an estimated cost of **$17,500**.

2.6.4 Illuminated Guidance Signs

In 1994 new illuminated guidance signs were installed in accordance with the standards of Transport Canada. These signs are all in good condition. Select signs were replaced and/or rehabilitated in 2010.

It is recommended that the illuminated guidance signs be replaced with the edgelighting replacement projects in 2019.

The cost for the replacement of the illuminated guidance signs has been included in the estimated cost for the edgelighting replacement projects.

2.6.5 Illuminated Wind Direction Indicators

There are four (4) IWDIs at the Oshawa Municipal Airport. Each are located in the general area of the runway thresholds.

All IWDI's are reported to be in good condition.

It is recommended that the IWDIs be replaced with the edgelighting replacement projects in 2019.

The cost for the replacement of the IWDIs has been included in the estimated cost for the edgelighting replacement projects.

2.6.6 Field Electrical Centre (FEC)

2.6.6.1 Airfield Lighting Control Panel

The Airfield Lighting Control Panel was replaced as part of the Airfield Lighting Projects in 2010, and is reported to be in good condition.

It is recommended that the Airfield Lighting Control Panel be replaced at the end of its anticipated lifespan in 2035 at an estimated cost of **$115,000**.

2.6.6.2 Regulators

The existing regulators were installed with the existing edgelighting system in 1994. It is recommended that the regulators be replaced with their respective edgelighting circuits, at an estimated cost of **$23,000** per regulator.

Table 2-4 Visual Aids / Lighting

Lighting	Facility	Lighting Type	Condition Rating	Construction Year	Rehabilitation Year	Estimated Cost
Approach	12	RIL	Excellent	2010	2035	N/A
		PAPI	Fair	1994	2019	$30,500
	30	RIL	Excellent	2010	2035	N/A
		PAPI	Excellent	2010	2035	N/A
	05	RIL	Excellent	2010	2035	N/A
		PAPI	Excellent	2010	2035	N/A

Table 2-4 Visual Aids / Lighting

Lighting	Facility	Lighting Type	Condition Rating	Construction Year	Rehabilitation Year	Estimated Cost
	23	RIL	N/A	N/A	2019	$17,500
		PAPI	N/A	N/A	2019	$30,500
Runways	12-30	Threshold / End / Edgelights	Fair	1994	2019	$427,000
	05-23	Threshold / End / Edgelights	Fair	1994	2019	$300,500
Taxiways and Aprons	Alpha	Edgelights	Fair	1994	2019	$12,500
	Bravo	Edgelights	Fair	1994	2019	$216,000
	Charlie (MID)	Edgelights	Fair	1994	2019	$11,500
	Charlie (NORTH) (SOUTH)	Solar Edgelights	Excellent	2010	2030	$118,000
	Delta	Edgelights	Fair	1994	2019	$46,000
	Apron I	Edgelights	Fair	1994	2019	$15,500
Airside Guidance		Illuminated Airside Signage	Good	1994	2019	N/A
Wind Speed & Direction		Illuminated Wind Direction Indicators	Good	1994	2019	N/A
FEC	ALCP	Lighting Control	Excellent	2010	2035	N/A
	Regulators	Lighting Control	Good	1994	2019	$138,000

Notes:

1. Estimated costs are preliminary. Preliminary Design should be completed prior to any request for funding to ensure accuracy of estimated costs.
2. All estimated costs are based on 2014 dollars.
3. All estimated costs are total costs including engineering and contingencies but excluding applicable taxes.

3. SOUTH FIELD AIRSIDE ITEMS

3.1 PROPOSED SOUTH FIELD ACCESS ROUTE

Due to the deteriorating pavements on the abandoned portion of the South Field, access to the airfield from the south gate to the airfield for maintenance purposes is becoming problematic.

It is proposed rehabilitate an 8m wide roadway from Threshold 05 to the South Gate, a total length of 200m. Based on the current condition of the South Field pavements and the anticipate low volume vehicular use of the proposed road, the anticipated rehabilitation method will include milling the existing pavements to a depth of 50mm, asphalt padding and 50mm new HMAC.

It is recommended that this rehabilitation be completed in 2016 at an estimated cost of **$57,000**.

3.2 FEC FENCING REPLACEMENT

The existing fencing around the Field Electrical Centre (FEC) is in poor condition and requires replacement. It is proposed to replace the existing fence with new security fencing, and to remove the section of fencing separating the FEC from the airside.

There would be some minor pavement works required to join the existing South Field pavements and the asphalt area surrounding the FEC.

It is recommended that this project be completed in 2015 at an estimated cost of **$16,000**.

3.3 LOC FENCING REPLACEMENT

The existing wooden fence in the area of the Localizer (LOC), east of Threshold 30, is reaching the end of its service life.

It is anticipated that NAV CANADA will be removing the LOC within 5 years. Once the LOC is removed, it is recommended that the existing wooden fence be replaced with standard chain link security fencing.

It is anticipated that this project will be required in 2018 at an estimated cost of **$65,000**

4. RUNWAY 12-30 REHABILITATION CONSIDERATIONS

4.1 CONSTRUCTION STAGING

As noted previously, it is recommended that the Runway 12-30, Taxiway Bravo and Apron I pavements be rehabilitated in 2016.

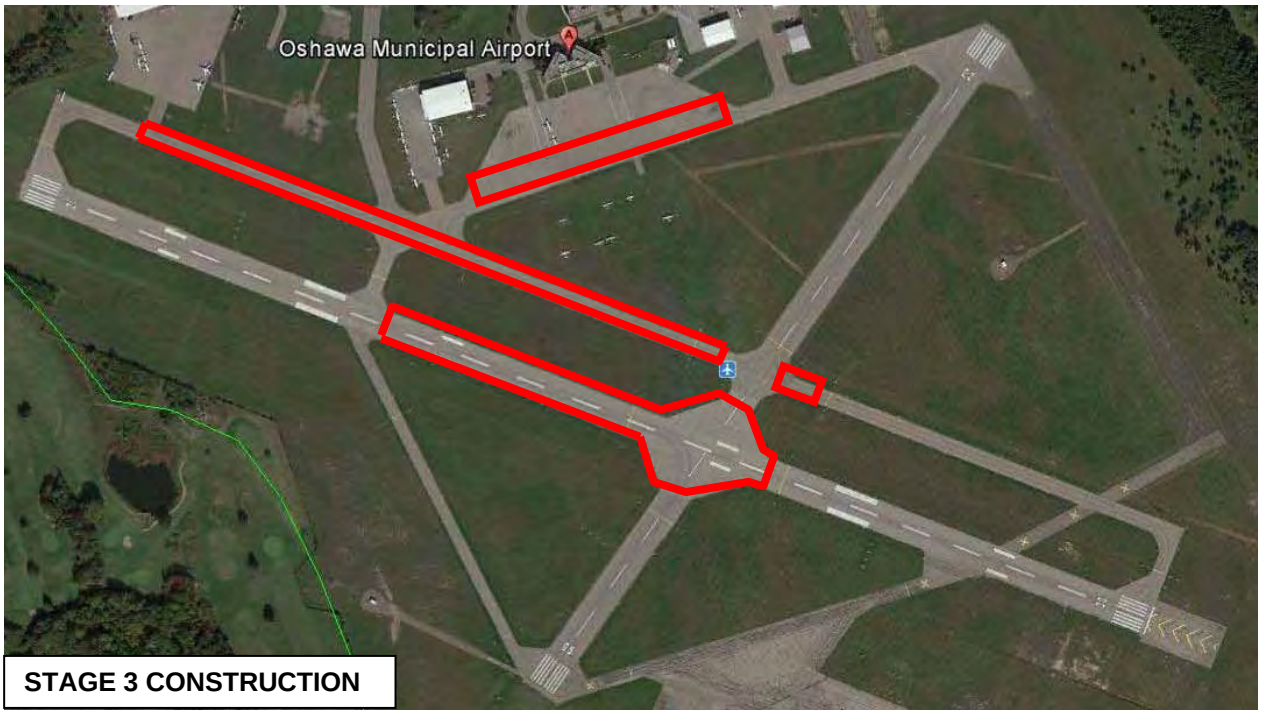
In general, there are two possible approaches to construction staging for the project:

1. Staged construction, and

2. Full runway closure

The staged construction would generally involve phasing construction to maintain Runway 12-30 and Runway 05-23 open to air traffic as much as possible.

While there would be a period of construction in the intersection of the two runways that would necessitate full closure of the airfield, this approach would ensure that at least 800m of Runway 12-30 is available to aircraft for the majority of the construction period.



Full closure would involve the full closure of the airfield to aircraft for the duration of construction, providing full access to the airfield for construction to the Contractor. This approach would likely result in a reduced construction cost and duration.

4.2 CONSTRUCTION DURATION

Based on experience with similar projects, we anticipate a 10 to 12 week construction duration for the staged construction approach described above. This estimate is based on a construction schedule of 10 hours/day, 5 days/week.

Should the airport opt for the full closure approach, we would estimate a 1 to 2 week reduction in the total construction duration due to the reduction of phasing considerations such as the installation of temporary displaced thresholds, modifications to airfield lighting, etc.

The shortest construction duration possible would result from a full airfield closure, partnered with a construction schedule of 24 hours/day, 7 days per week. We estimate that the total construction duration could be reduced to 6 to 7 weeks.

5. 20 YEAR CAPITAL PLAN

Outlined in Table 4-1 is the suggested 20 Year Capital Plan based on our review of background information, discussions with airport officials and our initial preliminary review of the airport infrastructure.

It is to be noted that the 20 Year Capital Plan cost estimates are preliminary at this stage and are to be used for budget planning.

It is also recommended that the 20 Year Capital Plan be updated on an annual basis to assist the airport in establishing budgets and identifying future projects.

Table 4-1

Oshawa Municipal Airport

Capital Plan Update

Summary of Costs of Capital Works for the Period 2014-2033

Item	Description	Estimated Capital Costs																			Total Estimated Capital Costs
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
1.0	**Runways**																					
1.1	Runway 12-30			$2,130,000																		$2,130,000
1.2	Runway 05-23																					$0
2.0	**Taxiways**																					
2.1	Taxiway Alpha		$61,000																			$61,000
2.2	Taxiway Bravo			$1,052,000																		$1,052,000
2.3	Taxiway Charlie North																					$0
2.4	Taxiway Charlie Mid				$57,000																	$57,000
2.5	Taxiway Charlie South																					$0
2.6	Taxiway Delta		$223,500																			$223,500
3.0	**Aprons**																					
3.1	Apron I			$953,000																		$953,000
3.2	Apron II Tie-Downs							$432,000														$432,000
3.3	Apron II City T- Hangar Area																					$0
4.0	**Approach Lighting**																					
4.1	Runway 12 RIL																					$0
4.2	Runway 12 PAPI						$30,500															$30,500
4.3	Runway 30 RIL																					$0
4.4	Runway 30 PAPI																					$0
4.5	Runway 05 RIL																					$0
4.6	Runway 05 PAPI																					$0
4.7	Runway 23 RIL						$17,500															$17,500
4.8	Runway 23 PAPI						$30,500															$30,500
5.0	**Runway Edgelighting**																					
5.1	Runway 12-30						$470,000															$470,000
5.2	Runway 05-23						$330,500															$330,500
6.0	**Taxiway Edgelighting**																					
6.1	Taxiway Alpha						$12,500															$12,500
6.2	Taxiway Bravo						$216,000															$216,000
6.3	Taxiway Charlie						$11,500											$118,000				$129,500
6.4	Taxiway Delta						$46,000															$46,000
7.0	**Apron Edgelighting**																					
7.1	Apron I						$15,500															$15,500
8.0	**FEC Building**																					
8.1	ALCP																					$0
8.2	Regulators						$138,000															$138,000
9.0	**Future Development**																					
9.1	Proposed South Access Route			$59,000																		$59,000
9.2	FEC Fencing Replacement		$16,000																			$16,000
9.3	LOC Area Fencing Replacement					$65,000																$65,000
9.0	**TOTAL**	$0	$300,500	$4,194,000	$57,000	$65,000	$1,318,500	$432,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$118,000	$0	$0	$0	$6,485,000

Notes:

1. Estimated costs are preliminary. Preliminary Design should be completed prior to any request for funding to ensure accuracy of estimated costs.
2. All estimated costs are based on 2014 dollars.
3. All estimated costs are total costs including engineering and contingencies but excluding applicable taxes.

6. REFERENCES

1. DeLCan, *Oshawa Airport Master Plan*, March 1987
2. The Corporation of the City of Oshawa, The Department of Planning and Development, *City of Oshawa Official Plan*, June, 1985
3. Natural Resources Canada, *Canada Flight Supplement,* 2007.
4. Natural Resources Canada, *Canada Air Pilot, Ontario*, 2007.
5. The Greer Galloway Group, *Oshawa Municipal Airport, Runway 12-30, Taxiway H, Taxiway K, Design Drawings*, May, 1994
6. Transport Canada, *Guidelines Respecting Airport Pavement Structural Condition Surveys*, January 2004.
7. Pryde Schropp McComb, Inc., *Oshawa Municipal Airport 25 Year Capital Plan 2008-2032*, October 2007.

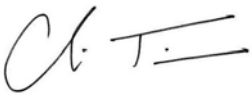
7. SUMMARY

We trust that the preceding provides sufficient information, analysis and recommendations to confirm the required annual upgrades and/or rehabilitations at the Oshawa Municipal Airport for the 20 year period from 2014 through 2033.

All questions and inquiries regarding the Preliminary Design Report should be directed to our office.

All of which is respectfully submitted,

WSP CANADA INC.



Chris Timmerman, CET
Project Design Manager, Aviation

C:\Users\christopher.timmerma\Desktop\Projects\CYOO\131-16880-00 CYOO 20 YR Cap Plan 031014.doc

Tel: 519.823.1311
Fax: 519.823.1316

RWDI AIR Inc.
650 Woodlawn Road West
Guelph, Ontario, Canada
N1K 1B8

Oshawa Municipal Airport

Oshawa, Ontario

Final Report

Air Quality Assessment

RWDI #1400980
April 10, 2015

SUBMITTED TO:

Stephen Wilcox, Airport Manager
SWilcox@oshawa.ca

Oshawa Municipal Airport
1200 Airport Blvd, Suite 200
Oshawa, ON L1J 8P5

SUBMITTED BY:

Sharon Schajnoha, P.Eng.
Senior Project Manager, Associate
Sharon.Schajnoha@rwdi.com

Mike Lepage, M.Sc., ACM, CCM
Project Director, Principal
Mike.Lepage@rwdi.com

Nancy Chan, B.A.Sc., P.Eng.
Senior Air Quality Engineer
Nancy.Chan@rwdi.com

EXECUTIVE SUMMARY

RWDI AIR Inc. was subcontracted by XCG Consultants Ltd. (XCG) to conduct an Air Quality and Health Risk Assessment of the Oshawa Municipal Airport Environmental Consulting Project for the Corporation of the City of Oshawa (CCO). The main objective of the assessment was to quantify the air quality impacts and to discuss potential impacts to human health associated with the forecasted movements of 102,000 per year.

The assessment considered the following sources of air emissions at Oshawa Municipal Airport:

- Aircraft;
- Ground Support Equipment (GSE) and Auxiliary Power Units (APU);
- Parking Facilities;
- Roadways;
- Stationary Sources (e.g. emergency generator and boiler/space heater); and,
- Training Fires.

These sources produce a variety of trace air contaminants as a result of fuel combustion. The air quality contaminants considered in this assessment were carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter with a diameter less than 2.5 microns ($PM_{2.5}$) and lead.

The corresponding emissions were estimated through computer simulation techniques that are based on extensive testing of a wide range of aircraft emissions, vehicular emissions, ground support equipment and other key sources. The primary tool used in compiling the emissions inventory was the Emissions and Dispersion Modeling System (EDMS) version 5.1.3. EDMS is a combined emissions and dispersion model for assessing air quality at civilian airports and military air bases that was developed by the Federal Aviation Administration (FAA) in cooperation with the United States Air Force (USAF).

Dispersion modelling was conducted using the United States Environmental Protection Agency (US EPA) AERMOD model to estimate the ambient ground-level concentrations over a 6 km by 6 km area, centered on the Oshawa Municipal Airport. The dispersion modelling results were combined with background ambient concentrations and compared to relevant ambient air quality thresholds.

The maximum predicted CO, NO_2 and $PM_{2.5}$ concentrations, including background, were well below their applicable thresholds. The maximum predicted 24-hour lead concentration approached its threshold along the northern property boundary. In general, if the concentration of an airborne pollutant can be maintained below its threshold, then either no health effect is observed or the effect is small enough that it presents an acceptably low risk to the population and the environment.

The modelling predictions for lead were supplemented with a literature review. The U.S. EPA undertook an ambient monitoring study of 15 airports in the U.S. where annual aircraft movements range from about 120,000 to 520,000 (Oshawa Airport is forecasting 102,000 annual movements). The maximum 3-month lead concentrations were less than the corresponding U.S. National Ambient Air Quality Standard (NAAQS), which is similar to Ontario's Ambient Air Quality Criterion at 13 of the 15 airports. The two airports where measured levels were higher than the NAAQS had significantly higher annual movements. Based on the U.S. EPA study, the modelled 24-hour results may be conservative (ie., higher than what would actually occur).

TABLE OF CONTENTS

Tables

Figures

Appendices

1. INTRODUCTION

RWDI AIR Inc. was subcontracted by XCG Consultants Ltd. (XCG) to conduct an Air Quality and Health Risk Assessment of the Oshawa Municipal Airport Environmental Consulting Project for the Corporation of the City of Oshawa (CCO).

The Oshawa Municipal Airport is an executive level regional airport situated on 182 hectares (450 acres) located within the City of Oshawa and the Region of Durham.

The City is currently updating the Airport's business plan to include current trends, which will include impacts associated with the pending closure of the Buttonville Airport. The City undertook a study in 2012 to determine the potential impacts of the Buttonville Airport closure. This study found that the Oshawa Municipal Airport could see a potential increase in the number of aircraft movements. The forecasted total annual aircraft movements are expected to be approximately 102,000 annually.

The objective of the assessment was to quantify air quality and discuss potential impacts to human health with the forecasted number of annual flights. The study incorporates baseline (background) air quality for the study area and evaluates the incremental contribution of aircraft and airport operations.

1.1 Study Area

The study area for the air quality impact assessment was selected to be a 6 km by 6 km area, centered on the Oshawa Municipal Airport. The land around the airport is mostly urban and the terrain is generally flat. A base map of the Airport is shown in Figure 1.

1.2 Emission Sources Considered

Emissions to air from aircraft, ground support equipment (GSE), auxiliary power units (APU), roadways, parking facilities, and stationary sources and training fires have been included in the development of the emission inventory.

1.3 Air Quality Contaminants of Interest

The sources under consideration produce a variety of air contaminants as a result of fuel combustion. The air quality contaminants considered in this assessment were carbon monoxide (CO), nitrogen dioxide (NO_2), and particulate matter with a diameter less than 2.5 microns ($PM_{2.5}$). These contaminants are among a group of contaminants known as criteria air contaminants and are key representatives of the contaminants emitted by the piston-engine aircraft that dominate the traffic at Oshawa Airport. In addition to these criteria contaminants, lead was also considered. Both CO and lead are of particular interest, since piston-engine aircraft use leaded fuel, do not use catalytic converters and are large emitters of both of these compounds compared to other vehicular sources.

2. AIR QUALITY CRITERIA AND GUIDELINES

Ontario Ambient air quality criteria (AAQC) and Canadian Ambient Air Quality Standards (CAAQS) are effects-based levels in air, based on health and/or other effects and represent the maximum desirable pollutant levels in ambient air. They are used in environmental assessments, special air monitoring studies and assessments of general air quality to determine the potential for adverse effects. The relevant AAQC established by the Ontario Ministry of Environment (MOE) and CAAQS established by the federal government and the Canadian Council of Ministers of the Environment are summarized in Table 2.1. These values are collectively referred to as air quality thresholds.

Table 2.1: Ambient Air Quality Thresholds

Contaminants	Averaging Period	Air Quality Thresholds ($\mu g/m^3$)
CO	1-hour	36,200
	8-hour	15,700
NO_2	1 hour	400
	24-hour	200
$PM_{2.5}$[a]	24-hour	27
Lead	24-hour	0.5

Notes: [a] New Canadian Ambient Air Quality Standards for 24-hour PM2.5 were adopted in 2013. The standard becomes 28 $\mu g/m^3$ in 2015, and drops to 27 $\mu g/m^3$ in 2020. Achievement of these standards is based on the annual 98th percentile 24-hour concentration, averaged over three consecutive years.

In general, if the concentration of an airborne pollutant can be maintained below its threshold, then either no health effect is observed or the effect is small enough that it presents an acceptably low risk to the population and the environment.

3. BACKGROUND AIR QUALITY CONDITIONS

The current background air quality in the study area can be characterized based on historical air quality monitoring data from the Ontario MOE. The MOE operates a station at 2200 Simcoe Street North in Oshawa (Station #45026), located approximately 3 km north of the Oshawa Municipal Airport. This location is sufficiently far from the airport and in a suitable setting to represent general background air quality conditions in the surrounding area; however, the station does not measure CO. For CO, therefore, the nearest stations that record it were used, which are MOE Station #31103 (Bay/Wellesley St., Toronto), located approximately 50 km southwest of the Oshawa Municipal Airport; and MOE Station #35125 (Toronto West - 125 Resources Rd, Toronto), located approximately 57 km southwest of the Oshawa Municipal Airport.

Tables 3.1 to 3.3 provide a summary of the data collected over the 5-year period from January 2007 to December 2011. The 90th percentile values are representative of elevated background conditions that may coincide with maximum predicted concentrations from project-related emissions and were selected for use as background values in the air quality assessment. For simplicity, the 90th percentile 1-hour concentrations presented in MOE annual reports were used to represent background not only for the 1-hour averaging period, but also for 8-hour and 24-hour averaging periods.

Note that Tables 3.1 through 3.3 do not include lead, which is no longer routinely monitored by the MOE. Lead is discussed further in Section 4.2.2.

Table 3.1: Background Concentrations of CO for the Different Averaging Periods (from MOE Stations #31103 [Toronto Downtown - Bay/Wellesley St] and #35125 [Toronto West - 125 Resources Rd])

	1 hour		8 hour		24 hour		Annual	
	ppm	µg/m^3	ppm	µg/m^3	ppm	µg/m^3	ppm	µg/m^3
Maximum	1.77	2,133	N/A	N/A	1.53	1,844	0.26	313
Average	0.20	245	N/A	N/A	N/A	N/A	N/A	N/A
99th Percentile	0.64	766	N/A	N/A	N/A	N/A	N/A	N/A
90th Percentile	0.34	415	N/A	N/A	N/A	N/A	N/A	N/A
50th Percentile	0.19	228	N/A	N/A	N/A	N/A	N/A	N/A

Table 3.2: Background Concentrations of NO_2 for the Different Averaging Periods (from MOE Station #45026 [Oshawa - 2200 Simcoe St N, Durham College])

	1 hour		24 hour		Annual	
	ppm	µg/m^3	ppm	µg/m^3	ppm	µg/m^3
Maximum	0.051	101	0.032	63	0.009	17
Average	0.076	15	N/A	N/A	N/A	N/A
99th Percentile	0.031	62	N/A	N/A	N/A	N/A
90th Percentile	0.016	32	N/A	N/A	N/A	N/A
50th Percentile	0.005	11	N/A	N/A	N/A	N/A

Table 3.3: Background Concentrations of $PM_{2.5}$ for the Different Averaging Periods (from MOE Station #45026 [Oshawa - 2200 Simcoe St N, Durham College])

	1 hour µg/m^3	24 hour µg/m^3	Annual µg/m^3
Maximum	53	38	6.8
Average	6	N/A	N/A
99th Percentile	28	N/A	N/A
90th Percentile	14	N/A	N/A
50th Percentile	4	N/A	N/A

4. EMISSION INVENTORY

Section 4.1 describes the methodology used to estimate emissions from the Oshawa Municipal Airport. Section 4.2 summarizes the results of the emission inventory.

4.1 Methodology

The standard approach for estimating emissions from airports is to use computer simulation techniques that are based on extensive testing of a wide range of aircraft emissions, vehicular emissions, ground support equipment and other key sources. The primary tool used in compiling the emissions inventory was the Emissions and Dispersion Modeling System (EDMS) Version 5.1.3. EDMS is a combined emissions and dispersion model for assessing air quality at civilian airports and military air bases that was

developed by the Federal Aviation Administration (FAA) in cooperation with the United States Air Force (USAF).

Note that Version 5.1.3 is not the latest version of EDMS. The latest version, 5.1.4, was reviewed and tested, and it was found that fuel consumption data for the dominant types of aircraft at the airport (e.g., Cessna 150, 172 and 182) were significantly too high compared to engine manufacturers' specifications. The model developers were contacted and they concurred with this finding. Version 5.1.3 had more realistic fuel consumption data, but had the problem that it did not include emission factors for aircraft emissions of $PM_{2.5}$. Based on these findings, the following approach was adopted. Version 5.1.3 of EDMS was used for modeling CO and NO_X. Version 5.1.4 was used to determine the approximate ratio of $PM_{2.5}$ to NO_X emissions from the aircraft. The NO_X results from Version 5.1.3 were then scaled accordingly to represent an estimate of $PM_{2.5}$.

Note that neither version of EDMS addresses lead emissions from piston aircraft. Lead was addressed by separate emission estimates, as discussed in Section 4.2.2.

The following subsections discuss the EDMS inputs and assumptions for each of the source types included in the emission inventory for the Oshawa Municipal Airport. A detailed compilation of the EDMS inputs can be found in Appendix A.

4.1.1 Aircraft

Emissions from aircraft were estimated using the EDMS model, with all itinerant movements represented as landing and takeoffs (LTOs) and all local movements represented as touch-and-go's (TGOs). For modeling purposes, EDMS separates each movement into six categories. The six categories, referred to as modes of operation, are approach, taxi in, start-up, taxi out, takeoff and climb out and are defined as follows:

Approach: The airborne segment of an aircraft's arrival extending from the start of the flight profile or the mixing height, whichever is lower, to touchdown on the runway. Emissions during this mode of operation were estimated using EDMS's performance module as described below.

Taxi-In: The landing ground roll segment (from touchdown to runway exit, including reverse thrust) of an arriving aircraft and the taxiing from runway exit to gate. Taxi times were derived using EDMS's sequencing module as described below. This mode does not apply to TGO's.

Start-up: Aircraft main engine start-up occurs at the gate. This methodology is only applied to aircraft with ICAO certified engines. Start-up emissions are not calculated for other aircraft with non-ICAO certified engines. This mode does not apply to TGO's.

Taxi Out: Taxiing from gate to runway end. Taxi times were derived using EDMS's sequencing module as described below. This mode does not apply to TGO's.

Takeoff: The portion from the start of the ground roll on the runway, through wheels off, and the airborne portion of the ascent up to cutback during which the aircraft operates at maximum thrust. Emissions during this mode of operation were estimated using EDMS's performance module as described below.

Climb Out: The portion from engine cutback to the end of the flight profile or the mixing height, whichever is lower. Emissions during this mode of operation were estimated using EDMS's performance module as described below.

One LTO comprises all of the above modes of operation, and one TGO comprises only landing, take-off and climb-out. Forecasted potential aircraft movements were provided by the Oshawa Municipal Airport, along with an indication of aircraft types used at the airport. A total of 30 different aircraft types were identified. Of these 30 aircraft types, 8 were chosen in consultation with the Oshawa Municipal Airport to represent emissions from the different engine/weight categories. Since some aircraft types used at the airport are not supported in EDMS, similar aircraft models had to be selected. Table 4.1 summarizes the aircraft types and movements entered into EDMS.

Since engine models were not provided, the EDMS default engine models were used where available; otherwise typical engine models were selected for each aircraft model.

Table 4.1: Aircraft Types and Forecasted Movements

Aircraft Model	EDMS Model	Local Movements	Itinerant Movements			
			Piston Under 2000 kg	Piston Over 2000 kg	Jets	Turboprop
Cessna 152	Cessna 150 Series	24,600	12,395	--	--	--
Cessna 172	Cessna 172	12,300	6,197	--	--	--
Cessna 182	Cessna 182	--	32,019	--	--	--
Cessna 421	Cessna 421	--	--	4,558	--	--
Piper Seminol	Piper PA-28 Cherokee	2,050	516	--	--	--
Piper Aztec	Piper PA-23 Apache/Aztec	2,050	516	--	--	--
Falcon 20[a]	Dassault Falcon 20-F	--	--	--	965	--
King Air 200[b]	Raytheon Super King Air 200	--	--	--	--	3,861
Total		**41,000**	**51,643**	**4,558**	**965**	**3,861**
Grand Total		**102,027**				

Notes: [a] Falcon 20 was selected to represent all itinerant jets as discussed in a phone conversation on February 21st, 2014.
[b] King Air 200 was selected to represent all itinerant turboprops as discussed in a phone conversation on February 21st, 2014.

For the purposes of this study, aircraft emissions during the airborne segments and approach ground roll were estimated using EDMS's performance module. The performance module dynamically models each flight by taking into account aircraft type, engine, weight, approach angle for arrivals, and elevation. The methodology used for the performance module is based on that presented in the Society of Automotive Engineers Aerospace Information Report 1845 and provides a much more precise and accurate assessment over the ICAO default times-in-mode that are available within EDMS.

The EDMS sequencing module was used to estimate taxi-in and taxi-out times. The sequencing module uses information about the layout of the airport's runways, taxiways and the apron (considered to be the gate at Oshawa Municipal Airport) to model the ground movement of aircraft. For departure flights this includes any queuing that might occur along taxiways leading to runway entrances as predicted by the WWLMINET delay model, a network queuing model developed by the Logistics Management Institute. EDMS then consolidates this information into taxi time estimates for each LTO. Note that EDMS assumes that arrivals are able to taxi unimpeded to their gates.

In order to enable the EDMS performance and sequencing modules, runway use must be specified. Runway use was estimated based on data provided by the Oshawa Municipal Airport for June to September, 2010. Runway use was separated into two configurations, depending on the wind speed, as summarized in Table 4.2.

Table 4.2: Runway Use at Oshawa Municipal Airport

Movement Type	Configuration	Runway Use (%)			
		04	22	12	30
Itinerant	Wind speeds < 5 knots	1.6	24.6	23.0	50.8
	Wind speeds >= 5 knots	3.5	29.3	21.4	45.8
Local	All conditions	2.6	34.9	21.5	41.0

Lastly, temporal profiles were input into EDMS to represent when aircraft movements may occur. Based on the data provided by the Oshawa Municipal Airport for June to September, 2010, a profile was generated by hour of day and by day of week. Since these data did not include night-time flights, 130 night-time flights were distributed evenly between 22:30 and 06:30 and added to the hour of day profile. A monthly profile was also generated based on 2012 information from Statistics Canada. The profiles used can be found in Appendix A.

4.1.2 Ground Support Equipment and Auxiliary Power Units

Oshawa Municipal Airport indicated that two fuel trucks and one natural gas tug operate at the airport (Enterprise Air). The operation of ground support equipment was approximated by using the default GSE and APU information from EDMS associated with each aircraft movement. The default GSE and APU assignments are summarized in Table 4.3. Since EDMS does not account for natural gas powered tugs, diesel was assumed. Since the emissions from this equipment are a very minor component of the

airport's overall emission inventory (as will be seen), this assumption has no significant implications for the results of the analysis.

Table 4.3: Default GSE Assignment Based on Aircraft Movements

Aircraft Type	GSE Assignment
Cessna 150 Series	Fuel Truck – F750, Dukes Transportation Services, DART 3000 to 6000 gallon
Cessna 172 Skyhawk	Fuel Truck – F750, Dukes Transportation Services, DART 3000 to 6000 gallon
Cessna 421 Golden Eagle	Fuel Truck – F750, Dukes Transportation Services, DART 3000 to 6000 gallon
Cessna 182	Fuel Truck – F750, Dukes Transportation Services, DART 3000 to 6000 gallon
Piper PA-23 Apache/Aztec	Fuel Truck – F750, Dukes Transportation Services, DART 3000 to 6000 gallon
Piper PA-28 Cherokee Series	Fuel Truck – F750, Dukes Transportation Services, DART 3000 to 6000 gallon
Dassault Falcon 20-F	Aircraft Tractor – Stewart Stevenson TUG MC Fuel Truck – F750, Dukes Transportation Services, DART 3000 to 6000 gallon Ground Power Unit – TLD, 28 VDC Auxiliary Power Unit – GTCP 36-150
Raytheon Super King Air 200	Fuel Truck – F750, Dukes Transportation Services, DART 3000 to 6000 gallon Ground Power Unit – TLD, 28 VDC

4.1.3 Parking Facilities

The following parking lots were included in the emission inventory:

- Airport parking;
- Flight school parking;
- Gymnastics parking 1 & 2; and,
- Tower parking.

Vehicle numbers for the airport parking were estimated to be one car per LTO (landing and take-off cycle), not including those associated with flight training. Vehicle numbers for all other parking lots were estimated based on a vehicle count from satellite imagery. For the flight school parking, the vehicle count from satellite imagery was assumed to be representative of a weekday; vehicle numbers during the weekend were estimated to be approximately half the weekday vehicle numbers, as suggested by the Oshawa Municipal Airport. For the gymnastics and tower parking, the vehicle count from satellite imagery was assumed to represent a typical day and was applied to every day of the year.

Travel distances in parking facilities were estimated using satellite imagery, assuming vehicles travelled the circumference of the lot once to and from the nearest roadway. An EDMS default idling time of 1.5 minutes and an estimated vehicle speed of 10 miles per hour (i.e. representative of small service roads) were used in the model.

4.1.4 Roadways

Emissions from roadways servicing the Oshawa Municipal Airport were estimated for the following roadways:

- Airport Blvd;
- Keith Ross Rd;
- Oshawa Airport Rd A; and,
- Oshawa Airport Rd B.

Roadway traffic volumes were estimated based on the aforementioned vehicle numbers for parking lots. All vehicles travelling to the airport parking and flight school parking were assumed to be evenly distributed between Airport Blvd and Keith Ross Rd. All vehicles travelling to the gymnastics parking were assumed to travel directly northeast from Stevenson Rd N along Oshawa Airport Rd A. All vehicles travelling to the tower parking were assumed to travel northwest and then northeast along Oshawa Airport Rd B.

Roadway distances were estimated using satellite imagery.

Table 4.4 summarizes the vehicle numbers for parking lots and roadways for existing conditions and with the forecasted number of movements, since students are assumed to use transit to get to the airport, parking lot vehicle numbers are not expected to change significantly.

Table 4.4: Vehicle Numbers for Parking Lot and Roadways

Parking Lot/Roadway	Annual Traffic Volume
Airport Parking	28,956
Flight School Parking	7,248
Gymnastics Parking	15,695
Tower Parking	1,095
Airport Blvd	36,204
Keith Ross Rd	36,203
Oshawa Airport Rd A	31,390
Oshawa Airport Rd B	2,190

4.1.5 Stationary Sources

Stationary sources include space heating at facilities within the airport property boundary as well as the emergency generator.

The following facilities were included in the emission inventory:

- Enterprise Air (27,000 sq. ft.);
- Optech (10,000 sq. ft.);
- Canadian Flight Academy (15,000 sq. ft.);
- Main Terminal Building (14,500 sq. ft.); and,
- 2 hangars (13,916 sq. ft. and 17,334 sq. ft.).

The Air Partners hangar and Corporate Aircraft Restoration were excluded because at the time of the commencement of the assessment, they were both unoccupied. Although this is no longer the case, the air emissions from these buildings are insignificant compared to the emissions from the rest of the activities at the airport. Their inclusion would not affect the results of the assessment.

All space heating was assumed to be using uncontrolled natural gas wall-fired boilers with less than 100 million BTU/hour capacity. The amount of natural gas required for space heating were estimated based on the square footage using the natural gas load and cost estimator available on the Enbridge website. The hangars were represented as warehouses, while all other buildings were represented as office buildings. The total estimated natural gas usage at the Oshawa Municipal Airport is 38,400 m^3/year.

The emergency generator was assumed to be a diesel-fuelled unit with 1340 hp rating (EDMS default), tested for 30 minutes every two weeks.

4.1.6 Training Fires

Training fires facility at the Oshawa Municipal Airport was indicated to be used once every two weeks for about nine month of the year, and to use approximately 1,000 lbs of natural gas annually. This is equivalent to approximately 150 gallons of natural gas usage per year. Since natural gas is not an available option for estimating training fire emissions in EDMS, propane fuel was selected.

4.2 Results

4.2.1 Criteria Contaminants

EDMS was run for each of the 5 years in the meteorological dataset used for dispersion modelling (see Section 5.1.2). Average annual emissions for the Oshawa Municipal Airport are presented in Table 4.5. For all contaminant emissions are largely dominated by aircraft movements at the airport.

Table 4.5: Average Annual Emissions from Oshawa Municipal Airport (tonnes/year)

Source	CO	NO_X	$PM_{2.5}$
Aircraft	670.6	3.1	0.73
GSE	4.8	0.8	0.03
APU	0.09	0.07	0.01
Parking Facilities	0.2	0.01	0.0
Roadways	0.3	0.03	0.001
Stationary Sources	0.2	0.5	0.04
Training Fires	0.002	0.0	0.008
Total	**676.1**	**4.6**	**0.82**

Note: N/A = not available

4.2.2 Lead

The US EPA banned the use of leaded gasoline in highway vehicles in 1996, but did not ban leaded fuel for piston-engine aircraft at that time. The most commonly used form of aviation gasoline (avgas) in the North America is 100 Octane Low Lead (100 LL) which contains up to 2.12 grams/gallon of lead (approx. 0.6 g/L). The lead boosts the octane, prevents knock and prevents valve seal recession. In 2010, the U.S. EPA provided advance notice of a proposed rule-making on lead emissions from piston-engine aircraft (Federal Register, Vol. 75, No. 81, April 28, 2010). To date, a rule-making has not been finalized.

The US EPA estimates an average fuel usage for single-engine piston aircraft of 2.83 gallons/LTO (approx. 10 L/LTO), and 9.12 gallons/LTO (approx. 35 L/LTO) for twin engine aircraft, where LTO refers to a complete cycle of landing, take-off and climb-out. The US EPA further estimates that 95% of the lead is emitted and 5% is retained in the engine and engine oil. Forecasted Movements for the Oshawa Municipal Airport are based on the annual number of LTOs and Touch and Go's (TGO) for piston aircraft presented in Table 4.6.

Table 4.6: Summary of Annual LTO's and TGO's for Piston Aircraft at Oshawa Airport

Type of Movement	Annual Activity Levels
Landing or Take-off	56,201
Complete LTO cycle	28,101
TGO	41,000
Total	**69,101**

Notes: The lead estimates are based on the number of LTOS for piston aircraft. From Table 4.1, the total number of itinerant movements for piston aircraft is 56,201 (arrival or departure) which equals 28,101 LTOs (arrival and a departure). For local movements (TGOs), the total number of movements is 41,000, which include an arrival and a departure. Therefore the total LTOs for piston aircraft is 28,101+41,000=69,101.

The majority of these LTOs and TGOs are single engine aircraft (Cessna 150, 172, 182). The following preliminary estimate of lead emissions is derived on the basis of the foregoing data:

69,101 x 2.83 gal x 2.12 grams/gal x 0.95/10E6 = 0.39 tonnes/year of lead emission

5. DISPERSION MODELLING

Air contaminants emitted from airport sources will drift downwind and disperse as they travel. The degree to which the contaminants disperse depends on weather-related factors, such as wind speed and the amount of atmospheric turbulence. The only approach to determine potential future downwind concentrations or historic concentrations in the absence of an ambient monitoring program is through the use of computer simulation that predicts the dispersal of air pollutants as they drift away from the airport. These simulations are referred to as dispersion models.

5.1 Methodology

Dispersion modeling was conducted using the United States Environment Protection Agency (US EPA) AERMOD model to estimate the maximum ground-level concentrations of CO, and NO_X. Results for $PM_{2.5}$ and lead were then scaled from the NO_X results. AERMOD is a steady-state dispersion model designed

for short-range dispersion, and represents an approved model under Provincial air quality regulations (Reg. 419/05).

5.1.1 Receptor Locations

In the AERMOD model, a discrete set of receptor points is specified at which pollutant concentrations are predicted. A Cartesian nested grid of receptors was defined within the study area, as per the *Air Dispersion Modelling Guideline for Ontario* (Ontario MOE 2009). Receptor spacing for the Cartesian grid is as follows:

- 10-m spacing along the airport property boundary;
- 20-m spacing within 200 m of the airport;
- 50-m spacing within 500 m of the airport;
- 100-m spacing within 1 km of the airport; and,
- 200-m spacing for the remainder of the study area.

In addition to the Cartesian grid described above, a number of sensitive receptors were identified at child care facilities, parks, places of worship, schools, and senior homes. Receptor locations are shown in Figure 2.

Digital Elevation Mapping (DEM) was used to create the elevations for the locations of the receptors for the AERMOD model.

5.1.2 Meteorological Data

Regional meteorological data were obtained from the Ontario MOE to represent meteorological conditions near the study area. This includes 5 years of hourly surface meteorological data from the Toronto Pearson International Airport and upper air data from Buffalo, New York, for the years 1996 to 2000. The data were processed using EDMS for use in the AERMOD model.

Figure 3 shows the joint frequency distribution of wind direction and wind speed in a wind rose (a polar histogram format). The orientation of each bar indicates the wind direction where the wind blows from, based on 16 compass points. The length of each bar indicates the frequency of occurrence. Winds at the Toronto Pearson International Airport tend to be primarily from the west-southwest to north-northwest. Calms, or periods when wind speeds are less than 1 m/s, occur approximately 12% of the time.

5.1.3 NO_X to NO_2 Conversion

Emissions of NO_X from the project are comprised of both NO and NO_2. The primary emission is predominantly in the form of NO with reactions in the atmosphere resulting in the conversion of NO to NO_2. The thresholds are based on NO_2, rather than NO_X or NO. The AERMOD model predicts ambient NO_X concentrations, which need to be converted to ambient NO_2 concentrations for comparison to the threshold.

The most conservative method for NO_X to NO_2 conversion is the total conversion method, in which 100% of the predicted NO_X is assumed to exist as NO_2. This method was applied for this assessment.

5.2 Results

Table 5.1 shows the maximum predicted concentrations of CO, NO_2, $PM_{2.5}$ and lead, with background ambient concentrations added, where available.

The spatial distribution of selected results (including ambient background) is shown as isopleth plots in the Figures 4 to 7.

Table 5.1: Maximum Predicted Concentrations for the Oshawa Municipal Airport (in µg/m^3)

Contaminant	Averaging Period	Maximum Predicted Concentration	Background Concentration	Total Concentration	Ambient Air Quality Threshold
CO	1-hour	527	415	942	36,200
	8-hour	110	415	525	15,700
NO_2	1-hour	66	32	98	400
	24-hour	9	32	41	200
$PM_{2.5}$	24-hour	1.0	14	15	30
Lead	24-hour	0.4	~0	0.4	0.5

The maximum predicted concentrations are well below the respective thresholds for CO, NO_2 and $PM_{2.5}$. In the case of lead, the maximum predicted 24-hour concentration approached its threshold value. Therefore a review of an ambient monitoring study was undertaken to supplement the modelling results for lead. The US EPA has been conducting a comprehensive lead monitoring program at 15 airports that have lead emissions in the range from 0.5 to 1.0 tons/year in an effort to understand potential impacts on air quality (US EPA, 2013). Airports with significant piston-engine aircraft activity and predominant use of one runway were selected so as to evaluate whether lead concentrations could exceed air quality standards. Since the Oshawa Airport is expected to have similar total lead emissions as those evaluated in the US EPA study, the EPA monitoring data provide an indication of expected air quality impacts at the Oshawa Airport.

Annual aircraft movements at each of the 15 airports, along with those at Oshawa Airport are presented in Appendix B. The number of movements at Oshawa is much less than those at the airports where the measurements were taken.

The maximum 3-month lead concentrations were less than the corresponding U.S. National Ambient Air Quality Standard (NAAQS), which is similar to Ontario's AAQC) at 13 of the 15 airports. The two airports where measured levels were higher than the NAAQS had significantly higher annual movements compared to those at Oshawa. Based on the U.S. EPA study, the modelled 24-hour results may be conservative (ie., higher than what would actually occur).

6. CONCLUSIONS

Emissions were estimated from the Oshawa Municipal Airport. Estimated emissions were subsequently entered into the AERMOD dispersion model to estimate maximum ambient ground-level concentrations associated with the aircraft Forecasted Movements scenario. Background ambient concentrations were added to predicted concentrations to estimate cumulative air quality effects for comparison to the air quality thresholds.

The maximum predicted CO, NO_2 and $PM_{2.5}$ concentrations, including background, were well below their applicable thresholds. The maximum predicted 24-hour lead concentration approached its threshold. In general, if the concentration of an airborne pollutant can be maintained below its threshold, then either no health effect is observed or the effect is small enough that it presents an acceptably low risk to the population and the environment.

The modelling predictions for lead were supplemented with a literature review. The U.S. EPA undertook an ambient monitoring study of 15 airports in the U.S. where annual aircraft movements range from about 120,000 to 520,000 (Oshawa Airport is forecasting 102,000 annual movements). The maximum 3-month lead concentrations were less than the corresponding U.S. National Ambient Air Quality Standard (NAAQS), which is similar to Ontario's AAQC) at 13 of the 15 airports. The two airports where measured levels were higher than the NAAQS had significantly higher annual movements. Based on the U.S. EPA study, the modelled 24-hour results may be conservative (ie., higher than what would actually occur).

7. REFERENCES

Standards Development Branch, Ontario Ministry of the Environment, April 2012. Ontario's Ambient Air Quality Criteria (Sorted by Chemical Abstracts Service Registry Number (CASRN)

http://www.ontario.ca/environment-and-energy/ontarios-ambient-air-quality-criteria-sorted-chemical-abstracts-service

Ontario Ministry of the Environment, March 2009. Air Dispersion Modelling Guideline for Ontario, Version 2.0.

http://www.ontario.ca/environment-and-energy/guideline-11-air-dispersion-modelling-guideline-ontario

Federal Register, Vol. 75, No. 81, April 28, 2010, Proposed Rules. Part II, Environmental Protection Agency, 40 CFR Part 87, Advance Notice of Proposed Rulemaking on Lead Emissions from Piston-Engine Aircraft Using Leaded Aviation Gasoline; Proposed Rule. http://www.epa.gov/otaq/aviation.htm

United States Environmental Protection Agency (US EPA) Office of Transportation and Air Quality, June 2013. Airport Lead Monitoring Program Update.

FIGURES

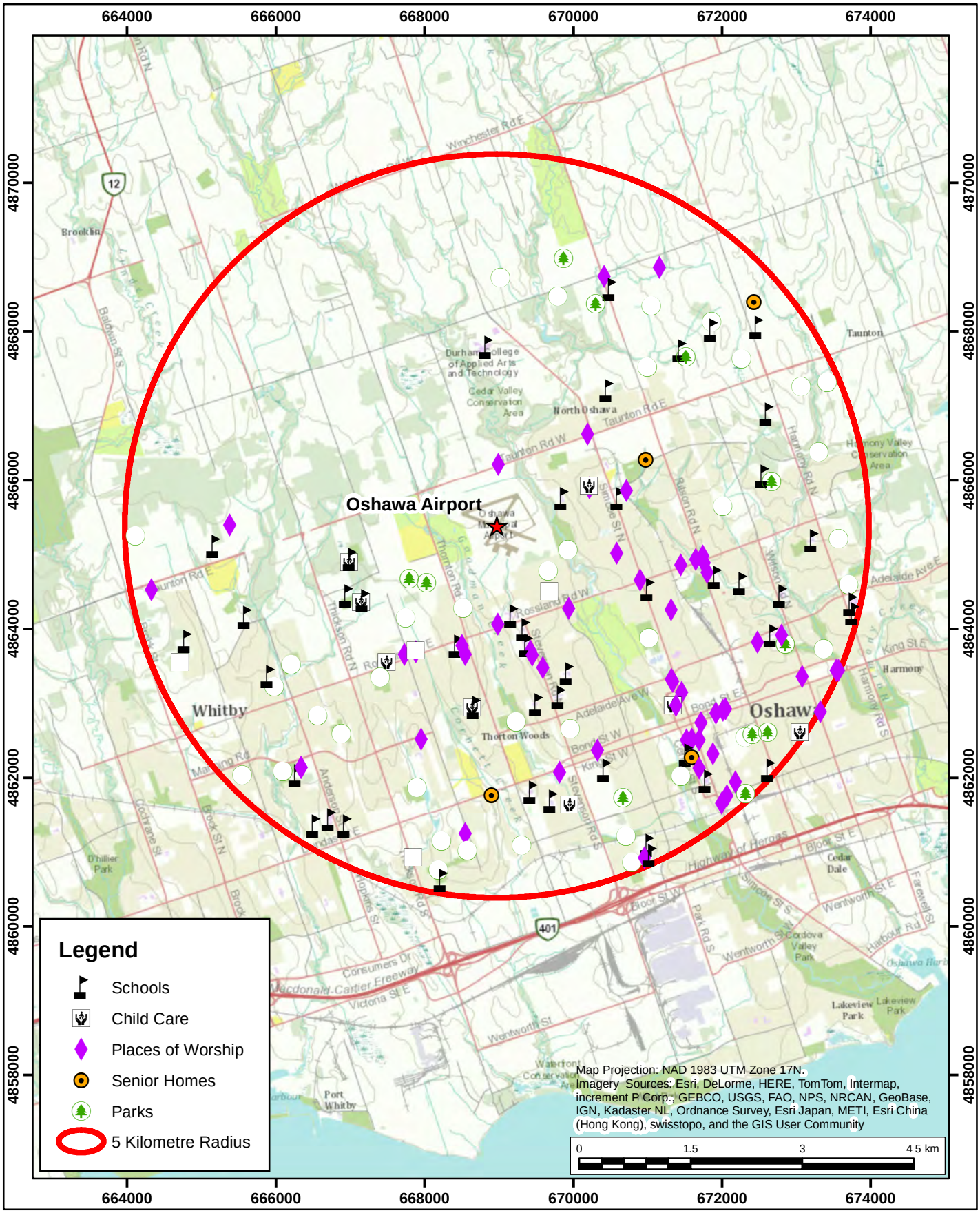
Oshawa Municipal Airport Base Map

True North

The Corporation of the City of Oshawa - Oshawa, Ontario

Project #1400980

Drawn by:	NBN	Figure:	1
Approx. Scale:	1:12,000		
Date Revised:	Apr. 8, 2018		



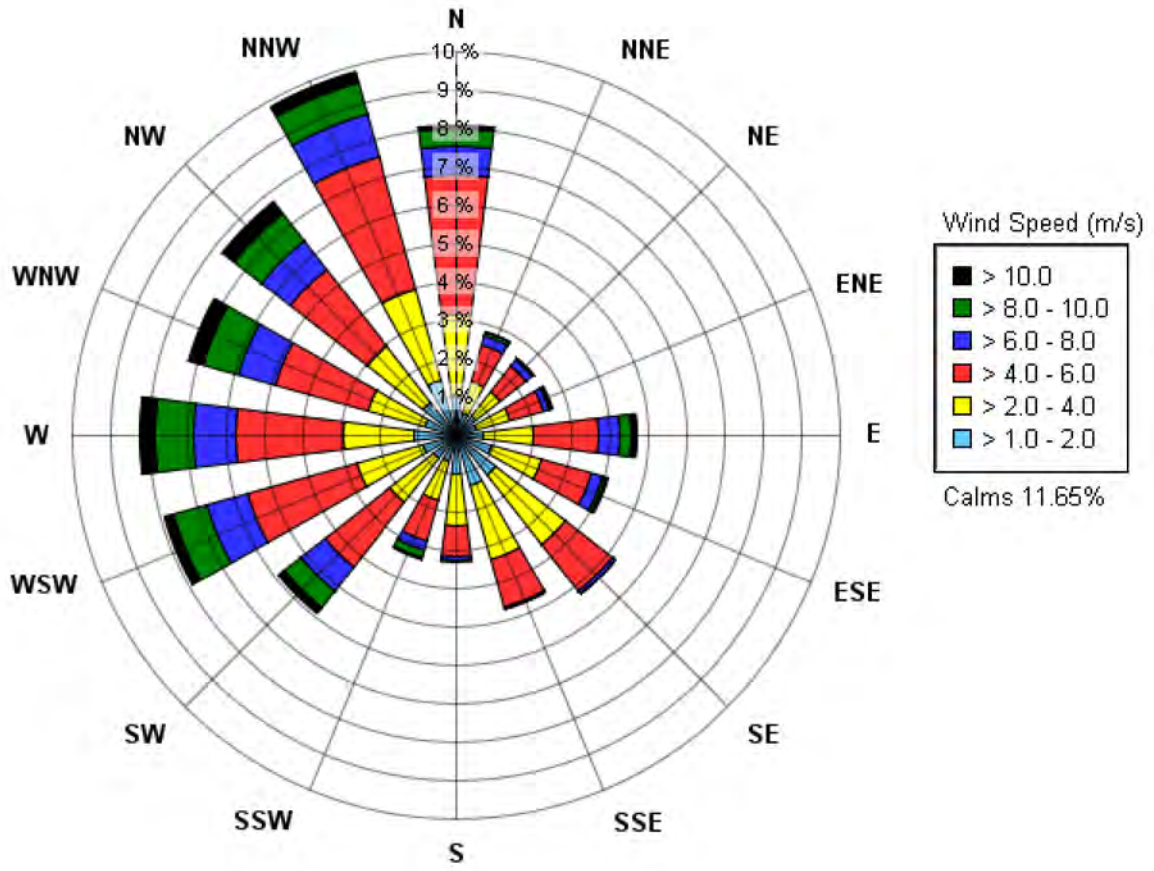
Location of Sensitive Receptors within a 5 Kilometre Radius of the Airport

The Corporation of the City of Oshawa - Oshawa, Ontario

True North

Project #1400980

Drawn by:	NBN	Figure:	2
Approx. Scale:		1:70,000	
Date Revised:		Apr. 11, 2014	



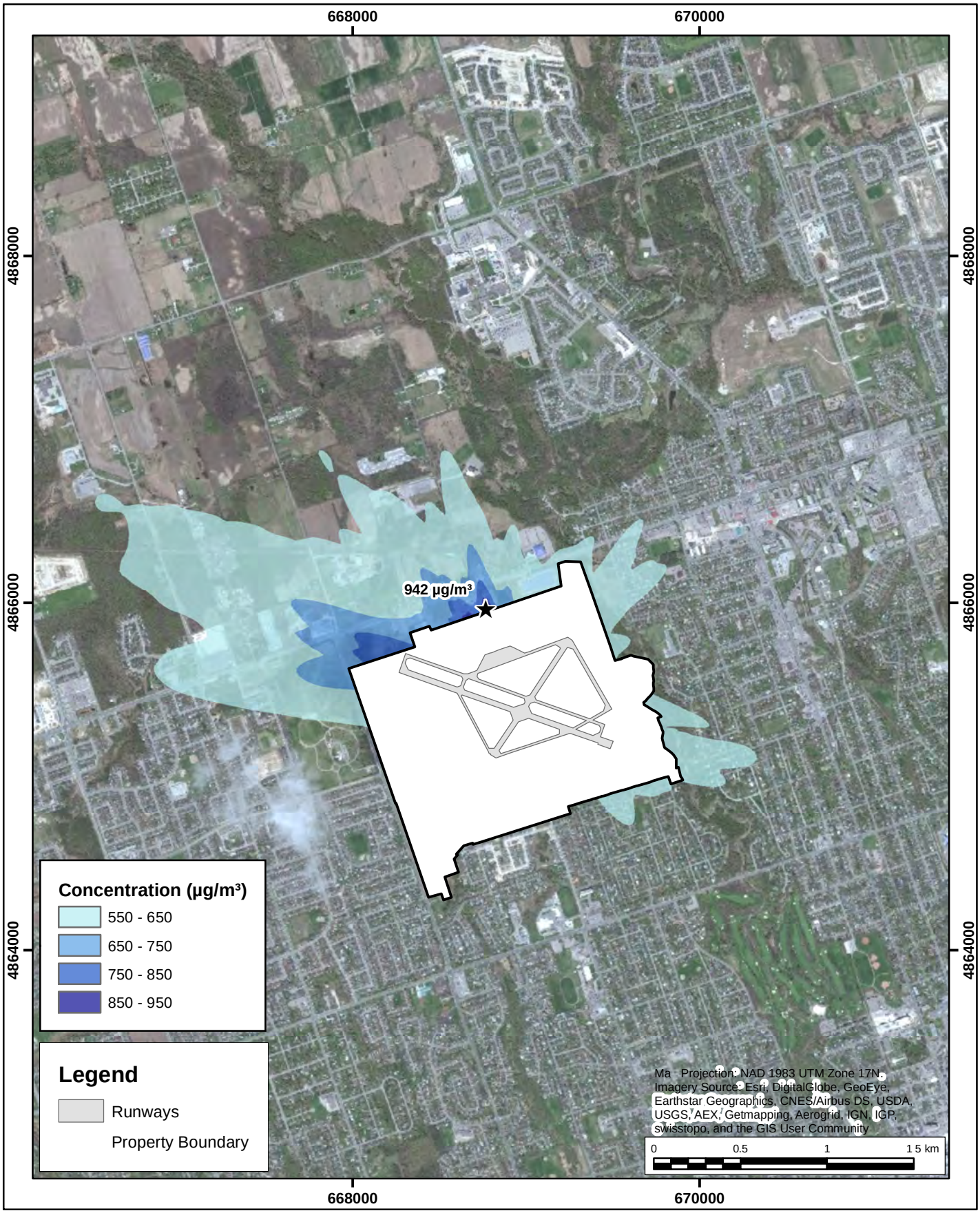
Wind Rose from the Toronto Pearson International Airport

Date: January 1, 1996 to December 31, 2000

The Corporation of the City of Oshawa - Oshawa, Ontario

Project #1400980

Drawn by:	NBN	Figure:	3
Approx. Scale:	NA		
Date Revised:	Apr. 11, 2014		



Maximum Predicted 1-Hour CO Concentrations

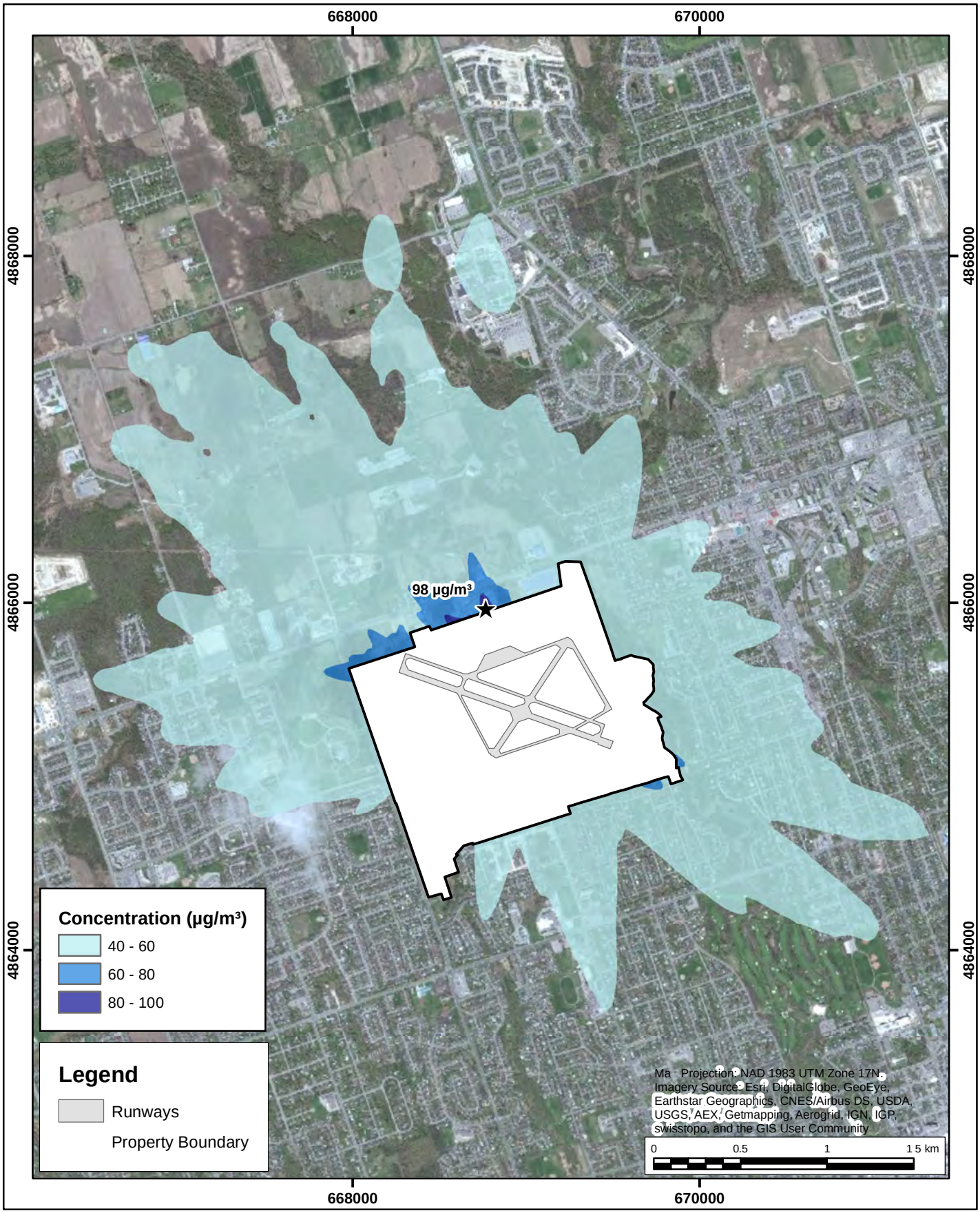
Ontario AAQC = 36,200 µg/m³

True North

Drawn by:	NBN	Figure:	4
Approx. Scale:	1:30,000		
Date Revised:	Apr. 9, 2015		

The Corporation of the City of Oshawa - Oshawa, Ontario

Project #1400980



Maximum Predicted 1-Hour NO_2 Concentrations

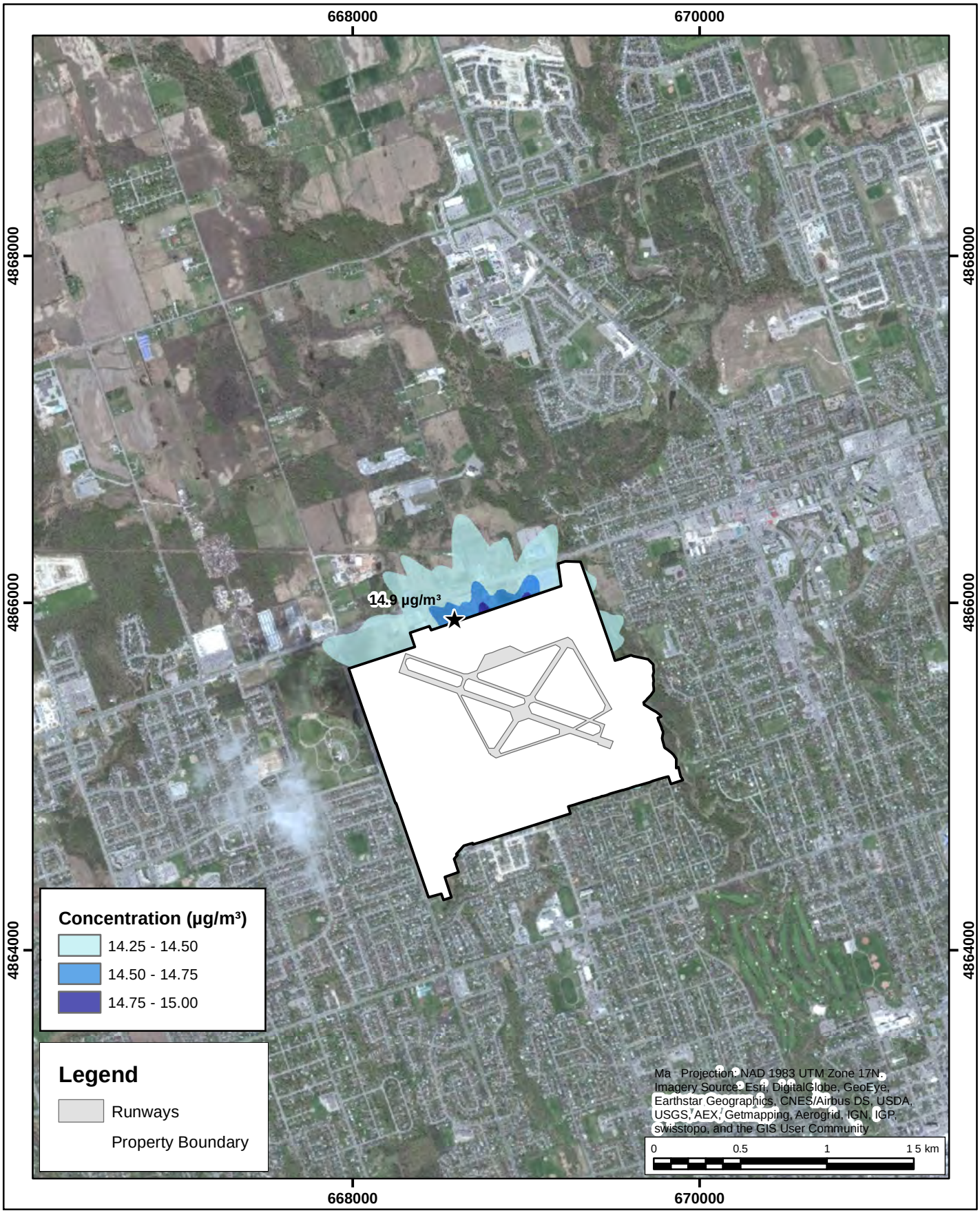
Ontario AAQC = 400 µg/m³

The Corporation of the City of Oshawa - Oshawa, Ontario

True North

Project #1400980

Drawn by:	NBN	Figure:	5
Approx. Scale:		1:30,000	
Date Revised:		Apr. 9, 2015	



Maximum Predicted 24-Hour $PM_{2.5}$ Concentrations

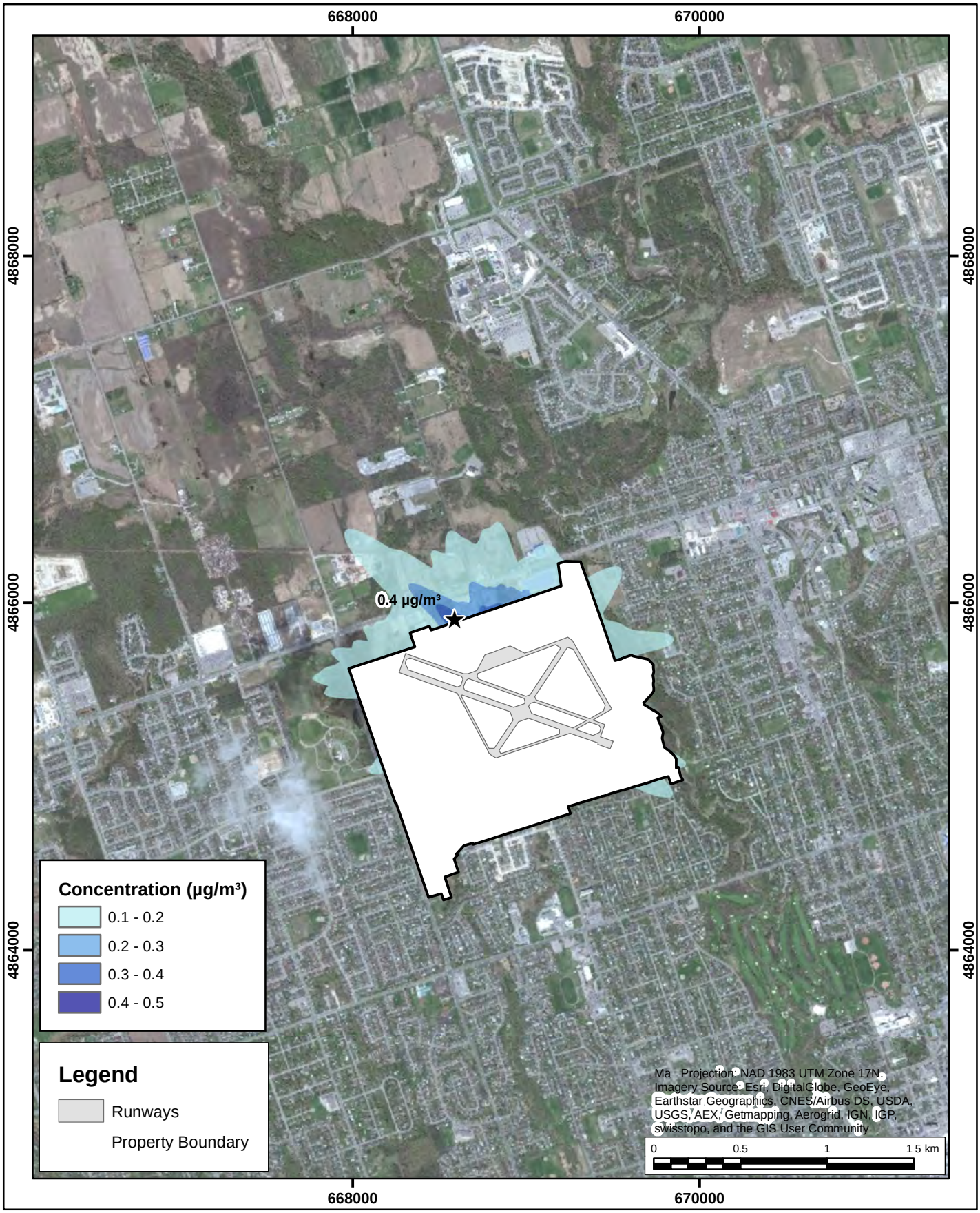
Ontario AAQC = 30 µg/m³

The Corporation of the City of Oshawa - Oshawa, Ontario

True North

Project #1400980

Drawn by:	NBN	Figure:	6
Approx. Scale:	1:30,000		
Date Revised:	Apr. 9, 2015		



Maximum Predicted 24-Hour Lead Concentrations

Ontario AAQC = 0.5 µg/m³

True North

Drawn by:	NBN	Figure:	7
Approx. Scale:	1:30,000		
Date Revised:	Apr. 9, 2015		

The Corporation of the City of Oshawa - Oshawa, Ontario

Project #1400980

DI A

EDMS 5.1.3 Model Inputs for Oshawa_v513 Study

Study Created:	Thu Mar 20 10:01:01 2014
Report Date:	Thu Apr 10 11:25:02 2014
Study Pathname:	C:\1400980\Oshawa_v513\Oshawa_v513.edm

Study Setup

Unit System:	Metric
Dispersion Modeling:	Dispersion is enabled for this study
Speciated Organic Gas (OG) Modeling:	Speciated Organic Gas (OG) Emissions are excluded from this study.
Analysis Years:	2013

Scenarios

Scenario Name:	Description:	Add a description.
With Cap	Aircraft Times in Mode Basis:	Performance-Based
	Taxi Time Modeling:	Delay & Sequencing Model
	FOA3 Sulfur-to-Sulfate Conversion Rate:	2.400000 %
Scenario Name:	Description:	Add a description.
Without Cap	Aircraft Times in Mode Basis:	Performance-Based
	Taxi Time Modeling:	Delay & Sequencing Model
	FOA3 Sulfur-to-Sulfate Conversion Rate:	2.400000 %

Airports

Airport Name:	Oshawa
IATA Code:	YOO
ICAO Code:	CYOO
FAA Code:	
Country:	CA
State:	
City:	Oshawa/Ontario
Airport Description:	Oshawa
Latitude:	43.923°
Longitude:	-78.895°
Northing:	4865449.99
Easting:	668986.73
UTM Zone:	17
Elevation:	459.00 feet
PM Modeling Methodology:	FOA3

Scenario-Airport: With Cap, Oshawa

Weather

With Cap, Oshawa

Mixing Height:	914.40 meters
Temperature:	7.77 °C
Daily High Temperature:	13.52 °C
Daily Low Temperature:	2.02 °C
Pressure:	101320.73 Pa
Sea Level Pressure:	101659.37 Pa
Relative Humidity:	69.84
Wind Speed:	12.32 kph

Wind Direction: 0.00 °
Ceiling: 30480.00 m
Visibility: 80.47 km
The user has used hourly meteorological data.
Base Elevation: 139.90 meters
Date Range: Saturday, January 01, 2000 to Sunday, December 31, 2000
Source Data File Location:
Upper Air Data File Location:

Quarter-Hourly Operational Profiles

With Cap, Oshawa

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000
12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000
3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000
4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Name: Itinerant

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	0.013000	6:00am to 6:14am	0.013000	12:00pm to 12:14 pm	0.838000	6:00pm to 6:14pm	0.610000
12:15am to 12:29 am	0.013000	6:15am to 6:29am	0.013000	12:15pm to 12:29 pm	0.838000	6:15pm to 6:29pm	0.610000
12:30am to 12:44 am	0.013000	6:30am to 6:44am	0.053000	12:30pm to 12:44 pm	0.838000	6:30pm to 6:44pm	0.610000
12:45am to 12:59 am	0.013000	6:45am to 6:59am	0.053000	12:45pm to 12:59 pm	0.838000	6:45pm to 6:59pm	0.610000
1:00am to 1:14am	0.013000	7:00am to 7:14am	0.200000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	0.542000
1:15am to 1:29am	0.013000	7:15am to 7:29am	0.200000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	0.542000
1:30am to 1:44am	0.013000	7:30am to 7:44am	0.200000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	0.542000
1:45am to 1:59am	0.013000	7:45am to 7:59am	0.200000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	0.542000
2:00am to 2:14am	0.013000	8:00am to 8:14am	0.486000	2:00pm to 2:14pm	0.954000	8:00pm to 8:14pm	0.442000
2:15am to 2:29am	0.013000	8:15am to 8:29am	0.486000	2:15pm to 2:29pm	0.954000	8:15pm to 8:29pm	0.442000
2:30am to 2:44am	0.013000	8:30am to 8:44am	0.486000	2:30pm to 2:44pm	0.954000	8:30pm to 8:44pm	0.442000
2:45am to 2:59am	0.013000	8:45am to 8:59am	0.486000	2:45pm to 2:59pm	0.954000	8:45pm to 8:59pm	0.442000
3:00am to 3:14am	0.013000	9:00am to 9:14am	0.727000	3:00pm to 3:14pm	0.884000	9:00pm to 9:14pm	0.275000
3:15am to 3:29am	0.013000	9:15am to 9:29am	0.727000	3:15pm to 3:29pm	0.884000	9:15pm to 9:29pm	0.275000
3:30am to 3:44am	0.013000	9:30am to 9:44am	0.727000	3:30pm to 3:44pm	0.884000	9:30pm to 9:44pm	0.275000
3:45am to 3:59am	0.013000	9:45am to 9:59am	0.727000	3:45pm to 3:59pm	0.884000	9:45pm to 9:59pm	0.275000
4:00am to 4:14am	0.013000	10:00am to 10:14am	0.964000	4:00pm to 4:14pm	0.797000	10:00pm to 10:14pm	0.086000
4:15am to 4:29am	0.013000	10:15am to 10:29am	0.964000	4:15pm to 4:29pm	0.797000	10:15pm to 10:29pm	0.086000
4:30am to 4:44am	0.013000	10:30am to 10:44am	0.964000	4:30pm to 4:44pm	0.797000	10:30pm to 10:44pm	0.013000
4:45am to 4:59am	0.013000	10:45am to 10:59am	0.964000	4:45pm to 4:59pm	0.797000	10:45pm to 10:59pm	0.013000
5:00am to 5:14am	0.013000	11:00am to 11:14am	0.967000	5:00pm to 5:14pm	0.679000	11:00pm to 11:14pm	0.013000
5:15am to 5:29am	0.013000	11:15am to 11:29am	0.967000	5:15pm to 5:29pm	0.679000	11:15pm to 11:29pm	0.013000
5:30am to 5:44am	0.013000	11:30am to 11:44am	0.967000	5:30pm to 5:44pm	0.679000	11:30pm to 11:44pm	0.013000
5:45am to 5:59am	0.013000	11:45am to 11:59am	0.967000	5:45pm to 5:59pm	0.679000	11:45pm to 11:59pm	0.013000

Name: Local

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	0.000000	6:00am to 6:14am	0.000000	12:00pm to 12:14 pm	0.601000	6:00pm to 6:14pm	0.636000
12:15am to 12:29 am	0.000000	6:15am to 6:29am	0.000000	12:15pm to 12:29 pm	0.601000	6:15pm to 6:29pm	0.636000
12:30am to 12:44 am	0.000000	6:30am to 6:44am	0.002000	12:30pm to 12:44 pm	0.601000	6:30pm to 6:44pm	0.636000
12:45am to 12:59 am	0.000000	6:45am to 6:59am	0.002000	12:45pm to 12:59 pm	0.601000	6:45pm to 6:59pm	0.636000

1:00am to 1:14am	0.000000	7:00am to 7:14am	0.086000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	0.459000
1:15am to 1:29am	0.000000	7:15am to 7:29am	0.086000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	0.459000
1:30am to 1:44am	0.000000	7:30am to 7:44am	0.086000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	0.459000
1:45am to 1:59am	0.000000	7:45am to 7:59am	0.086000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	0.459000
2:00am to 2:14am	0.000000	8:00am to 8:14am	0.537000	2:00pm to 2:14pm	0.782000	8:00pm to 8:14pm	0.473000
2:15am to 2:29am	0.000000	8:15am to 8:29am	0.537000	2:15pm to 2:29pm	0.782000	8:15pm to 8:29pm	0.473000
2:30am to 2:44am	0.000000	8:30am to 8:44am	0.537000	2:30pm to 2:44pm	0.782000	8:30pm to 8:44pm	0.473000
2:45am to 2:59am	0.000000	8:45am to 8:59am	0.537000	2:45pm to 2:59pm	0.782000	8:45pm to 8:59pm	0.473000
3:00am to 3:14am	0.000000	9:00am to 9:14am	0.654000	3:00pm to 3:14pm	0.822000	9:00pm to 9:14pm	0.376000
3:15am to 3:29am	0.000000	9:15am to 9:29am	0.654000	3:15pm to 3:29pm	0.822000	9:15pm to 9:29pm	0.376000
3:30am to 3:44am	0.000000	9:30am to 9:44am	0.654000	3:30pm to 3:44pm	0.822000	9:30pm to 9:44pm	0.376000
3:45am to 3:59am	0.000000	9:45am to 9:59am	0.654000	3:45pm to 3:59pm	0.822000	9:45pm to 9:59pm	0.376000
4:00am to 4:14am	0.000000	10:00am to 10:14am	0.748000	4:00pm to 4:14pm	0.728000	10:00pm to 10:14pm	0.088000
4:15am to 4:29am	0.000000	10:15am to 10:29am	0.748000	4:15pm to 4:29pm	0.728000	10:15pm to 10:29pm	0.088000
4:30am to 4:44am	0.000000	10:30am to 10:44am	0.748000	4:30pm to 4:44pm	0.728000	10:30pm to 10:44pm	0.000000
4:45am to 4:59am	0.000000	10:45am to 10:59am	0.748000	4:45pm to 4:59pm	0.728000	10:45pm to 10:59pm	0.000000
5:00am to 5:14am	0.000000	11:00am to 11:14am	0.788000	5:00pm to 5:14pm	0.507000	11:00pm to 11:14pm	0.000000
5:15am to 5:29am	0.000000	11:15am to 11:29am	0.788000	5:15pm to 5:29pm	0.507000	11:15pm to 11:29pm	0.000000
5:30am to 5:44am	0.000000	11:30am to 11:44am	0.788000	5:30pm to 5:44pm	0.507000	11:30pm to 11:44pm	0.000000
5:45am to 5:59am	0.000000	11:45am to 11:59am	0.788000	5:45pm to 5:59pm	0.507000	11:45pm to 11:59pm	0.000000

Daily Operational Profiles

With Cap, Oshawa

Name: DEFAULT

Day	Weight	Day	Weight
Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000
Thursday	1.000000		

Name: Itinerant

Day	Weight	Day	Weight
Monday	0.930000	Friday	0.820000
Tuesday	0.890000	Saturday	0.790000
Wednesday	0.900000	Sunday	0.000000
Thursday	1.000000		

Name: Local

Day	Weight	Day	Weight

Monday	1.000000	Friday	0.760000
Tuesday	0.940000	Saturday	0.420000
Wednesday	1.000000	Sunday	0.000000
Thursday	0.980000		

Monthly Operational Profiles

With Cap, Oshawa

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	1.000000

Name: Itinerant

Month	Weight	Month	Weight
January	0.280000	July	1.000000
February	0.350000	August	0.740000
March	0.430000	September	0.610000
April	0.530000	October	0.440000
May	0.630000	November	0.480000
June	0.680000	December	0.270000

Name: Local

Month	Weight	Month	Weight
January	0.390000	July	1.000000
February	0.460000	August	0.610000
March	0.540000	September	0.630000
April	0.540000	October	0.450000
May	0.750000	November	0.620000
June	0.650000	December	0.320000

Name: Facility Heating

Month	Weight	Month	Weight
January	1.000000	July	0.000000
February	1.000000	August	0.000000
March	1.000000	September	0.500000
April	1.000000	October	1.000000
May	0.500000	November	1.000000
June	0.000000	December	1.000000

Name: Training Fire

Month	Weight	Month	Weight
January	0.000000	July	1.000000
February	0.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	0.000000

Aircraft

With Cap, Oshawa

Default Taxi Out Time: 19.000000 min

Default Taxi In Time: 7.000000 min

Year:	Uses Schedule?	Schedule Filename:
2013	No	(None)

Aircraft Name:
Cessna 150 Series
Engine Type:
O-200
Identification:
Itinerant
Category:
SGPP

Take Off weight:	998.00 Kgs
Approach Weight:	898.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	6198
Annual Arrivals:	6198
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Cessna 150 Series
Engine Type:
O-200
Identification:
Local
Category:
SGPP

Take Off weight:	998.00 Kgs
Approach Weight:	898.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time	Departure Op Time	Horsepower (hp)	Load Factor	Manufactured Year

		(mins)	(mins)		(%)
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00

Year: 2013

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	24600
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	Local
Touch & Go Daily Operational Profile:	Local
Touch & Go Monthly Operational Profile:	Local

Aircraft Name: Cessna 172 Skyhawk
Engine Type: TSIO-360C
Identification: Itinerant
Category: SGPP

Take Off weight:	1111.00 Kgs
Approach Weight:	1111.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year: 2013

Annual Departures:	3099
Annual Arrivals:	3099
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational	Itinerant

Profile:	
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Cessna 172 Skyhawk
Engine Type:
TSIO-360C
Identification:
Local
Category:
SGPP

Take Off weight:	1111.00 Kgs
Approach Weight:	1111.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	12300
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	Local
Touch & Go Daily Operational Profile:	Local
Touch & Go Monthly Operational Profile:	Local

Aircraft Name:
Cessna 182
Engine Type:
IO-360-B
Identification:
Itinerant

Take Off weight:	1270.00 Kgs
Approach Weight:	1270.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None

Category:
SGPP

APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	16010
Annual Arrivals:	16010
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Cessna 421 Golden Eagle
Engine Type:
TIO-540-J2B2
Identification:
Itinerant
Category:
SGPB

Take Off weight:	2495.00 Kgs
Approach Weight:	2495.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	2279
Annual Arrivals:	2279
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model

Taxi In Time:	Determined by Sequencing model
Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Dassault Falcon 20-F
Engine Type:
TFE731-3
Identification:
Itinerant
Category:
SGJB

Take Off weight:	13000.00 Kgs
Approach Weight:	11140.00 Kgs
Glide Slope:	3.00°
APU Assignment:	APU GTCP 36-150[]
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Aircraft Tractor (Stewart & Stevenson TUG MC)	Diesel	0.00	5.00	86.00	80.00	
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	20.00	175.00	25.00	
Ground Power Unit (TLD, 28 VDC)	Diesel	0.00	40.00	71.00	75.00	

Year:
2013

Annual Departures:	483
Annual Arrivals:	483
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model
Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly	DEFAULT

Operational profile:	
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Piper PA-23 Apache/Aztec
Engine Type:
TIO-540-J2B2
Identification:
Itinerant
Category:
SGPB

Take Off weight:	2495.00 Kgs
Approach Weight:	2495.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	259
Annual Arrivals:	259
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Piper PA-23 Apache/Aztec
Engine Type:
TIO-540-J2B2
Identification:
Local
Category:
SGPB

Take Off weight:	2495.00 Kgs
Approach Weight:	2495.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op	Departure	Horsepower	Load	Manufactured

		Time (mins)	Op Time (mins)	(hp)	Factor (%)	Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	2050
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	Local
Touch & Go Daily Operational Profile:	Local
Touch & Go Monthly Operational Profile:	Local

Aircraft Name:
Piper PA-28 Cherokee Series
Engine Type:
IO-360-B
Identification:
Itinerant
Category:
SGPP

Take Off weight:	998.00 Kgs
Approach Weight:	898.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	259
Annual Arrivals:	259
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant

Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Piper PA-28 Cherokee Series
Engine Type:
IO-360-B
Identification:
Local
Category:
SGPP

Take Off weight:	998.00 Kgs
Approach Weight:	898.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	2050
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	Local
Touch & Go Daily Operational Profile:	Local
Touch & Go Monthly Operational Profile:	Local

Aircraft Name:
Raytheon Super King Air 200
Engine Type:
PT6A-42
Identification:

Take Off weight:	5670.00 Kgs
Approach Weight:	5021.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None

Itinerant
Category:
SCTP

APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Baggage Tractor (Stewart & Stevenson TUG MA 50)	Gasoline	17.00	18.00	107.00	55.00	
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	
Ground Power Unit (TLD, 28 VDC)	Diesel	0.00	40.00	71.00	75.00	

Year:
2013

Annual Departures:	1931
Annual Arrivals:	1931
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

GSE Population

With Cap, Oshawa

Type:	Fuel:	Ref. Model:	Identification:
Aircraft Tractor	Gasoline		NG Tug

Rated Power:	12.00 hp
Load Factor:	80.00%

The user has selected to use the default age distribution, and has not chosen a specific age.

Analysis Year:	2013
Year of Manufacture:	N/A
Age:	N/A

Gate:	Percent
Gate	100

Year:
2013

Population:	1 units
Yealry Operating Time:	40.00 hours
Quarter-Hourly Operational profile:	Local
Daily Operational profile:	Local
Monthly Operational Profile:	Local

Type:	Fuel:	Ref. Model:	Identification:
Fuel Truck	Diesel	F750, Dukes Transportation Services, DART 3000 to 6000 gallon	Fuel Trucks

Rated Power:	175.00 hp
Load Factor:	25.00%

The user has selected to use the default age distribution, and has not chosen a specific age.

Analysis Year:	2013
Year of Manufacture:	N/A
Age:	N/A

Gate:	Percent
Gate	100

Year:
2013

Population:	2 units
Yealry Operating Time:	195.00 hours
Quarter-Hourly Operational profile:	Local
Daily Operational profile:	Local
Monthly Operational Profile:	Local

Parking Facilities

With Cap, Oshawa

Parking Facility Name:
Airport Parking

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	-1 mph
Average Distance Traveled:	217.00 meters
Average Idle Time:	1.50 mins

Number of Levels:	1
Release Height:	1.50 meters
Level Spacing	3.00 meters
Elevation:	139.90 meters

Point:	X (meters)	Y (meters)
1	-131.00	495.00
2	-111.00	442.00
3	-145.00	426.00
4	-166.00	483.00

Year:
2013

Number of Vehicles per Year:	28956

Quarter-Hourly Operational profile:	Itinerant
Daily Operational profile:	Itinerant
Monthly Operational Profile:	Itinerant

The user has NOT edited the following emission factors:

CO (g/veh):	3.1258
THC (g/veh):	-1
NMHC (g/veh):	0.2773
VOC (g/veh):	0.2804
NOX (g/veh):	0.2219
SOX (g/veh):	0.0017
PM-10 (g/veh):	0.007
PM-25 (g/veh):	0.004
TOG (g/veh):	
BENZENE (g/veh):	0.007277
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.000989
FORMALDEHYDE (g/veh):	0.002655
ACETALDEHYDE (g/veh):	0.001903
ACROLEIN (g/veh):	0.000117

Parking Facility Name:
Gymnastics Parking 1

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	10 mph
Average Distance Traveled:	184.00 meters
Average Idle Time:	1.50 mins

Number of Levels:	1	
Release Height:	1.50 meters	
Level Spacing	3.00 meters	
Elevation:	139.90 meters	
Point:	X (meters)	Y (meters)
1	239.00	-406.00
2	289.00	-423.00
3	296.00	-408.00
4	259.00	-395.00
5	275.00	-357.00
6	262.00	-353.00

Year:
2013

Number of Vehicles per Year:	7847
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	3.2533

THC (g/veh):	-1
NMHC (g/veh):	0.3035
VOC (g/veh):	0.307
NOX (g/veh):	0.2375
SOX (g/veh):	0.0016
PM-10 (g/veh):	0.0063
PM-25 (g/veh):	0.0036
TOG (g/veh):	
BENZENE (g/veh):	0.008162
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.001115
FORMALDEHYDE (g/veh):	0.003127
ACETALDEHYDE (g/veh):	0.002188
ACROLEIN (g/veh):	0.000138

Parking Facility Name:
Gymnastics Parking 2

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	10 mph
Average Distance Traveled:	236.00 meters
Average Idle Time:	1.50 mins

Number of Levels:	1	
Release Height:	1.50 meters	
Level Spacing	3.00 meters	
Elevation:	139.90 meters	
Point:	X (meters)	Y (meters)
1	210.00	-403.00
2	221.00	-382.00
3	176.00	-365.00
4	167.00	-390.00

Year:
2013

Number of Vehicles per Year:	7848
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	3.6896
THC (g/veh):	-1
NMHC (g/veh):	0.3324
VOC (g/veh):	0.3364
NOX (g/veh):	0.2763
SOX (g/veh):	0.0018
PM-10 (g/veh):	0.0074
PM-25 (g/veh):	0.0042
TOG (g/veh):	
BENZENE (g/veh):	0.009238
MTBE (g/veh):	0

1,3-BUTA (g/veh):	0.001263
FORMALDEHYDE (g/veh):	0.003564
ACETALDEHYDE (g/veh):	0.002486
ACROLEIN (g/veh):	0.000158

Parking Facility Name:
School Parking

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	10 mph
Average Distance Traveled:	279.00 meters
Average Idle Time:	1.50 mins

Number of Levels:	1	
Release Height:	1.50 meters	
Level Spacing	3.00 meters	
Elevation:	139.90 meters	
Point:	X (meters)	Y (meters)
1	-222.00	340.00
2	-228.00	364.00
3	-214.00	367.00
4	-218.00	384.00
5	-283.00	367.00
6	-280.00	356.00
7	-248.00	364.00
8	-240.00	338.00

Year:
2013

Number of Vehicles per Year:	7248
Quarter-Hourly Operational profile:	Local
Daily Operational profile:	Local
Monthly Operational Profile:	Local

The user has NOT edited the following emission factors:

CO (g/veh):	4.0504
THC (g/veh):	-1
NMHC (g/veh):	0.3563
VOC (g/veh):	0.3608
NOX (g/veh):	0.3084
SOX (g/veh):	0.0021
PM-10 (g/veh):	0.0084
PM-25 (g/veh):	0.0047
TOG (g/veh):	
BENZENE (g/veh):	0.010129
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.001386
FORMALDEHYDE (g/veh):	0.003926
ACETALDEHYDE (g/veh):	0.002731
ACROLEIN (g/veh):	0.000173

Parking Facility Name:
Tower Parking

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	10 mph
Average Distance Traveled:	56.00 meters
Average Idle Time:	1.50 mins

Number of Levels:	1
Release Height:	1.50 meters
Level Spacing	3.00 meters
Elevation:	139.90 meters

Point:	X (meters)	Y (meters)
1	52.00	-344.00
2	66.00	-298.00
3	29.00	-286.00
4	15.00	-334.00

Year:
2013

Number of Vehicles per Year:	1095
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	2.1792
THC (g/veh):	-1
NMHC (g/veh):	0.2323
VOC (g/veh):	0.2347
NOX (g/veh):	0.142
SOX (g/veh):	0.0009
PM-10 (g/veh):	0.0035
PM-25 (g/veh):	0.002
TOG (g/veh):	
BENZENE (g/veh):	0.005512
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.000751
FORMALDEHYDE (g/veh):	0.002051
ACETALDEHYDE (g/veh):	0.001456
ACROLEIN (g/veh):	9.1e-005

Roadways

With Cap, Oshawa

Roadway Name:
Airport Blvd

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed:	20 mph
Roadway Length:	0.29 miles
Release Height:	

Width:	20.00 meters

Point:	X (meters)	Y (meters)	Elevation (meters)
1	-264.00	704.00	139.9

2	-187.00	496.00	139.9
3	-198.00	414.00	139.9
4	-168.00	400.00	139.9
5	-61.00	460.00	139.9

Year: 2013

Traffic Volume:	36204
Quarter-Hourly Operational profile:	Itinerant
Daily Operational profile:	Itinerant
Monthly Operational Profile:	Itinerant

The user has NOT edited the following emission factors:

CO (g/veh):	11.092
THC (g/veh):	-1
NMHC (g/veh):	0.636
VOC (g/veh):	0.646
NOX (g/veh):	0.969
SOX (g/veh):	0.0088
PM-10 (g/veh):	0.0356
PM-25 (g/veh):	0.0201
TOG (g/veh):	
BENZENE (g/veh):	0.024139
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.003311
FORMALDEHYDE (g/veh):	0.009384
ACETALDEHYDE (g/veh):	0.006514
ACROLEIN (g/veh):	0.00041

Roadway Name: Keith Ross Dr

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed:	20 mph
Roadway Length:	0.27 miles
Release Height:	

Width:	20.00 meters		
Point:	X (meters)	Y (meters)	Elevation (meters)
1	-550.00	598.00	139.9
2	-503.00	473.00	139.9
3	-214.00	572.00	139.9

Year: 2013

Traffic Volume:	36203
Quarter-Hourly Operational profile:	Itinerant
Daily Operational profile:	Itinerant
Monthly Operational Profile:	Itinerant

The user has NOT edited the following emission factors:

CO (g/veh):	11.092
THC (g/veh):	-1
NMHC (g/veh):	0.636

VOC (g/veh):	0.646
NOX (g/veh):	0.969
SOX (g/veh):	0.0088
PM-10 (g/veh):	0.0356
PM-25 (g/veh):	0.0201
TOG (g/veh):	
BENZENE (g/veh):	0.024139
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.003311
FORMALDEHYDE (g/veh):	0.009384
ACETALDEHYDE (g/veh):	0.006514
ACROLEIN (g/veh):	0.00041

Roadway Name:
Oshawa Airport Rd A

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed:	20 mph
Roadway Length:	0.16 miles
Release Height:	

Width:	20.00 meters		
Point:	X (meters)	Y (meters)	Elevation (meters)
1	159.00	-592.00	139.9
2	192.00	-502.00	139.9
3	249.00	-353.00	139.9

Year:
2013

Traffic Volume:	31390
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	11.092
THC (g/veh):	-1
NMHC (g/veh):	0.636
VOC (g/veh):	0.646
NOX (g/veh):	0.969
SOX (g/veh):	0.0088
PM-10 (g/veh):	0.0356
PM-25 (g/veh):	0.0201
TOG (g/veh):	
BENZENE (g/veh):	0.024139
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.003311
FORMALDEHYDE (g/veh):	0.009384
ACETALDEHYDE (g/veh):	0.006514
ACROLEIN (g/veh):	0.00041

Roadway Name:

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)

Oshawa Airport Rd B

Fuel:	Gasoline
Manufactured Year:	2013
Average Speed:	20 mph
Roadway Length:	0.23 miles
Release Height:	

Width:	20.00 meters		
Point:	X (meters)	Y (meters)	Elevation (meters)
1	159.00	-592.00	139.9
2	-13.00	-524.00	139.9
3	35.00	-340.00	139.9

Year:
2013

Traffic Volume:	2190
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	11.092
THC (g/veh):	-1
NMHC (g/veh):	0.636
VOC (g/veh):	0.646
NOX (g/veh):	0.969
SOX (g/veh):	0.0088
PM-10 (g/veh):	0.0356
PM-25 (g/veh):	0.0201
TOG (g/veh):	
BENZENE (g/veh):	0.024139
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.003311
FORMALDEHYDE (g/veh):	0.009384
ACETALDEHYDE (g/veh):	0.006514
ACROLEIN (g/veh):	0.00041

Stationary Sources

With Cap, Oshawa

Stationary Source Name:
Facility Heating

Stationary Category:	Boiler/Space Heater
Stationary Type:	Natural Gas: Wall Fired Boiler, <100 Million BTU/hr, Uncontrolled

This stationary source is modeled as a point

Elevation:	139.90 meters
Release Height:	7.00 meters
Gas Velocity:	2.50 m/s
Temperature:	257.00 °F
CO EI :	1.3000Kg/1000 m^3
THC EI :	0.1800Kg/1000 m^3
NOx EI :	1.6000Kg/1000 m^3
SO2 EI :	0.0100Kg/1000 m^3
PM-10 EI :	0.1200Kg/1000 m^3
CO Pollution Control Factor :	0.00 %
TOC Pollution Control Factor :	0.00 %

NOx Pollution Control Factor :	0.00 %	
SO2 Pollution Control Factor :	0.00 %	
PM-10 Pollution Control Factor:	0.00 %	
Point:	X (meters)	Y (meters)
1	-145.00	382.00

Year: 2013

1,000s of m³ Used	38.5
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	Facility Heating

The user has NOT edited the emission factors.

Stationary Source Name: Generator

Stationary Category:	Emergency Generator
Stationary Type:	Diesel Fuel (EPA Methodology)

This stationary source is modeled as a point

Elevation:	139.90 meters	
Release Height:	1.00 meters	
Gas Velocity:	2.50 m/s	
Temperature:	257.00 °F	
CO EF :	3.0300grams/hp-hr	
TOC EF :	1.1400grams/hp-hr	
NOx EF :	14.0000grams/hp-hr	
SOx EF :	0.9300grams/hp-hr	
PM-10 EF :	0.9980grams/hp-hr	
CO Pollution Control Factor :	0.00 %	
TOC Pollution Control Factor :	0.00 %	
NOx Pollution Control Factor :	0.00 %	
SOx Pollution Control Factor :	0.00 %	
PM-10 Pollution Control Factor:	0.00 %	
Power Rating :	1340horsepower	
Point:	X (meters)	Y (meters)
1	30.00	428.00

Year: 2013

Hours	26
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the emission factors.

Training Fires

With Cap, Oshawa

Training Fire Name:
Training Fire

Fuel:	Propane
Release Height:	3.00 meters
Diameter:	5.00 meters
Gas Velocity	10.00 m/s
Temperature:	650.00 °F
X:	-162.00 meters
Y:	10.00 meters
Elevation:	139.90 meters

Year:
2013

Gallons of Fuel Used (gal/year):	150
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	Training Fire

The user has NOT edited the following emission factors:

CO (g/gallon):	15.78
HC (g/gallon):	14.42
NOX (g/gallon):	2.9
SOX (g/gallon):	0.009
PM-10 (g/gallon):	53.16

Gates

With Cap, Oshawa

Gate Name:
Gate

Elevation:	139.90 meters	
Release Height:	1.50 meters	
Initial Sigma-Z:	3.00 meters	
Initial Sigma-Y:	16.00 meters	
Point:	X (meters)	Y (meters)
1	-109.00	284.00

Taxiways

With Cap, Oshawa

Taxiway Name:
CX1

Width: 20.00 (meters)

Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
1	-278.00	213.00	139.90	17.26
2	-653.00	324.00	139.90	17.26
3	-682.00	197.00	139.90	

Taxiway Name:
CX2

Width: 20.00 (meters)

Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
1	-109.00	284.00	139.90	17.26
2	210.00	396.00	139.90	17.26
3	231.00	355.00	139.90	

Taxiway Name:
CX6

Width: 20.00 (meters)

	Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
	1	-384.00	241.00	139.90	17.26
	2	471.00	-75.00	139.90	17.26
	3	416.00	-204.00	139.90	

Taxiway Name: CX7

Width: 20.00 (meters)

Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
1	-303.00	249.00	139.90	17.26
2	-352.00	127.00	139.90	17.26
3	-163.00	-244.00	139.90	

Taxiway Name: O1

Width: 20.00 (meters)

Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
1	-109.00	284.00	139.90	17.26
2	-397.00	207.00	139.90	

Runways

With Cap, Oshawa

Runway Name: 5

Name:	X (meters)	Y (meters)	Elevation (meters)	Glide Slope (°)
5	-165.00	-244.00	139.90	3.00

Runway Name: 12

Name:	X (meters)	Y (meters)	Elevation (meters)	Glide Slope (°)
12	-682.00	247.00	139.90	3.00

Runway Name: 23

Name:	X (meters)	Y (meters)	Elevation (meters)	Glide Slope (°)
23	231.00	355.00	139.90	3.00

Runway Name: 30

Name:	X (meters)	Y (meters)	Elevation (meters)	Glide Slope (°)
30	438.00	-154.00	139.90	3.00

Taxipaths

With Cap, Oshawa

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Outbound	Gate	5		O1 CX7

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Inbound	Gate	5	CX2	CX2

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Outbound	Gate	12		O1 CX1

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Inbound	Gate	12	CX6	CX6 O1

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Outbound	Gate	23		CX2

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Inbound	Gate	23	CX7	CX7 O1

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Outbound	Gate	30		O1 CX6

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Inbound	Gate	30	CX1	CX1 O1

Configurations

With Cap, Oshawa

Configuration Name:
Other
Time Used:
0 %

	From	To
Wind Direction:	no bound (°)	no bound (°)
Wind Speed:	no bound (knots)	no bound (knots)
Hour of Day:	no bound (hh:mm)	no bound (hh:mm)
Ceiling:	no bound (feet)	no bound (feet)
Visibility:	no bound (statute miles)	no bound (statute miles)
Temperature:	no bound (°F)	no bound (°F)

Point:	Arrivals Per Hour	Departures per Hour
1	100	200
2	200	100

Aicraft Size:	Runway	Arrivals (%)	Departures (%)	Touch & Gos (%)
Small	12	21.4 %	21.4 %	21.5 %
Small	23	29.3 %	29.3 %	34.9 %
Small	30	45.8 %	45.8 %	41 %
Small	5	3.5 %	3.5 %	2.6 %
Large	12	0 %	0 %	0 %
Large	23	0 %	0 %	0 %
Large	30	100 %	100 %	100 %
Large	5	0 %	0 %	0 %
Heavy	12	0 %	0 %	0 %
Heavy	23	0 %	0 %	0 %
Heavy	30	100 %	100 %	100 %
Heavy	5	0 %	0 %	0 %

Configuration Name:
Wind <5 knots
Time Used:
0 %

	From	To
Wind Direction:	no bound (°)	no bound (°)
Wind Speed:	0 (knots)	5 (knots)

Hour of Day:	no bound (hh:mm)	no bound (hh:mm)
Ceiling:	no bound (feet)	no bound (feet)
Visibility:	no bound (statute miles)	no bound (statute miles)
Temperature:	no bound (°F)	no bound (°F)

Point:	Arrivals Per Hour	Departures per Hour
1	100	200
2	200	100

Aicraft Size:	Runway	Arrivals (%)	Departures (%)	Touch & Gos (%)
Small	12	23 %	23 %	21.5 %
Small	23	24.6 %	24.6 %	34.9 %
Small	30	50.8 %	50.8 %	41 %
Small	5	1.6 %	1.6 %	2.6 %
Large	12	0 %	0 %	0 %
Large	23	0 %	0 %	0 %
Large	30	100 %	100 %	100 %
Large	5	0 %	0 %	0 %
Heavy	12	0 %	0 %	0 %
Heavy	23	0 %	0 %	0 %
Heavy	30	100 %	100 %	100 %
Heavy	5	0 %	0 %	0 %

Buildings
With Cap, Oshawa

None.

Discrete Cartesian Receptors
With Cap, Oshawa

Discrete Catersian Receptor Name: Cartesian_Receptor

X:	1544.00 meters
Y:	97.00 meters
Height:	1.80 meters
Elevation:	139.90 meters

Discrete Polar Receptors
With Cap, Oshawa

None.

Cartesian Receptor Networks
With Cap, Oshawa

None.

Polar Receptor Networks
With Cap, Oshawa

None.

User-Created Aircraft
With Cap, Oshawa

None.

User-Created GSE
With Cap, Oshawa

None.

User-Created APU
With Cap, Oshawa

None.

Scenario-Airport: Without Cap, Oshawa

Weather

Without Cap, Oshawa

Mixing Height:	914.40 meters
Temperature:	7.77 °C
Daily High Temperature:	13.52 °C
Daily Low Temperature:	2.02 °C
Pressure:	101320.73 Pa
Sea Level Pressure:	101659.37 Pa
Relative Humidity:	69.84
Wind Speed:	12.32 kph
Wind Direction:	0.00 °
Ceiling:	30480.00 m
Visibility:	80.47 km

The user has used hourly meteorological data.

Base Elevation:	139.90 meters
Date Range:	Saturday, January 01, 2000 to Sunday, December 31, 2000
Source Data File Location:	Z:\1400980\MetData\TORONTO.TXT
Upper Air Data File Location:	Z:\1400980\MetData\BUFFALO.UA

Quarter-Hourly Operational Profiles

Without Cap, Oshawa

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000
12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000
3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000

4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Name: Itinerant

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	0.013000	6:00am to 6:14am	0.013000	12:00pm to 12:14 pm	0.838000	6:00pm to 6:14pm	0.610000
12:15am to 12:29 am	0.013000	6:15am to 6:29am	0.013000	12:15pm to 12:29 pm	0.838000	6:15pm to 6:29pm	0.610000
12:30am to 12:44 am	0.013000	6:30am to 6:44am	0.053000	12:30pm to 12:44 pm	0.838000	6:30pm to 6:44pm	0.610000
12:45am to 12:59 am	0.013000	6:45am to 6:59am	0.053000	12:45pm to 12:59 pm	0.838000	6:45pm to 6:59pm	0.610000
1:00am to 1:14am	0.013000	7:00am to 7:14am	0.200000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	0.542000
1:15am to 1:29am	0.013000	7:15am to 7:29am	0.200000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	0.542000
1:30am to 1:44am	0.013000	7:30am to 7:44am	0.200000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	0.542000
1:45am to 1:59am	0.013000	7:45am to 7:59am	0.200000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	0.542000
2:00am to 2:14am	0.013000	8:00am to 8:14am	0.486000	2:00pm to 2:14pm	0.954000	8:00pm to 8:14pm	0.442000
2:15am to 2:29am	0.013000	8:15am to 8:29am	0.486000	2:15pm to 2:29pm	0.954000	8:15pm to 8:29pm	0.442000
2:30am to 2:44am	0.013000	8:30am to 8:44am	0.486000	2:30pm to 2:44pm	0.954000	8:30pm to 8:44pm	0.442000
2:45am to 2:59am	0.013000	8:45am to 8:59am	0.486000	2:45pm to 2:59pm	0.954000	8:45pm to 8:59pm	0.442000
3:00am to 3:14am	0.013000	9:00am to 9:14am	0.727000	3:00pm to 3:14pm	0.884000	9:00pm to 9:14pm	0.275000
3:15am to 3:29am	0.013000	9:15am to 9:29am	0.727000	3:15pm to 3:29pm	0.884000	9:15pm to 9:29pm	0.275000
3:30am to 3:44am	0.013000	9:30am to 9:44am	0.727000	3:30pm to 3:44pm	0.884000	9:30pm to 9:44pm	0.275000
3:45am to 3:59am	0.013000	9:45am to 9:59am	0.727000	3:45pm to 3:59pm	0.884000	9:45pm to 9:59pm	0.275000
4:00am to 4:14am	0.013000	10:00am to 10:14am	0.964000	4:00pm to 4:14pm	0.797000	10:00pm to 10:14pm	0.086000
4:15am to 4:29am	0.013000	10:15am to 10:29am	0.964000	4:15pm to 4:29pm	0.797000	10:15pm to 10:29pm	0.086000
4:30am to 4:44am	0.013000	10:30am to 10:44am	0.964000	4:30pm to 4:44pm	0.797000	10:30pm to 10:44pm	0.013000
4:45am to 4:59am	0.013000	10:45am to 10:59am	0.964000	4:45pm to 4:59pm	0.797000	10:45pm to 10:59pm	0.013000
5:00am to 5:14am	0.013000	11:00am to 11:14am	0.967000	5:00pm to 5:14pm	0.679000	11:00pm to 11:14pm	0.013000
5:15am to 5:29am	0.013000	11:15am to 11:29am	0.967000	5:15pm to 5:29pm	0.679000	11:15pm to 11:29pm	0.013000
5:30am to 5:44am	0.013000	11:30am to 11:44am	0.967000	5:30pm to 5:44pm	0.679000	11:30pm to 11:44pm	0.013000

5:45am to 5:59am	0.013000	11:45am to 11:59am	0.967000	5:45pm to 5:59pm	0.679000	11:45pm to 11:59pm	0.013000

Name: Local

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	0.000000	6:00am to 6:14am	0.000000	12:00pm to 12:14 pm	0.601000	6:00pm to 6:14pm	0.636000
12:15am to 12:29 am	0.000000	6:15am to 6:29am	0.000000	12:15pm to 12:29 pm	0.601000	6:15pm to 6:29pm	0.636000
12:30am to 12:44 am	0.000000	6:30am to 6:44am	0.002000	12:30pm to 12:44 pm	0.601000	6:30pm to 6:44pm	0.636000
12:45am to 12:59 am	0.000000	6:45am to 6:59am	0.002000	12:45pm to 12:59 pm	0.601000	6:45pm to 6:59pm	0.636000
1:00am to 1:14am	0.000000	7:00am to 7:14am	0.086000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	0.459000
1:15am to 1:29am	0.000000	7:15am to 7:29am	0.086000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	0.459000
1:30am to 1:44am	0.000000	7:30am to 7:44am	0.086000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	0.459000
1:45am to 1:59am	0.000000	7:45am to 7:59am	0.086000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	0.459000
2:00am to 2:14am	0.000000	8:00am to 8:14am	0.537000	2:00pm to 2:14pm	0.782000	8:00pm to 8:14pm	0.473000
2:15am to 2:29am	0.000000	8:15am to 8:29am	0.537000	2:15pm to 2:29pm	0.782000	8:15pm to 8:29pm	0.473000
2:30am to 2:44am	0.000000	8:30am to 8:44am	0.537000	2:30pm to 2:44pm	0.782000	8:30pm to 8:44pm	0.473000
2:45am to 2:59am	0.000000	8:45am to 8:59am	0.537000	2:45pm to 2:59pm	0.782000	8:45pm to 8:59pm	0.473000
3:00am to 3:14am	0.000000	9:00am to 9:14am	0.654000	3:00pm to 3:14pm	0.822000	9:00pm to 9:14pm	0.376000
3:15am to 3:29am	0.000000	9:15am to 9:29am	0.654000	3:15pm to 3:29pm	0.822000	9:15pm to 9:29pm	0.376000
3:30am to 3:44am	0.000000	9:30am to 9:44am	0.654000	3:30pm to 3:44pm	0.822000	9:30pm to 9:44pm	0.376000
3:45am to 3:59am	0.000000	9:45am to 9:59am	0.654000	3:45pm to 3:59pm	0.822000	9:45pm to 9:59pm	0.376000
4:00am to 4:14am	0.000000	10:00am to 10:14am	0.748000	4:00pm to 4:14pm	0.728000	10:00pm to 10:14pm	0.088000
4:15am to 4:29am	0.000000	10:15am to 10:29am	0.748000	4:15pm to 4:29pm	0.728000	10:15pm to 10:29pm	0.088000
4:30am to 4:44am	0.000000	10:30am to 10:44am	0.748000	4:30pm to 4:44pm	0.728000	10:30pm to 10:44pm	0.000000
4:45am to 4:59am	0.000000	10:45am to 10:59am	0.748000	4:45pm to 4:59pm	0.728000	10:45pm to 10:59pm	0.000000
5:00am to 5:14am	0.000000	11:00am to 11:14am	0.788000	5:00pm to 5:14pm	0.507000	11:00pm to 11:14pm	0.000000
5:15am to 5:29am	0.000000	11:15am to 11:29am	0.788000	5:15pm to 5:29pm	0.507000	11:15pm to 11:29pm	0.000000
5:30am to 5:44am	0.000000	11:30am to 11:44am	0.788000	5:30pm to 5:44pm	0.507000	11:30pm to 11:44pm	0.000000
5:45am to 5:59am	0.000000	11:45am to 11:59am	0.788000	5:45pm to 5:59pm	0.507000	11:45pm to 11:59pm	0.000000

Daily Operational Profiles

Without Cap, Oshawa

Name: DEFAULT

Day	Weight	Day	Weight
Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000

Thursday	1.000000

Name: Itinerant

Day	Weight	Day	Weight
Monday	0.770000	Friday	1.000000
Tuesday	0.930000	Saturday	0.820000
Wednesday	0.890000	Sunday	0.790000
Thursday	0.900000		

Name: Local

Day	Weight	Day	Weight
Monday	0.900000	Friday	0.980000
Tuesday	1.000000	Saturday	0.760000
Wednesday	0.940000	Sunday	0.420000
Thursday	1.000000		

Monthly Operational Profiles

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	1.000000

Name: Itinerant

Month	Weight	Month	Weight
January	0.280000	July	1.000000
February	0.350000	August	0.740000
March	0.430000	September	0.610000
April	0.530000	October	0.440000
May	0.630000	November	0.480000
June	0.680000	December	0.270000

Name: Local

Month	Weight	Month	Weight
January	0.390000	July	1.000000
February	0.460000	August	0.610000
March	0.540000	September	0.630000
April	0.540000	October	0.450000
May	0.750000	November	0.620000
June	0.650000	December	0.320000

Name: Facility Heating

Month	Weight	Month	Weight
January	1.000000	July	0.000000
February	1.000000	August	0.000000
March	1.000000	September	0.500000
April	1.000000	October	1.000000
May	0.500000	November	1.000000

June	0.000000	December	1.000000

Name: Training Fire

Month	Weight	Month	Weight
January	0.000000	July	1.000000
February	0.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	0.000000

Aircraft

Without Cap, Oshawa

Default Taxi Out Time: 19.000000 min

Default Taxi In Time: 7.000000 min

Year:	Uses Schedule?	Schedule Filename:
2013	No	(None)

Aircraft Name:
Cessna 150 Series
Engine Type:
O-200
Identification:
Itinerant
Category:
SGPP

Take Off weight:	998.00 Kgs
Approach Weight:	898.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	10869
Annual Arrivals:	10869
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT

Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Cessna 150 Series
Engine Type:
O-200
Identification:
Local
Category:
SGPP

Take Off weight:	998.00 Kgs
Approach Weight:	898.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	44140
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	Local
Touch & Go Daily Operational Profile:	Local
Touch & Go Monthly Operational Profile:	Local

Aircraft Name:
Cessna 172 Skyhawk
Engine Type:
TSIO-360C
Identification:
Itinerant
Category:
SGPP

Take Off weight:	1111.00 Kgs
Approach Weight:	1111.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes	Diesel	0.00	10.00	175.00	25.00	

	Transportation Services, DART 3000 to 6000 gallon)						

Year: 2013

Annual Departures:	5435
Annual Arrivals:	5435
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name: Cessna 172 Skyhawk
Engine Type: TSIO-360C
Identification: Local
Category: SGPP

Take Off weight:	1111.00 Kgs
Approach Weight:	1111.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year: 2013

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	22070
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT

Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	Local
Touch & Go Daily Operational Profile:	Local
Touch & Go Monthly Operational Profile:	Local

Aircraft Name:
Cessna 182
Engine Type:
IO-360-B
Identification:
Itinerant
Category:
SGPP

Take Off weight:	1270.00 Kgs
Approach Weight:	1270.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	16303
Annual Arrivals:	16303
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Cessna 421 Golden Eagle
Engine Type:
TIO-540-J2B2
Identification:
Itinerant
Category:
SGPB

Take Off weight:	2495.00 Kgs
Approach Weight:	2495.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min

Gate Assignment: Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	2279
Annual Arrivals:	2279
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model
Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Dassault Falcon 20-F
Engine Type:
TFE731-3
Identification:
Itinerant
Category:
SGJB

Take Off weight:	13000.00 Kgs
Approach Weight:	11140.00 Kgs
Glide Slope:	3.00°
APU Assignment:	APU GTCP 36-150[]
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Aircraft Tractor (Stewart & Stevenson TUG MC)	Diesel	0.00	5.00	86.00	80.00	
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	20.00	175.00	25.00	
Ground Power Unit (TLD, 28 VDC)	Diesel	0.00	40.00	71.00	75.00	

Year:
2013

Annual Departures:	483
Annual Arrivals:	483
Annual TGOs:	0

Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model
Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Piper PA-23 Apache/Aztec
Engine Type:
TIO-540-J2B2
Identification:
Itinerant
Category:
SGPB

Take Off weight:	2495.00 Kgs
Approach Weight:	2495.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	680
Annual Arrivals:	680
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model
Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT

Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Piper PA-23 Apache/Aztec
Engine Type:
TIO-540-J2B2
Identification:
Local
Category:
SGPB

Take Off weight:	2495.00 Kgs
Approach Weight:	2495.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
2013

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	3679
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	Local
Touch & Go Daily Operational Profile:	Local
Touch & Go Monthly Operational Profile:	Local

Aircraft Name:
Piper PA-28 Cherokee Series
Engine Type:
IO-360-B
Identification:
Itinerant
Category:
SGPP

Take Off weight:	998.00 Kgs
Approach Weight:	898.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes	Diesel	0.00	10.00	175.00	25.00	

	Transportation Services, DART 3000 to 6000 gallon)						

Year: 2013

Annual Departures:	680
Annual Arrivals:	680
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name: Piper PA-28 Cherokee Series
Engine Type: IO-360-B
Identification: Local
Category: SGPP

Take Off weight:	998.00 Kgs
Approach Weight:	898.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year: 2013

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	3679
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT

Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	Local
Touch & Go Daily Operational Profile:	Local
Touch & Go Monthly Operational Profile:	Local

Aircraft Name:
Raytheon Super King Air 200
Engine Type:
PT6A-42
Identification:
Itinerant
Category:
SCTP

Take Off weight:	5670.00 Kgs
Approach Weight:	5021.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	Gate

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Baggage Tractor (Stewart & Stevenson TUG MA 50)	Gasoline	17.00	18.00	107.00	55.00	
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	
Ground Power Unit (TLD, 28 VDC)	Diesel	0.00	40.00	71.00	75.00	

Year:
2013

Annual Departures:	1931
Annual Arrivals:	1931
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	Itinerant
Departure Daily Operational Profile:	Itinerant
Departure Monthly Operational Profile:	Itinerant
Arrival Quarter-Hourly Operational profile:	Itinerant
Arrival Daily Operational Profile:	Itinerant
Arrival Monthly Operational Profile:	Itinerant
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Type:	Fuel:	Ref. Model:	Identification:
Aircraft Tractor	Gasoline		NG Tug

Rated Power:	12.00 hp
Load Factor:	80.00%

The user has selected to use the default age distribution, and has not chosen a specific age.

Analysis Year:	2013
Year of Manufacture:	N/A
Age:	N/A

Gate:	Percent
Gate	100

Year:
2013

Population:	1 units
Yealry Operating Time:	40.00 hours
Quarter-Hourly Operational profile:	Local
Daily Operational profile:	Local
Monthly Operational Profile:	Local

Type:	Fuel:	Ref. Model:	Identification:
Fuel Truck	Diesel	F750, Dukes Transportation Services, DART 3000 to 6000 gallon	Fuel Trucks

Rated Power:	175.00 hp
Load Factor:	25.00%

The user has selected to use the default age distribution, and has not chosen a specific age.

Analysis Year:	2013
Year of Manufacture:	N/A
Age:	N/A

Gate:	Percent
Gate	100

Year:
2013

Population:	2 units
Yealry Operating Time:	1213.00 hours
Quarter-Hourly Operational profile:	Local
Daily Operational profile:	Local
Monthly Operational Profile:	Local

Parking Facilities

Without Cap, Oshawa

Parking Facility Name:
Airport Parking

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	-1 mph
Average Distance Traveled:	217.00 meters

Average Idle Time:	1.50 mins

Number of Levels:	1	
Release Height:	1.50 meters	
Level Spacing	3.00 meters	
Elevation:	139.90 meters	
Point:	X (meters)	Y (meters)
1	-131.00	495.00
2	-111.00	442.00
3	-145.00	426.00
4	-166.00	483.00

Year:
2013

Number of Vehicles per Year:	28956
Quarter-Hourly Operational profile:	Itinerant
Daily Operational profile:	Itinerant
Monthly Operational Profile:	Itinerant

The user has NOT edited the following emission factors:

CO (g/veh):	3.1258
THC (g/veh):	-1
NMHC (g/veh):	0.2773
VOC (g/veh):	0.2804
NOX (g/veh):	0.2219
SOX (g/veh):	0.0017
PM-10 (g/veh):	0.007
PM-25 (g/veh):	0.004
TOG (g/veh):	
BENZENE (g/veh):	0.007277
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.000989
FORMALDEHYDE (g/veh):	0.002655
ACETALDEHYDE (g/veh):	0.001903
ACROLEIN (g/veh):	0.000117

Parking Facility Name:
Gymnastics Parking 1

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	10 mph
Average Distance Traveled:	184.00 meters
Average Idle Time:	1.50 mins

Number of Levels:	1	
Release Height:	1.50 meters	
Level Spacing	3.00 meters	
Elevation:	139.90 meters	
Point:	X (meters)	Y (meters)
1	239.00	-406.00
2	289.00	-423.00
3	296.00	-408.00
4	259.00	-395.00

5	275.00	-357.00
6	262.00	-353.00

Year: 2013

Number of Vehicles per Year:	7847
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	3.2533
THC (g/veh):	-1
NMHC (g/veh):	0.3035
VOC (g/veh):	0.307
NOX (g/veh):	0.2375
SOX (g/veh):	0.0016
PM-10 (g/veh):	0.0063
PM-25 (g/veh):	0.0036
TOG (g/veh):	
BENZENE (g/veh):	0.008162
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.001115
FORMALDEHYDE (g/veh):	0.003127
ACETALDEHYDE (g/veh):	0.002188
ACROLEIN (g/veh):	0.000138

Parking Facility Name: Gymnastics Parking 2

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	10 mph
Average Distance Traveled:	236.00 meters
Average Idle Time:	1.50 mins

Number of Levels:	1	
Release Height:	1.50 meters	
Level Spacing	3.00 meters	
Elevation:	139.90 meters	
Point:	X (meters)	Y (meters)
1	210.00	-403.00
2	221.00	-382.00
3	176.00	-365.00
4	167.00	-390.00

Year: 2013

Number of Vehicles per Year:	7848
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	3.6896
THC (g/veh):	-1
NMHC (g/veh):	0.3324
VOC (g/veh):	0.3364
NOX (g/veh):	0.2763
SOX (g/veh):	0.0018
PM-10 (g/veh):	0.0074
PM-25 (g/veh):	0.0042
TOG (g/veh):	
BENZENE (g/veh):	0.009238
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.001263
FORMALDEHYDE (g/veh):	0.003564
ACETALDEHYDE (g/veh):	0.002486
ACROLEIN (g/veh):	0.000158

Parking Facility Name:
School Parking

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	10 mph
Average Distance Traveled:	279.00 meters
Average Idle Time:	1.50 mins

Number of Levels:	1	
Release Height:	1.50 meters	
Level Spacing	3.00 meters	
Elevation:	139.90 meters	
Point:	X (meters)	Y (meters)
1	-222.00	340.00
2	-228.00	364.00
3	-214.00	367.00
4	-218.00	384.00
5	-283.00	367.00
6	-280.00	356.00
7	-248.00	364.00
8	-240.00	338.00

Year:
2013

Number of Vehicles per Year:	7248
Quarter-Hourly Operational profile:	Local
Daily Operational profile:	Local
Monthly Operational Profile:	Local

The user has NOT edited the following emission factors:

CO (g/veh):	4.0504
THC (g/veh):	-1
NMHC (g/veh):	0.3563
VOC (g/veh):	0.3608
NOX (g/veh):	0.3084

SOX (g/veh):	0.0021
PM-10 (g/veh):	0.0084
PM-25 (g/veh):	0.0047
TOG (g/veh):	
BENZENE (g/veh):	0.010129
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.001386
FORMALDEHYDE (g/veh):	0.003926
ACETALDEHYDE (g/veh):	0.002731
ACROLEIN (g/veh):	0.000173

Parking Facility Name:
Tower Parking

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed	10 mph
Average Distance Traveled:	56.00 meters
Average Idle Time:	1.50 mins

Number of Levels:	1	
Release Height:	1.50 meters	
Level Spacing	3.00 meters	
Elevation:	139.90 meters	
Point:	X (meters)	Y (meters)
1	52.00	-344.00
2	66.00	-298.00
3	29.00	-286.00
4	15.00	-334.00

Year:
2013

Number of Vehicles per Year:	1095
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	2.1792
THC (g/veh):	-1
NMHC (g/veh):	0.2323
VOC (g/veh):	0.2347
NOX (g/veh):	0.142
SOX (g/veh):	0.0009
PM-10 (g/veh):	0.0035
PM-25 (g/veh):	0.002
TOG (g/veh):	
BENZENE (g/veh):	0.005512
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.000751
FORMALDEHYDE (g/veh):	0.002051
ACETALDEHYDE (g/veh):	0.001456

ACROLEIN (g/veh): 9.1e-005

Roadways

Without Cap, Oshawa

Roadway Name: Airport Blvd

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed:	20 mph
Roadway Length:	0.29 miles
Release Height:	

Width:	20.00 meters		
Point:	X (meters)	Y (meters)	Elevation (meters)
1	-264.00	704.00	139.9
2	-187.00	496.00	139.9
3	-198.00	414.00	139.9
4	-168.00	400.00	139.9
5	-61.00	460.00	139.9

Year: 2013

Traffic Volume:	36204
Quarter-Hourly Operational profile:	Itinerant
Daily Operational profile:	Itinerant
Monthly Operational Profile:	Itinerant

The user has NOT edited the following emission factors:

CO (g/veh):	11.092
THC (g/veh):	-1
NMHC (g/veh):	0.636
VOC (g/veh):	0.646
NOX (g/veh):	0.969
SOX (g/veh):	0.0088
PM-10 (g/veh):	0.0356
PM-25 (g/veh):	0.0201
TOG (g/veh):	
BENZENE (g/veh):	0.024139
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.003311
FORMALDEHYDE (g/veh):	0.009384
ACETALDEHYDE (g/veh):	0.006514
ACROLEIN (g/veh):	0.00041

Roadway Name: Keith Ross Dr

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed:	20 mph
Roadway Length:	0.27 miles
Release Height:	

Width:	20.00 meters		
Point:	X (meters)	Y (meters)	Elevation (meters)
1	-550.00	598.00	139.9

2	-503.00	473.00	139.9
3	-214.00	572.00	139.9

Year:
2013

Traffic Volume:	36203
Quarter-Hourly Operational profile:	Itinerant
Daily Operational profile:	Itinerant
Monthly Operational Profile:	Itinerant

The user has NOT edited the following emission factors:

CO (g/veh):	11.092
THC (g/veh):	-1
NMHC (g/veh):	0.636
VOC (g/veh):	0.646
NOX (g/veh):	0.969
SOX (g/veh):	0.0088
PM-10 (g/veh):	0.0356
PM-25 (g/veh):	0.0201
TOG (g/veh):	
BENZENE (g/veh):	0.024139
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.003311
FORMALDEHYDE (g/veh):	0.009384
ACETALDEHYDE (g/veh):	0.006514
ACROLEIN (g/veh):	0.00041

Roadway Name:
Oshawa Airport Rd A

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed:	20 mph
Roadway Length:	0.16 miles
Release Height:	

Width:	20.00 meters		
Point:	X (meters)	Y (meters)	Elevation (meters)
1	159.00	-592.00	139.9
2	192.00	-502.00	139.9
3	249.00	-353.00	139.9

Year:
2013

Traffic Volume:	31390
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	11.092
THC (g/veh):	-1
NMHC (g/veh):	0.636
VOC (g/veh):	0.646
NOX (g/veh):	0.969

SOX (g/veh):	0.0088
PM-10 (g/veh):	0.0356
PM-25 (g/veh):	0.0201
TOG (g/veh):	
BENZENE (g/veh):	0.024139
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.003311
FORMALDEHYDE (g/veh):	0.009384
ACETALDEHYDE (g/veh):	0.006514
ACROLEIN (g/veh):	0.00041

Roadway Name:
Oshawa Airport Rd B

Vehicle Type:	Default Fleet Mix (all types, fuels & ages)
Fuel:	Gasoline
Manufactured Year:	2013
Average Speed:	20 mph
Roadway Length:	0.23 miles
Release Height:	

Width:	20.00 meters		
Point:	X (meters)	Y (meters)	Elevation (meters)
1	159.00	-592.00	139.9
2	-13.00	-524.00	139.9
3	35.00	-340.00	139.9

Year:
2013

Traffic Volume:	2190
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the following emission factors:

CO (g/veh):	11.092
THC (g/veh):	-1
NMHC (g/veh):	0.636
VOC (g/veh):	0.646
NOX (g/veh):	0.969
SOX (g/veh):	0.0088
PM-10 (g/veh):	0.0356
PM-25 (g/veh):	0.0201
TOG (g/veh):	
BENZENE (g/veh):	0.024139
MTBE (g/veh):	0
1,3-BUTA (g/veh):	0.003311
FORMALDEHYDE (g/veh):	0.009384
ACETALDEHYDE (g/veh):	0.006514
ACROLEIN (g/veh):	0.00041

Stationary Sources

Without Cap, Oshawa

Stationary Source Name:
Facility Heating

Stationary Category:	Boiler/Space Heater
Stationary Type:	Natural Gas: Wall Fired Boiler, <100 Million BTU/hr, Uncontrolled

This stationary source is modeled as a point		
Elevation:	139.90 meters	
Release Height:	7.00 meters	
Gas Velocity:	2.50 m/s	
Temperature:	257.00 °F	
CO EI :	1.3000Kg/1000 m^3	
THC EI :	0.1800Kg/1000 m^3	
NOx EI :	1.6000Kg/1000 m^3	
SO2 EI :	0.0100Kg/1000 m^3	
PM-10 EI :	0.1200Kg/1000 m^3	
CO Pollution Control Factor :	0.00 %	
TOC Pollution Control Factor :	0.00 %	
NOx Pollution Control Factor :	0.00 %	
SO2 Pollution Control Factor :	0.00 %	
PM-10 Pollution Control Factor:	0.00 %	
Point:	X (meters)	Y (meters)
1	-145.00	382.00

Year:
2013

1,000s of m³ Used	38.5
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	Facility Heating

The user has NOT edited the emission factors.

Stationary Source Name:
Generator

Stationary Category:	Emergency Generator
Stationary Type:	Diesel Fuel (EPA Methodology)

This stationary source is modeled as a point	
Elevation:	139.90 meters
Release Height:	1.00 meters
Gas Velocity:	2.50 m/s
Temperature:	257.00 °F
CO EF :	3.0300grams/hp-hr
TOC EF :	1.1400grams/hp-hr
NOx EF :	14.0000grams/hp-hr
SOx EF :	0.9300grams/hp-hr
PM-10 EF :	0.9980grams/hp-hr
CO Pollution Control Factor :	0.00 %
TOC Pollution Control Factor :	0.00 %
NOx Pollution Control Factor :	0.00 %
SOx Pollution Control Factor :	0.00 %
PM-10 Pollution Control Factor:	0.00 %
Power Rating :	1340horsepower

Point:	X (meters)	Y (meters)
1	30.00	428.00

Year:
2013

Hours	26
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	DEFAULT

The user has NOT edited the emission factors.

Training Fires

Without Cap, Oshawa

Training Fire Name:
Training Fire

Fuel:	Propane
Release Height:	3.00 meters
Diameter:	5.00 meters
Gas Velocity	10.00 m/s
Temperature:	650.00 °F
X:	-162.00 meters
Y:	10.00 meters
Elevation:	139.90 meters

Year:
2013

Gallons of Fuel Used (gal/year):	150
Quarter-Hourly Operational profile:	DEFAULT
Daily Operational profile:	DEFAULT
Monthly Operational Profile:	Training Fire

The user has NOT edited the following emission factors:

CO (g/gallon):	15.78
HC (g/gallon):	14.42
NOX (g/gallon):	2.9
SOX (g/gallon):	0.009
PM-10 (g/gallon):	53.16

Gates

Without Cap, Oshawa

Gate Name:
Gate

Elevation:	139.90 meters	
Release Height:	1.50 meters	
Initial Sigma-Z:	3.00 meters	
Initial Sigma-Y:	16.00 meters	
Point:	X (meters)	Y (meters)
1	-109.00	284.00

Taxiways

Without Cap, Oshawa

Taxiway Name:
CX1

Width:	20.00 (meters)			
Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
1	-278.00	213.00	139.90	17.26

	2	-653.00	324.00	139.90	17.26
	3	-682.00	197.00	139.90	

Taxiway Name: CX2	Width:	20.00 (meters)			
	Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
	1	-109.00	284.00	139.90	17.26
	2	210.00	396.00	139.90	17.26
	3	231.00	355.00	139.90	

Taxiway Name: CX6	Width:	20.00 (meters)			
	Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
	1	-384.00	241.00	139.90	17.26
	2	471.00	-75.00	139.90	17.26
	3	416.00	-204.00	139.90	

Taxiway Name: CX7	Width:	20.00 (meters)			
	Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
	1	-303.00	249.00	139.90	17.26
	2	-352.00	127.00	139.90	17.26
	3	-163.00	-244.00	139.90	

Taxiway Name: O1	Width:	20.00 (meters)			
	Point:	X (meters)	Y (meters)	Elevation (meters)	Speed (mph)
	1	-109.00	284.00	139.90	17.26
	2	-397.00	207.00	139.90	

Runways

Without Cap, Oshawa

Runway Name: 5	Name:	X (meters)	Y (meters)	Elevation (meters)	Glide Slope (°)
	5	-165.00	-244.00	139.90	3.00

Runway Name: 12	Name:	X (meters)	Y (meters)	Elevation (meters)	Glide Slope (°)
	12	-682.00	247.00	139.90	3.00

Runway Name: 23	Name:	X (meters)	Y (meters)	Elevation (meters)	Glide Slope (°)
	23	231.00	355.00	139.90	3.00

Runway Name: 30	Name:	X (meters)	Y (meters)	Elevation (meters)	Glide Slope (°)
	30	438.00	-154.00	139.90	3.00

Taxipaths

Without Cap, Oshawa

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Outbound	Gate	5		O1 CX7

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Inbound	Gate	5	CX2	CX2

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Outbound	Gate	12		O1 CX1

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Inbound	Gate	12	CX6	CX6 O1

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Outbound	Gate	23		CX2

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Inbound	Gate	23	CX7	CX7 O1

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Outbound	Gate	30		O1 CX6

Direction:	Gate:	Runway:	Runway Exit:	Taxiways:
Inbound	Gate	30	CX1	CX1 O1

Configurations

Without Cap, Oshawa

Configuration Name:
Other
Time Used:
0 %

	From	To
Wind Direction:	no bound (°)	no bound (°)
Wind Speed:	no bound (knots)	no bound (knots)
Hour of Day:	no bound (hh:mm)	no bound (hh:mm)
Ceiling:	no bound (feet)	no bound (feet)
Visibility:	no bound (statute miles)	no bound (statute miles)
Temperature:	no bound (°F)	no bound (°F)

Point:	Arrivals Per Hour	Departures per Hour
1	100	200
2	200	100

Aicraft Size:	Runway	Arrivals (%)	Departures (%)	Touch & Gos (%)
Small	12	21.4 %	21.4 %	21.5 %
Small	23	29.3 %	29.3 %	34.9 %
Small	30	45.8 %	45.8 %	41 %
Small	5	3.5 %	3.5 %	2.6 %

Large	12	0 %	0 %	0 %
Large	23	0 %	0 %	0 %
Large	30	100 %	100 %	100 %
Large	5	0 %	0 %	0 %
Heavy	12	0 %	0 %	0 %
Heavy	23	0 %	0 %	0 %
Heavy	30	100 %	100 %	100 %
Heavy	5	0 %	0 %	0 %

Configuration Name:
Wind <5 knots
Time Used:
0 %

	From	To
Wind Direction:	no bound (°)	no bound (°)
Wind Speed:	0 (knots)	5 (knots)
Hour of Day:	no bound (hh:mm)	no bound (hh:mm)
Ceiling:	no bound (feet)	no bound (feet)
Visibility:	no bound (statute miles)	no bound (statute miles)
Temperature:	no bound (°F)	no bound (°F)

Point:	Arrivals Per Hour	Departures per Hour
1	100	200
2	200	100

Aicraft Size:	Runway	Arrivals (%)	Departures (%)	Touch & Gos (%)
Small	12	23 %	23 %	21.5 %
Small	23	24.6 %	24.6 %	34.9 %
Small	30	50.8 %	50.8 %	41 %
Small	5	1.6 %	1.6 %	2.6 %
Large	12	0 %	0 %	0 %
Large	23	0 %	0 %	0 %
Large	30	100 %	100 %	100 %
Large	5	0 %	0 %	0 %
Heavy	12	0 %	0 %	0 %
Heavy	23	0 %	0 %	0 %
Heavy	30	100 %	100 %	100 %
Heavy	5	0 %	0 %	0 %

Buildings
Without Cap, Oshawa

None.

Discrete Cartesian Receptors
Without Cap, Oshawa

Discrete Catersian Receptor Name:
Cartesian_Receptor

X:	1544.00 meters
Y:	97.00 meters
Height:	1.80 meters
Elevation:	139.90 meters

Discrete Polar Receptors
Without Cap, Oshawa

None.

Cartesian Receptor Networks
Without Cap, Oshawa

None.

Polar Receptor Networks
Without Cap, Oshawa

None.

User-Created Aircraft
Without Cap, Oshawa

None.

User-Created GSE — Without Cap, Oshawa
None.

User-Created APU — Without Cap, Oshawa
None.

DI B

RWDI
CONSULTING ENGINEERS & SCIENTISTS

COMPARISON OF AIRCRAFT MOVEMENTS FROM LEAD STUDY

Airport	Annual Movements
Oshawa Airport	102,000
Auburn Municipal Airport, WA	164,250
Brookhaven Airport, NY	135,100
Centennial Airport, CO	283,186
Deer Valley Airport, AZ	317,443
Gillespie Field, CA	209,345
Harvey Field, WA	140,700
McClellan-Palomar Airport, CA	141,462
Merrill Field, AK	191,550
Nantucket Memorial Airport, MA	163,810
Oakland County International Airport, MI	119,347
Palo Alto Airport, CA	191,625
Pryor Field Regional Airport, AL	167,701
Reid-Hillview Airport, CA	Not available
Republic Airport, NY	188,642
San Carlos Airport, CA	155,273
Stinson Municipal, TX	157,044
Van Nuys Airport, CA	520,000 (estimated from LTOs)